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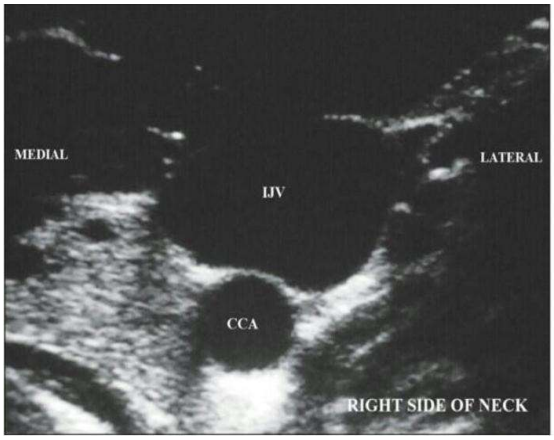
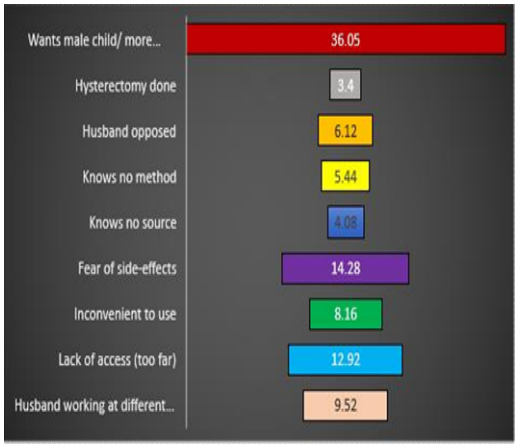


Anterior position of internal jugular vein to carotid artery



Reason for not using contraception (n=147)

MRI breast showing thin septations in subpectoral lipoma

Meckel's diverticulum with Mesodiverticular band causing constriction of ileum

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EDITORIAL

Training of a General Surgeon: A Re-look into Skill Enhancement Training in Broad Specialties

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The burden of diseases, particularly surgery, is disproportionately heavy in the sub-urban areas of India. The Lancet Commission on Global Surgery reported that 28–32% of the global burden of disease can be attributed to surgically treatable conditions, and 5 billion people lack timely access to safe surgical care. Increasingly, surgery is being championed as "an indivisible and indispensable part of health care." The majority of social resources are concentrated in urban centers, but rural areas have few resources and fewer trained providers.

The Ministry of Health and Family Welfare (MoHFW) has emphasized the importance of the surgical system in universal health care. Public-funded hospitals typically have limited resources and focus on the most prevalent diseases. MoHFW envisages a more cohesive approach to sustainably expanding surgical services to areas of need and sets targets for improving access, workforce density, surgical volume, safety, and affordability nationwide by 2030.

Specialists in India are still far and few

- Skill enhancement courses are, therefore, one way to augment training to cater to daunting national needs.
- The importance of robust rotation in specialties is similar, albeit on a modest scale, but it plays a crucial role.
- The training areas used to be part of general surgery in the past, but now several of these have come to occupy prominent scale as super- or sub-specialties.
- A dynamic mechanism for self-growth and a broad-based training environment is necessary for constant sustenance.

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Specialized surgeries in shortage areas

- A general surgeon is constantly required to provide specialized surgeries in shortage areas, which are vast in our country and in all developing countries.
- A general surgeon is expected to provide quality care in mid-segment hospitals in the private sector and district hospitals.
- A general surgeon is responsible for dealing with multiple organ systems in the human body.
- Since, many of these systems have already become Super Specialties (SS), it has raised the bar in the clinical management arena.
- Therefore, the general surgeon is expected to provide the same level of as the ever-growing set of standard operating procedures (SOPs) in SS.
- Therefore, general surgery training departments need to improve their standards by incorporating provisions into professional bodies' regulations. Both concurrent trainees and post-MS, fresh PG should have provisions for such exposure.

Reinforcing the current provisions and introducing new ones, as follows

- **Provision A:** Recruiting faculty with advanced training in these specialties
- **Provision B:** For the concurrent resident-in training, rotation is all that is possible within the 3-year program. However, it requires departments where such rotation could be enabled. Not all general surgery programs possess access to these SS departments. Therefore, training modules need to be developed that impart the desired curriculum, such as Neurosurgery, GI, Thoracic, Urology, Pediatric Surgery, etc., as well as exposure to hands-on MIS.
- **Provision C:** For the post-MS and fresh PGs who opt out of SS, skill enhancement courses, preferably in the form of Fellowships by the NBEMS, should be encouraged. An additional advantage of Fellowships is *capacity building*, as it maintains their continued eligibility for employment in government-run training departments and NBEMS-accredited centers. According to the current NMC regulations, SS degree holders are not allowed to apply to general surgery departments after completing their degrees because they must join SS departments.

Rejigging super-specialty training

- Reorganizing skill enhancement training into broad specialties can help improve the overall capability of healthcare providers, particularly in primary healthcare-led systems. Here are a few methods to achieve this:

Joint Accreditation

- Training today should have robust rotation through Joint Accreditation, a scheme already launched by the National Board of Examinations in Medical Sciences (NBEMS). This would provide broad exposure to the residents-in-training.
- Therefore, future teachers and departments are able to cover the ground, obtain cutting-edge training through ongoing rotations, and continue to nourish the departments following this trajectory.

A. CURRICULUM RESTRUCTURING

1. Integrated Training Modules
   a) Develop training modules that integrate super-specialty skills into the existing broad specialty curriculum.
   b) Focus on essential skills that can enhance the management of

complex cases within broad specialties.

2. Competency-Based Education:
   a) Shift towards a competency-based training model that emphasizes practical skills and hands-on experience.
   b) Define clear competencies and milestones that trainees must achieve in their broad specialty with added super-specialty skills.

B. RESOURCE PROVISIONS

Flexible Training Programs

1. Modular Training:
   a) Introduce modular training programs that allow trainees to acquire specific super-specialty skills over shorter, intensive periods.
   b) Offer these modules as part of the broad specialty training, enabling trainees to gain additional expertise without committing to full super-specialty programs.
2. Part-Time and Distance Learning:
   a) Provide part-time or distance learning options for skill enhancement training, making it accessible to more healthcare providers.
   b) Use online platforms and virtual simulations to deliver training in advanced skills.

3. Hands-On Workshops and Simulation Training

A. Workshops:
   a) Organize regular hands-on workshops focusing on critical super-specialty skills relevant to broad specialties.
   b) Encourage participation from primary and secondary care providers to broaden their skill sets.

B. Simulation Centers:
   a) Establish simulation centers equipped with advanced technology to provide realistic training scenarios.
   b) Use simulation training to allow practitioners to practice and refine their skills in a controlled environment.

C. Mentorship and On-the-Job Training

A. Mentorship Programs:
   a) Pair trainees with experienced mentors from both broad and super-specialties to guide their skill enhancement.
   b) Encourage mentors to provide continuous feedback and support throughout the training process.

D. On-the-Job Training:
   a) Implement on-the-job training programs where trainees work alongside specialists in real clinical settings.
   b) Allow trainees to apply new skills directly to patient care under the supervision of experienced specialists.

Collaborative Practice Models

A. Multidisciplinary Teams:
   a) Foster the development of multidisciplinary teams where broad specialty providers and super-specialists work together.
   b) Encourage knowledge sharing and collaborative care, allowing broad specialty providers to learn from superspecialists in real-time.

B. Case Discussions and Grand Rounds:

a) Hold regular case discussions and grand rounds that include both broad specialty providers and superspecialists.
b) Use these sessions to discuss complex cases, share insights, and learn advanced management techniques.

A. Continuing Medical Education (CME)

Focused CME Programs:

a) Develop CME programs specifically aimed at enhancing skills in broad specialties with relevant super-specialty knowledge.
b) Ensure these programs are easily accessible and provide certification or accreditation upon completion.

B. Online CME Resources

a) Create an online repository of CME resources, including lectures, webinars, and training videos, focusing on skill enhancement.
b) Provide healthcare providers with access to these resources in both urban and rural settings.

C. INCENTIVES AND RECOGNITION

Financial Incentives

a) Offer financial incentives, such as scholarships or stipends, for healthcare providers who pursue skill enhancement training.
b) Provide funding for attending workshops, conferences, and advanced training courses.

Professional Recognition

a) Recognize and reward healthcare providers who successfully complete skill enhancement training.
b) Introduce certifications that indicate additional expertise in specific areas, which can be displayed on professional profiles.

Policy and Institutional Support

Institutional Policies

a) Encourage healthcare institutions to support and facilitate skill enhancement training for their staff.
b) Develop policies that allow for protected time and resources for training without compromising patient care.

Government Initiatives

a) Advocate for government policies that promote and fund skill enhancement training within broad specialties.
b) Ensure that national health programs recognize and integrate the importance of skill enhancement in improving healthcare delivery.

Monitoring and Evaluation

Regular Assessments

a) Conduct regular assessments to evaluate the effectiveness of skill enhancement training programs. b) Use feedback from trainees and mentors to continuously improve training modules and methodologies.

Outcome Measurement

a) Measure the impact of skill enhancement training on patient outcomes and healthcare delivery.
b) Use these metrics to demonstrate the value of integrating super-specialty skills into broad specialties and to secure ongoing support and funding.

By implementing these strategies, super-specialty training can be effectively transformed into skill enhancement training within broad specialties, *ultimately improving the quality and accessibility of healthcare services across primary healthcare-led systems*.

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ORIGINAL ARTICLE

Comparison of Ultrasound Versus Non Ultrasound based Techniques for Internal Jugular Venous Cannulation in Cardiac Surgical Patients: A Prospective Randomised Controlled Trial

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Abstract

Objectives: The study aims to compare the success rate, time for cannulation and complications of ultrasound-guided internal jugular venous cannulation versus blind landmark-based technique in adult cardiac surgical patients. The primary objective is to compare the success rate between USG group and landmark group. The secondary objectives are to determine the complications, time for cannulation and compare between the two groups. **Materials and Methods**: In a prospective randomized controlled double-blinded trial, 122 adult patients undergoing elective cardiac surgery were split up into two pairs. Group U (ultrasound-guided technique) and Group N (non-ultrasound-based technique). We assessed first attempt success rate, number of attempts required, time for cannulation and complications (e.g., carotid artery puncture, hematoma, pneumothorax). **Results**: Demographics between Group U and N were similar. Ultrasound-guided technique exhibited higher first attempt success rate (91.8% vs. 75.4%, p=0.014), fewer attempts (1.10 vs. 1.61, p=0.017) and fewer complications (carotid artery puncture: 1.6% vs. 6.6%, p=0.042; hematoma: 1.6% vs. 6.6%, p=0.042) compared to the non-ultrasound-based technique. Group N had a higher failure rate (6.6% vs. 0%, p=0.042). No significant difference in cannulation time was observed (U: 217.02 seconds vs. N: 214.31 seconds, p=0.92). **Conclusion**: Ultrasound-guided internal jugular venous cannulation yields better first attempt success, fewer attempts, and fewer complications than non-ultrasound-based IJV cannulation. But there wasn't any obvious distinction in cannulation time between the two sets.

Keywords: Ultrasound, internal jugular venous cannulation, cardiac surgery, success rate, complications.

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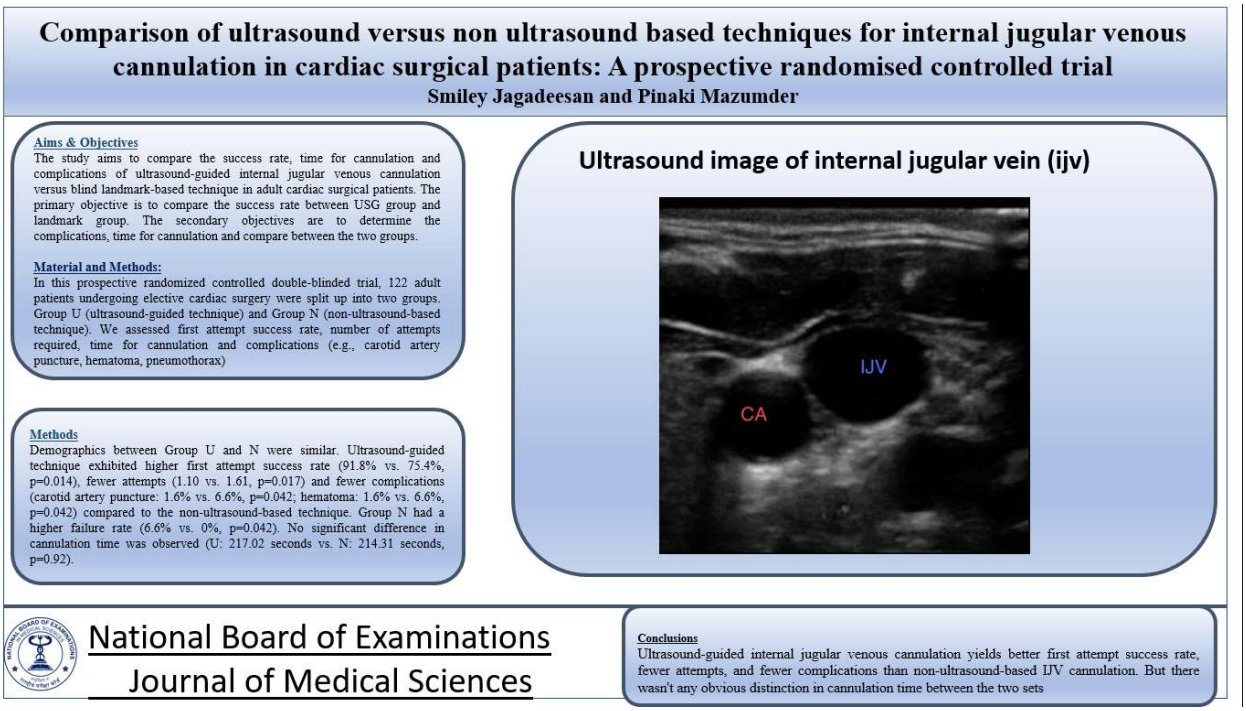
Graphical Abstract



Introduction

Central venous catheters (CVC) could help in diagnosis and treatment of critically ill patients. The catheter could be inserted into an internal jugular vein, subclavian vein, or femoral vein. In order to gain central venous access for hemodynamic monitoring (such as central venous pressure), continuous fluid administration, long-term antibiotic administration, total parenteral nutrition, chemotherapy, and hemodialysis, internal jugular vein (IJV) catheterization is frequently undertaken. Since 1966, numerous anatomic landmark-guided methods for percutaneous IJV puncture have been documented. [1-4]. Nevertheless, this procedure has concerns such as arterial puncture leading in hematoma, which can become infected or lead to carotid artery compression and other problems (thrombosis, embolism, pneumothorax, nerve damage) and should be conducted with as few attempts as possible. Complications, including mortality are influenced by patient characteristics such as BMI, location of attempted access, and operator expertise [5-7].

Despite the non-ultrasound-based technique being most commonly used for jugular venous cannulation, it is a blind procedure and carries a significant risk of accidental injury to surrounding structures (e.g., the carotid artery) and deeper penetration of the needle to underlying structures, causing pneumothorax, hemothorax, etc. The use of ultrasound aims to visualise both the jugular vein and carotid artery side by side and helps to get IJV access

under direct visualisation and reduce the risk of accidental carotid puncture. It had been proposed that central venous catheter placement would benefit from ultrasound guidance [8-12]. Ultrasound guided central venous cannulation improves success rate, reduces the number of needle passes and decreasing complications [12-16].

Though ultrasound has been effectively compared to the non-ultrasound-based technique, its widespread use has been impeded due to the impracticality of specially designed ultrasound equipment, their unavailability, the cost of the devices, and the lack of adequately trained personnel [12-16].

Ultrasound also helps to visualise the needle tip within the jugular vein and prevents deep penetration of the needle, thereby reducing puncture of the posterior wall of the IJV. It also guides the passage of a guidewire and catheter under direct vision to the IJV [10-12]. Moreover very limited number of clinical studies are available on comparison of two techniques of IJV cannulation in adult cardiac surgical patients particularly in Indian scenarios where due to vast patient population and limited resources effective utilization of available resources poses a big challenge to healthcare professionals. Therefore, this study was conducted with the objectives of comparing the success rate, time for cannulation and complications of ultrasound-guided internal jugular venous cannulation versus blind landmark-based technique in adult cardiac surgical patients.

This study distinguishes itself from previous research by specifically addressing the challenges and needs within the context of adult cardiac surgical patients in India. While conventional methods based on landmarks for internal jugular venous cannulation have been widely used, they are associated with significant risks, including arterial puncture and complications. This study's novelty lies in its focus on this specific patient population and the comparison of ultrasound-guided cannulation to the traditional technique. Additionally, it recognizes the practical limitations in terms of equipment availability and trained personnel, which are particularly pertinent in resource-constrained settings like India [10, 12]. This research intends to shed light on the effectiveness of ultrasound guidance in a unique healthcare environment, contributing valuable data to the existing body of knowledge.

Material and Methods

Study setting: This was a prospective, controlled, randomized study undertaken with 122 adult patients undergoing elective cardiac surgery at Medical College Hospital, Kolkata from October 2018 to May 2019.

Inclusion criteria: Adults more than 18 years of age who require Internal jugular venous cannulation for cardiac surgery.

Exclusion criteria: Patients with a history of CVC within 15 days, neck structural deformities from surgery or other illnesses, burns at the insertion site, bleeding disorders, local skin infection.

During enrollment 122 patients of either sex were assessed for eligibility. They were divided into two groups of sixty-one people each at random.

Control Group: The control group (Group N) in this study underwent internal jugular venous (IJV) cannulation by central approach with needle puncture at the apex of sternomastoid triangle using the traditional landmark-based technique. Patients in this group had their anatomical landmarks identified before the sterile procedure. The puncture site was determined based on these landmarks, and the IJV was accessed without the aid of ultrasound guidance. The control group served as a reference point to compare the outcomes of IJV cannulation using the traditional method against the ultrasound-guided approach.

Treatment Group: The treatment group (Group U) received IJV cannulation using the ultrasound-guided technique. In this group, ultrasound equipment was employed to visualize the IJV and carotid artery. The procedure involved precise needle placement under real-time ultrasound guidance, enhancing the accuracy of catheter insertion into the IJV. This group represented the experimental arm of the study, assessing the effectiveness of ultrasound guidance in improving the cannulation process.

Randomization Procedure: Patient allocation into either Group U or Group N was carried out through a computer-generated randomization process with software STATA 16. Eligible patients (n=122) were assessed for inclusion and they were assigned to the groups using concealed envelopes containing random numbers. This approach of allocation at random assured that each patient had an equal chance of being assigned to either group, reducing selection bias and improving the study's internal validity.

In our study, ultrasound guided IJV cannulations were done by second year junior residents posted at the cardiothoracic surgery and anesthesia unit who previously performed atleast 20 USG cannulations under the guidance of consultant anesthesiologist.

Sample size calculation: A previously completed study's formula was used to determine the sample size [11] considering an alpha error of 0.05, power 0.90 or 90%, assuming first attempt success rate of USG guided CVC insertion would be 20 % more compared to landmark technique [11]. Total 55 patients were needed to be recruited in each group for the study. Assuming a 10% dropout. A total of 122 patients, or 61 in each group, were enrolled in the study.

Procedure

A preanaesthetic check-up was performed on previous day of the surgery proper preoperative guidance was provided. After obtaining patients were moved to the preoperative room with written and informed consent, and baseline vitals were taken. On arrival in the operating room, Electrocardiographic leads, a pulse oximeter probe, and a non-invasive blood pressure cuff were connected. Nasal cannula oxygen was given at 3 liter per minute. An 18 G intravenous catheter was secured and injection morphine 2mg intravenously was given before starting the cannulation. A left-facing head position in a 10°–20° Trendelenburg angle was performed to aid the process of right IJV cannulation. Every cannulation was carried out by second year junior residents under the guidance of a consultant anaesthetist.

Ultrasound Guided Technique (Group U): In Group U, the patients underwent IJV cannulation by ultrasound technique. The neck area was prepped and draped in sterile manner with 2% chlorhexidine. The puncture site was infiltrated with 2% lignocaine. A high frequency linear probe (8-12MHz) of PHILIPS HD11XE (Philips US, Bothell, WA, USA) ultrasound machine was used. The ultrasonic probe was ready using lignocaine jelly and a sterile ultrasound A cover was put on over the probe without any bubbles. With the patient's head tilted to the left, the patient was put in a recumbent posture. The transducer was positioned above the point when the triangle made up of the sternal and clavicular heads of the sternocleidomastoid muscle, perpendicular to the vessels (out of plane technique) and parallel to the clavicle. The marker on the USG probe was directed as to face the marker on the ultrasound image corresponds to the left side of the patient. The carotid artery and IJV were located. The round, pulsing tissue that was hard to compress was found to be the common carotid artery (Fig. 1). The bigger, more readily compressible, non-pulsating structure was determined to be the IJV (Fig 2). Using the transducer while gently pressing the vein, the patency of the IJV was verified. Using the out of plane approach, an 18G the introducer needle was positioned at a 45° angle beneath the probe and had a syringe attached (Fig 1). The needle's intravascular position was confirmed by visualizing its tip on the image, and blood flow upon aspiration validated its placement. After obtaining blood flashback, after disconnecting the syringe, a steady, non-pulsatile blood flow was guaranteed. After that, a guide wire was inserted into the vein through the needle. Once the guide wire reached the needle was removed at the proper depth, leaving the guide wire visible on the screen. A minor excision was made at the wire entry point to aid dilator passage. Following dilatation, a 7Fr triple lumen was reached at the target vessel by the catheter. After removing the guide wire, each port's blood flow was examined, flushed, capped, and the line secured with sutures, concluding with the application of a sterile dressing.

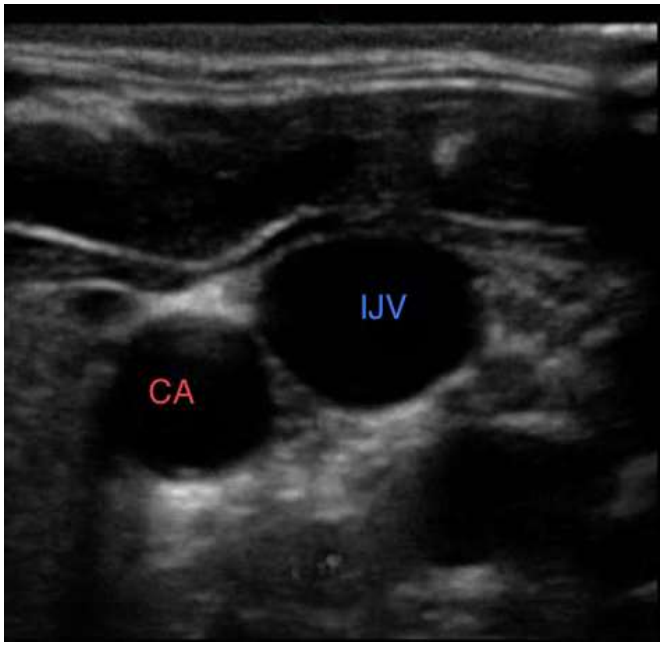


Figure 1. Ultrasound image of internal jugular vein (IJV) out of plane method- anterolateral position of IJV to carotid artery.
*IJV- Internal Jugular Vein **CA- Carotid Artery

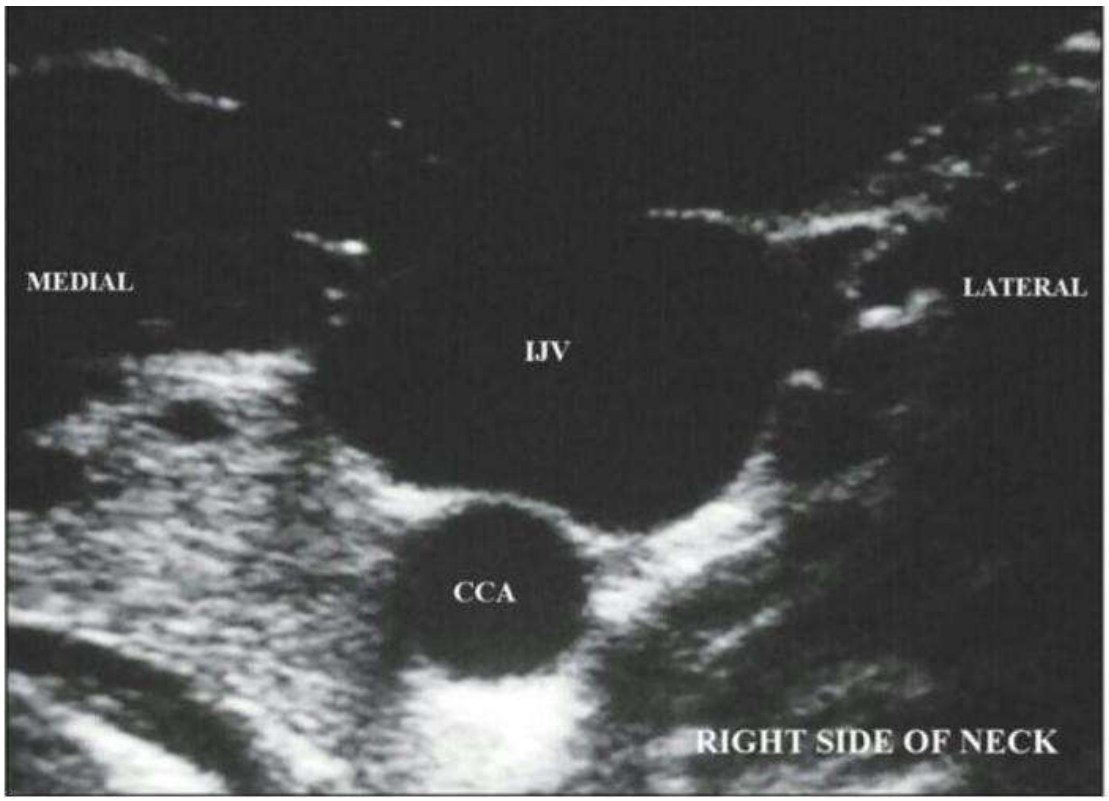


Figure 2. Anterior position of internal jugular vein to carotid artery

Non-ultrasound-based technique (Group N)

In Group N, the patients underwent IJV cannulation by traditional landmark technique through central approach on the right side. Before the sterile procedure, anatomic landmarks like the sternal notch, clavicle, and sternocleidomastoid muscle were identified. The carotid artery's course in the neck was determined through palpation. After sterile preparation and draping, landmarks were reaffirmed. Puncturing the skin at the medial border of the clavicular head of the sternocleidomastoid muscle, just lateral to the carotid pulse, was done with a seeker needle, guiding the 18G introducer needle with a syringe containing heparinized saline. Maintaining carotid palpation, the needle was inserted at a 45-degree angle from the coronal plane toward the ipsilateral nipple. The guide wire was advanced through the introducer, and after reaching the appropriate depth, the needle was withdrawn, leaving the guide wire. A small incision was made for the dilator, followed by passing the catheter over the wire. After removing the guide wire, blood return was checked at all ports, flushed, capped, sutured, and a sterile dressing applied.

The time of insertion was calculated from introducer needle skin puncture till catheter insertion over guide wire. If the puncturing needle was completely removed from the skin's surface after being pierced, the attempt was unsuccessful. When three tries at cannulation failed, the ultrasonic approach was used save the attempt, but it was still deemed a failure for both groups.

All data including patient demographics, number of attempts, first attempt success rate, failure rate, time to cannulate and complications encountered were recorded independently by junior resident. Any complications like carotid artery puncture, hematoma formation were recorded. Post procedural chest x-ray was done to ascertain the position of the catheter tip and rule out any possible complications like pneumothorax and hemothorax in both groups.

Statistical analysis

The data were collected by specifically designed proforma and entered in the Microsoft excel spreadsheet. The analysis was carried out with the help of Statistical Package for Social Sciences (SPSS), Version 25.0. After the data collection was complete, analysis was done by appropriate statistical tests. Percentage difference between two groups were expressed by Chi- square tests. Normally distributed data were expressed as mean and non-normally distributed data were expressed as median. Difference between means of two groups were expressed by unpaired student t tests. Difference between non normally distributed variables were expressed by Mann Whitney U tests. The confidence level for significance was 95% with P value lesser than 0.05 was considered as statistically significant.

Results

Of the total 122 patients recruited, 61 patients each were allocated to two groups- Ultrasound guided CVC insertion (group U) and landmark guided technique (group N). The demographic profile (Table 1) of the patients in two groups as well as for the types of cardiac surgeries performed (Table 2) were

comparable. ($p > 0.05$) Coronary artery bypass grafting was the most commonly performed cardiac surgery in both the groups.

Table 1: Characteristics of study participants.

Characteristics		Group N (n=61)	Group U (n=61)	P value
Age (years), Mean ± SD		51.03 ± 11.4	54.48 ± 8.56	0.063 ~
Gender	Females	13 (21.3%)	15 (24.6%)	0.085 ∫
	Males	48 (78.7%)	46 (75.4%)	
Weight (kg), Mean ± SD		61.67±4.3	60.34±4.5	0.810 ~
Height (cm), Mean ± SD		161.44±4.2	162.31±3.6	0.662 ~
ASA 3		37 (60.7%)	35 (57.4%)	0.136 ω
ASA 4		24 (39.3%)	26 (42.6%)	

~ Unpaired t-test was used; ∫ Chi-square test was used; ω Fisher's-exact test was used; ASA: American society of anaesthesiologist

Table 2. Number of cardiac surgeries performed in both groups.

Name of surgery	**Group N N (%)**	**Group U N (%)**
ASD* closure	2 (3.3)	0 (0)
AVR†	3 (4.9)	3 (4.9)
MVR§	11 (18.0)	9 (14.8)
CABG‖	42 (68.9)	47 (77.1)
CMC**	1 (1.6)	1 (1.6)
Others	2 (3.3)	1 (1.6)

*Atrial septal defect, † Aortic valve replacement, § Mitral valve replacement, ‖ Coronary artery bypass grafting,** closed mitral commissurotomy

Table 3. Outcome variables among the study participants.

Characteristics		**Group N**	**Group U**	**P value**
Success rate (%)	First attempt success rate	**46 (75.4%)**	**56 (91.8%)**	**0.014*** (∫)
	Failure (more than 3 attempts)	**4 (6.6%)**	**0 (0%)**	**0.042 *(Ω)**
	Mean number of attempts ± SD	**1.61 ± 1.595**	**1.10 ± 351**	**0.017 *(~)**
	Mean time for cannulation in seconds ± SD	**214.31 ± 210.693**	**217.02 ± 67.914**	**0.920 (~)**
Complications (%)	Carotid artery puncture	**4(6.6%)**	**1(1.66%)**	**0.042 *** (∫)
	Hematoma	**4(6.6%)**	**1(1.66%)**	**0.042 *(∫)**

*-P(<0.05) statistically significant ∫ Chi-square test, Ω Fisher's exact test, ~ Unpaired t-test.

Ultrasound guided CVC insertion was associated with significantly better first attempt successful cannulation (91.8%) versus landmark guided CVC technique (75.4%), p=0.014. There was no incidence of failure when cannulation was done under USG guidance versus a 6.6% failure rate in landmark based approach, p=0.042. The mean number of attempts needed to cannulate IJV was significantly less when ultrasound technique was used (1.10±0.351) versus landmark guided CVC insertion (1.61±1.595) p = 0.017, p<0.05. However there was no significant difference was noticed in time for cannulation in two groups (group U=217.02±67.914 seconds versus group N =214.31±210.693 seconds), p=0.92, > 0.05). In group N, carotid artery puncture and hematoma were noticed in 4 cases out of 61 patients (6.6%)and in group U, 1 case out of 61 patients(1.6%) had carotid artery puncture and hematoma with p value=0.042. [P value <0.05 statistically significant]. There were no cases of pneumothorax and hemothorax recorded during the study.

Discussion

In this study, our findings demonstrate the superiority of ultrasound-guided (US) internal jugular vein (IJV) cannulation over the landmark-based technique. Our investigation reveals a higher first attempt success rate, a reduced number of attempts required for IJV cannulation, lower failure and complication rates, with no significant difference in the time needed for successful cannulation.

This aligns with the results of meta-analyses of randomized controlled trials (RCTs) comparing real-time ultrasound-guided venipuncture of the IJV with the anatomical landmark-based approach. These meta-analyses consistently report higher first insertion attempt success rates, higher overall success rates, lower rates of arterial puncture, and fewer insertion attempts when using US-assisted cannulation. Consequently, the revised practice guidelines by the American Society of Anesthesiologists in 2020 recommend the use of ultrasound for guiding needle, wire, and catheter placement (American Society of Anesthesiologists, 2020) [16]. Similarly, the European Society of Anaesthesiology guidelines on peri-operative use of ultrasound for vascular access (PERSEUS vascular access) recommend ultrasound guidance for IJV cannulation in adults due to its safer profile, improved success rates, and reduced puncture and cannulation time (European Society of Anaesthesiology, 2020) [17].

The success of ultrasound-guided techniques may vary depending on the type of ultrasound guidance (static vs. real-time), the ultrasound probe used, and the study population. Notably, most studies demonstrating the superiority of US techniques over landmark techniques have utilized the dynamic method for US-guided IJV cannulation [18].

In our study, we employed real-time ultrasound guidance for IJV cannulation, which yielded a higher success rate and reduced complications compared to the landmark-based technique. However, it's worth noting that some studies, such as Tempe et al. [19], failed to demonstrate the superiority of USG-guided IJV cannulation, possibly due to the use of a static ultrasound method and a low-frequency ultrasound

probe. Furthermore, they did not define the experience level of senior residents or the number of successful cannulations performed before entering the study.

Despite the established benefits and safety of ultrasound guidance, its utilization for central venous cannulation remains inconsistent. Studies investigating current practices in the Netherlands found that ultrasound guidance was used in only 68% of patients. Barriers to its use included working in non-academic, non-teaching hospitals, providing cardiac anesthesia, and greater physician experience. Reasons for not using ultrasound included a perceived lack of benefit, increased procedure time, the absence of ultrasound equipment, and concerns about losing landmark technique skills [20]. Our study challenges this notion and underscores the importance of having ultrasound machines available at all sites for potential IJV central venous catheterization needs.

Cochrane systematic reviews and meta-analyses comparing current evidence for ultrasound guidance versus anatomical landmark techniques for IJV placement in over 5100 adult and pediatric patients in operating rooms and intensive care units have consistently demonstrated the advantages of ultrasound-guided IJV catheterization. Notably, the use of ultrasound reduces the overall rate of complications, increases overall success rates, decreases arterial puncture rates, hematoma formation, and the number of attempts, while also enhancing the success of the first attempt [9].

In contrast, the anatomical landmark technique, despite being validated and time-tested, is associated with numerous complications. For instance, Karakitsos et al. [21] reported a higher incidence of carotid artery puncture, hematoma, hemothorax, pneumothorax, and central venous catheter-associated bloodstream infections with landmark-based IJV cannulation, all significantly increased compared to the ultrasound group ($p < 0.001$). In our study, the incidence of carotid puncture was significantly lower in the ultrasound group compared to the landmark-based technique ($p = 0.042$). However, our study was not adequately powered to detect differences in other complications between the two groups.

The definition of operator competence and successful cannulation varies among different studies, making it challenging to compare success rates between the two techniques. Nandi et al. [22] compared the performance and complications of US-guided right IJV cannulation by operators with different levels of experience. They defined an expert operator as one who had performed 30 or more ultrasound-guided IJV cannulations, resulting in higher successful cannulation rates and a lower percentage of patients requiring more than two attempts. In contrast, our study defined failure as requiring more than three attempts for cannulation. This definition resulted in a lower failure rate in the landmark method compared to the ultrasound-guided group.

The definition of time for successful cannulation also varies between studies. In our study, time was calculated from introducer needle skin puncture to catheter insertion over the guide wire, leading to a longer time for cannulation in our study. However, there was no significant difference

in the time for IJV cannulation between the two groups (p = 0.92). In contrast, other studies, such as Pozzoli et al. [23], found no significant difference in the time to perform cannulation using either approach.

Furthermore, our study revealed a significantly higher first attempt success rate in the ultrasound group compared to the landmark-based technique. Similar findings were reported by Denys et al. [11]. In our study, the mean number of attempts to cannulate the IJV was lower in the ultrasound group compared to the landmark group, consistent with findings by Miller et al. [13] and Agarwal et al. [12].

In summary, our study provides compelling evidence in favor of ultrasound-guided IJV cannulation, offering a safer and more effective approach with higher success rates and fewer complications compared to the landmark-based technique. These findings emphasize the need to consider the widespread adoption of ultrasound machines for potential IJV central venous catheterization requirements.

Future directions: Future studies in central venous cannulation should focus on operator proficiency and training standards, comparing different ultrasound-guided techniques, assessing the influence of patient demographics, addressing barriers to ultrasound adoption, standardizing definitions, and further evaluating time considerations. Additionally, research should explore long-term patient outcomes and satisfaction to refine best practices in this critical medical procedure.

Limitations

Both ultrasound and landmark guided technique of CVC insertion was done by second year residents with experience of at least 20 USG guided CVC cannulation. Lack of USG guided cannulation by well trained consultants might influence the study results.

Conclusion

USG guided internal jugular venous cannulation in adult elective cardiac surgical patients achieves better first attempt success rate, reduces the number of attempts during cannulation and decrease complications like carotid artery puncture and neck hematoma compared to landmark based technique. However no difference was noticed between two techniques with regards to time taken for IJV cannulation.

Conflicts of interest

Not applicable

Ethical statement

The study was conducted after obtaining approval from institutional ethical committee (Ref no: MC/KOL/IEC/NON-SPON/133/08-2018) and written informed consent from patients.

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ORIGINAL ARTICLE

Unlocking the Silent Struggle: Addressing Unmet Family Planning Needs in Saurashtra's Health Centres

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Abstract

Introduction: According to NFHS-V revealed that in Gujarat, contraceptive prevalence rate was 65.3%. Female sterilization is the predominant contraception method, favored by 35.9% of individuals. Whereas, total unmet need for family planning is 10.3%. Women with unmet need are those who are fecund and sexually active but are not using any method of contraception, and report not wanting to delay the next child. The concept of unmet need points to the gap between women's reproductive intentions and their contraceptive behaviour.Aims & Objectives of study is the prevalence of unmet needs of family planning and its determinants among married women (15-49 yrs) attending rural and urban health centre of a teaching hospital of Saurashtra Region of Gujarat. **Methodology:** Cross-sectional Hospital based study which was conducted at rural & urban health centre under MPGMC, Jamnagar, Gujarat amongst married women (15-49 yrs) during April 2021 to August 2021. Sample size was calculated by using Daniels Formula. Verbal informed consent was taken from every subject. The study was initiated after it was approved by the Research and Ethics Committee of MPSGMC. **Results**: In this study, conducted with a total of 300 participants (comprising 150 from rural areas and 150 from urban areas), the unmet need for family planning stands at approximately 35.67%. This figure was even higher among younger age groups and among women with smaller family sizes. Of the participants, 51% were currently utilizing contraceptive methods, with only a small percentage reporting contraceptive use by their partners. Government health facilities were the major source of contraceptive service. **Conclusion**: Unmet needs of family planning were high in this study population, and the knowledge about the contraceptive use and family planning was found to be fairly adequate.

Keywords: Unmet needs, Family Planning, Contraception, Practices

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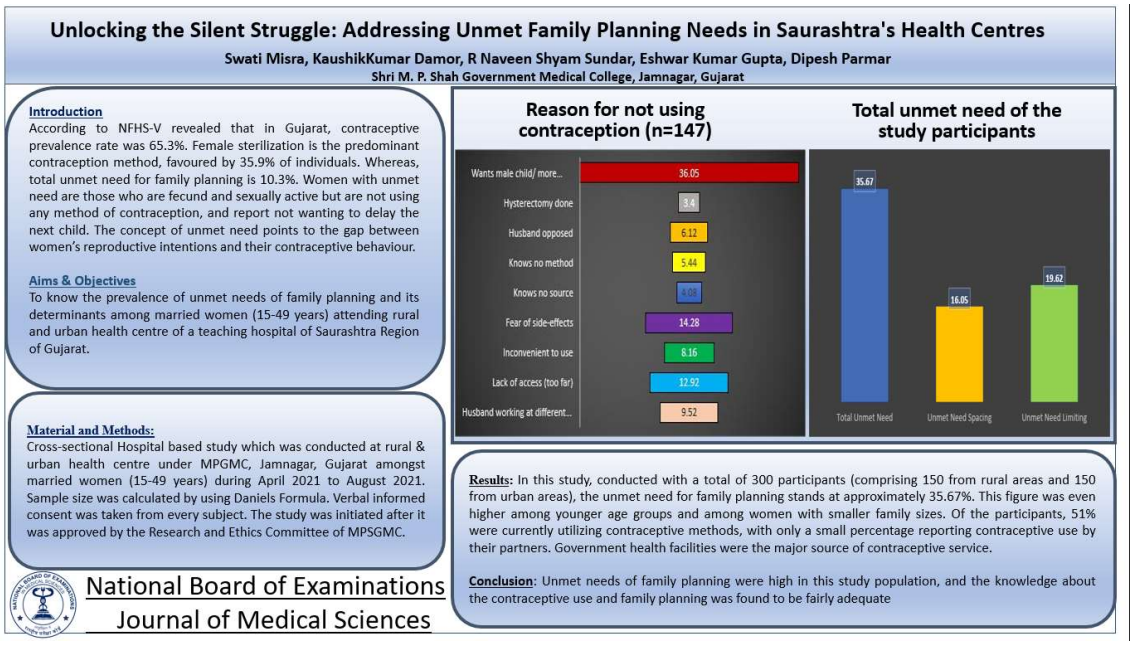
Graphical Abstract



Introduction

Unmet needs of family planning persist as a critical global health challenge, particularly affecting women in low-resource settings. These needs denote the gap between women's reproductive intentions and their contraceptive use. Factors contributing to this disparity include limited access to contraceptive services, cultural barriers, inadequate education, and socioeconomic inequalities. Addressing unmet family planning needs is imperative for promoting maternal and child health, reducing unintended pregnancies, and empowering women to make informed choices about their reproductive health. Comprehensive strategies involving improved healthcare infrastructure, education, community outreach, and access to a wide range of contraceptive options are essential to bridging this gap and ensuring reproductive rights for all individuals. In 2010, worldwide contraceptive usage reached 63.3%, marking a 9% increase from the rate in 1990. Over the past two decades, the global unmet need for family planning declined from 15.4% to 12.3%. These shifts were observed across nearly all global regions, except those where family planning services were already well-established. Nevertheless, the extent of change varied across different regions [1]. Even though India pioneered an official National Family Planning program as early as 1952, the primary focus was on women's health rather than population control. However, the 1971 census uncovered a concerning trend of rapid population growth, prompting the adoption of population control strategies in India [2].

The NFHS-V (National Family Health Survey) conducted in Gujarat indicated a contraceptive prevalence rate of 65.3%. Female sterilization is the predominant contraception method, favored by 35.9% of individuals. Whereas, total unmet need for family planning is

10.3%. In that unmet need for spacing and unmet need for limiting is 4.5% and 5.8% respectively [3]. Offering comprehensive family planning services universally is a crucial strategy for diminishing maternal morbidity and managing population growth. In India, 10% of all pregnancies are mistimed, while 11% are unwanted [3]. Effective utilization of family planning services can significantly reduce the incidence of unintended pregnancies. Although the unmet need for family planning has decreased globally over the past two decades, the absolute number of women with unmet needs has remained constant due to population growth. In Gujarat, female sterilization is the leading choice of contraception, comprising 35.9% of all contraceptive methods used [3]. Alternatively, male sterilization, IUD/PPIUD, oral contraceptive pills (OCP), condoms, and injectables constitute other methods of contraception, representing 0.2%, 3.1%, 2.3%, 11.4%, and 0.1% of usage, respectively [3]. Hence, the utilization of temporary contraception methods remains minimal, primarily attributed to social stigma, cultural misconceptions [4-6], inadequate awareness [7,8], and apprehensions regarding potential side effects [5,8-10].

Women classified with unmet need are those who are fecund, married or in a union, not currently using any form of contraception, and have expressed a desire to either cease childbearing altogether or delay pregnancy for at least two years. Additionally, unmet need encompasses pregnant or amenorrhoeic women who have experienced unwanted or mistimed pregnancies/births and were not using contraception at the time of their last conception. This category also includes women who are employing ineffective, incorrect, unsafe, or unsuitable contraceptive methods [11]. Women's decisions regarding contraceptive methods are often influenced by various social constraints and circumstances, including family sex composition and gender preferences [3]. Globally, when contraception is utilized properly and effectively to prevent unwanted pregnancies, it has the potential to decrease maternal deaths by 25-35% [12-13]. Therefore, the aims and objectives of this study are to investigate the prevalence of unmet needs for family planning and identify its determinants among married women aged 15-49 years attending rural and urban health centers affiliated with a teaching hospital in the Saurashtra Region of Gujarat.

Materials and Methods

The initiation of the study followed approval by the Research and Ethics Committee of MPSGMC. Conducted between April 2021 and August 2021, this hospital-based cross-sectional study took place in both rural and urban health centers affiliated with Shri MP Shah Government Medical College, Jamnagar, Gujarat. The study determined a minimum sample size of 410, calculated using the Daniel Formula. This calculation was based on the prevalence of unmet family planning needs, estimated at 10.3% from NFHS-V, with a desired precision of 3%. Within this framework, 300 married women aged 15-49 years, with 150 from rural and 150 from urban health centers, were included. Verbal informed consent was obtained from each participant prior to their involvement. A self-structured questionnaire, which had been pilot-tested, was administered in the local language. This questionnaire covered various variables including

sociodemographic profiles, personal details, knowledge about contraceptives, perceptions on family planning, and desired family size. The sampling technique employed was purposive, excluding participants unwilling to undergo interviews. Prior to data collection, participants were briefed in their native language about the study's benefits and implications, and their voluntary written consent was obtained. Female interviewers, trained by the authors, conducted interviews with participants in isolated hospital settings to ensure a conducive environment for open responses.

Operational definitions were established, defining unmet need for family planning as the percentage of fecund, sexually active women not currently using contraception who either do not desire more children or wish to delay their next childbirth [14]. Data entry utilized Epidata version 3.1, while statistical analysis employed SPSS version 21. Chi-square tests were applied to ascertain differences in proportions, with a significance level set at $p < 0.05$. Through meticulous planning, rigorous methodology, and adherence to ethical standards, this study aimed to comprehensively address the unmet family planning needs among women attending health centers in the Saurashtra region of Gujarat.

Results

Table 1 outlines participant demographics: the largest age group is 26-35 (48%), followed by 15-25 (27%), and 36-49 (25%). Parity analysis shows most have two children (44.33%), followed by one child (26%), three children (19%), and over three (2.67%). Educational attainment is significant, with 36.67% of participants and 45% of spouses having completed high school or higher. Homemakers comprise 46.33%, agricultural workers 30.67%, and others 23%. Socio-economic class distribution favors Class I (43%), followed by Classes II & III (35.33%), and IV & V (21.67%). Residentially, participants are evenly split between urban and rural areas. Family type is predominantly joint (67%), with strong family support (77.33%). Contraceptive usage is prevalent, with 65.67% ever using and 51% currently. Information primarily comes from Doctors & health workers (62.67%), and services are often accessed from government facilities (83.67%). Partner awareness is high (88.33%), with joint decision-making (65.33%) regarding contraception.

Table 2 explores participants' perceptions and knowledge regarding unmet family planning needs. The optimal age for female marriage is mostly seen as between 20-23 years (49%) and 24-28 years (48%), with few advocating for ages 16-19 years (3%). Regarding the recommended family size, there is a strong preference for two children (63%), followed by one child (31.33%), and a small fraction advocating for three children (5.67%). Participants' beliefs Regarding Maternal Health Risks with Increased Childbearing, especially with more children (58%). Spacing between children is deemed important, with preferences for 1-2 years spacing (38.33%), and concerns about inadequate spacing leading to maternal health issues (67.67%). However, there is limited knowledge about STD prevention through contraceptives (7.67%). Gender preference leans towards male children (52.33%) over female (26.33%), with some expressing no preference (21.34%). A minority report experiencing unwanted pregnancies (9.67%), highlighting the need for targeted

interventions to address these perceptions and knowledge gaps.

Table 3 displays associations between socio-demographic factors and unmet family planning needs among participants. Each row represents a specific variable such as age group, parity, educational status, occupation, and family support, among others. The table presents percentages for the presence and absence of unmet family planning needs within each variable category, along with chi-square statistics (X2) and p-values indicating association strength and significance. Notable associations include age groups (X2 = 7.99, p = 0.02), parity (X2 = 74.66, p < 0.0001), educational status of participant (X2 = 13.48, p = 0.001) and spouse (X2 = 13.95, p = 0.0009), among others. These associations offer insights into factors influencing unmet family planning needs, emphasizing the necessity of addressing socio-demographic determinants in interventions. Further research and targeted efforts based on these findings can enhance family planning services and reproductive health outcomes.

Figure 1 shows the reasons for not using contraception among 147 participants, most of them wanted male child and fear of side effects of using contraception. While, the total prevalence of unmet family planning needs stood at 35.67%, with 19.62% aimed at limiting pregnancies and 16.05% for spacing between them (Figure 2).

Table 1. Socio-Demographic Variables of Participants

Socio Demographic Variables		**%**	**N**
Age Groups	15-25	27	81
	26-35	48	144
	36-49	25	75
Parity	0	8	24
	1	26	78
	2	44.33	133
	3	19	57
	>3	2.67	8
Educational Status	Illiterate	27	81
	< High School	36.33	109
	>= High School	36.67	110
Educational Status of Spouse	Illiterate	22.67	68
	< High School	32.33	97
	>= High School	45	135
Occupation	Home-maker	46.33	139
	Agricultural Worker	30.67	92
	Working	23	69

Socio-Economic Class	I	43	129
	II & III	35.33	106
	IV & V	21.67	65
Residential Area	Urban	50	150
	Rural	50	150
Family Type	Nuclear	33	99
	Joint	67	201
Family Support	Present	77.33	232
	Absent	22.67	68
Contraceptive Usage (Past)	Ever used	65.67	197
	Never used	34.33	103
Current Contraceptive Usage	Yes	51	153
	No	49	147
Sources of Contraceptive Information	Doctor/ Health Worker	62.67	188
	Media/ Relatives/ Friends	37.33	112
Contraceptive Service Provider	Government health facility	83.67	251
	Private health facility	16.33	49
Partner's Awareness of Contraceptive Use	Yes	88.33	265
	No	11.67	35
Contraceptive Method Decision-Making	Self	15.67	47
	Husband	6	18
	Both Self & Husband	65.33	196
	Suggested by Family/Friends	5.67	17
	Suggested by Doctor/ Health Worker	7.33	22

Table 2. Perception and knowledge of participants regarding unmet need of family planning

Perception & Knowledge		**%**	**N**
Optimal Age for Female Marriage (in years)	16-19	3	9
	20-23	49	147
	24-28	48	144
Recommended Family Size	1	31.33	94
	2	63	189
	3	5.67	17
	Yes	58	174

Beliefs Regarding Maternal Health Risks with Increased Childbearing	No	20.33	61
	Don't Know	21.67	65
Preferred Interbirth Interval (in years)	1-2	38.33	115
	3-4	34.67	104
	5-6	17.67	53
	Don't Know	9.33	28
Concerns Regarding Short Interbirth Intervals and Maternal Health	Yes	67.67	203
	No	12.67	38
	Don't Know	19.66	59
Understanding of STD Prevention through Contraceptive Use	Yes	7.67	23
	No	27.67	83
	Don't Know	64.66	194
Gender Preference Distribution among Participants	Male	52.33	157
	Female	26.33	79
	No Preference	21.34	64
Incidence of Unplanned Pregnancies in Personal History	Yes	9.67	29
	No	90.33	271

Table 3. Association between Socio-Demographic variables and unmet need of family planning

Variables		**Present**	**Absent**	**X^2 (p value)**
Age Groups	15-25	36.45	21.76	7.99 (0.02)
	26-35	43.93	50.26	
	36-49	19.63	27.98	
Parity	0	7.48	8.29	74.66 (0.0001)
	1	54.21	25.64	
	2	19.62	58.03	
	3	16.82	20.21	
	>3	1.87	3.11	
Educational Status	Illiterate	15.89	33.16	13.48

	< High School	47.66	30.05	(0.001)
	>= High School	36.45	36.79	
Educational Status of Spouse	Illiterate	12.15	28.50	13.95 (0.0009)
	< High School	42.99	26.42	
	>= High School	44.86	45.08	
Occupation	Home-maker	48.60	45.08	14.78 (0.0006)
	Agricultural Worker	18.69	37.31	
	Working	32.71	17.62	
Socio-Economic Class	I	49.53	39.38	4.24 (0.12)
	II & III	34.58	35.75	
	IV & V	15.89	24.87	
Residential Area	Urban	60.75	44.04	5.9 (0.015)
	Rural	39.25	55.96	
Family Type	Nuclear	54.21	21.76	33.83 (0.00001)
	Joint	45.79	78.76	
Family Support	Present	61.68	86.01	23.24 (0.00001)
	Absent	38.32	13.99	
Sources of Contraceptive Information	Doctor/Health Worker	72.90	56.99	7.44 (0.0064)
	Media/Relatives/friends	27.10	43.01	
Contraceptive Service Provider	Government health facility	90.65	79.79	5.94 (0.015)
	Private health facility	9.35	20.21	
Partner's Awareness of Contraceptive Use	Yes	93.46	85.49	4.24 (0.0395)
	No	6.54	14.51	
Contraceptive Method Decision-Making	Self	12.15	17.62	11.46 (0.022)
	Husband	5.61	6.22	
	Both Self & Husband	67.29	64.25	
	Suggested by Family/ Friends	4.67	6.22	
	Suggested by Doctor/ Health Worker	14.02	3.63	

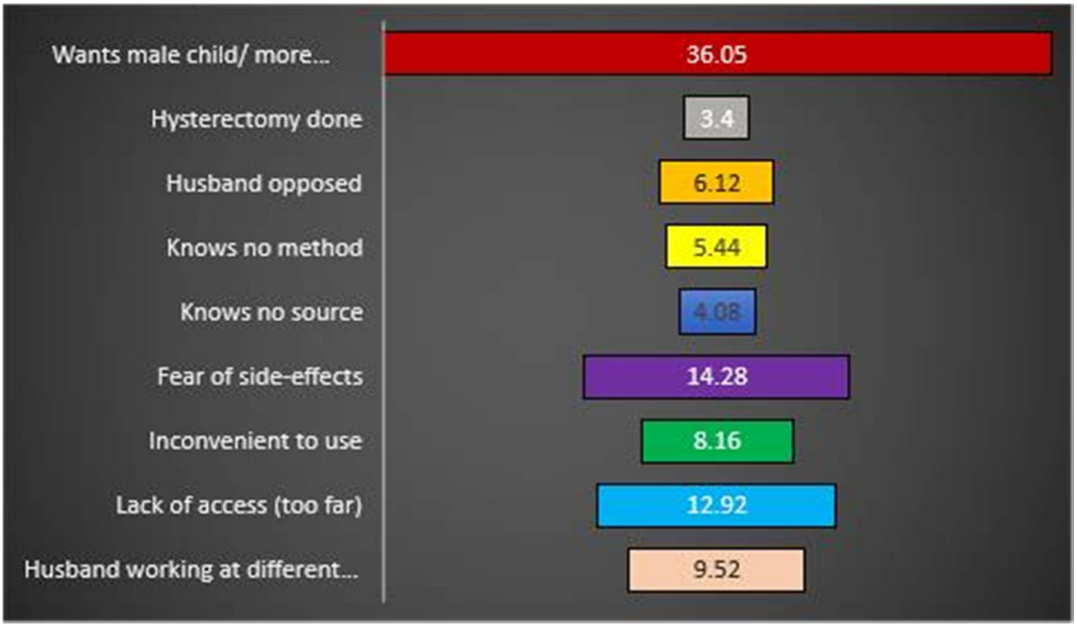


Figure 1. Reason for not using contraception (n=147)

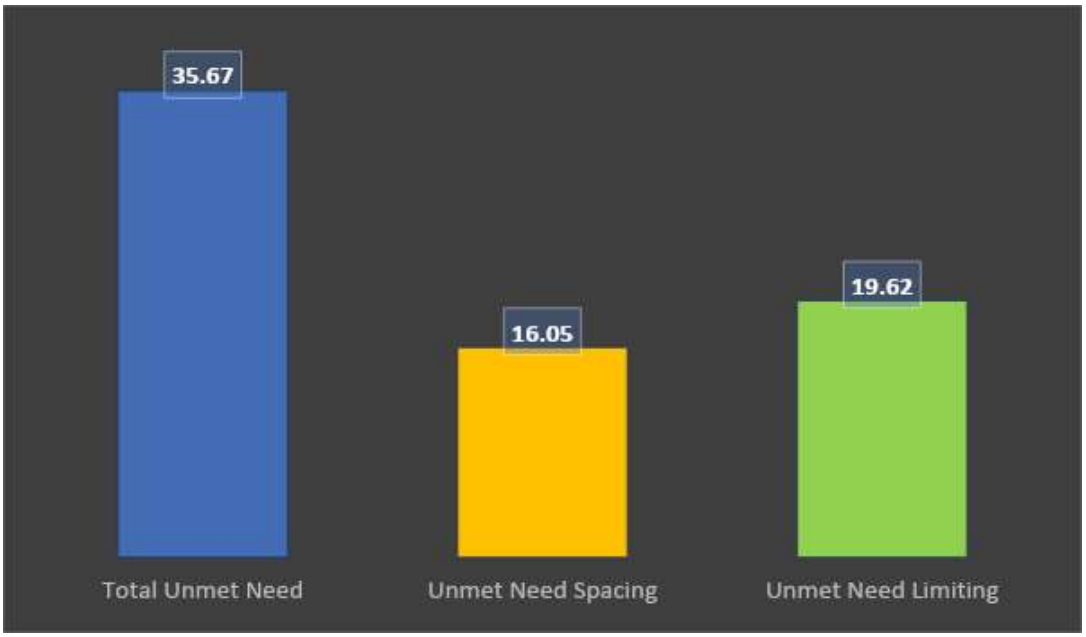


Figure 2. Total unmet need of the study participants

Discussion

Our research was conducted at both rural and urban health facilities affiliated with Shri MP Shah Government Medical College in Jamnagar, Gujarat, a state known for its notable achievements in various health indicators, particularly in the provision of adequate family planning services. Despite commendable coverage in certain regions, there persists a significant unmet need for family planning in several parts of the state. Considering the shifting

population patterns in the country, with more women entering the reproductive age group, ensuring the provision of sufficient family planning services, especially in rural and urban areas, becomes imperative.

The findings of our study reveal that among married women aged 15-49 years in our study population, the prevalence of unmet family planning needs is notably high at 35.67%. This figure surpasses the reported prevalence rates by Speizer et al. [15] in six cities of Uttar Pradesh, which ranged between 12% and 20% across different regions. Similarly, Yadav et al. [16] found a prevalence rate of 17.5% in North India, Haryana. In contrast, the National Family Health Survey (NFHS-V) data for Gujarat [3] reported a lower prevalence of 10.3%. Conversely, Prateek et al.[17] reported a much higher prevalence of 51% among women of reproductive age in Kancheepuram district [18], Tamil Nadu, albeit in an urban health center setting. The disparity in prevalence rates between our study and national data could potentially be attributed to a lack of sustained emphasis on family welfare services nationwide. Our study also highlights that 65.67% of participants have ever used contraception, indicating a considerable level of awareness and uptake. This aligns with findings from Sharma et al. [19] in Lucknow, where over 90% of women were aware of various contraceptive methods. Additionally, Makade et al. [20] reported high awareness levels in a Mumbai slum, with 87% of married women aware of oral contraceptive pills and Copper-T, and 80% aware of female sterilization. Furthermore, our study indicates that among those aware of contraception, 61% prefer female sterilization, while 39% prefer intrauterine contraceptive devices. These preferences are lower than the NFHS-V data, which reported a prevalence of female sterilization at 35.9% in Gujarat. Additionally, the contraceptive prevalence rate in our study population was found to be 51%, lower than the NFHS-V data, which reported a rate of 65.3% [3].

Regarding contraceptive access, 83.67% of participants who used contraception obtained it from government facilities, comparable to the coverage reported for Gujarat government services at 84%. In terms of family structure and composition, 63% of participants believed the ideal number of children for a couple is two, while 38.33% preferred a spacing of 1-2 years between children. A preference for male children was evident among 36.4% of participants, consistent with the broader trend observed in Indian families according to NFHS-V data. Only 7.67% of participants believed that contraceptive methods can prevent sexually transmitted diseases (STDs), with condoms being identified as the most effective method for STD prevention by nearly half of them. Knowledge acquisition primarily occurred through doctors or health workers, with the media also contributing to improving awareness of contraceptive services. Importantly, the decision-making process regarding contraception was predominantly mutual between husbands and wives, consistent with NFHS-V data [3].

In conclusion, our study underscores the importance of addressing the unmet need for family planning and improving access to contraceptive services, particularly in rural and urban areas. It also emphasizes the necessity of targeted interventions to enhance awareness and knowledge regarding contraceptive methods and their benefits. By addressing these gaps, we can strive towards achieving

better reproductive health outcomes for women in Gujarat and beyond.

The strength of this study lies in its thorough exploration of women's perspectives on contraceptive usage, facilitated by trained female interviewers. Unmet family planning needs result in unwanted pregnancies, posing potential risks to the mother, family, and society. Consequences of such pregnancies include unsafe abortions and impacts on children's health and well-being, potentially exacerbating rapid population growth, particularly in developing nations like India. Assessing unmet needs remains crucial as an analytical tool and serves as a policy-making benchmark. In our study population, unmet family planning needs were notably high, yet there was a reasonably good level of knowledge regarding contraceptive use and family planning. This underscores the importance of addressing these needs effectively to improve reproductive health outcomes.

Recommendations

Efforts should focus on expanding access to a diverse range of contraceptive methods, especially temporary methods, through comprehensive family planning services. Targeted educational campaigns aimed at dispelling cultural stigma and addressing misconceptions surrounding contraception are crucial. Additionally, interventions promoting gender equality and women's empowerment are necessary to enhance decision-making autonomy in family planning. Collaboration between healthcare providers, community leaders, and policymakers is essential to tailor interventions to local needs and facilitate sustainable change.

Limitations

While this study provides valuable insights into the prevalence and determinants of unmet family planning needs, several limitations should be acknowledged. The cross-sectional design restricts our ability to establish causality or assess changes over time. Sampling bias may have occurred due to the purposive sampling technique and reliance on self-reported data, potentially impacting the generalizability of findings. Furthermore, social desirability bias could influence participants' responses, particularly regarding sensitive topics such as contraceptive use. Future research should employ longitudinal designs and employ diverse sampling methods to mitigate these limitations and provide more nuanced insights into family planning dynamics in low-resource settings.

Author Contributions

The manuscript has been read and approved by all authors and we believe that the manuscript represents honest work.

Conflict of Interest

The authors declares that they do not have conflict of interest.

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ORIGINAL ARTICLE

Prevention of Initiation of Smokeless Tobacco and Non Tobacco Products Consumption Among Students of a Private High School in Puducherry: An Interventional Study

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Abstract

Tobacco is dried and fermented leaves. Tobacco epidemic is killing 8 million people a year. Thus, the study is done to assess the frequency of smokeless tobacco and Non tobacco in school students. School based Interventional study conducted among 373 students of 7th to 10th standard in a private high school, in our city. Data collected was entered in Excel and analysis was done using SPSS software version 23.0. Around 362 (97%) students were aware that tobacco usage affects health. Around 58 (16 %) students had consumed non tobacco products and 11 (3%) students had consumed smokeless tobacco ever in their lifetime. After 2 weeks of awareness session on Tobacco use and its effects by the investigator, quit rate was 66% for Non-Tobacco Products & Smokeless Tobacco. There is significant association between awareness about tobacco usage and students who quit Non-Tobacco Products and Smokeless Tobacco after awareness session with p value of <0.039. Post-test results after the awareness session showed that it helped in improving knowledge and developing negative attitude towards Tobacco usage among school students.

Keywords: Tobacco, Smokeless tobacco, non-tobacco products, addiction

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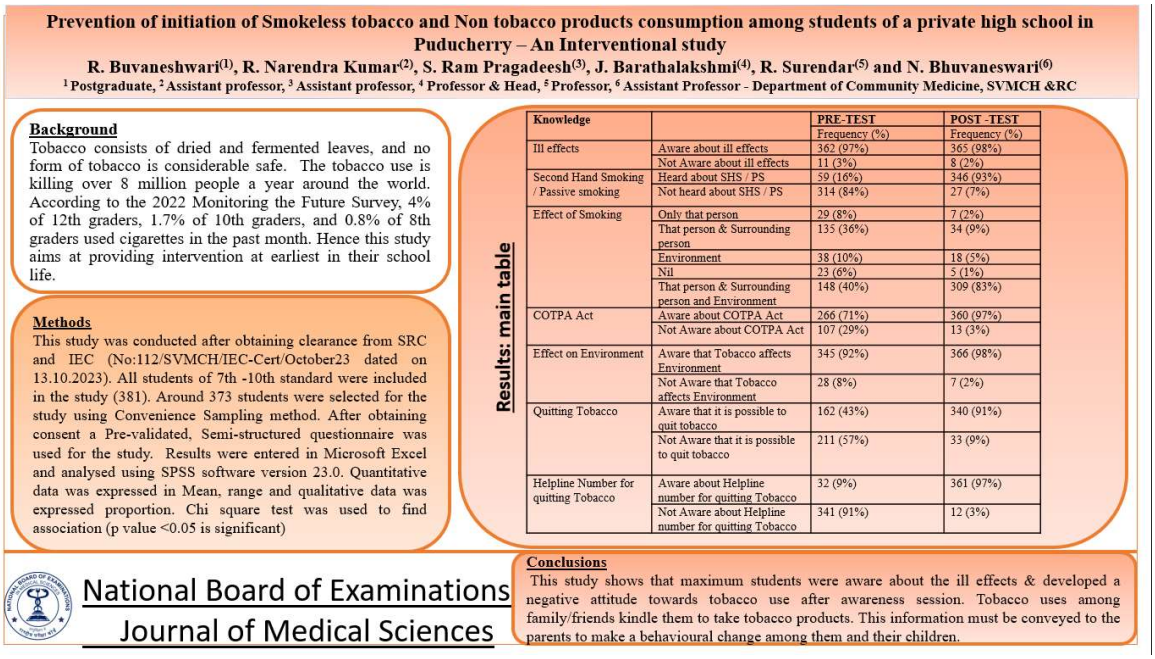
Graphical Abstract



Introduction

A study mentioned that Tobacco use is widely recognized as preventable cause of premature death due to NCDs [1]. Tobacco consists of dried and fermented leaves, and no form of tobacco is considerable safe. WHO states that the reason for tobacco being addictive is Nicotine and tobacco use is a major risk factor for non-communicable diseases, various types of cancer, and many other debilitating health conditions [3].

India stands third in production and consumption of tobacco products in the world. There is a long history of tobacco use in our country. Tobacco is used in a variety of ways in India; its use has unfortunately been well recognized among the adolescents [2]. The tobacco use is killing over 8 million people a year around the world. In which around 7 million are the result of direct tobacco use while 1.3 million are the result of non-smokers being exposed to second-hand smoke [3].

2019 - India Global Youth Tobacco Survey shows that 8.5% of the young age group consume tobacco products. Also, Highest current use of any tobacco was in Arunachal Pradesh & Mizoram (58% each) and lowest in Himachal Pradesh (1.1%). 4.1% of students (4.6% of boys and 3.4% of girls) currently used smokeless tobacco [4].

In Puducherry 14.7% of men, 0.1% of women and 7.2% of all adults currently smoke tobacco. 4.5% of men, 4.9% of women and 4.7% of all adults currently use smokeless tobacco. NIDA (National Institute on Drug Abuse) strongly mentions that people who use tobacco has initiated it during adolescence by non - tobacco substance chewing. According to the 2022 Monitoring the Future Survey, 4% of 12th graders, 1.7% of 10th graders, and 0.8% of 8th graders used cigarettes in the past month [5].

For today's adolescents and young adults, consumption, including the use of tobacco and nicotine products, is all about showing their unique identity. (6) Various factors have been implicated for the uptake of the habit including inadequate knowledge and unfavourable attitude. (7) In India, bidis—tobacco hand-rolled and wrapped in

dried leaves of particular trees—and cigarettes are the most common smoking products. Khaini, gutkha or pan masala (a powdered mixture of scented tobacco, lime, and areca nut wrapped in a betel leaf), chewing pan (a mixture of lime, areca nut pieces, tobacco, and spices), and mishri (a type of toothpaste applied to the gums) are examples of smokeless tobacco use. (8) Limited data are available regarding interventional studies conducted for the prevention of initiation of Smokeless tobacco use in India. Targeting the children before initiation of tobacco use is the most effective way of preventing SLT use. Hence this cross-sectional study is planned and conducted to Assess the frequency of smokeless tobacco and Non tobacco products consumption among students and to provide a school-based intervention to bring out behavioural changes among 7th to 10th standard students of a selected private high school

Operational Definition: (National Cancer Institute)

Smokeless tobacco is tobacco that is not burned. It is also known as chewing tobacco, oral tobacco, spit or spitting tobacco, dip, chew, and snuff. Most people chew or suck (dip) the tobacco in their mouth and spit out the tobacco juices that build up, although "spitless" smokeless tobacco has also been developed. Nicotine in the tobacco is absorbed through the lining of the mouth.

Chewing tobacco, which is available as loose leaves, plugs (bricks), or twists of rope. A piece of tobacco is placed between the cheek and lower lip, typically toward the back of the mouth. It is either chewed or held in place. Saliva is spit or swallowed.

Snuff, which is finely cut or powdered tobacco. It may be sold in different scents and flavors. It is packaged moist or dry; It is available loose, in dissolvable lozenges or strips, or in small pouches similar to tea bags. Some people inhale dry snuff into the nose.

Materials and Methods

This study was conducted after obtaining clearance from Scientific Research Committee and Institutional Ethics Committee (No:112/SVMCH/IEC-Cert/October23 dated on 13.10.2023). Before conducting the study, prior permission was sought from the school authority after explaining the background, objectives of the study, confidentiality of identity. A School based Interventional study was done among 7th to 10th standard students of Rural in our city. All students of 7th -10th (7th +8th +9th +10th = 140+81+85+75) standard was included in the study (381). Those who did not give consent /assent and who were absent on the day of study were excluded. Around 373 students were selected for the study using Convenience Sampling method. Informed written consent from parents and the Assent from students were obtained a day prior to the start of the study.

A Pre-validated, Semi-structured questionnaire was used for the study. This includes a pretest question regarding the use of Smokeless tobacco and Non tobacco products among them to assess their Knowledge, Attitude and Practice regarding tobacco usage. After the Pretest, Health awareness was given on Tobacco use and its ill effects using Power point presentation. After 2 weeks, Post test was conducted among same students and the results were entered in Microsoft Excel and analysed using SPSS software version 23.0. Quantitative data was expressed in Mean, range and qualitative data was expressed proportion. Chi square test was used to find association and p value <0.05 was considered as significant.

Table 1. Distribution of study participants based on selected Socio-Demographic Characteristics (N=373)

Socio-Demographic Characteristics	**Frequency (Percentage)**
Age (in years)	
< 13	151 (40.4%)
> 13	222 (59.6%)
Gender	
Male	213 (57.1%)
Female	160 (42.9%)
Standard of Education	
7^{th}	140 (37.6%)
8^{th}	81 (21.7%)
9^{th}	78 (20.9%)
10^{th}	74 (19.8%)

Results

Table 1 shows the socio demographic characteristics of the students involved in the study. The students were in the age range of 11-15 years. Out of 373 participants, majority 59.6% (222) of them were > 13 years. Majority of the participants were male 213 (57.1%) and the remaining 160 (42.9%) were female. Student's distribution was slightly higher 140 (37.6%) in the 7th standard and almost equal (~20%) in the 8th, 9th and 10th standards (Table 1).

Table-2 shows that among 373 participants, 362 (97%) were already aware about ill effect of tobacco usage in the pretest. Knowledge about Second Hand Smoking (SHS) / Passive Smoking was 59 (16%) in the pretest and it increased to 346 (93%) during post-test. Majority of participants 309 (83%) learned that Smoking affects the person who smokes and the surrounding person and also the Environment in post-test when compared to pre-test 148 (40%). Knowledge about COTPA Act improved in the post-test 360 (97%) when compared to 266 (71%) in the pretest. Pre-test results shows that 345 (92%) were already aware that Tobacco affects Environment. Following awareness talk 340 (91%) has accepted it is possible to quit tobacco for an addicted person which was 162 (43%) during pre-test. Only 32 (9%) knows the helpline number for quitting tobacco in pre-test and it increased to 361 (97%) in post-test (Table 2).

Figure 1 shows out of 373 students, post test results showed 329 students (88.2%) were made aware that tobacco usage can cause various Ill effects like Mouth cancer, Lung cancer, Heart attack, Ulcer, Leukoplakia after the awareness session (Figure 1)

Table 3 determines the association after 2 weeks following awareness session between awareness about Ill effects of Tobacco usage and quit rate of NTP / SLT, the post-test results showed 66% of students who were using NTP/STP had quit it's use when compared 34% of students who did not quit and this proportion was statistically significant with p value < 0.039. (Table 3).

Figure 2 describes that students have developed Negative attitude towards Tobacco usage in any form after the awareness session (Figure 2).

Table -2: Comparison of Knowledge between pre-test and post-test among students (N=373)

Knowledge		**PRE-TEST**	**POST -TEST**
		Frequency (Percentage)	Frequency (Percentage)
Ill effects	Aware about ill effects	362 (97%)	365 (98%)
	Not Aware about ill effects	11 (3%)	8 (2%)
Second Hand Smoking / Passive smoking	Heard about SHS / PS	59 (16%)	346 (93%)
	Not heard about SHS / PS	314 (84%)	27 (7%)
Effect of Smoking	Only that person	29 (8%)	7 (2%)
	That person & Surrounding person	135 (36%)	34 (9%)
	Environment	38 (10%)	18 (5%)
	Nil	23 (6%)	5 (1%)
	That person & Surrounding person and Environment	148 (40%)	309 (83%)
COTPA Act	Aware about COTPA Act	266 (71%)	360 (97%)
	Not Aware about COTPA Act	107 (29%)	13 (3%)
Effect on Environment	Aware that Tobacco affects Environment	345 (92%)	366 (98%)
	Not Aware that Tobacco affects Environment	28 (8%)	7 (2%)
Quitting Tobacco	Aware that it is possible to quit tobacco	162 (43%)	340 (91%)
	Not Aware that it is possible to quit tobacco	211 (57%)	33 (9%)
Helpline Number for quitting Tobacco	Aware about Helpline number for quitting Tobacco	32 (9%)	361 (97%)
	Not Aware about Helpline number for quitting Tobacco	341 (91%)	12 (3%)

*SHS – Second Hand Smoking, PS – Passive Smoking, COTPA – Cigarettes and Other Tobacco Products Act

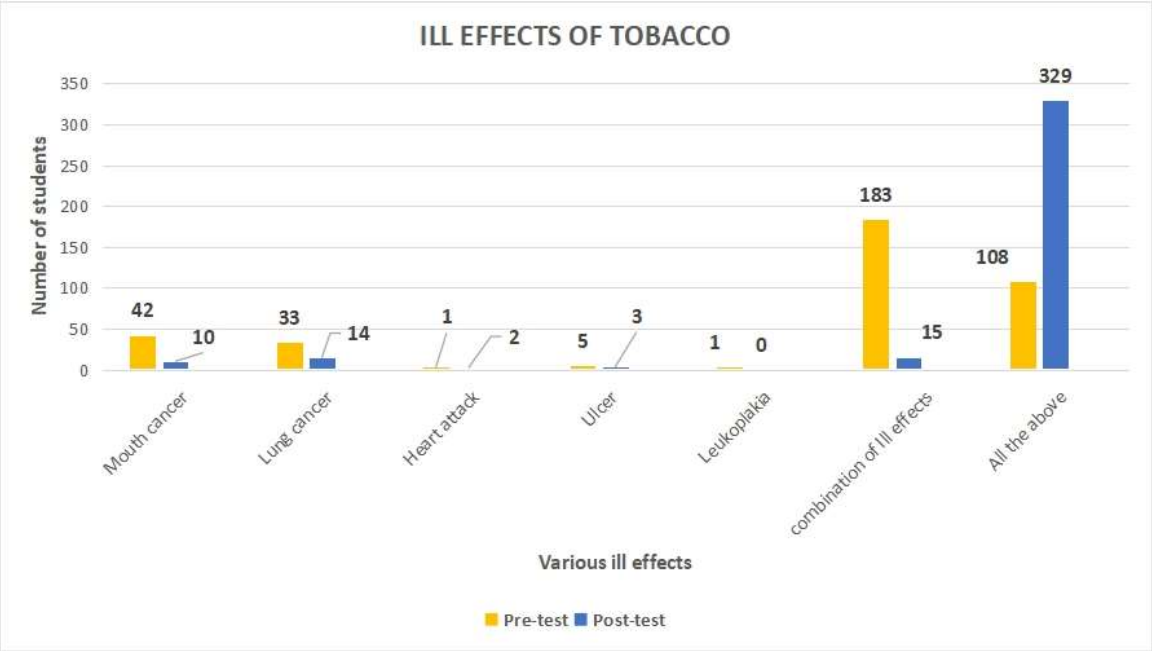


Figure1. Pre-test and post-test comparison of Knowledge about Ill effects of Tobacco usage (n=373)

Table 3. Association between awareness about Ill effects of Tobacco usage and Number of students who quit NTP / SLT in post-test (N=69)

Awareness of Ill effects of Tobacco usage	Quit use of NTP / SLT		Significance P value (chi- square)
	Yes	No	
Yes	43 (66%)	22 (34%)	0.039 (6.509)
No	2 (50%)	2 (50%)	

*Using chi square, significant if p value is < 0.05

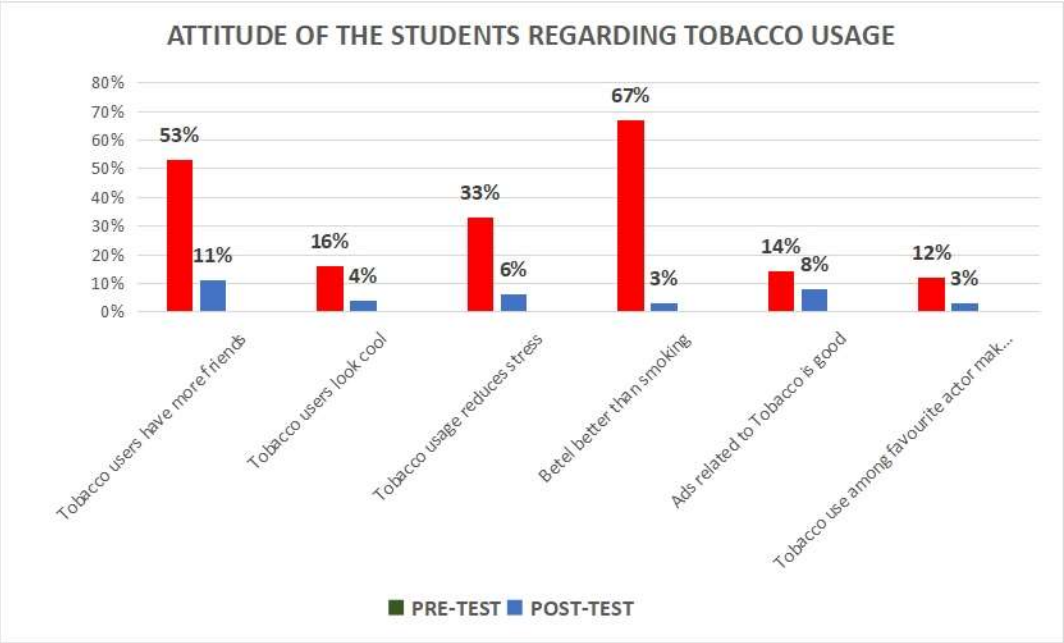


Figure 2. Attitude of the students regarding Tobacco usage (N=373)

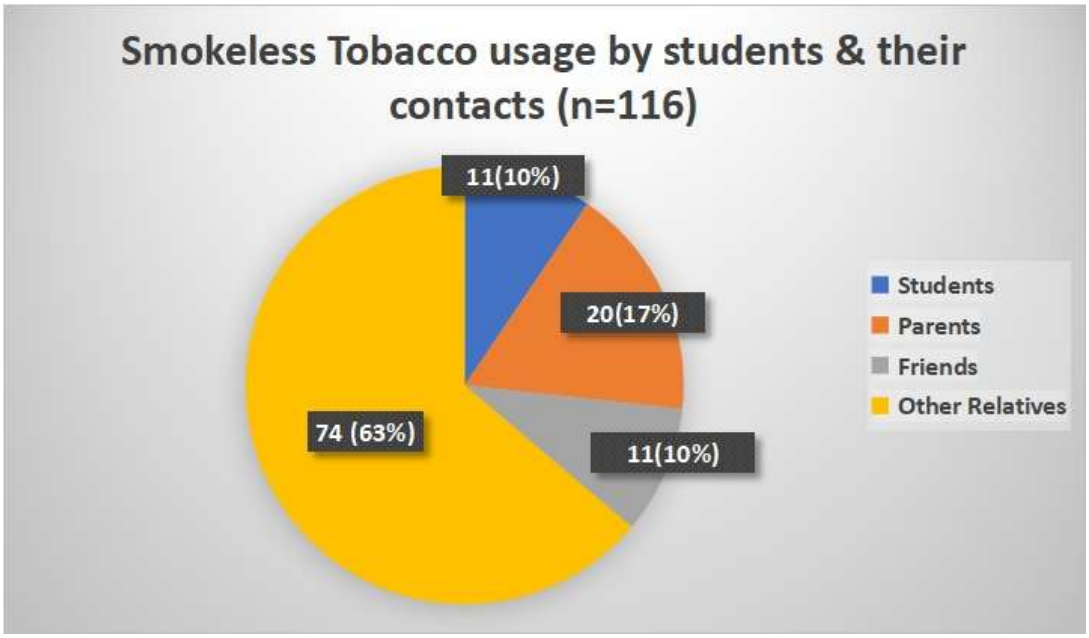


Figure 3. Smokeless Tobacco usage by Students and their Contacts (n = 116)

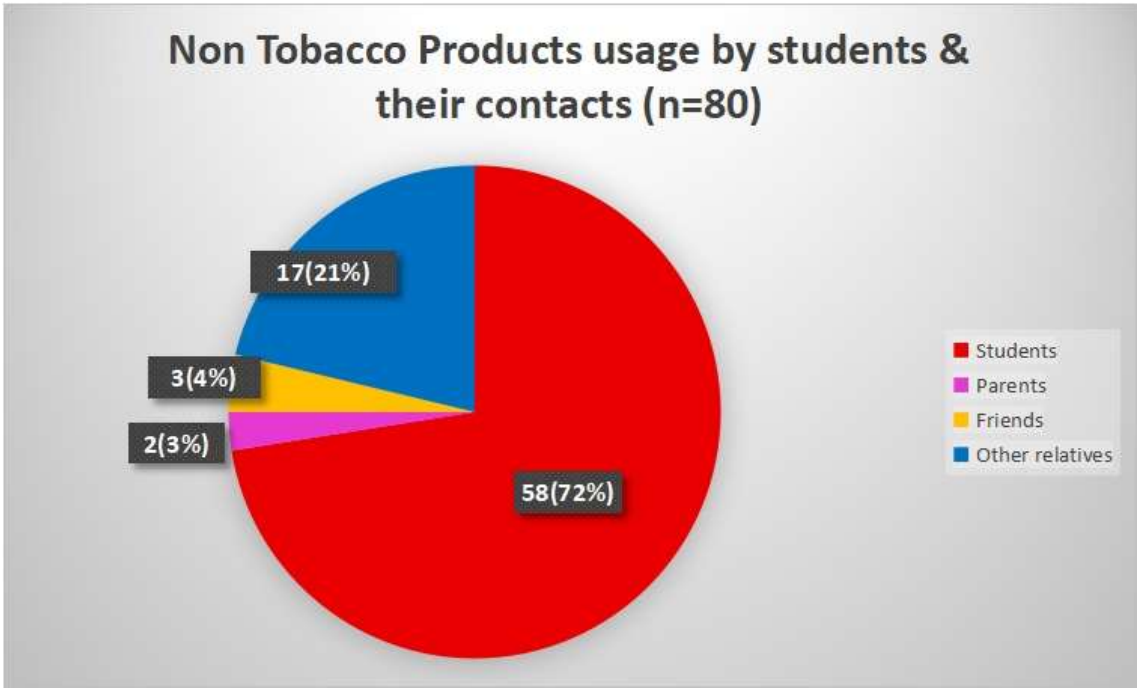


Figure 4. Non-Tobacco Products usage by Students and their Contacts (n=80)

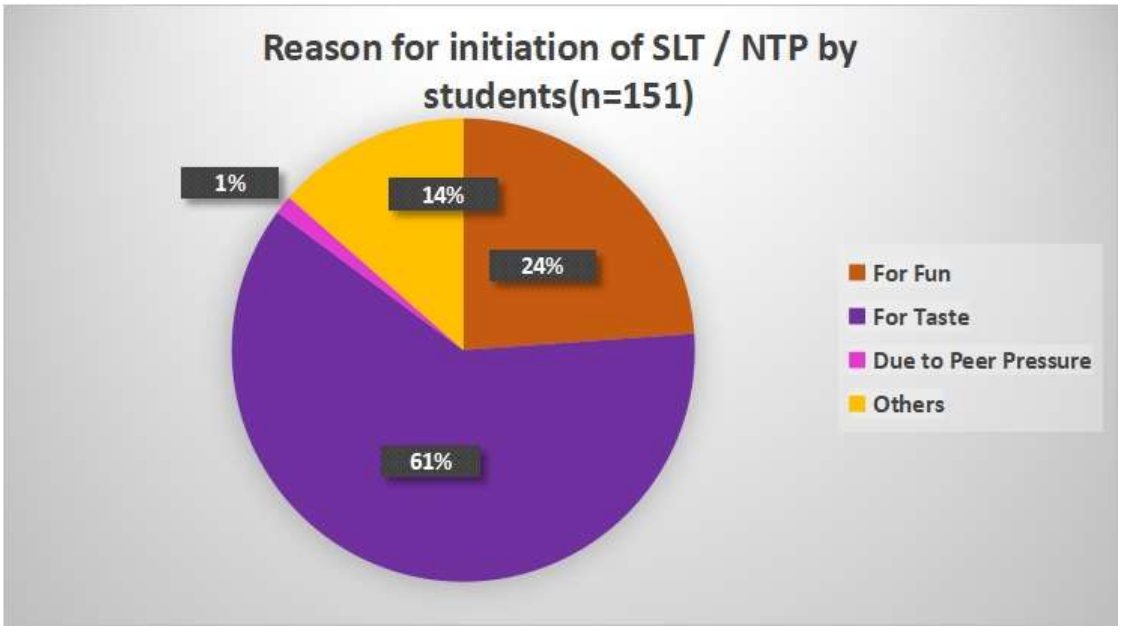


Figure 5. Reason for Initiation of Smokeless Tobacco and Non- Tobacco Products (n=151)

Figure 3 shows the use of smokeless tobacco by students and their contacts (n=116). It was found that 74 (63%) was among relatives, 20 (17%) by parents followed by 11 (10%) by friends and 11(10%) by students themselves (Figure 3).

Figure 4 determines the Usage of Non-Tobacco Products among students and their contacts (n=80). Results shows that 58 (72%) students use NTP, 17 (21%) by relatives, 3 (4%) by friends and 2 (3%) by parents (Figure 4).

The reason for initiation of NTP/SLT by students is explained in Figure-5 (n=151). It shows that majority of students 94 (61%) had tried it for taste, 37 (24%) for fun, 2(1%) due to peer pressure and 18 (14%) due to other causes (Effect of mass media/social media, since it is easily available, Because of family members compulsion) (Figure 5).

Discussion

People in India are addicted to nicotine in various forms. This study focuses on the KAP related to tobacco use and the impact of the interventions on KAP. Among 373 students participated the mean age was 13 years whereas another study done by Patel PR et al (4) found that the Mean age for use of tobacco products was 9 years. Majority were boys 57 % (213) and 43% (160) were girls. Of 373 students 365 (98%) felt that it was harmful to health in post-test which is similar to study done by Rangey et al. [9] was around 84%. Parental use of Smokeless Tobacco and Non-Tobacco products were second highest among family members and friends which supports the results of study done by Ravishankar et al. [10] where it states that Parental Tobacco status especially place of use had a significant influence on adolescents experimenting tobacco.

Majority of students 79% came to know about Tobacco from social media / Mass media that is similar to study done by Rangey et al. [9] that showed around 78% had seen tobacco warnings in media. 98% (366) students accepted that Tobacco contribute to Environment pollution and contamination in post-test.

Long term use of Non tobacco products may lead a path to consumption of tobacco products in future. But in our country NTP consumption is not restricted for any particular age groups and it is accepted as social habit. Here in this study the NTP intake among 373 participants was 16% (58) compared to study done by Patel et al. [4] where the NTP consumption rate is 36.5%.

The reason for initiation of NTP and SLT in our study is for taste (61%) followed by for fun (24%). Study by Patel et al. [11] concluded that reason for initiation of tobacco as Economic problems (66.8%) followed by problems in family (64.7%) and problems with friends or near one (60.3%).

In a study of Patel et al. [4], it was found that the quit rate of SLT and NTP was 48.5% after intervention. In our study the quit rate was 66% after awareness session. Varying quit rate in our study as compared to other study could be due to level of understanding of students which invariably depends on their intellectual abilities and high-level advent of social media in students' life.

Conclusion

This study shows that maximum students were aware about the ill effects of tobacco usage and students developed a negative attitude towards tobacco use after awareness session. Tobacco uses among family/friends kindle the students to take tobacco products. This information must be conveyed to the parents to make a behavioural change among them and their children. School-based tobacco (smoking

and smokeless) prevention programs for community awareness can be planned only if we know the current frequency of student's using it and their knowledge regarding tobacco. This study will help in implementation of Policy, Planning and creating Tobacco free Environment that helps in reducing the morbidities related to tobacco.

Limitations of the Study

The study was conducted only in one private school of Rural in our city so generalisability of results to Government schools and Urban in our city could be compromised. There could be under reporting of its usage as tobacco use is a sensitive issue to be reported at the first instance.

Strength of the Study

Since the initiation of SLT and NTP begins in their school life, this study is an opportunity to create awareness among budding students as early as possible in their life

Recommendation

1. It is recommended to increase the number of tobacco awareness programmes in schools and colleges.
2. Addictions to drugs and other substances like Tobacco, Alcohol and their ill effects should be added in their curriculum as a part of school-based education.
3. Specific training for teachers in Tobacco cessation program and knowledge of smokeless tobacco should be done as they play a pivotal role in molding a child's behaviour.
4. Involvement of parents in the school-based tobacco cessation programme as parental smoking is not only detrimental to the parents but also to the children.
5. Author Contribution - Reinforcement of the message regarding the prevention of initiation of SLT and non-tobacco products among adolescents is indeed need for the country. This study will thus carve the path for policy making and implementation in future**.**

Statements and Declarations

Conflicts of interest

The authors declares that they do not have conflict of interest.

Funding

No funding was received for conducting this study.

Ethics approval

Research Committee and Institutional Ethics Committee (No:112/SVMCH/IEC-Cert/October23 dated on 13.10.2023).

Human and animal rights

This article does not contain any studies with human participants or animals performed by any of the authors.

Informed consent

For this type of study formal consent is not required.

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ORIGINAL ARTICLE

Incidence and Severity of Neuraxial Anesthesia-Related Back Pain in Postpartum Women: Insights from a Cross-Sectional Study

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Abstract

Introduction: Back pain is a prevalent global health issue, particularly among women during the postpartum period. Neuraxial anesthesia, commonly used in procedures such as cesarean section, is associated with complications, including postspinal back pain (PSBP). However, limited data exist on its incidence and characteristics, especially within specific demographic groups. This study aimed to examine the prevalence and features of PSBP among women who underwent neuraxial anesthesia for cesarean section in a tertary care center in south India. **Materials and Methods:** A cross-sectional study was conducted involving 168 women who underwent spinal anesthesia for cesarean section between January 2015 and December 2018. Data were collected through telephone interviews, utilizing a structured proforma covering sociodemographic profiles, pain characteristics, and disability assessment using the Oswestry Disability Scale. Descriptive statistics and chi-squared test were used for data analysis. **Results:** Among the participants, 40.5% reported experiencing back pain after neuraxial anesthesia, with 39.3% experiencing pain post-delivery and 1.2% since their first delivery. The majority of participants were under 30 years old (78%) and homemakers (92.3%). Severity of back pain varied, with 22.06% classified as mild, 35.29% as moderate, and 42.65% as severe. Statistical analysis revealed a significant association between the number of children and the incidence of back pain ($p<0.05$). **Conclusion:** The research emphasizes a significant proportion (40.5%) of postpartum back pain (PSBP) in women who have cesarean sections with neuraxial anesthesia. The intensity of pain experienced varied, with a notable link detected between the number of children a woman has and the likelihood of experiencing back pain. These results highlight the necessity of recognizing and managing factors that contribute to PSBP, aiming to enhance maternal health and recovery after surgery.

Keywords: Back pain, Neuraxial anesthesia, Cesarean section, Postspinal back pain, Postpartum, Prevalence.

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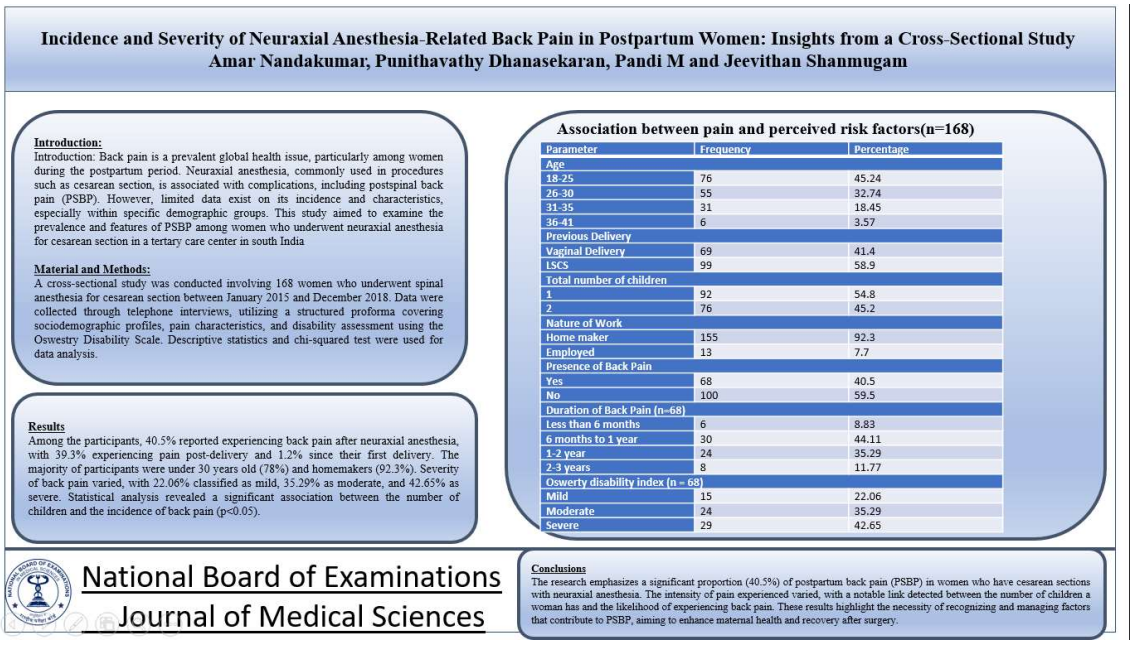
Graphical Abstract



Introduction

Back pain is a prevalent health issue globally, affecting a significant proportion of the population at some point in their lives. It imposes substantial physical, psychological, and economic burdens on both individuals and societies. The term "back pain" encompasses a spectrum of discomforts and pathologies involving the muscles, nerves, bones, and supporting structures of the spine [1].

The adoption of neuraxial anesthesia/analgesia, particularly spinal anesthesia (SA), has become widespread across various surgical interventions due to its efficacy and safety profile. However, alongside its benefits, neuraxial anesthesia is associated with complications, foremost among them being postspinal back pain (PSBP). This complication is of particular concern, given its potential to undermine patient comfort and surgical outcomes [2,3].

The incidence of back pain, including PSBP, is staggering, with studies indicating that between 50% and 80% of individuals experience back pain at some juncture in their lives. Chronic low back pain, characterized by persistent discomfort lasting beyond three months, affects approximately 23% of the population and contributes to substantial disability rates, affecting 11-12% of individuals [2,4-7].

Among women, back pain assumes added significance, especially during the postpartum period. Studies reveal that lower back pain is a common complaint among postpartum women, further highlighting the need for a comprehensive understanding of its etiology, risk factors, and management strategies. Despite the recognized importance of addressing postoperative pain, particularly chronic pain after surgical procedures such as cesarean section (CS) with spinal anesthesia, there is a paucity of data regarding its incidence, especially within

specific demographic groups such as the Asian population. Chronic pain following CS not only impairs functional abilities but may also disrupt the maternal-infant bonding process, underscoring the urgency of identifying predisposing factors and implementing targeted preventive measures [4,5,8,9].

Against this backdrop, this study aims to investigate the incidence of back pain, with a specific focus on PSBP, among women who underwent neuraxial anesthesia/analgesia. By elucidating the prevalence and associated features of back pain in this context, this research endeavors to inform clinical practice and facilitate the development of tailored interventions to mitigate the burden of postoperative pain and optimize patient outcomes.

Materials and Methods

This cross-sectional study was conducted at a tertiary care center in south India after receiving approval from the Institutional Health Ethics Committee (IHEC) between June and December 2019. The study aimed to investigate the experiences of patients who underwent Neuraxial anesthesia at the center between January 2015 and December 2018.Patients who had underwent spinal anaesthesia for Caesarean section during the specified period were contacted via telephone and provided with detailed explanations regarding the study's purpose, objectives, and ethical considerations. They were then invited to participate in the study, and only those who provided consent were included. Out of the 1372 mothers contacted, 168 agreed to participate.

A structured proforma was developed and validated prior to commencing the study. This proforma included sections covering sociodemographic profiles, pain status before and after the procedure, and the Oswestry Disability Scale was employed to assess pain characteristics, duration, exacerbating and relieving factors, and any associated conditions. Data collected from the participants were entered into Microsoft Excel and analyzed with SPSS version 27. Descriptive statistics, including mean with standard deviation and frequency with percentages, were utilized to describe the data. The association between pain and various parameters or risk factors was examined using the Chi-square test, with a significance level set at $p<0.05$.

Results

A retrospective cross-sectional study was conducted to determine the prevalence of lower back pain (LBA) in women who underwent Lower Segment Cesarean Section (LSCS) under spinal anesthesia. The study included 1372 women who delivered at our hospital between 2015 and 2018. From June to December 2019, at least six months after the procedure, we contacted these women by phone. Out of those contacted, 168 women consented to participate in the study. Those who experienced back pain were further questioned about the pain's characteristics, duration, exacerbating and relieving factors, and any associated conditions.

The mean age of the participants was 26.9 years, with an age range of 19 to 41 years. Most participants (78%) were under 30 years old, and over 96% were under 35 years old. Among the participants, 54.8% were delivering their first child, while 45.2% were delivering their second child. Additionally, 92.3% of the participants were homemakers.

Among the participants, 40.5% reported experiencing back pain after neuraxial anesthesia. Of those, 39.3% experienced back pain after their recent delivery, while 1.2% reported pain since their first delivery. Among those reporting pain, 8.83% experienced it for less than 6 months, 44.11% for 6 months to one year, and the remaining 35.29% for 1-2 years. The severity was assessed using the Oswestry Disability Index, with 22.06% being classified as having mild pain, 35.29% as moderate pain, and 42.65% as severe pain (Table 1).

We analyzed the association of pain with the number of children, and their employment status using chi-square tests. There was no significant association between their nature of employment and pain. However, 33.69% of women who gave birth to one child reported pain, compared to 48.68% of those who gave birth to two children, and this association was statistically significant (Table 2).

Furthermore, we assessed the association between the Oswestry Disability Index with number of children, and employment status using chi-square tests, but found no significant associations.

Table 1. Distribution of study population according to socio demographics

Parameter	**Frequency**	**Percentage**
Age		
18-25	76	45.24
26-30	55	32.74
31-35	31	18.45
36-41	6	3.57
Previous Delivery		
Vaginal Delivery	69	41.4
LSCS	99	58.9
Total number of children		
1	92	54.8
2	76	45.2
Nature of Work		
Home maker	155	92.3
Employed	13	7.7
Presence of Back Pain		
Yes	68	40.5
No	100	59.5
Duration of Back Pain (n=68)		
Less than 6 months	6	8.83
6 months to 1 year	30	44.11
1-2 year	24	35.29
2-3 years	8	11.77
Oswerty disability index (n = 68)		
Mild	15	22.06
Moderate	24	35.29
Severe	29	42.65

Table 2. Association between pain and perceived risk factors (n=168)

Parameter	Sub classification	Pain Present		Pain Absent		CSV	P Value
		F	%	F	%		
	LSCS	40	40.40	59	59.60		
Number of Children	1	31	33.69%	61	66.31	3.881	0.049
	2	37	48.68%	39	51.32		
Employment status	House Wife	66	42.58	89	57.42	3.682	0.055
	Employed	2	15.38	11	84.62		

Discussion

This retrospective study was conducted to know if Neuraxial Anesthesia is associated with Low back ache or not. A total of 168 mothers participated. The prevalence of Low back ache was found to be 40.5%. In a study done in turkey in 2022, The Prevalance of Low back pain was 18.8% in Turkey in a study done by Hizir et al. [5]. In another study done by Mukhopadhyay et al. [4] in 2019 in West Bengal, India reported 22.2% prevalence of Back ache. In a study done in Ethiopia in 2021 by Zeleke et al., the prevalence was 40.5% [2]. In Germany [10] and Korea [11], the prevalence was 40% and 32% respectively. It was 10% in Singapore [9].

Back pain during and after pregnancy, particularly following neuraxial anesthesia, is a multifaceted issue which is influenced by various physiological, anatomical, and procedural factors.

Physiological and Anatomical Changes during pregnancy

During pregnancy, hormonal changes, such as increase in the levels of hormone namely relaxin, alongside biomechanical alterations and weight gain, contribute to spinal imbalance and increased lordotic posture [5]. These changes place additional strain on the spine, predisposing women to low back pain (LBP) during and after pregnancy.

1. **Anesthetic Technique and Persistent Low Back Pain (LBP)**

Persistent lower back pain (LBP) following either cesarean section (CS) or vaginal delivery doesn't exclusively correlate with the type of anesthesia administered but is instead influenced by physiological and anatomical changes during pregnancy. Despite this, a significant number of women may still encounter persistent LBP after undergoing a cesarean section [4,5,8].

2. **Spinal Anesthesia and Neuropathic Pain**

While spinal anesthesia increases the neuropathic pain risk, the severity of pain perception is influenced by various factors beyond the anesthesia type. Lifestyle stress, anxiety, and depression can modulate pain perception levels, complicating the relationship between anesthesia and pain outcomes [1,2,4,11].

3. **Soft Tissue Damage and Lumbar Puncture Attempts**

Soft tissue damage during spinal anesthesia, possibly due to multiple lumbar puncture attempts, increases the risk of post-spinal back pain (PSBP). Higher BMI is associated with increased PSBP risk, potentially due to difficulties in identifying landmarks during lumbar puncture in obese patients [1,2,4,12].

4. Needle Type and Size

Despite extensive research on the type and size of spinal needles used for anesthesia, no significant variance in the occurrence of postoperative backache has been consistently observed between different needle types or sizes. Specifically, studies have produced inconsistent findings regarding the relationship between the type and size of needles used for neuraxial anesthesia and the incidence of postoperative backache. Furthermore, pre-existing back pain is recognized as a notable risk factor for persistent back pain following neuraxial anesthesia [2,4].

5. Posture and Epidural-Related Back Pain

Epidural anesthesia can lead to muscular relaxation and immobility, promoting stressed positions during labor and delivery. Prolonged poor posture under epidural anesthesia may contribute to chronic LBP post-delivery, exacerbated by the physical and physiological changes experienced during pregnancy and childbirth [1,4].

6. Additional Factors and Considerations

Urinary tract infections have been associated with an increased risk of LBP in postpartum women, suggesting a potential interplay between infection and pain perception [5,12,13].

Maternal workload, including repetitive bending and lifting, as well as hormonal and vascular changes, contribute to increased strain on the lower back [4,6,8,9].

The presence of epidural hematoma may exacerbate the risk of developing LBP [13].

7. Complex Nature of Back Pain

Back pain is a complex condition with various contributing factors, making it challenging to identify a single source of pain in many cases [3,4,13].

A notable limitation of our study on back pain prevalence among pregnant women following neuraxial anesthesia during delivery is the low participation rate. Out of 1672 individuals contacted, only 168 agreed to participate, potentially introducing selection bias. This bias could skew prevalence estimates if individuals who experienced back pain were more likely to participate, thus inflating the reported prevalence. Conversely, if those with severe back pain were less inclined to participate, the prevalence estimate may underestimate the true burden of back pain. Strategies to improve participation rates and sensitivity analyses to assess the impact of selection bias were not employed in this study. Therefore, caution should be exercised when generalizing our findings, as they may not fully represent the experiences of the broader population of pregnant women undergoing neuraxial anesthesia.

To address the limitations of our current study and further elucidate the association between neuraxial anesthesia and back pain among pregnant women, future research avenues should explore conducting large-scale prospective studies across multiple centers. By leveraging data from diverse populations and settings, these studies can provide a more comprehensive understanding of the factors contributing to back pain prevalence and its association with anesthesia techniques. Additionally, a multi-center approach allows for the examination of potential variations in practice patterns, patient demographics, and clinical outcomes, enhancing the

generalizability and robustness of findings. Moreover, these studies could incorporate comprehensive assessments of patient characteristics, procedural details, and postpartum outcomes to better inform clinical decision-making and optimize perioperative care for pregnant women. By advancing our understanding through rigorous multi-center investigations, we can effectively address the complexities surrounding back pain after neuraxial anesthesia and improve maternal outcomes on a broader scale.

Conclusions

Back pain after spinal anesthesia in pregnant women is influenced by a myriad of factors, including physiological changes during pregnancy, procedural aspects of anesthesia administration, and postpartum conditions. Understanding these complexities is crucial for implementing strategies to mitigate the risk of back pain and improve maternal outcomes during and after delivery.

Statements and Declarations

Conflicts of interest

The authors declare that they do not have conflict of interest.

Funding

No funding was received for conducting this study.

Ethics approval

Ethical approval obtained from the institute.

Human and animal rights

All ethical principles were strictly adhered by the authors.

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ORIGINAL ARTICLE

Exploring the regrets for joining medical profession and Its Determinants Among Phase I MBBS Students: A Mixed-Methods Study

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Abstract

Objectives: To determine the proportion of Phase I MBBS students regretting their choice of joining medical profession; and to assess the reasons for regretting their choice of joining medical profession. **Methods:** This was a questionnaire based, mixed-methods, cross-sectional study conducted among Phase I medical students pursuing Bachelor of Medicine, Bachelor of Surgery (MBBS) in MCI/NMC recognised institutions across India. **Results:** In this study involving 1060 Phase I MBBS students, 32.0% regretted their decision to pursue medicine. Factors contributing to regret included societal pressure, demanding nature of education and profession, lack of support systems, negative patient attitudes, and COVID-19 stress. Notably, 53.7% of those regretting cited the pandemic's influence, while 51.3% desired super specialization. Those regretting were more likely to doubt their career choice before joining (58.1%), compared to 21.6% who didn't regret. Additionally, 56.3% of regretful students preferred clinical specialization, and 34.0% had taken education loans. Demographics showed significance in parental medical background (11.2% regretful vs. 7.2% non-regretful with doctor fathers). Qualitative analysis emphasized the need for parental guidance reconsideration and systemic improvements to alleviate stress and enhance support structures within medical education. **Conclusion:** The findings underscore the complex interplay of personal, environmental, and systemic factors shaping students' perceptions of their chosen profession. To mitigate the negative consequences of regret and promote career satisfaction among medical students, targeted interventions and support services are needed.

Keywords: Regret, Medical student, India, Career, Satisfaction

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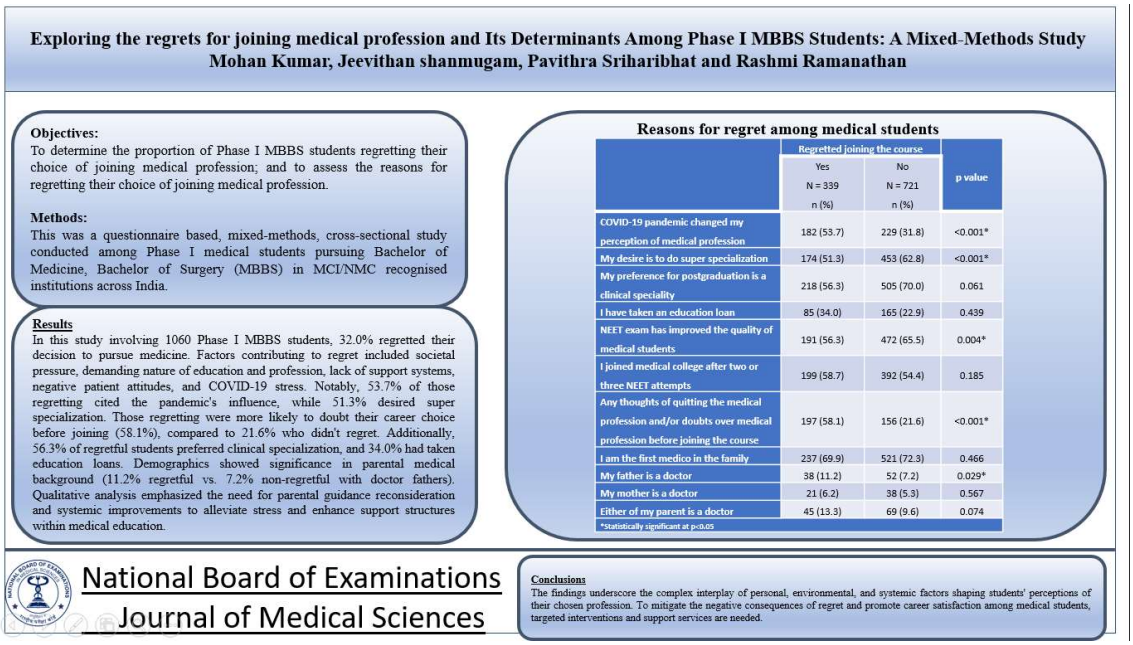
Graphical Abstract



Introduction

The pursuit of a career in medicine is often regarded as a noble and esteemed endeavour, attracting individuals with a passion for healing and a desire to serve humanity [1]. However, the journey towards becoming a medical professional is not without its challenges, and the decision to embark on this path is a significant one that can shape the course of one's life and career [2]. In recent years, there has been growing interest in understanding the factors influencing career satisfaction and decision-making among medical students, particularly in light of the evolving landscape of healthcare and medical education.

The present study aims to explore the phenomenon of regret among Phase I MBBS students – those in the initial phase of their Bachelor of Medicine, Bachelor of Surgery (MBBS) training – regarding their decision to pursue a career in medicine. Regret, defined as the feeling of disappointment or remorse over a past decision, is a complex and multifaceted emotion that can have profound implications for individuals' well-being, career trajectories, and overall satisfaction with their chosen profession [3,4]. While previous research has examined various aspects of medical education and career satisfaction, limited attention has been paid to the experience of regret among medical students and its underlying causes [5-7].

Understanding the factors contributing to regret among Phase I MBBS students is crucial for informing interventions and support services aimed at promoting career satisfaction and well-being within the medical profession [8]. To address this gap in the literature, the present study employs a mixed-methods approach, combining quantitative analysis of survey data with qualitative exploration of participants' experiences and perspectives. By examining both the prevalence of regret and the reasons behind it, this study seeks to provide a comprehensive understanding of the challenges faced by Phase I MBBS

students and the factors influencing their perceptions of their chosen profession.

The findings of this study have the potential to inform medical education policy, curriculum development, and support services aimed at enhancing student well-being and career satisfaction. By identifying the sources of regret and addressing them proactively, medical schools and healthcare institutions can create a more supportive and fulfilling learning environment for future medical professionals.

Against this background, the objectives of the present study were to determine the proportion of Phase I MBBS students regretting their choice of joining medical profession; and to assess the reasons for regretting their choice of joining medical profession.

Materials and Methods

This was a questionnaire based, mixed-methods, cross-sectional study conducted among Phase I medical students pursuing Bachelor of Medicine, Bachelor of Surgery (MBBS) in MCI/NMC recognised institutions across India. The study was approved by the Institutional Human Ethics Committee (IHEC), KMCH Institute of Health Sciences and Research, Coimbatore, Tamil Nadu, India (40/IHEC/2020). All Phase 1 medical students willing to provide informed written consent were included in the present study.

A purpose predesigned questionnaire was used through Google Forms platform – the need for the study was explained in the first section; participant rights and data confidentiality statement was provided in second section along with willingness to participate in the study using a "I consent to participate in the study" tab. Participants willing to participate continued filling the questionnaire, while those not consenting to participate submitted the form/logged out. The Google Forms link was shared with potential participants through social media platforms (including Facebook, Twitter), known/unknown, direct/indirect, formal/informal contact networks.

The quantitative data was analysed using SPSS v27. Descriptive analysis was presented using numbers and percentages for categorical variables; mean (standard deviation) or median (interquartile range) for continuous variables. To test for association, we used Chi square test or Fisher's exact test for categorical variables; and independent 't' test for continuous variables. Statistical significance was considered at $p<0.05$. The qualitative data obtained was analysed using manual, theoretical thematic content analysis following the steps endorsed in Braun and Clarke's six-phase framework [9]. The transcripts were read and re-read to ensure familiarity with the data corpus. Also, the notes were made, and early impressions jotted down. The data was then organized in a systematic meaningful way by generating codes. Because each open-ended question was thematically enquired about, the data was thematically sorted to start with. However, it was ensured whether the themes make sense, data supports these themes, trying to fit too much into a theme, there any overlaps, any subthemes within predetermined themes, or other novel themes within the data. The results was presented according to the themes. Under each theme, codes and supportive manually chosen verbatims were provided (Tables 1 and 2).

Table 1. Reasons for regret among medical students

	Regretted joining the course		p value
	Yes N = 339 n (%)	No N = 721 n (%)	
COVID-19 pandemic changed my perception of medical profession	182 (53.7)	229 (31.8)	<0.001*
My desire is to do super specialization	174 (51.3)	453 (62.8)	<0.001*
My preference for postgraduation is a clinical speciality	218 (56.3)	505 (70.0)	0.061
I have taken an education loan	85 (34.0)	165 (22.9)	0.439
NEET exam has improved the quality of medical students	191 (56.3)	472 (65.5)	0.004*
I joined medical college after two or three NEET attempts	199 (58.7)	392 (54.4)	0.185
Any thoughts of quitting the medical profession and/or doubts over medical profession before joining the course	197 (58.1)	156 (21.6)	<0.001*
I am the first medico in the family	237 (69.9)	521 (72.3)	0.466
My father is a doctor	38 (11.2)	52 (7.2)	0.029*
My mother is a doctor	21 (6.2)	38 (5.3)	0.567
Either of my parent is a doctor	45 (13.3)	69 (9.6)	0.074
*Statistically significant at p<0.05			

Table 2. Verbatims of medical students, as reasons for regretting the decision to join medical profession

Theme	Verbatim
Reasons for regret	Verbatim: "For people like me who come from a middle-class family, being 'settled' is a pressure. Medicine is considered a non-risky job by parents.” Verbatim: “Exams, hectic duty schedules are the times I regret the most”

	Verbatim: "The lack of supportive environment is medical colleges is what makes me regret" Verbatim: "Attitudes of patients towards doctors, abuse, treats make me regret my choice of serving them" Verbatim: "Atrocious behaviours of patients towards doctors; I have even thought of moving abroad" Verbatim: "COVID-19 has definitely increased the stress levels; particularly I am concerned about my family who are at a long distance" Verbatim: "My inability to perform well in academics has made my MBBS life stressful" Verbatim: "Lack of clarity regarding licensing exams, NEXT; and always changing NMC guidelines regarding these is very stressful" Verbatim: "We were ill-informed regarding the course; the working hours are insane; no role models; I have started using substances to cope with stress" Verbatim: "Career choices that parents put forward to children should change"

Results

A total of 1060 Phase I MBBS students participated in the present study. Nearly two third participants were males (63.6%) and one third were females (36.4%). The results showed that 339 (32.0%) students regretted the decision to join MBBS/medical profession. We conducted tests of association to determine the potential reasons for medical students to regret joining MBBS/medical profession.

The results showed that 53.7% of those who regretted joining the course reported that the COVID-19 pandemic changed their perception of the medical profession, compared to 31.8% of those who did not regret joining – a statistically significant difference ($p<0.05$). More than half (51.3%) the participants who regretted joining expressed a desire for super specialization, whereas 62.8% of those who did not regret expressed the same desire – a statistically significant difference ($p<0.05$). Other results showed that 56.3% of those who regretted joining believed that the NEET exam has improved the quality of medical students, while 65.5% of those who did not regret held the same belief; 58.1% of those who regretted joining had thoughts of quitting the medical profession and/or doubts over it before joining, while only 21.6% of those who did not regret had the same thoughts; and 11.2% of those who regretted joining had a father who is a doctor, while 7.2% of those who did not regret had the same – these difference were

found to be statistically significant ($p<0.05$).

More than half (56.3%) of those who regretted joining preferred a clinical specialty for postgraduation, while 70.0% of those who did not regret had the same preference; however, the difference was not statistically significant difference ($p>0.05$). Other results showed that 34.0% of those who regretted joining had taken an education loan, compared to 22.9% of those who did not regret; 58.7% of those who regretted joining joined medical college after two or three NEET attempts, compared to 54.4% of those who did not regret; 69.9% of those who regretted joining were the first medicos in their family, compared to 72.3% of those who did not regret; 6.2% of those who regretted joining had a mother who is a doctor, compared to 5.3% of those who did not regret; and 13.3% of those who regretted joining had either of their parents as doctors, while 9.6% of those who did not regret had the same – these differences were not found to be statistically significant ($p>0.05$).

Qualitative analysis

The reasons cited by Phase I MBBS students for regretting their decision to join medical profession included societal pressure, especially from middle-class families, to pursue a career perceived as non-risky like medicine, in order to achieve stability. Regret was also linked to the demanding nature of medical education and profession, particularly due to the stress induced by exams and hectic duty schedules. Participants cited the absence of a supportive environment within medical colleges as a contributing factor to their regret, indicating a need for better support systems. The negative attitudes and behaviours of patients towards doctors, including abuse and threats, were mentioned as reasons for regretting the choice of the medical profession. Some participants expressed extreme distress caused by the behaviours of patients and even contemplated moving abroad to escape such treatment.

The COVID-19 pandemic was highlighted as a source of increased stress, particularly concerning the health and safety of distant family members. The inability to perform well in academic endeavours during the MBBS program was mentioned as a significant stressor leading to regret. Participants expressed stress and regret due to the lack of clarity regarding licensing exams, such as the NEXT exam, and the frequent changes in guidelines by regulatory bodies like the NMC. Lack of information about the course structure, excessive workload, absence of role models, and resorting to substances to cope with stress were highlighted as contributing factors to regret. Some participants suggested a need for a shift in parental influence regarding career choices, indicating that traditional career paths should be reconsidered. These responses collectively illustrate various personal, environmental, and systemic factors contributing to regret among medical students and professionals.

Discussion

With the objective of determining the proportion of Phase I MBBS students regretting their choice of joining medical profession; and assessing the reasons for regretting their choice of joining medical profession, the results of the present study showed that nearly one third (32.0%) of Phase I MBBS students regretted their decision to join the medical profession.

This highlights an important aspect of career satisfaction and decision-making among medical students. Regret regarding career choice is a significant issue in medical education that can have implications for students' well-being, academic performance, and future career trajectories [10]. Regretting the decision to pursue medicine can lead to heightened stress, anxiety, and burnout among medical students [11]. Studies have shown that medical students experience high levels of psychological distress, with factors such as academic pressure, workload, and uncertainty about the future contributing to their mental health challenges [12]. Understanding the factors contributing to this regret is essential for promoting student satisfaction and retention within the medical profession [13].

The quantitative findings from the study shed light on various personal, environmental, and systemic factors contributing to regret among Phase I MBBS students. These factors include societal pressure, demanding nature of medical education and profession, lack of support systems, negative patient interactions, impact of the COVID-19 pandemic, uncertainty about licensing exams, and parental influence on career choices. It's intriguing to note that over half of the students who regretted joining the medical profession cited the COVID-19 pandemic as a significant factor influencing their perception [14]. This finding highlights the profound impact of external events on individuals' career decisions and underscores the need for resilience and adaptability in the medical profession, especially during times of crisis like a pandemic [15]. The statistically significant difference in the desire for super specialization or clinical speciality for postgraduation between students who regretted and those who did not regret their choice indicates varying career aspirations within the medical student population.[16] This finding suggests that individuals' career goals and expectations play a crucial role in their satisfaction with their chosen profession. The contrasting beliefs regarding the impact of the NEET exam on the quality of medical students raise questions about the effectiveness and fairness of medical entrance exams [17]. Further research could explore students' perceptions of the exam's utility and its alignment with their educational and career objectives [18]. The higher prevalence of pre-existing doubts and thoughts of quitting the medical profession among students who regretted their choice underscores the importance of career counselling and support services for medical students [19]. Addressing these doubts early on may help prevent future regret and improve overall career satisfaction. The lack of statistically significant differences in family background and education loan uptake suggests that these factors may not directly influence career satisfaction among Phase I MBBS students. However, exploring the impact of familial expectations and financial pressures on career decisions warrants further investigation [20].

The qualitative findings showed that the pressure from middle-class families to pursue a career perceived as stable, such as medicine, highlights the influence of societal expectations on career decisions. This finding resonates with previous research emphasizing the role of familial and societal pressures in shaping career choices among medical students [21]. Addressing misconceptions about career stability and promoting career diversity within medical education may help

alleviate such pressures. The demanding nature of medical education and profession, characterized by stress from exams and hectic duty schedules, emerged as a significant source of regret among participants. This finding aligns with existing literature highlighting the high levels of stress and burnout among medical students and professionals [22]. Introducing interventions to enhance coping mechanisms, promote work-life balance, and provide mental health support can mitigate the negative impact of these stressors. The absence of a supportive environment within medical colleges underscores the importance of fostering a culture of support and mentorship among faculty and peers. Creating avenues for peer support, mentorship programs, and counselling services can enhance student well-being and satisfaction with their educational experience. Participants' experiences of negative attitudes and behaviours from patients, including abuse and threats, highlight the challenges faced by medical professionals in their interactions with patients. Addressing patient-provider communication, promoting empathy training, and implementing measures to ensure the safety of healthcare workers can mitigate the impact of such negative interactions [23-25].

The heightened stress and anxiety caused by the COVID-19 pandemic, particularly concerning the health and safety of distant family members, underscore the need for enhanced support mechanisms and resilience-building strategies during times of crisis. The lack of clarity regarding licensing exams and frequent changes in guidelines by regulatory bodies contribute to student distress and regret [26]. Ensuring transparent communication, providing adequate preparatory resources, and involving stakeholders in decision-making processes can address these concerns. The resorting to substances to cope with stress highlights the importance of addressing mental health issues and promoting healthy coping mechanisms among medical students [27]. Implementing stress management programs and destigmatizing help-seeking behaviours can support student well-being. Participants' suggestions regarding a shift in parental influence on career choices underscore the need for promoting autonomy and exploration in career decision-making processes [28]. Encouraging open dialogue and providing career guidance resources can empower students to make informed choices aligned with their interests and values.

Addressing the root causes of regret among medical students requires multifaceted interventions at both individual and systemic levels. Medical schools and healthcare institutions can implement support services such as mentorship programs, counselling services, stress management workshops, and resilience-building activities to help students cope with the challenges of medical education and practice. Additionally, efforts to promote a supportive learning environment, enhance communication skills, foster empathy, and address systemic issues such as workload and regulatory changes can contribute to reducing student regret and promoting career satisfaction [29].

Regarding future research, longitudinal studies can investigate the impact of regret on academic performance, career satisfaction, specialty choice, and overall well-being throughout medical

training and beyond. Understanding the trajectories of students who experience regret can inform targeted interventions and support services to mitigate the negative consequences and promote positive outcomes.

Conclusion

This study documents the proportion of Phase I MBBS students who regret their decision to join the medical profession and explored the underlying reasons for their regrets like societal pressure, the demanding nature of medical education and profession, lack of support systems, negative patient interactions, impact of the COVID-19 pandemic, uncertainty about licensing exams, and parental influence on career choices. The finding that 32.0% of participants experienced regret highlights the importance of influencing career satisfaction and decision-making among medical students. These findings underscore the complex interplay of personal, environmental, and systemic factors shaping students' perceptions of their chosen profession. To mitigate the negative consequences of regret and promote career satisfaction among medical students, targeted interventions and support services are needed. Medical schools and healthcare institutions can implement initiatives such as mentorship programs, counselling services, stress management workshops, and resilience-building activities. Additionally, efforts to foster a supportive learning environment, enhance communication skills, promote empathy, and address systemic issues can contribute to reduction in students regret and enhancing overall well-being.

Ethical Approval

The study was approved by the Institutional Human Ethics Committee (IHEC), KMCH Institute of Health Sciences and Research, Coimbatore, Tamil Nadu, India (40/IHEC/2020).

Conflicts of interest

The authors declares that they do not have conflict of interest.

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PERSPECTIVE ARTICLE

From Data Deficiency to Evidence-Based Interventions: The Case for a Poisoning Incident Database in India

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Abstract

Background: The increasing mortality and morbidity rates associated with poisoning in India have become a major public health concern. This short review paper discusses the urgent need for a comprehensive poisoning incident reporting and monitoring system to address data gaps and combat this threat at the national level. A national poisoning incident registry would not only provide traditional uses of data like aiding in the processes of planning, resource allocation, design of health programs, and public health research in the field of toxicology but also serve as a valuable tool for researchers investigating the scientific validity of using organs salvaged from poisoning cases for transplantation purposes. **Discussion:** With the emergence of biocrime as a stark reality in the post-COVID-19 era, the need for rigorous documentation of all poisoning incidents has become even more critical. Given the potential for molecular and genetic level threats, including bioterrorism, a strong public health surveillance system in the field of toxicology is essential in the future. **Conclusion:** The data on healthcare events is crucial for the proper implementation of healthcare programs, disease/issue control, and clinical decision-making. The Health Management Information System (HMIS) shows great promise in supporting decision-makers and healthcare professionals in providing high-quality care and reducing illness burden. The integration of toxicology event-related data in a registry on the lines of HMIS has a huge potential in improving the quality of health care in clinical toxicology scenarios in India. In conclusion, the implementation of a national toxicology incident registry is a categorical imperative to address the growing threat of poisoning fatalities in India.

Keywords: Poisoning, Epidemiology; Poisoning Incident Database; Digital Health; Clinical Toxicology.

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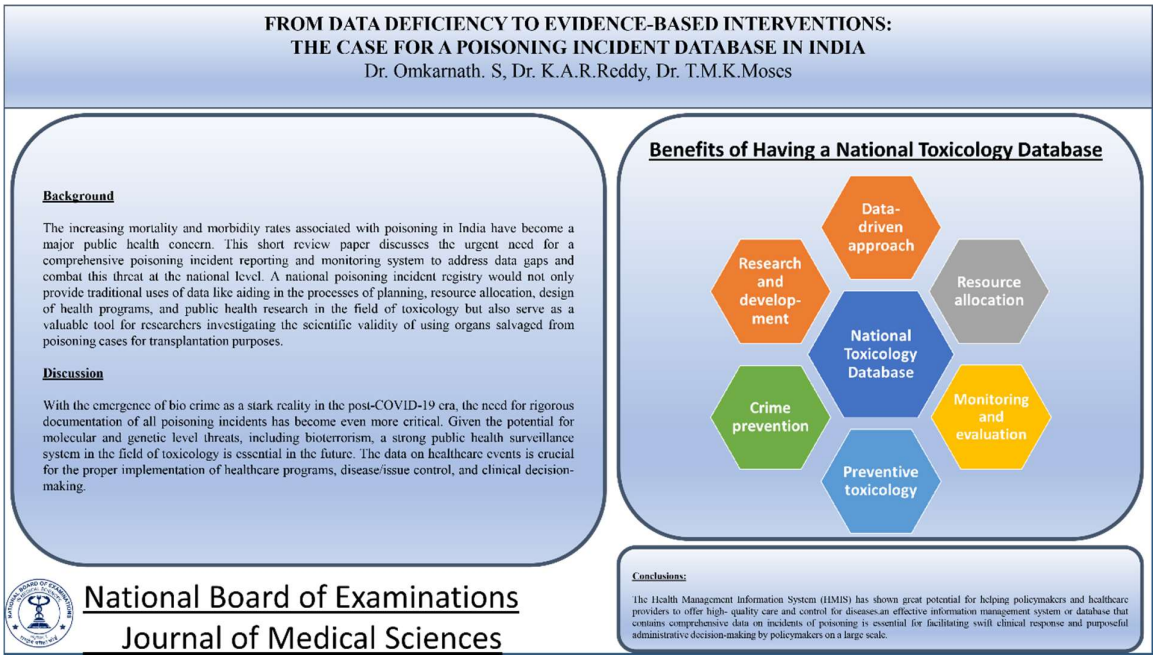
Graphical Abstract



Background

India is wrestling with a heavy burden of poisoning-related mortality and morbidity which is a matter of huge public health concern. The spectrum of poisoning in our country is extremely diverse ranging from envenomations, and suicidal consumption of agrochemical substances to the recreational abuse of several hard and soft drugs. Occupational exposure and environmental contamination with several poisons lead to significant health outcomes which are frequently unreported or underreported in health databases. A dearth of healthcare infrastructure and resources for prompt management of poisonings, along with difficulties in data collection and reporting are some of the reasons attributable to hampered progress in fighting this menace at a national level. The severity of poisoning incidents and their consequential events in India necessitates a comprehensive strategy to control and manage them. The measures include policy interventions, stringent enforcement of regulations, revision of existing laws in tune with public health needs, public education, and a robust poison incident reporting and surveillance system.

There are various sources of information that report on poisoning incidents in India, such as news agencies, standard-mandated government reports, and stray research studies. The National Crime Records Bureau (NCRB), which operates under the Ministry of Home Affairs, is responsible for gathering and releasing information on homicides, accidental fatalities, and suicides in India, some of which may involve instances of poisoning.

Additionally, the National Institute of Occupational Health (NIOH) under the Indian Council of Medical Research (ICMR) maintains a National Poison Information Centre (NPIC) that provides

information on poisoning cases, including their causes, symptoms, and treatment. However, they hold very little real-time data on the actual poisoning incidents across the country.

The Indian Pharmacopoeia Commission (IPC), a self-governing organization overseen by the Ministry of Health and Family Welfare, Government of India, is responsible for establishing guidelines for drugs and pharmaceuticals within the nation and works closely in association with the Central Drug Standard Control Organisation (CDSCO). They maintain a database of adverse drug reactions, which includes cases of poisoning due to pharmaceuticals, i.e., Pharmaceutical Toxicology events.

Under the Integrated Disease Surveillance Programme (IDSP), the Integrated Health Information Platform (IHIP) collects the data on snake bite cases throughout the country which provides the repository of such snake bite cases in India. Similarly, the data on common types of poisoning cases may be collected.

However, since there is no centralized database, the information available on poisoning incidents in India may be limited, fragmented, and held in silos of different governmental agencies. It is also important to note that not all poisoning incidents may be reported or documented, especially in rural areas where healthcare facilities may be limited. Aligning with the current trends of digitalizing healthcare, we can aspire for a digital repository of poisoning incidents that can capture the data on commonly encountered poisoning incidents in India. The present article discusses in detail the establishment of a comprehensive reporting and surveillance system that is imperative in India to address data gaps and effectively tackle the significant burden of poisonings.

Discussion

Data pertaining to healthcare-related events is crucial for proper systems management and appropriate health governance in any country. We live in the age of *data currency* where every minute detail of activity is essential in the broader planning perspective for ensuring optimal institutional and individual performance in public health. In recent times, the importance of data in health has been a topic of huge discussion amongst academicians and practitioners. Data science and big data analytics offer valuable insights and support strategic decision-making in healthcare systems, enabling a holistic understanding of the interaction between stakeholders in the industry and opening up new opportunities to enhance healthcare quality [1].

Suicidal poisoning is one of the important causes of unnatural deaths in our country. The toxicoepidemiology of poisonings in our country is generally studied by forensic pathologists, general physicians, and emergency physicians in a hodgepodge manner. Any systematic review or meta-analysis conducted by considering such data is also biased and can be misleading at times. We are aware of the dictum, *'Our data quality determines our results.'* In this regard, the data provided by the National Crime Records Bureau (NCRB, Ministry of Home Affairs, Government of India) only includes the number of cases registered under specific sections of procedural law (Cr. P.C) or penal law (IPC), which lacks key details from a clinical or health policy perspective. There is a notable absence of information on the circumstantial aspects which influence the

cause of death, the toxicity of the compound, and healthcare or treatment-related matters, which limits the utility of this data for planning interventions at various levels. Similarly, the data registered by the registrar of deaths are of no use for research in the field of toxicology thanks to the improper documentation of many deaths in the Medical Certification of Cause of Death (MCCD) forms as '*cardiorespiratory arrest/cardiorespiratory failure.'* The data procured and which is available with pharmacovigilance agencies, ICMR institutions, and other designated agencies are not sorted scientifically or cleaned and curated for usage in medical research.

Although few researchers attempted to solve the question of data need in the realm of poisoning-related health events in India, they seem to be partially successful which is yet too far from what is needed in this arena [2,3].

The existing network of poison control centers in India does not have comprehensive data on the trends of poisoning because they have no access to all the poisoning-related data, they respond only to the instances in which they receive a request for help. However, the role of poison information and control centers in reducing mortality due to poisoning cannot be understated in any way [4,5]. The national poison information and control center at AIIMS New Delhi and other WHO-assisted centers in the country like the NIOH, ICMR are doing a yeoman service in the field of clinical toxicology from the public health point of view.

A database of incidents involving poisoning in our country would be extremely helpful for creating policies, allocating resources, and conducting research in this field. A poisoning incident database would make it easier to gather and examine information on clinical and forensic poisoning episodes, causes, trends, and patterns of poisoning cases in India. To successfully prevent and manage poisoning occurrences, evidence-based policies and interventions can be generated using this knowledge. The potential benefits of having a national toxicology database that has up-to-date details of all events of poisoning are:

- **Data-driven approach:** This helps to formulate evidence-based policies related to poisoning prevention, management, and design of standard treatment guidelines/Clinical workflows.
- **Resource allocation:** A centralized database allows for better allocation of resources, including medical personnel, emergency services, and medical supplies, to areas with higher incidences of poisoning cases.
- **Research and development:** A comprehensive database shall serve as a valuable resource for researchers to conduct a plethora of studies with emphasis on aetiology, risk factors, clinical outcomes, designing new management workflows, and also frame appropriate research questions from the bedside. The database shall function as a bridge between the preclinical and clinical researchers in novel antidote development.
- **Monitoring and evaluation:** A database would enable continuous monitoring and evaluation of the effectiveness of healthcare interventions, allowing for timely adjustments to improve outcomes. For instance, the availability and

procurement of antidotes to several poisonings can be optimized with proper data on the subject.

- **Preventive toxicology:** A database would help us know more about emerging trends, new toxic agents, geo-profiling of incidents, and changes in poisoning patterns. This could enable planning prompt responses to reduce the incident burden.
- **Crime prevention:** A database could also help us analyse food poisoning, occupational toxicology, environmental toxicology, drug abuse, and other events from a forensic epidemiology perspective which can help us plan prevention activities through interdepartmental coordination.
- **Improving Connected Health Solutions:** A database would enable easy interactions between the different categories of the stakeholders. It will provide a basis for the telemedicine consultations for the poisoning cases in both patient-doctor and doctor-doctor teleconsultations.

The data to be sourced through the digital infrastructure in this context includes the sociodemographic data, the name of the compound involved in poisoning(if known), the clinical toxidrome data (if categorizable or a record of clinical presentation), circumstances of poisoning (suicidal, accidental, homicidal), the source of availability of substance(in suicidal, homicidal cases), route of exposure, the severity of exposure, availability, and use of antidote, the time lapse between incident and reaching the point of care, contact with poison information and control center, discharge/death particulars of the patient, etc. For practical purposes, the registry should have all the information necessary to do a *critical incident analysis* or a *psychological autopsy* of the event at a later date. Any other data desired by the public health experts from time to time may be included in the light of new requirements.

The different stakeholders involved with fatal poisoning events apart from treating medical personnel should also be entrusted with the responsibility of updating the database in accordance with the needs of the case. Some agencies like the police authorities, scientific officers at forensic science laboratories, forensic medicine practitioners, or autopsy surgeons are to be encouraged to update relevant portions of the national database about toxicology events.

This whole exercise involves several privacy issues and creating a new database for this purpose requires strong statutory backing as well. Nevertheless, scientifically procured sensitive data in this regard will help us a lot to deal with the menace of agrochemical substance poisoning, which is very rampant in India. We will also get an opportunity to pressurize the regulating agencies to ban extremely hazardous agrochemical substances and persuade them to look for substitution and safer alternatives. Moreover, we can likewise request the companies for financing antidote availability to the hospitals and antidote research as part of their corporate social responsibility.

The existing poison incident report systems in countries like the UK and the USA are worth a mention at this juncture. In the UK, The National Poison Information System (NPIS) is a

professional organization that provides expert advice on poisoning management. The National Health Service (NHS) Digital collects data on poisonings which contains information on diagnoses, procedures, and health-related outcomes from patients treated at their hospitals. The Office for National Statistics (ONS) has all data regarding the poisoning deaths. The Health and Safety Executive (HSE) is responsible for executing workplace safety and health which deal with overall surveillance and issues in the occupational toxicology domain.[6]

In the USA, the National Poison Data System (NPDS) is a comprehensive electronic database managed by the American Association of Poison Control Centres (AAPCC) for real-time professional communication and guidance to healthcare personnel. The Toxic Exposure Surveillance System (TESS) collects data on acute chemical exposures and poisonings from multiple sources, including poison control centers, hospitals, and other health agencies. TESS uses this data to identify trends, assess the public health impact of toxic exposures, and develop prevention strategies. The National Electronic Injury Surveillance System (NEISS) is a surveillance system administered by the Consumer Product Safety Commission (CPSC) that monitors injuries and adverse events related to consumer products, including those caused by poisoning [7,8].

In Korea, the Poisoning Information Database (PIDB) offers clinical toxicology data related to frequently encountered toxic substances. Launched in 2007, the PIDB has been expanding steadily, with the number of toxic substances listed growing from 50 to 470 by 2014. While the PIDB accounts for a significant portion of actual poisoning incidents in Korea, it is essential to continually expand the database to provide information on even the rarest toxic substances [9].

TOXBASE serves as the primary poisons information database for the National Poisons Information Service (NPIS) across the United Kingdom. It has been accessible to registered National Health Service users free of charge since its establishment, and as of 1999, contained details about roughly 12,000 substances and products. Moreover, TOXBASE has a collection of monographs on different facets of poison management, including pediatric poisoning, slang drug names, and pregnancy-related poisoning [10]. In India, only apex tertiary healthcare institutions currently utilize toxicology databases to provide information to healthcare personnel and the general public. It is important to note that our poison control centers rely on toxicology databases from international sources, highlighting the need to develop our indigenous poison information database. To establish a robust indigenous toxicology information database that can meet clinical needs, it is crucial to begin by creating a database containing details of poisoning incidents in India for at least a few years.

ToxBase Lanka is a National Poison Centre (NPC) in Sri Lanka that offers round the clock poisons information service to all its citizens. The NPC possesses a comprehensive and up-to-date database of nearly all the poisonous substances present in the country and offers expert and prompt guidance in the event of poisoning cases [11].

Looking at the above-mentioned examples, we identify a glaring lacuna in our system dealing with poisoning and managing them both at the incident and

national levels. The current global practices underscore the need for generating more data in the fields of both occupational toxicology and preventive toxicology. '*Agadha Tantra'*, the ancient Ashtanga ayurvedic form of toxicology studied and practiced in the Vedic times shows the expertise and mettle of Indians in understanding the field of toxicology from a diverse perspective. It is time we rededicate ourselves to live up to the standards of our ancient forefathers [12].

The task at hand is integrating the existing fragmented hospital-based surveillance systems into a national one and using the existing national health information systems infrastructure to serve our purpose. These systems may include electronic health records (EHRs), health information exchanges (HIEs), or other health information management systems that can capture data on poison exposures or poison-related injuries. Data from these systems can be used for surveillance and research purposes, with appropriate privacy and security measures in place [8]. Similarly, we should also explore the feasibility of incorporating the element of toxicology-related events in the existing public health reporting programs and pharmacovigilance/toxicovigilance mechanisms. The authors also suggest the use of a similar virtual infrastructure used for reporting several Adverse Events Following Immunisation (AEFI) in public health for bringing out a toxicology registry in India.

For instance, as per Section 89 of The Factories Act, 1948, it is mandatory to notify occupationally acquired toxicological health conditions. Similarly, abiding to the World Health Organisation's International Health Regulations 2005, the Department of Health and Family Welfare, Government of India has identified certain diseases of significant public health importance under the Integrated Disease Surveillance Program - Integrated Health Information Platform (IDSP-IHIP). Notably, most of the poisoning cases are not included in this list except for animal bites and snake bites as mentioned above. It would be beneficial to formulate a separate national policy or program specifically addressing the reporting of poisoning incidents. Additionally, incentivizing the notification of cases and monitoring treatment outcomes pertaining to such incidents could enhance the overall effectiveness of this initiative.

The Way Forward

In the past ten years, the field of digital health has undergone a significant transformation, with the Government of India playing a significant role in promoting eHealth through initiatives such as Ayushman Bharat Digital Mission, e-hospitals, and telemedicine. Similarly, the government may encourage digital reporting of poisoning incidents from various sources, such as hospitals, poison control centers, and emergency services across the country ensuring privacy and confidentiality. Existing digital infrastructure like HMIS, Integrated Health Information Portal (IHIP), and Ayushman Bharat Digital Mission (ABDM) may be used to collect the data from the sources and analyse them to identify patterns, trends, and risk factors associated with poisoning incidents. The findings should be disseminated to relevant stakeholders such as public health authorities, medical professionals, and the general public to help them make informed decisions. The government should also encourage data sharing and dissemination of the same to

relevant stakeholders. The database should be continually updated and improved based on feedback from users and changes in the types and sources of poisoning incidents.

The establishment of a poison information and control center in every state is necessary, and it is crucial to emphasize the importance of using poison incident data to determine the most suitable location for each center. The availability of a poison incident database is essential to provide timely and accurate guidance in the event of poison cases, and to ensure that up-to-date information regarding poisoning incidents is disseminated to the general public.

Apart from the traditional uses of this data, the national toxicology event registry can also serve as a valuable resource for researchers working to evaluate the scientific basis of salvaging organs from poisoning cases and the feasibility of utilizing them for transplantation purposes [13]. Moreover, the phenomenon of biocrime has emerged as a stark reality in the post-COVID-19 world, necessitating the collection of meticulous data pertaining to all poisoning events. From a forensic epidemiology perspective, robust public health surveillance is imperative, given the escalating criminogenic potential of molecular and genetic level threats, including bioterrorism [14].

Conclusion

Health information data is basic for diagnosing, treating, and controlling diseases, effectively implementing healthcare programs, and supporting clinical decisions. Therefore, the design and implementation of an effective information management system are a high priority for the healthcare system of every country. The Health Management Information System (HMIS) has shown great potential for helping policymakers and healthcare providers to offer high-quality care and control for diseases. Similarly, an effective information management system or database that contains comprehensive data on incidents of poisoning is essential for facilitating swift clinical response and purposeful administrative decision-making by policymakers on a large scale. We wish that a National Poisoning Incident Reporting System (NPIRS) will soon become a reality in our country.

Ethics Committee Approval

Not applicable

Conflict of interest

The authors declares that they do not have conflict of interest.

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IMAGES

Giant Subpectoral Lipoma: A Rare and Challenging Case

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Abstract
Giant subpectoral lipoma is an extremely rare case that can occasionally turn malignant. We highlight this case for the first time from India.

Keywords: Giant subpectoral lipoma, Liposarcoma, Liposuction

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A 62-year lady presented with a 15cm X10 cm mobile non tender lump on the upper outer quadrant of the right breast. Ultrasound breast revealed only a space occupying lesion which appears like a lipoma. A Fine needle aspiration cytology revealed lipoma. However, in view of the huge size of the lump in an aged lady, a MRI breast was done which revealed evidence of a large well defined space occupying lesion in the right retro mammary sub pectoral (posterior to Pectoralis major muscle) region showing well defined wall with thin enhancing septations and eccentric enhancing nodule showing type II enhancing curve and causing mass effect over the breast and pectoralis minor with the diagnosis confirmed as giant subpectoral lipoma (Figures 1 and 2).

Though a benign common tumour, the giant lipoma is a challenging case as usually they are defined as greater than 10 cm or more than 1000 gm in weight [1]. Since it's an extremely rare occurrence, not many cases are reported in the literature. The treatment of choice for lipomas is surgical excision with blunt dissection. The main concern is the rare transformation of lipoma (>10 cm) into a liposarcoma and therefore a good histopathological report from an expert pathologist of large lipomas is mandatory before the surgery. A specific criterion that would make a liposarcoma more likely is when the size is greater than 5cm, deep to deep fascia, irregularity, pain or thickened septae. [2] Regarding management of giant subpectoral lipoma surgical excision is the treatment of choice over liposuction as liposuction can lead to recurrence and does not yield complete histopathological tissue [3].

This is the first reported case of giant subpectoral lipoma from India.

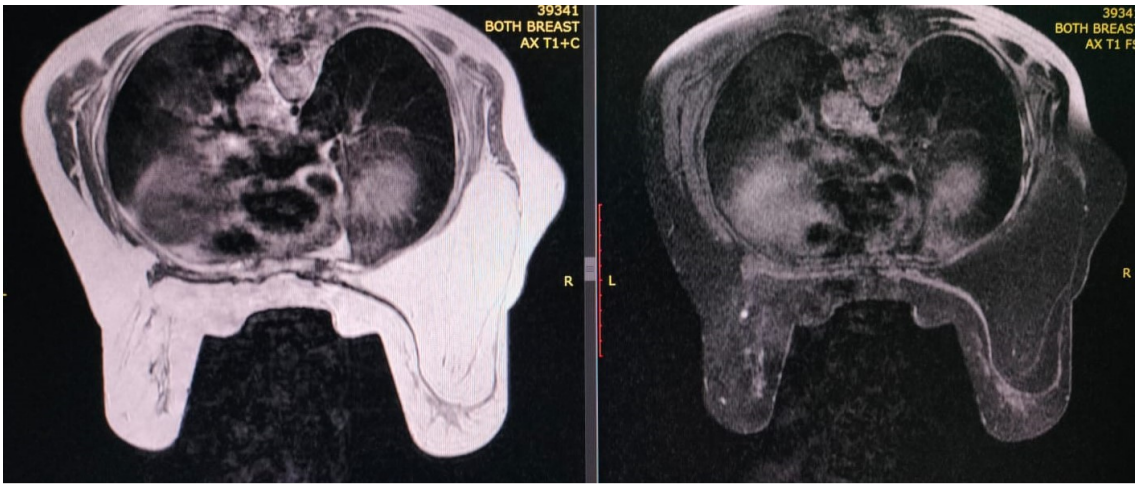

Figure 1. MRI breast showing right giant subpectoral lipoma.

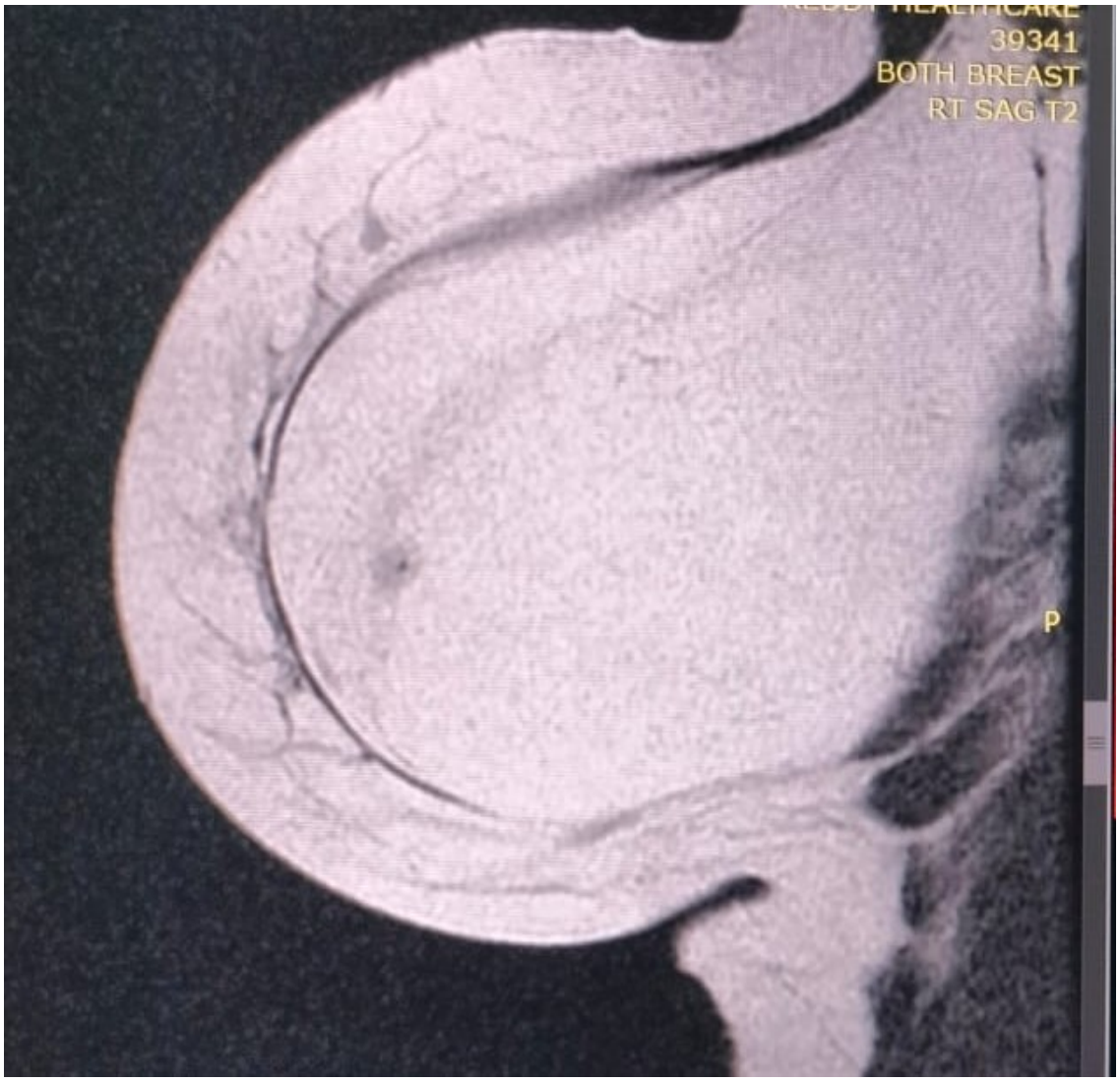

Figure 2. MRI breast showing thin septations in subpectoral lipoma.

Conflicts of interest

The authors declares that they do not have conflict of interest.

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IMAGE

Ainhum: A Rare Idiopathic Dermatological Disease with Surgical Management

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Abstract
Ainhum is an extremely rare and challenging case where there is development of a constricting ring along the digits leading to autoamputation. As rare case .it is being reported from India as not many literatures on this case from this part of the continent.

Keywords: Ainhum, Dactylolysis spontanea, Pseudo ainhum, Autoamputation

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A 42-year-old male patient reported to the Dermatology outpatient department with bilateral constricting ring in the 5th little toe with a past history of10 years duration [Figure 1]. He was referred to the Surgery department and a diagnosis of Ainhum was made. X ray of the foot showed bilateral bone resorption with osteolysis below the constricting ring in the 5th toe [Figure 2]. The patient underwent surgery and a Z plasty was done at the base of the 5th tarsometatarsal joint [Figure 3]. Postoperative course was uneventful, and patient was discharged in a stable condition. Ainhum is also known as 'Dactylolysis spontanea' , is an extremely rare idiopathic dermatological condition characterised by painful, constrictive, circumferential, progressive fibrous band at the base of the fifth toe, leading to autoamputation[1]. With an overall prevalence rate of 0.015 to 2.2%, this disease is usually found in South American and African countries. This condition was identified for the first time by Silva Lama in 1867 and in Yoruba language, Ainhum means 'to saw or cut'. Histopathological examination of the constricting ring under the electron microscope resembles features of keloid. The exact etiopathogenesis of true ainhum is unknown. The challenge in clinching the clinical diagnosis depends on at least one of the following three criteria: soft tissue constriction, bulbous enlargement of the toes, and thinning or lysis of phalangeal bones, in addition to radiographic confirmation. There is a differential diagnosis of Ainhum termed as Pseudo ainhum. Pseudo ainhum is caused by amniotic bands, constrictions associated with keratotic disorders or those associated with infections or trauma; and constriction by external forces such as hairs and threads [2]. The surgical intervention is only required to prevent the auto amputation and for long term preservation of the digit having the lesion.

Figure 1. Bilateral Ainhum in the foot

Figure 2. X ray foot showing bone resorption and osteolysis

Figure 3. Z plasty being done for Ainhum

As not many cases of Ainhum are reported from India, this condition remains rare and obscure and very few case reports are there in the literature from India.

Conflicts of interest

The authors declares that they do not have conflict of interest.

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CASE SERIES

Mesodiverticular Band of Meckel's Diverticulum Causing Small Intestinal Obstruction in Littre Hernia

Joe Nepram,[1] Kiratpal Singh Brar,[1] Dhiraj Kumar,[2] Sharad Syangden,[3] Mahesh Kumar,[3] Jashanpreet Singh,[1] Ghaiyoor Ahmad,[1] Diwakar Kumar,[1] Shahnawaz Alam,[1] Hibah Niyaz,[1] Akash Kumar[1] and Kaushik Bhattacharya[4,*]

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Abstract

Mesodiverticular band associated with Meckel's diverticulum can lead to surgical emergencies like intestinal obstruction or volvulus and may prove fatal as this pathology is quite rare, it may escape the clinical diagnosis. This band needs to be excised during emergent laparotomy along with Meckel's diverticulectomy. A high level of clinical suspicion and surgical acumen is required to manage this rare condition and have an uneventful recovery of the patient.

Keywords: Meckel's diverticulum, Littre Hernia, Mesodiverticular band, Acute intestinal obstruction

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Case Series

Case 1 - A 45-year-old male presented in the emergency department with features of acute intestinal obstruction with right-sided irreducible inguinoscrotal swelling of 10 cm X 5 cm size of gradual onset of 6 months duration. There was no cough impulse seen over the swelling. All the clinical investigations were normal, and the X-ray abdomen and ultrasound abdomen suggested features of intestinal obstruction due to dilated small bowel loops. With a provisional diagnosis of intestinal obstruction patient underwent exploratory laparotomy through the para-inguinal incision and a Meckel's diverticulum (MD) with a band constructing the ileum was seen in the hernial sac with features of obstruction. Because of Meckel's diverticulum in the inguinal hernial sac, this diagnosis of Littre's hernia was made. There was also a long mesodiverticular band attached from the tip of MD around the ileum forming a constricting ring with proximal dilated bowel loops, extending up to the base of the mesentery (Figure 1). Release of the mesodiverticular band along with Meckel's diverticulectomy done. The postoperative procedure was uneventful, and on the fifth day after the operation, the patient was released in a stable condition. The resected specimen was non-significant, and no ectopic or malignant pathology was reported.

Case 2 – A 79-year-old female presented with severe pain abdomen with lower abdominal distension with a history of constipation for 5 days. X Ray abdomen and Ultrasound abdomen gave a provisional diagnosis of bowel obstruction. On exploratory laparotomy, a mesodiverticular band was seen attaching from the MD to the mesentery. Resection of the band was done and the patient recovered smoothly in the postoperative period (Figure 2).

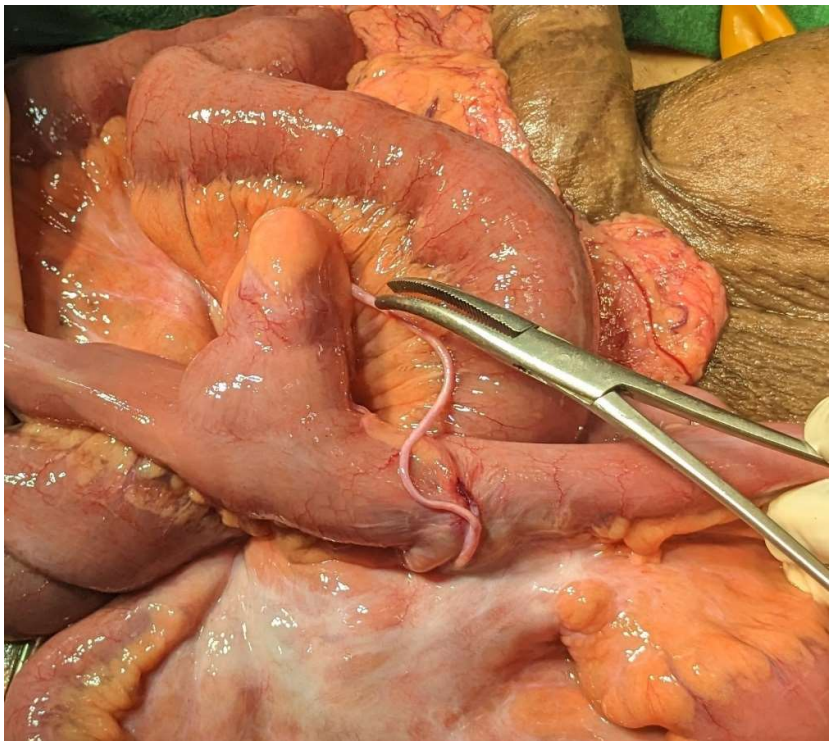

Figure 1. Meckel's diverticulum with Mesodiverticular band causing constriction of ileum

Figure 2. Mesodiverticular band being excised

Discussion

Though MD is the most common congenital anomaly of the intestinal tract with a reported incidence of 0.6%-4% in the literature, the incidence of Littre's hernia is an even more extremely rare condition, found in only 1% of all cases of MD. Till date, the literature has reported only about 50 cases over 300 years [1]. The protocol for surgical indication for intervention in MD is the removal of all incidentally discovered diverticula if they meet the following criteria: age <50 years, male gender, diverticulum length size more than 2 cm, broad based thickened diverticulum, fibrous bands attached to the diverticulum and histopathology specimen showing ectopic or abnormal tissue [2]. This case is also rare and interesting as there was a long mesodiverticular band causing intestinal obstruction in Littre's hernia which has not been reported before in the literature. Mesodiverticular band is embryologically a persistent vitelline artery that would supply the Meckel's diverticulum and this embryologic band extends from the adjacent mesentery to the tip of the MD creating a bridge through which bowel loops may be internally herniated or get entangled to develop acute intestinal obstruction. Studies have shown a high mortality rate of MD associated with mesodiverticular band which demands the surgical team to have a high level of clinical suspicion and intervene immediately without any delay to prevent any life-threatening complications [3]. Preoperative diagnosis of mesodiverticular band being the etiopathology causing intestinal obstruction is quite challenging and only an

expert radiologist can diagnose this pathology with either an ultrasound or CT scan abdomen. Mesodiverticular band has also been associated with causing Meckel's diverticulum volvulus which again is a surgical emergency [4].

In conclusion, the combination of Meckel's diverticulum with mesodiverticular band causing intestinal obstruction, especially in Littre's hernia should be diagnosed and managed with the highest level of surgical skill and expertise as such cases may lead to fatal catastrophe if managed casually .Every surgeon should be aware of this rare diagnosis in his clinical practice to avoid any type of negligence.

Conflicts of interest

The authors declares that they do not have conflict of interest.

Funding

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CASE REPORT

Impending Cardiac Tamponade as the Initial Manifestation of SLE

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Abstract

Systemic lupus erythematosus (SLE) is an autoimmune disorder with protean manifestations. most commonly affecting women Cardiovascular manifestations are common but rare at initial presentation. Our patient presented with impending cardiac tamponade and was subsequently diagnosed with SLE. A 31-year-old female presented with fever, rash, and progressive exertional dyspnea. On examination, she had an elevated JVP and muffled heart sounds and features of pulmonary hypertension her baseline blood investigations showed acute kidney injury, albuminuria, and grossly elevated BNP. Chest radiography showed an enlarged cardiac silhouette and echocardiography showed large pericardial effusion with impending cardiac tamponade for which the patient underwent emergency pericardiocentesis. ANA profile confirmed our diagnosis of SLE with positive anti-dsDNA, anti-nucleosomes, anti-histones, anti-SSA, and anti-Jo 1. Being positive she was treated with pulse steroids and hydroxychloroquine. Renal biopsy was also done which showed class IV lupus nephritis. She improved clinically and was discharged with oral steroids, mycophenolate mofetil, and hydroxychloroquine. Cardiac tamponade is a life-threatening condition and SLE is an important differential to be considered during evaluation.

Keywords: SLE, cardiac tamponade, pericardiocentesis

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Abbreviations

AFB: Acid fast bacilli
ANA: Antinuclear antibodies
BNP: Brain natriuretic peptide
CBNAAT: Cartridge-based nucleic acid amplification test
CK-MB: Creatine kinase-myoglobin binding
ECG: Electrocardiogram
ESR: Erythrocyte sedimentation rate
JVP: Jugular venous pressure
KOH: Potassium hydroxide
LDH: Lactate dehydrogenase
NSAIDs: Non-steroidal anti-inflammatory drugs
SLE: Systemic lupus erythematosus
SLEDAI: Systemic Lupus Erythematosus Disease Activity Index
TSH: Thyroid stimulating hormone
WBC: White blood cell

Introduction

Systemic lupus erythematosus (SLE) is a disease characterized by chronic, autoimmune, multisystem involvement with female preponderance (F: M = 10:1) [1]. The manifestations are protean with half of SLE patients having cardiovascular involvement [2]. However, cardiac involvement as an initial presentation is rare. We present a 31-year-old female with an initial presentation of pericardial tamponade who was subsequently diagnosed with SLE.

Case Report

A 31-year-old female came with complaints of intermittent, low-grade fever for the past ten days with rapidly progressive breathlessness for one month associated with orthopnea. She also had bilateral pedal edema without any chest pain, palpitations, decreased urine output, or wheezing. She noticed a non-pruritic, maculopapular rash beginning over her palms and soles. There was no history of hair loss or oral ulcers, headache, altered behavior, or involuntary movements. Family history was noncontributory.

She had a second-trimester pregnancy loss 3 weeks prior to presentation. She had high blood pressure and hypothyroidism during her pregnancy for which she was taking labetalol and levothyroxine supplementation.

On arrival, she was tachypneic, tachycardic, and febrile. Blood pressure was 118/88 mmHg, elevated jugular venous pressure (5 cm above sternal angle) with prominent v wave, and muffled heart sounds. Breath sounds were decreased in bilateral basal regions.

Laboratory tests are outlined in Table 1. ANA profile was done which was positive for anti-dsDNA, anti-nucleosomes, anti-histones, anti-SSA, and anti-Jo 1. Complement levels were low.

The electrocardiogram showed low voltage complexes and lateral lead T wave inversions (Figure 1A). Cardiac silhouette was enlarged on the roentgenogram. Echocardiography was evident for a swinging heart with paradoxical septal motion and large pericardial effusion (21 mm anteriorly and 29 mm posteriorly) with a normal ejection fraction of 55% (Figure 1B).

Table 1. Summary of laboratory parameters

Laboratory test	**Value**	**Normal range**
Hemoglobin	10 g/dl	12-15.5 g/dl
WBC	3450 cells/mm^3	4000-10000 cells/mm^3
Platelet count	1.98 lakh/mm^3	1.5-4.5 lakh/mm^3
ESR	110 mm/hour	0-10 mm/hr
Urea	37 mg/dl	12.6-42.6 mg/dl
Creatinine	1.32 mg/dl	0.7-1.2 mg/dl
Sodium/Potassium	136/4.8 mEq/L	136-145 mEq/L, 3.5-5.1 mEq/L
TSH	4.65 μIU/ml	0.27-4.2 μIU/ml
Urine analysis	2+ albumin, 4-6 RBCs	
Troponin T	0.024 ng/ml	0.0127-0.0249 ng/ml
CK-MB	0.81 ng/ml	0-4.94 ng/ml
Brain natriuretic peptide (BNP)	9594 pg/ml	0 – 125 pg/ml
ECG	Low voltage complexes, lateral lead T wave inversions	
Chest radiography	Enlarged cardiac silhouette with well-defined borders.	
Echocardiography	Swinging heart with paradoxical septal motion and a large pericardial effusion which was 21 mm anteriorly and 29 mm posteriorly (Fig 1). Her left ventricular systolic function was normal with an ejection fraction of 55% and there were no clots or vegetations.	
ANA profile	anti-dsDNA, anti-nucleosomes, anti-histones, anti-SSA, anti-Jo 1 positive	
Pericardial fluid: - Cell count - Protein - Glucose - Chloride - LDH - AFB - KOH - Culture & sensitivity - CBNAAT	Exudative 40 (mesothelial cells) 45 mg/dl 106 mg/dl 107.4 mEq/L 137 U/L Negative Negative No growth Negative	
C3	21.4 mg/dl	75-135 mg/dl
C4	5.8 mg/dl	9-36 mg/dl

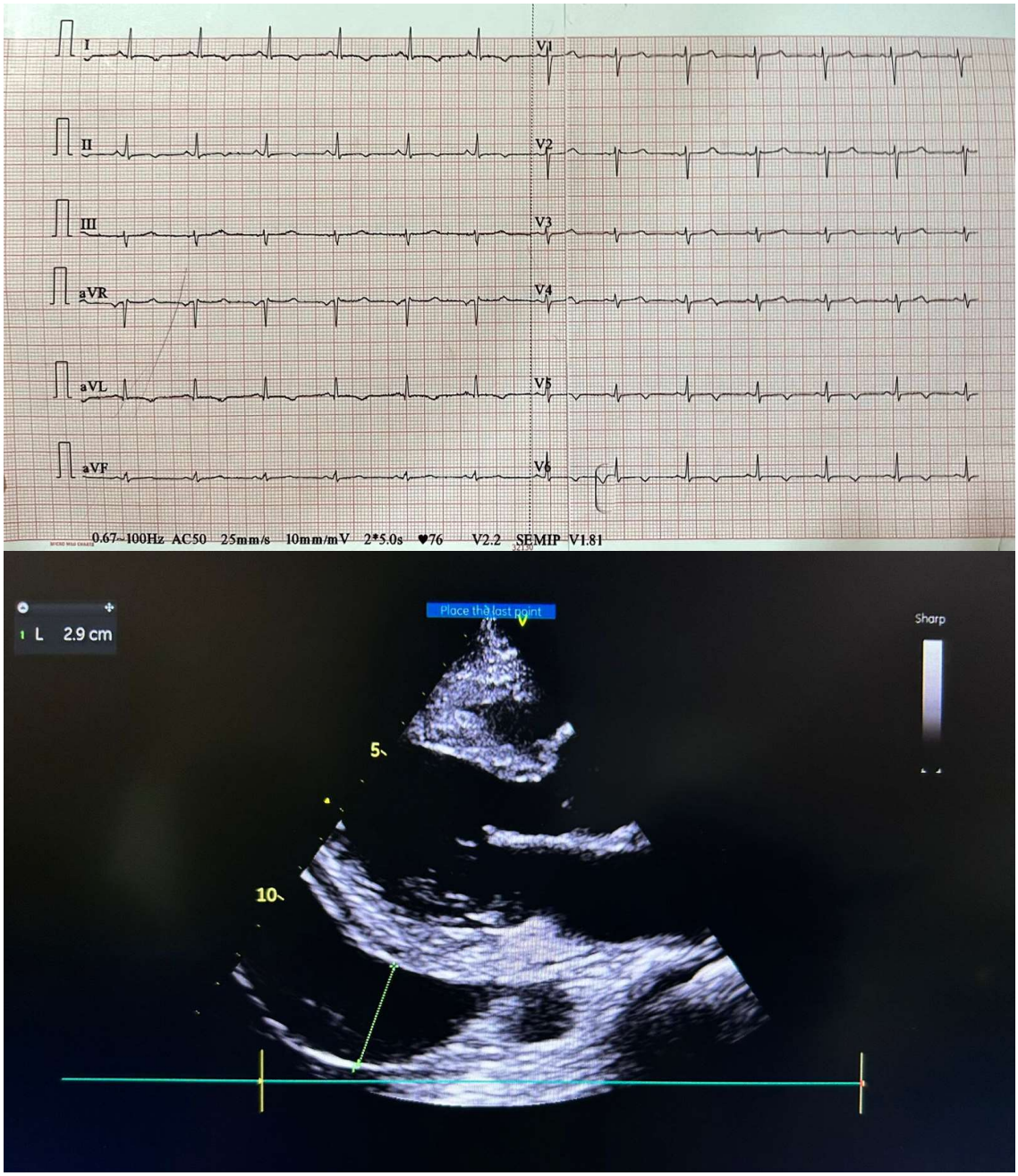

Figure 1A: Electrocardiogram showing low voltage complexes and T wave inversions in lateral leads; Figure 1B: Echocardiographic image of large pericardial effusion with impending cardiac tamponade.

Emergency pericardiocentesis was done and 800 ml of exudative fluid was drained followed by placement of a pigtail catheter.

Intravenous pulse methylprednisolone at a dose of 750 mg per day for 3 days was instituted following which there was resolution of pericardial effusion. Her 24-hour urine protein was 0.945 gm/day hence renal biopsy was done which showed class IV lupus nephritis. She had a Systemic Lupus Erythematosus Disease Activity Index (SLEDAI) score of 18. The patient was given treatment

options of cyclophosphamide and mycophenolate mofetil (MMF) and she opted for MMF as she planned to start a family. She was discharged on mycophenolate mofetil, hydroxychloroquine, and steroids. She is on regular follow-up and is doing well.

Discussion

Cardiovascular manifestations in SLE may affect the pericardium, myocardium, endocardium, heart valves, conduction system, or coronary vasculature [3]. Pericarditis is most common among these and often occurs in conjunction with serositis elsewhere. Occasionally, pericardial effusion is detected incidentally on routine echocardiography [4]. Cardiac tamponade is a rare manifestation of SLE and is seen during flares of lupus activity as was the case in our patient [5].

Cardiac tamponade is a life-threatening condition and prompt diagnosis is crucial to reduce mortality. Clinically, elevated jugular venous pressure, muffled heart sounds, hypotension, and tachycardia may be evident. Electrocardiogram may show low voltage complexes with electrical alternans, caused by swinging of the heart within the pericardial fluid. Chest radiography may reveal an enlarged cardiac silhouette once effusions are moderate in size. Echocardiography remains the standard method to establish the diagnosis and can reveal compression abnormalities of atria and ventricles throughout the cardiac cycle. Treatment necessitates emergency needle paracentesis under echocardiographic or fluoroscopic guidance. Open surgical drainage is reserved for cases where needle pericardiocentesis poses a challenge. Cardiac tamponade in SLE generally requires high-dose steroids and immunomodulators such as hydroxychloroquine, mycophenolate mofetil, and azathioprine [6]. Non-steroidal anti-inflammatory drugs (NSAIDs) and colchicine help reduce serositis and size of the effusion and hence can be used in the absence of significant hemodynamic compromise [7]. Timely intervention can be lifesaving, as demonstrated in this case where urgent pericardiocentesis was performed when echocardiography revealed signs of impending cardiac tamponade.

Connective tissue disorders such as SLE, rheumatoid arthritis, and scleroderma are important differentials to be kept in mind when evaluating pericardial effusion. Other causes include tuberculosis, post-cardiac surgery, trauma, malignancy, bacterial infection, aortic dissection, post-myocardial infarction, radiation-induced, uremia, and thyroid disorders [8]. A retrospective study done by Goswami et al concluded that out of 409 SLE patients, pericarditis was seen in 25.4% and cardiac tamponade in 5.9% of patients of which, tamponade was the presenting feature in only half the above cases. They also found that the presence of pleuritis, anti-nucleosome antibody positivity, and larger size of pericardial effusion were strong predictors of the development of cardiac tamponade [9].

In conclusion, a point of interest in our case was the strikingly rare occurrence of cardiac tamponade as the initial manifestation of SLE. Clinical suspicion and timely intervention are crucial in such cases.

Author Contributions

NS and MM drafted the article. DS, MM, and SR were involved in the concept and

design of the article. Every author is solely accountable for the accuracy and integrity of every part of this work.

Declaration of Patient Consent

Written informed consent was obtained from the patient for publication.

Conflicts of interest

The authors declares that they do not have conflict of interest.

Funding

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CASE REPORT

Phytobezoar (Mangifera indica seeds) induced Acute Small Bowel Obstruction: An Unusual Case

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Abstract

Phytobezoar causing acute intestinal obstruction is a rare event. A case of accidental ingestion of mango seed causing intestinal obstruction is being reported requiring surgical intervention to extract the mango seed from the ileum. This condition must be kept in mind during the mango season while dealing with a case of intestinal obstruction in an emergency.

Keywords: Phytobezoar, Acute intestinal obstruction, Ileocecal valve

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Case Report

A 46-year-old male came to the emergency with severe central abdominal distension along with being unable to pass stool for 2 days and vomiting 2 -to 3 episodes per day. He gave a history of accidental ingestion of mango seed two days back. No other significant history was there, and vitals were stable except pulse rate being 120/minute. The abdomen was distended with features of intestinal obstruction. There were hyperperistaltic bowel sounds with per rectum examination being normal. The patient was dehydrated. X-rays showed multiple dilated small intestinal loops and the ultrasound abdomen showed multiple dilated small bowels with inter-bowel free fluids, suggestive of acute intestinal obstruction (Figure 1). After initial resuscitation, the patient underwent emergent exploratory laparotomy through a midline incision. Dilated loops of the ileum were seen with mild free fluid. On tracing the small intestine, a foreign body of 10cm in length and 6 cm in width was felt approximately 20 cm from the ileocecal valve. The distal bowel collapsed, a longitudinal enterotomy was done and the foreign body was extracted which turned out to be a mango seed (Figure 2). The bowel decompression was done, and a temporary loop ileostomy was done (Figure 3). The patient had an uneventful postoperative course and was discharged in stable condition on the 7th postoperative day. Stoma bag care was taught to the patient and his relatives with advice to follow up after 6 weeks (Figure 4).

Figure 1. X Ray abdomen showing dilated intestinal loops.

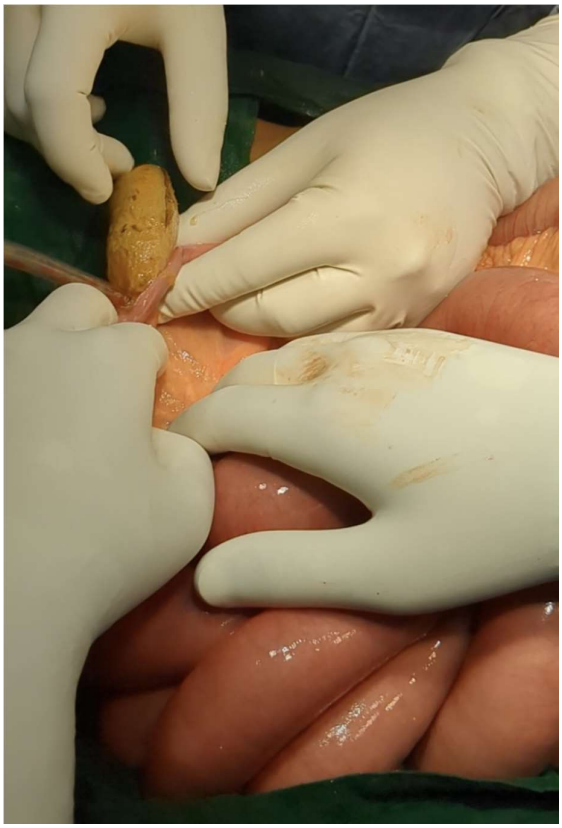

Figure 2. Mango seed getting extracted through enterotomy.

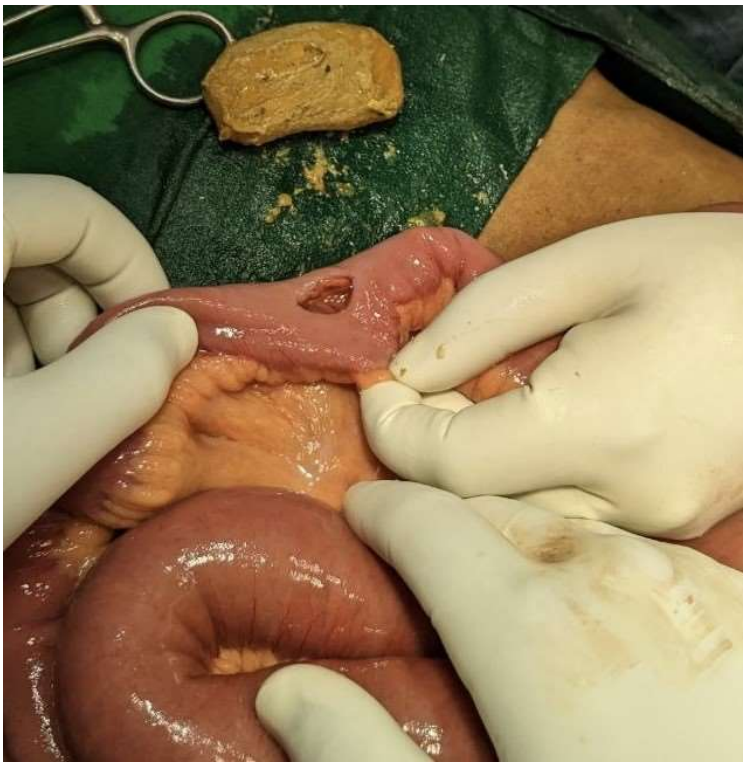

Figure 3. Enterotomy wound and the mango seed.

Figure 4. The phytobezoar mango seed 10 cm in length and 6 cm in breadth.

Discussion

Phytobezoar causing acute intestinal obstruction is a rare event and a mango seed ingested accidentally causing bowel obstruction is an even rarer case. Even though the foreign body that reaches the stomach has an 80–90% chance of passage, mango seed had a width making it impossible through the ileocecal valve [1].

The phytobezoar-induced obstruction typically occurs 50–70 cm from the ileocecal valve as the luminal diameter becomes narrow, and the luminal content viscosity increases due to decreased intestinal absorption. The most common risk factors associated with the formation of phytobezoar are history of past surgery, intake of a high fiber diets, and other

morbid conditions like psychiatric disease, dysmotility, diabetes mellitus with autonomic neuropathy, hypothyroidism, problem with mastication due to dental issues, and generalized frail person with myotonic dystrophy. There are few very interesting reports of small bowel obstruction caused by mango seed lodged within a Meckel's diverticulum [2]. As exploratory laparotomy has been the traditional gold standard procedure for acute intestinal obstruction when surgical intervention is necessary, diagnostic laparoscopy followed by therapeutic laparoscopic intervention can also be useful in the diagnosis and treatment of intestinal phytobezoar. Studies are showing Coca-Cola combined with endoscopic techniques being used effectively to treat gastric phytobezoar and avoid surgery [3]. The preventive measures mentioned to prevent such a complication from occurring are a low-fiber diet, more water, proper mastication, and treatment of gastrointestinal motility disorders [4]. Recent literature has recommended timely ingestion of Coca-Cola (2000-4000 mL per day for 7 days) yields significant benefits, including a complete dissolution rate of 100%, a low incidence of gastric ulcers, no need for fragmentation by surgical intervention, and is cost-effective, especially in patients with gastric phytobezoar [5]. There are not many reports from India on this condition in the literature even though such incidents keep happening. Apart from small bowel obstruction, mango seed has also been associated very rarely with large gut obstruction [6].

In conclusion, mango seed causing acute intestinal obstruction is not a common phenomenon but every patient who develops features of intestinal obstruction during the mango season needs to have phytobezoar as a differential diagnosis, as a cause behind this surgical emergency.

Statements and Declarations

Conflicts of interest

The authors declares that they do not have conflict of interest.

Funding

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CASE REPORT

Isolated pylorospasm in an infant: A diagnostic and therapeutic conundrum

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Abstract

Persistent vomiting in a small infant can be due to delayed gastric emptying which is a significant cause of distress and morbidity. After ruling out common medical causes, evaluation for a surgical cause such as pyloric stenosis is imperative. The diagnosis of pylorospasm is often missed between the medical and surgical realms. We describe a six-week-old infant with persistent nonbilious vomiting who was referred with a suspicion of pyloric stenosis. However, on evaluation clinical findings and imaging were not suggestive of pyloric stenosis. A diagnosis of pylorospasm was made and the patient was managed with anticholinergics without any surgery. The patient had an unremarkable recovery. The diagnosis of pylorospasm needs to be kept in mind in an infant with persistent nonbilious vomiting. It responds satisfactorily with pharmacotherapy and avoids the need for surgery.

Keywords: Pylorospasm, pyloric stenosis, anticholinergic, infant, nonbilious vomiting

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Abbreviations

GERD: Gastroesophageal reflux disease
IHPS: Infantile hypertrophic pyloric stenosis
PS: Pylorospasm
UGI: Upper gastrointestinal

Introduction

Repeated episodes of nonbilious vomiting in infants are a common cause of discomfort for the child and parents. Significant vomiting and intolerance of feeds leading to dehydration need careful examination and evaluation. Common causes in infants aged 2-8 weeks include infantile hypertrophic pyloric stenosis (IHPS) and gastroesophageal reflux disease (GERD). Pylorospasm (PS) is often considered as a differential but without any set diagnostic or management criteria. In the absence of any specific symptom, sign, or investigation, it is more of a diagnosis by exclusion [1]. In the recent literature, there have seldom been any reports of this entity.

Pyloric narrowing leading to gastroparesis causes a functional obstruction at the pylorus imitating IHPS and possibly GERD [2]. Clinical examination and imaging can reliably diagnose IHPS. However, no such clinching signs are available for PS. Hence, a high index of suspicion is necessary to avoid any unnecessary surgery or persistent symptoms, as possible PS cases can be managed medically successfully. Here, we describe a six-week-old infant with vomiting managed as PS and discuss the available literature on the same topic.

Case report

A six-week-old first-born male infant born to a thirty-year-old female presented with a history of multiple episodes of nonbilious projectile vomiting for five days. There was no previous comorbidity. The child was born via normal vaginal delivery at full term with appropriate for age weight and had been breastfeeding normally until five days prior. At examination, the patient was well preserved with a weight of 3.6 kilograms with depressed fontanelle and delayed capillary refill time. There was no history of fever, loose stools, inconsolable crying, or any other localizing signs. On abdominal examination, there was no abdominal distension, tenderness, or guarding. No mass or olive was palpable. There was metabolic acidosis (pH 7.2) in blood gas with normal serum electrolytes. Complete blood counts were normal with a total leucocyte count of 10,000/uL. Serum C-Reactive Protein was 2mg/L and serum Procalcitonin was 0.05ng/ml. Along with initial resuscitation with intravenous fluids, ultrasonography was ordered. There were no signs of hypertrophic pyloric stenosis on ultrasonography with a normal pyloric canal wall thickness, length, and diameter (Figure 1). However, a distended stomach was found. A contrast study revealed narrowing and stasis at the pylorus with a distended stomach, which subsequently had a small delayed clearance with a significant hold-up of contrast in the stomach (Figure 2). There was no GERD or malrotation observed in the contrast study. Nasogastric decompression via nasogastric tube was done and the child was kept nil per oral. The nasogastric tube was removed after three days, and small-volume trophic feeds were initiated with anti-GER measures. There was recurrent projectile vomiting and on repeat ultrasound, there was no IHPS.

Figure 1. Ultrasound depicting normal pyloric parameters: normal wall thickness, normal diameter, and canal length, not suggestive of pyloric stenosis. Passage of gastric contents and opening of the pylorus were observed while monitoring via ultrasound over a span of 10 minutes.

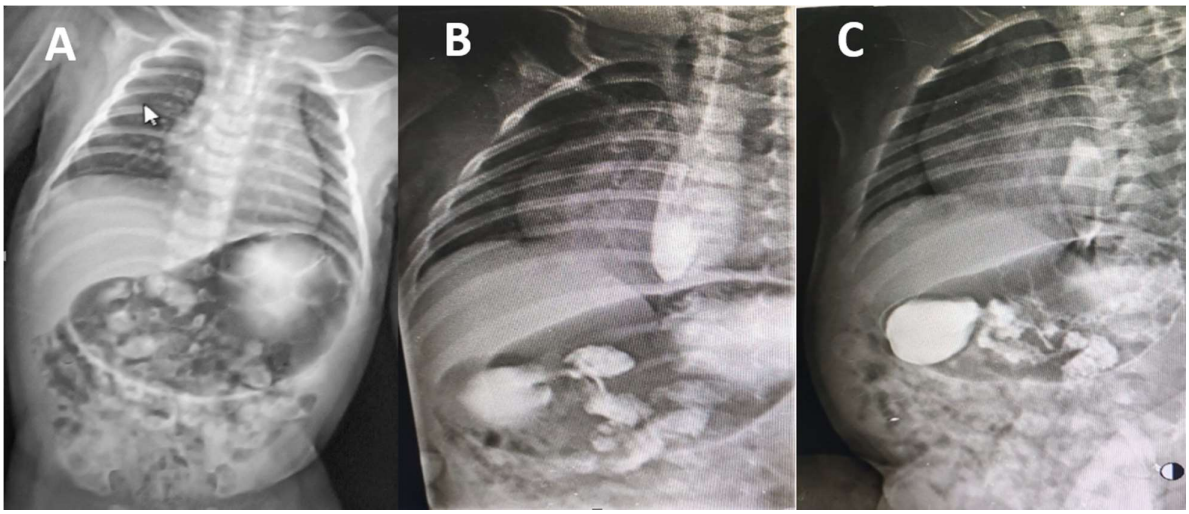

Figure 2. Upper gastrointestinal contrast study showing (**A**) a distended stomach with (**B**) hold up of contrast at the pylorus. However, a slow distal contrast run-off is observed after 40 minutes (**C**).

Isolated anti-GER measures were unable to alleviate the symptoms. All the history, investigations, and treatments were reviewed and a suspicion of pylorospasm as the cause was considered. Gastroesophageal reflux was ruled out based on history and even then anti-reflux measures were started after admission. However, there was no response. Gastroenteritis and Drug-induced gastroparesis were ruled out based on feeding history. The baby was fed only breastfed and no top feed was given. Hygiene-related issues were ruled out after evaluating the mother's feeding habits. The stool microscopy and culture were also negative. There was mild dehydration, which was corrected on admission. However, the symptoms persisted even then. Sepsis was ruled out clinically and laboratory tests as CRP and PCT were negative. Intestinal obstruction and malrotation of the gut were ruled out on plain abdominal radiographs and ultrasonograms, respectively. There were no signs, symptoms, or any other indication suggestive of a raised intracranial pressure.

Since the symptoms were intractable and persistent even on conservative management and reflux measures. The parents were duly explained about the differential diagnosis of pylorospasm. The parents were also explained that hyoscine is not the traditional management and has been rarely used in children, so the side effect profile is not well known in children. The patient was kept in the PICU for 48 hours after starting the medication, without any cost to the patient.

Given the suspicion of PS, the child was started on antispasmodic therapy in the form of hyoscine butylbromide at 0.2 mg twice daily. The patient was kept nil per oral for two days and then small-volume feeds (expressed breast milk) were started initially at the rate of 5ml every 3 hourly. The feeds were gradually increased and breastfeeding was started on the third day after initiating medication. By the morning of the fifth day, the baby was accepting breastfeeding ad-lib. The child tolerated feeds without any vomiting. The child was discharged on the fifth day and the dose was decreased to 0.2mg once daily. Repeat ultrasonography after two weeks, showed normal pyloric wall thickness, length, and diameter. Following this, 0.2mg alternate day was given for one week and then the medication was stopped completely. The child had no recurrence of symptoms and is thriving well at follow-up performed at six months of age with adequate weight gain.

Discussion

An infant with repeated episodes of persistent nonbilious vomiting requires urgent attention. Since smaller infants have poor reserves and are prone to dehydration leading to electrolyte disturbances, this can be deadly. With the advent and wide-scale acceptance of ultrasonography, the diagnosis of hypertrophic pyloric stenosis as a cause is readily picked up and treated. However, in the absence of sonographic findings, the remaining cases are attributed to either GERD or anecdotal. PS is an uncommonly described entity in patients with similar symptoms. The patients with PS are unlikely to improve with therapy directed at GERD and may worsen if not treated promptly.

However, the exact etiology or incidence of PS in infants is unknown. One case reported pylorospasm in a neonate due to an underlying subhepatic abscess due to *staphylococcus aureus* [3]. PS is a commonly suspected, seldom found, and

rarely proven entity in infants. There is no concrete literature available on the incidence or correlation with pyloric stenosis. Repeated episodes of non-bilious vomiting in a 4–6-week-old infant could be due to IHPS, GERD, PS, antral webs, duplication cyst, gastritis, gastroenteritis, raised intracranial pressure, or metabolic disorders among other causes. For an infant with typical examination findings of olive with corroborative evidence in ultrasonography and/or UGI contrast study, the diagnosis of IHPS can be made conclusively. However, in the absence of findings of IHPS or reflux on imaging, the diagnosis of PS could be considered. The double-track sign seen in ultrasound can be seen in both IHPS and PS and lacks specificity [1,4]. An ultrasonographic examination that suggests IHPS for a part of the study but changes during the study itself could be suggestive of PS [5]. In the future, investigations like antroduodenal manometry or ENDOFLIP could help to diagnose this entity. But at present, the lack of availability and expertise limits its use in general clinical practice.

Another school of thought is that PS as such could be a precursor in the natural history of IHPS. Sustained contraction of the pylorus could lead to hypertrophy of the pyloric muscle leading to IHPS over time. Wesley et al. followed up on ten patients with PS and found that all ten patients developed IHPS requiring surgery after 2 to 46 days (mean 13 days) [6]. Considering this, it is paramount to follow-up these patients to screen for resolution of symptoms. In case of persistence of symptoms, repeat imaging to rule out IHPS is warranted.

A plethora of therapies have been described in the literature for the management of PS. Thick cereal feeding was described initially, but at an age of 2-8 weeks, when these patients are most present; it is not a suitable therapy, especially for those on exclusive breastfeeding. Decreasing the volume of individual feeds and increasing the number of feeds has also been described to cause alleviation of PS [7]. A therapy of frequent stomach wash along with an injection of atropine before feeding with a mixture of albumin milk and the dextrin-maltose combination has been tried in earlier times. Drugs such as banthine bromide, procaine amide, and rociverine have also been used successfully [8]. Anticholinergic therapy in the form of intravenous atropine has been documented to have a success rate in the management of PS [9]. Oral anticholinergics that function as antispasmodics along with watchful observation are therapeutic. A strict follow-up is essential along with repeat evaluation if symptoms recur. Since it is a single case, so it is difficult to conclude that the resolution of symptoms with treatment has a temporal resolution or is serendipitous. Further research is necessary for a similar cohort of patients regarding diagnostic and management guidelines.

Conclusions

PS should be suspected in a small infant with recurrent nonbilious vomiting not attributable to any other cause. Medical treatment should be started when in doubt, for resolution of the distressing symptoms. It is a treatable cause of repeated vomiting in an infant with a good outcome, so a high index of suspicion should be maintained.

Statements and Declarations

Ethics approval

Ethical approval is not applicable.

Consent for publication

Written informed consent was obtained from the patient's parents for the publication of this case report and accompanying images.

Availability of data and material

Not applicable

Competing interests

The authors declare that they have no competing interests.

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CASE REPORT

A Documented Rare Case of a Duplicated Renal Collecting System with Ectopic Opening into the Vagina Managed with Robotic Assisted Heminephrectomy of the Non-Functioning Upper Moiety

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Abstract

Background: The definition of ectopic ureter is an abnormal opening of the ureter (single or duplex) that does not open in the trigonal region of the bladder. In 80% of these cases, ectopic ureter is associated with complete duplication. The upper moiety of a duplex kidney is usually the origin of a ectopic ureter in most of the cases. The opening of the ectopic ureteric in females can be anywhere from bladder neck to perineum with urethra, vagina, and vestibule. Duplex kidney, also known as duplex collecting system, is a common congenital urinary system anomaly with a morbidity of about 0.8–1%. We present a unique case of a completed duplicated system with ectopic ureter opening into the uterus leading to a non-functional associated upper renal moiety of the affected side which was managed by robotic assisted segmental nephrectomy. **Case presentation:** We present a case of 52-year- old lady who presented to urology outpatient department with complaints of sticky white perineal discharge through vaginum associated with left sided intermittent colicky flank pain who was diagnosed to have complete duplex left moiety with ectopic insertion of the upper moiety ureter into the vagina associated with non-functioning left upper renal moiety. She was managed by robotic assisted Left sided heminephrectomy with excision of left ectopic ureter. **Conclusion:** Our case report thus highlights the importance of adequate evaluation of a patient to determine the anatomy and the function of the kidney to decide for the definitive management of these patients with ectopic ureter and duplex kidneys.

Keywords: ectopic ureter, duplex system

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List of abbreviations

DJ Stent: Double J stent

CECT: Contrast Enhanced Computerised Tomography

DMSA Scan: Dimercaptosuccinic acid scan

Background

Ectopic ureter is defined as abnormal opening of the ureter (single or duplex) that does not open in the trigonal region of the bladder. In 80 % of these cases, ectopic ureter is associated with complete duplication. Most of the ectopic ureter arises from the upper moiety of a duplex kidney. In females, the ectopic ureteric opening can be located anywhere from bladder neck to perineum with urethra, vagina, and vestibule [1]. Duplex kidney, also known as duplex collecting system, is a common congenital urinary system anomaly with a morbidity of about 0.8%–1% [2]. We present a unique case of a completed duplicated system with ectopic ureter opening into the uterus leading to a non-functional associated upper renal moiety of the affected side which was managed by robotic assisted heminephrectomy.

Case presentation

A 52-year-old female presented to the urology outpatient department with complaints of sticky white perineal discharge associated with intermittent flank pain during these episodes. Local perineal examination did not reveal any abnormality. Per speculum examination of the vagina also was essentially normal. Patient was then evaluated by ultrasound which revealed duplex system with the ectopic ureter showing gross dilatation throughout and draining the upper pole renal moiety into the uterus on the left side whereas the normal ureter draining the rest of the left kidney into the bladder. Patient was then further evaluated using a Computerised Topography (CT) Urography which revealed duplex moiety on the left side with ectopic insertion of the upper moiety ureter into the vagina with moderate dilatation of the entire upper ureter and pelvicalyceal system of the upper ureter. The normal left ureter draining the rest of the left kidney was seen with insertion into the bladder. The right kidney and ureter were normal (Figures 1-5).

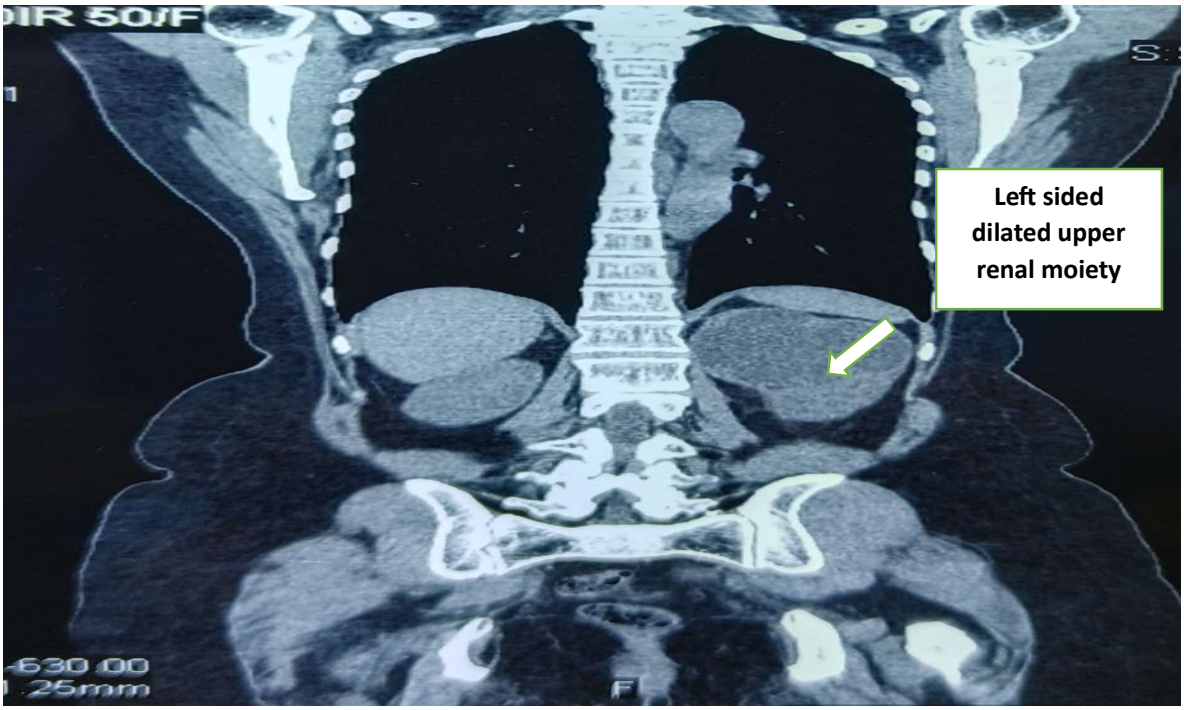

Figure 1. Coronal section of CECT KUB showing left sided dilated upper renal moiety.

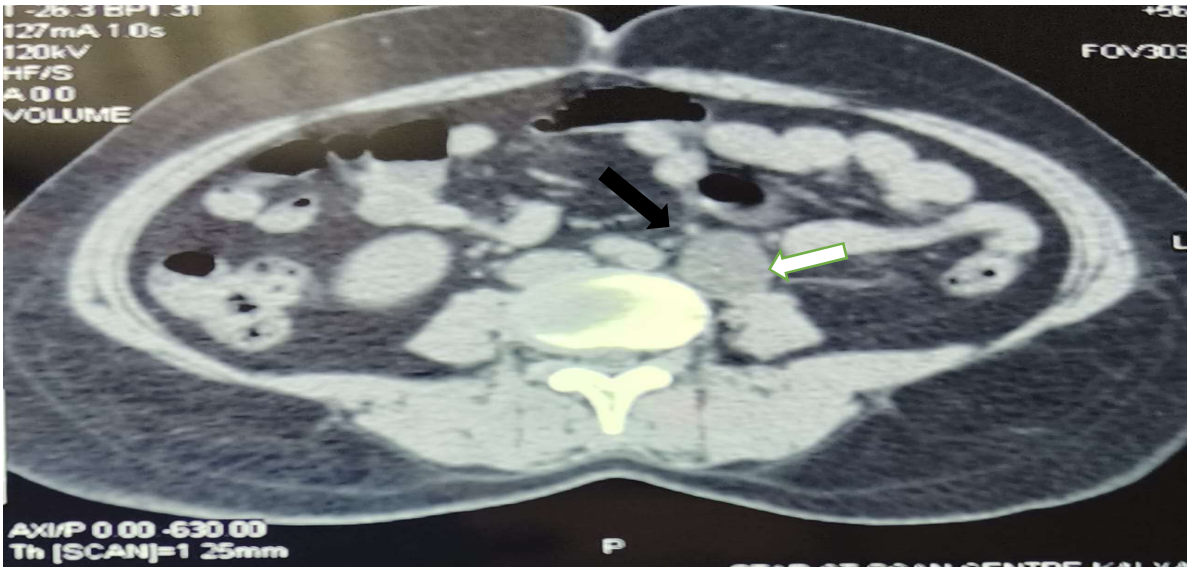

Figure 2. Axial section of CT KUB showing Left sided dilated ectopic ureter and left normal ureter. (Black Arrow-Left ectopic ureter and white arrow-Left ectopic ureter)

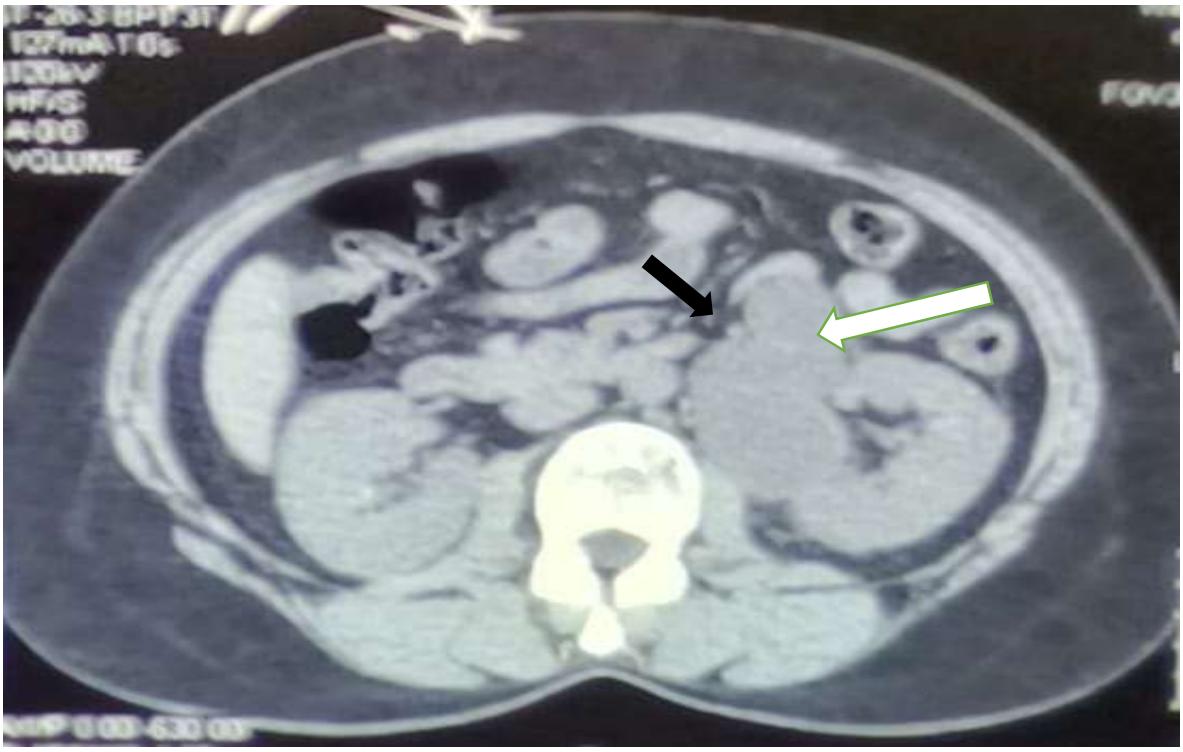

Figure 3. Serial Axial section of CT KUB showing dilated left ectopic ureter draining the upper renal moiety and left normal ureter. (Black Arrow-Left ectopic ureter and white arrow-Left ectopic ureter).

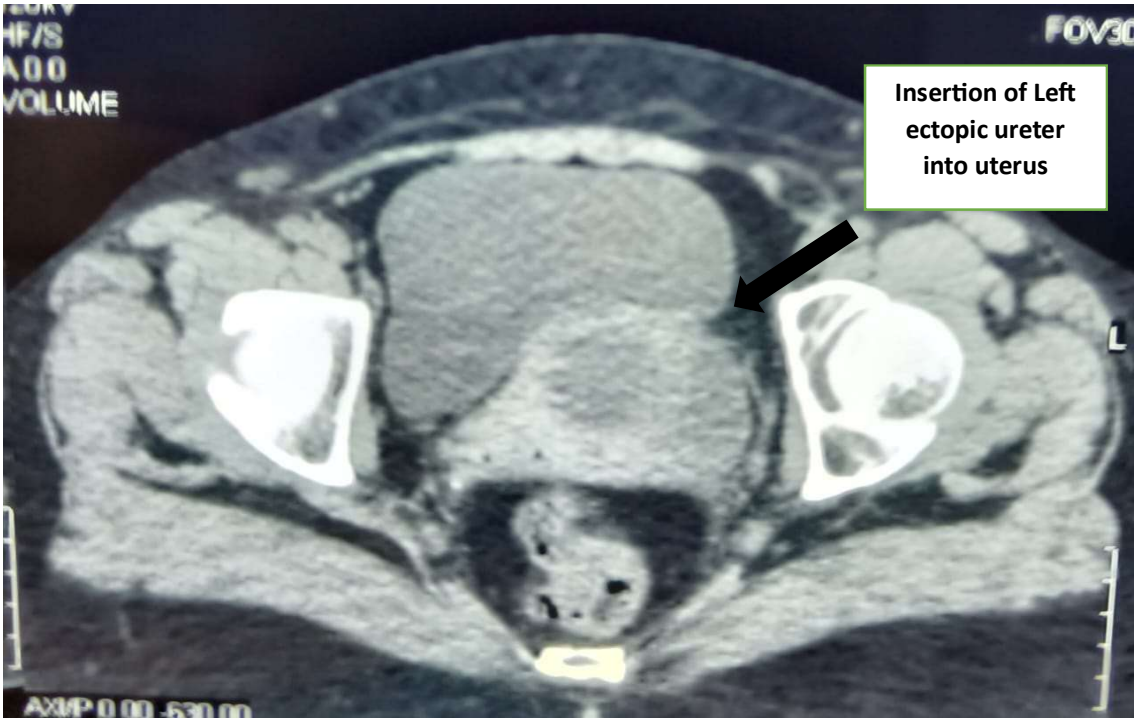

Figure 4. Axial section of CT KUB lower cuts showing insertion of the left ectopic ureter into the vagina.

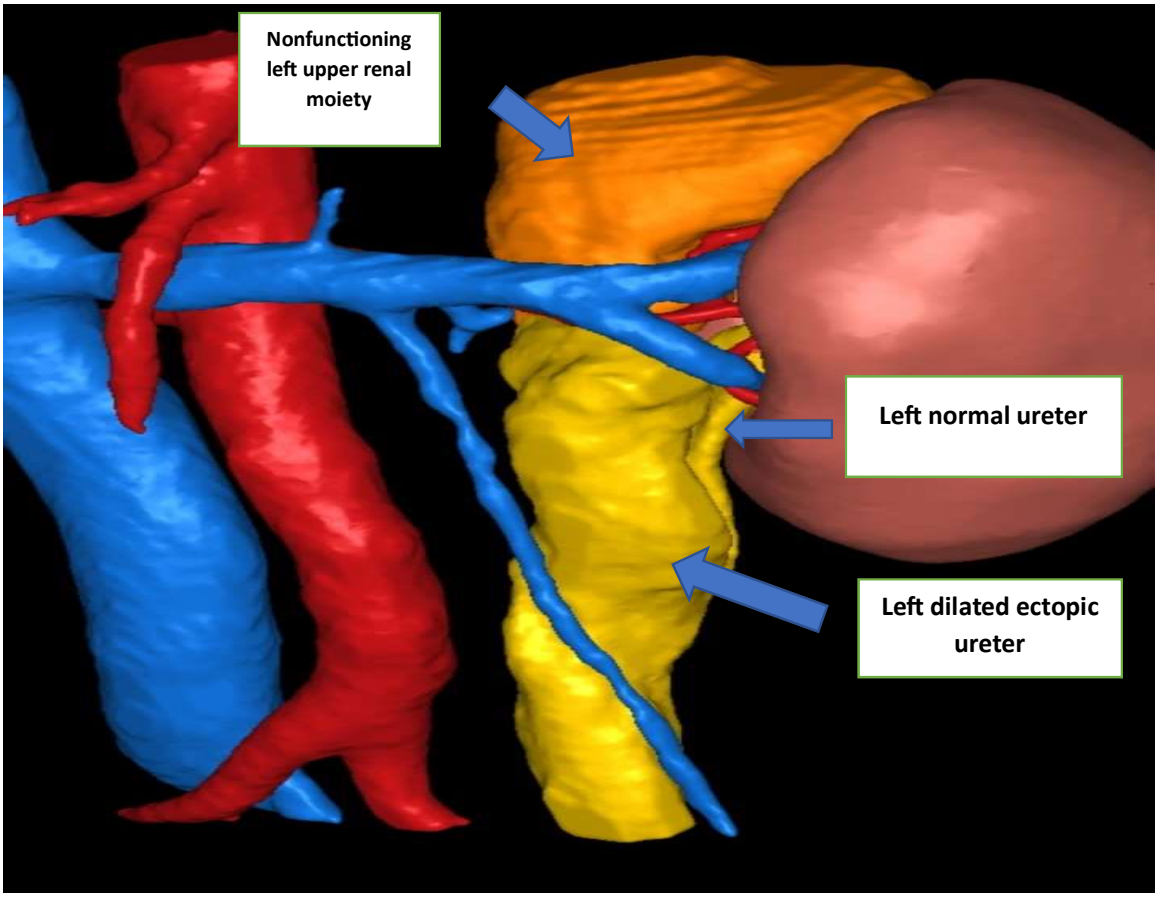

Figure 5. 3 D reconstructed image of the left side kidney showing two ureters- dilated ectopic ureter draining the upper renal moiety situated anteriorly and the normal ureter draining the rest of the middle and lower pole renal moiety situated posteriorly to the ectopic ureter.

In view of the non-functioning left sided upper renal moiety associated with recurrent episodes of left flank pain, decision was made to proceed with Robotic assisted Left sided segmental nephrectomy with excision of the left ectopic ureter. A cystoscopy was done before the definitive surgery which revealed normal bladder wall with normally placed bilateral ureteric orifices. Also, the left normal ureter was stented with 6/24 DJ stent to aid in identification and preservation of the left normal ureter (See Figure 6).

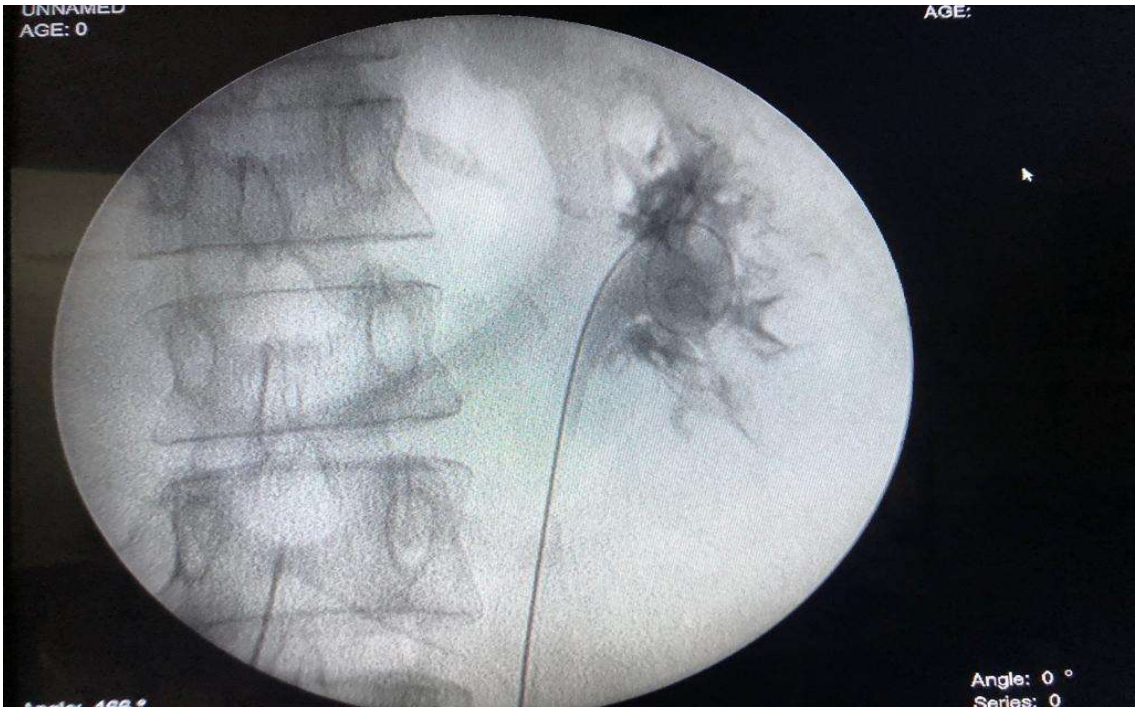

Figure 6. Left sided Retrograde pyelography image of the left side normal ureter draining the middle and the lower pole moiety followed by placement of 6/24 DJ stent to aid in identification during surgery.

Patient underwent robotic assisted left heminephrectomy with excision of the left ectopic ureter. A Da Vinci Xi (Intuitive Surgical) robot with three working robotic arms and one arm for camera was used for the surgery. A standard supraumbilical incision for 8 mm camera port and three more 8 mm ports were inserted -one in the left subcostal region, one in the lower left quadrant and one 5 cm above and superior to the left anterior superior iliac spine were inserted and one 12 mm assistant port were utilised for the robotic surgery (See Figures 7 and 8).

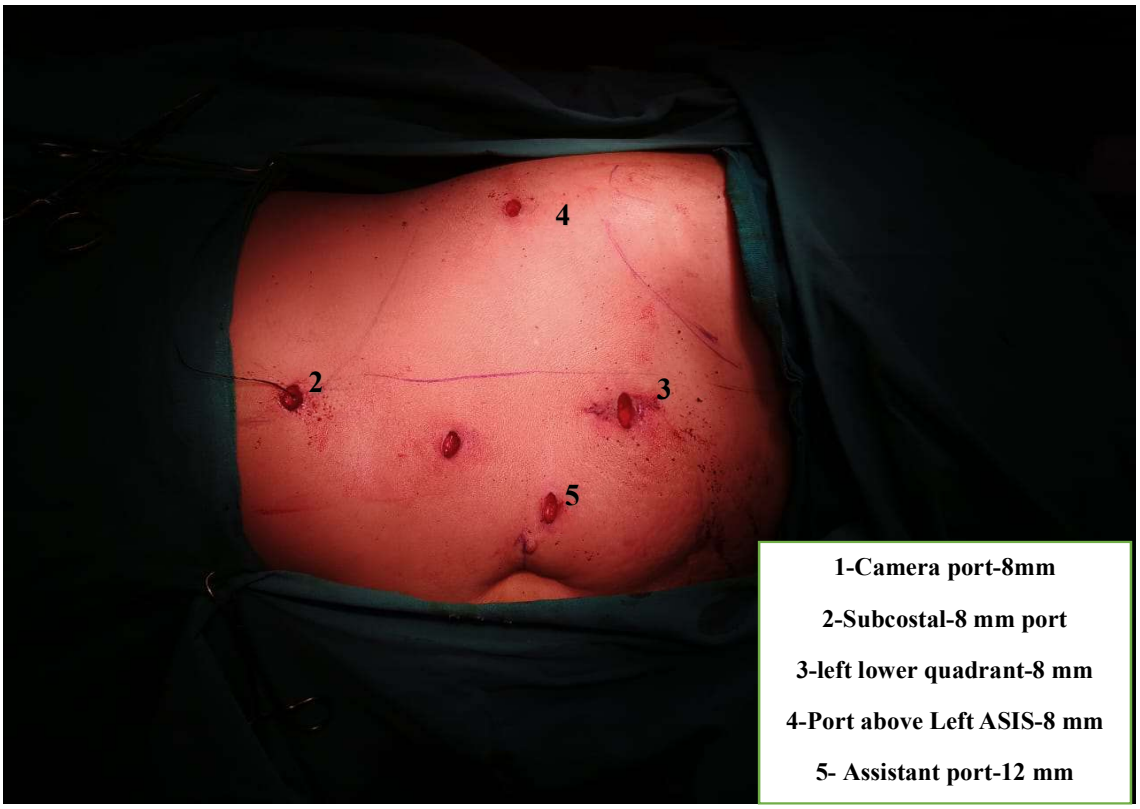

Figure 7. Intraoperative photograph showing port placement for the robotic arms and assistant port.

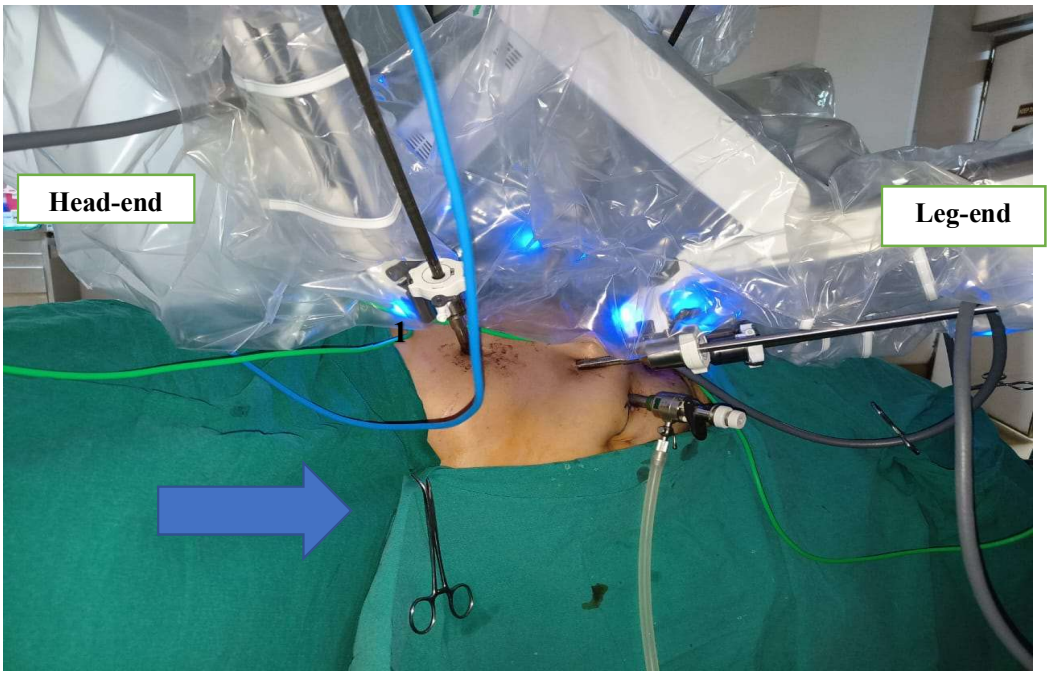

Figure 8. Intraoperative image showing the position of the ports and the Da Vinci Xi robot docked.

The surgery commenced with the mobilisation of the left colon medially from the white line of Toldt to expose the left kidney along with two left ureters and the gonadal vessels. Then the lower pole of the left kidney was exposed by tracing the left ureters. The two ureters were adherent to each other in a common sheath and were carefully separated with the DJ stent in the left normal ureter aiding in identification of the normal ureter (Figure 9).

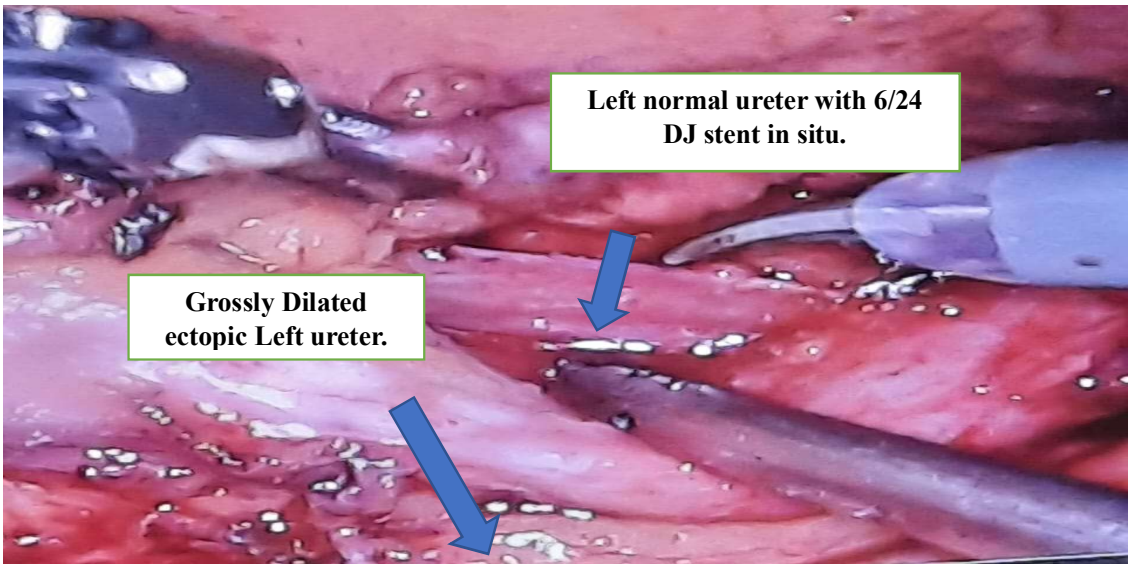

Figure 9. Intraoperative picture showing both the ureters of the duplex moiety of the left kidney.

The left ectopic ureter was carefully traced cranially where it was found to go behind the left renal vein (which was looped using a vesiloop) towards its origin from the left renal upper moiety. (See Figure 10).

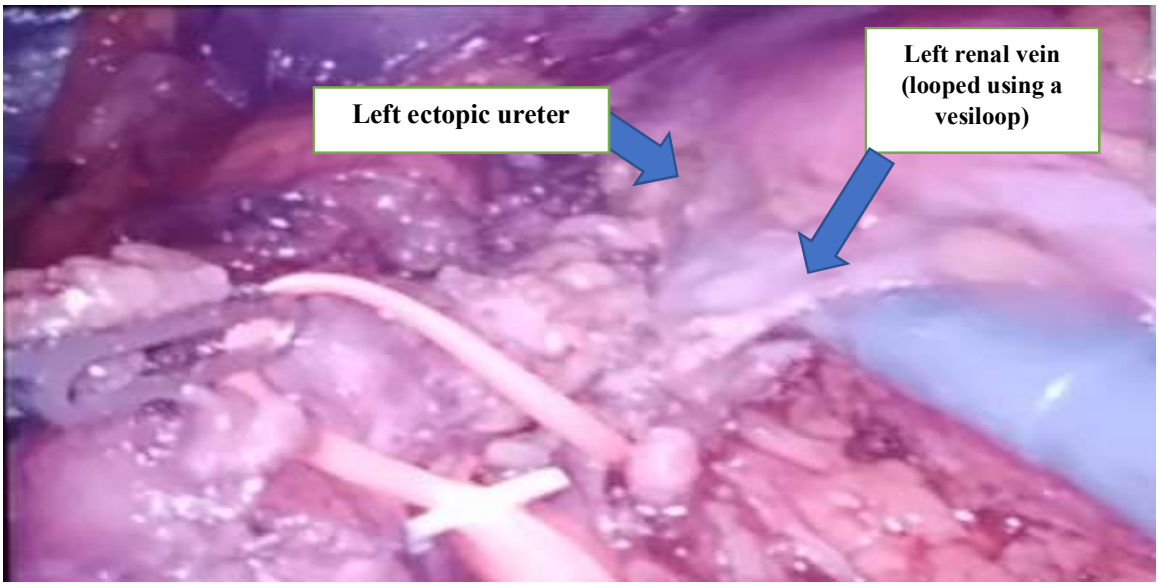

Figure 10. Intraoperative image showing the relation of the left ectopic ureter to the left renal vein (Left ectopic ureter was seen coursing posterior to the left renal vein)

Left sided hemi-nephrectomy of the non-functioning upper mole moiety was completed and the remaining left renal moiety of middle and lower pole was left behind. No renorrhaphy was required as there was clear delineation between the duplex moieties. The ectopic ureter was dissected till the level of external iliac vein and then through a small left flank incision, rest of the lower ectopic ureter was dissected to resect as much as possible of the ectopic ureter and then cut and the lower small segment stump was ligated. A pelvic drain was placed which was removed after 5 days. Patient had an uneventful recovery in the postoperative period with early mobilization and return to activity as the procedure was carried out by robotic assisted technique through small incisions. At 3 month follow up, patient reported no perineal discharge and renal function tests were within normal limits. Thus, this case report highlights the evaluation of patients with duplex moiety with ectopic ureter and their management by robotic surgery to aid in early recovery and earlier return to activity for the patient.

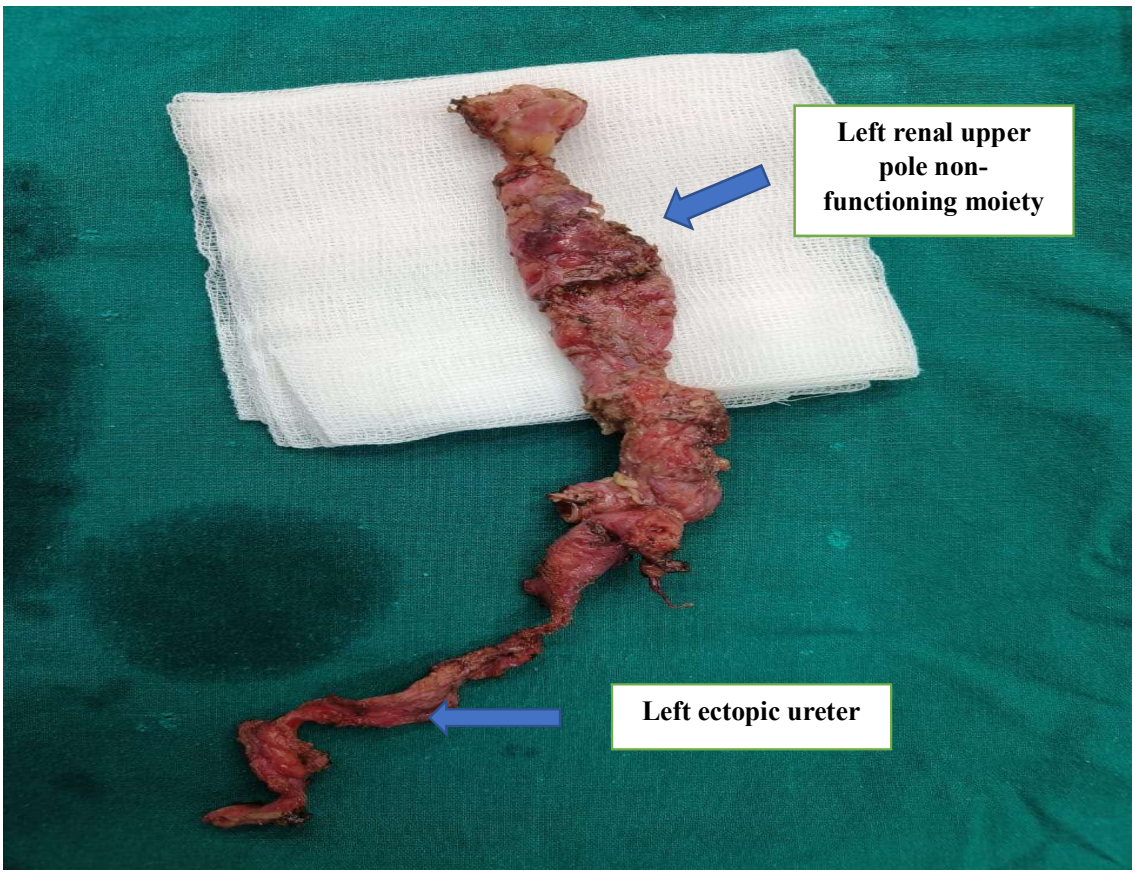

Figure 11. Postoperative image of the resected specimen of Left heminephrectomy with excision of the left ectopic ureter.

Discussion

The definition of ectopic ureter is a ureteric orifice outside the posterolateral extremity of the bladder trigone. The incidence of ectopic ureter is 1 in 2000 newborns. Male to female ratio is 2–6:1.The association of ectopic ureter with a duplicated renal collecting system is in 80-

85 % of the cases [1]. In our case, patient presented with sticky white discharge perineal discharge associated with intermittent episodes of flank pain. On further imaging, she was diagnosed to have complete duplex moiety with ectopic ureter draining upper renal moiety into the vagina and the normal ureter draining the middle and lower renal moiety into the bladder. In all cases imaging studies are mandatory to confirm the diagnosis. Contrast-enhanced computed tomography (CECT) or magnetic resonance imaging urography should be the method of choice for depicting or ruling out an ectopic ureter [3].

USG and IVU are usually performed for diagnosis. However, 16% of ectopic ureters may not be detected by IVP and so imaging modalities like CT/MRI or dimercaptosuccinic acid (DMSA) scan will have to be performed [3].

The renal function finally decided the finally surgical management in these conditions. In a functioning upper pole, the options are distal and proximal ureteroureterostomy (end-to-side). A concomitant ureteric reimplantation may be required in case of an associated lower polar refluxing system. The risk of infection may be eliminated by performing an upper polar nephrectomy in cases of non-functioning moiety [2,4]. In our case, heminephrectomy or the left kidney upper moiety was removed along with the left ectopic ureter.

Conclusion

Our case report thus highlights the importance of adequate evaluation of a patient to determine the anatomy and the function of the kidney to decide for the definitive management of these patients with ectopic ureter and duplex collecting system.

Ethical approval and consent to participate

Consent to participate is obtained from the patient.

Consent for publication

Consent for publication has been given by all the authors mentioned in the study.

Availability of data and material

The data and material required for the concerned patient was collected by use of hospital information system to collect patient related reports and other related data required for the study after obtaining consent from the patient and the hospital administration.

Competing interests

The authors have no competing interests to declare that are relevant to the content of this article.

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