



POINT OF VIEW

How Paediatric Key-hole and Endoscopic Surgery has Transformed Paediatric Surgical Care in India

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“Don't forget. To be a successful surgeon, you must have the eyes of a hawk, the heart of a lion, and the hands of a lady.”
- Sir Lancelot Spratt

Minimally invasive surgery was introduced in the year 1901 by Georg Kelling from Germany when he performed the first laparoscopic procedure in dogs but it was not up to 1910 when Hans Christian Jacobaeus of Sweden performed the first laparoscopic operation in humans. There were challenges, complications and initial apprehension but since then, the introduction of Paediatric Key hole and endoscopic surgery gave the kids suffering from various surgical ailments to undergo surgery with minimal pain, quick recovery, minimal scar with minimal days of hospital stay. At present, it's a real surgical wonder and marvel for the paediatric patients undergoing 'maximally' complicated surgical procedure through 'minimally' invasive procedure [1].

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Once upon a time, people used to be afraid of paediatric surgery. Already, the thought of having surgery done on a child is a harrowing one, but what if the surgery also leaves an ugly scar behind? What, then? Well, some parents would even have that listed as one of the reasons not to get surgery for their child.

But what alternatives do they have? Especially in cases like appendicitis and hernias where surgery is the only way to cure. This is where Paediatric Keyhole and endoscopic surgeries made a mark and brought new hope and success through the minimally invasive route. But before we discuss how this class of surgery has revolutionised the field of paediatric surgery, we need to know what it means in the first place [2].

In 1927, William Edwards Ladd, Surgeon-in-Chief at Boston Children's Hospital, established the first paediatric surgical training program and he knew that surgery in this age group of patients would be very challenging and risky. Paediatric surgery itself is a young speciality, only

around 45 years old in India. The Indian Association of Paediatric Surgeons (IAPS) established in 1965, as a section of Association of Surgeons of India (ASI) which separated from its parent body and became an independent Association in 1994. Minimally invasive paediatric surgery has developed rapidly in the last 20-30 years extending from fetuses to 17-year-old adolescents [3].

Paediatric keyhole surgery is a term used for laparoscopic surgery done on a child. In conventional open surgeries, the body wall is incised using instruments to allow surgeons direct access to the body cavity. However, in laparoscopic surgeries, the surgeon makes precise small 'keyhole' incisions through your abdominal wall and uses a camera, called a laparoscope and specialized instruments to guide the surgery and finish the procedure without ever entering the abdominal cavity. Funnily enough, the first laparoscopic surgery was done by a gynecologist!

With the advent of electronic videoscopes, small instruments and insufflators feasible for children, Minimally Invasive Surgery was also gaining ground in paediatric surgery. In 1976 Rodgers reported thoracoscopy for diagnostic reasons in children. But the main era of innovation was the 1990s which marked many firsts such as the first laparoscopic congenital diaphragmatic hernia repair in 1995, and the first MIS oesophageal atresia repair among others. There was a new dawn on the world of pediatric surgery and the field had been changed forever.

But was it all rainbows and sunshine? How effective was it practically? Would parents trust the doctors who could not directly see what he was operating on, instead of using a camera?

Well, the reality is that pediatric keyhole surgeries hold many advantages over conventional open procedures. This included reduced pain and discomfort, smaller incisions which lead to less scarring, a faster recovery time, and reduced exposure to the external environment which automatically reduces the risk of infection. It also grants an improved visualisation of the surgical site, which allows for more precise surgery which in turn, leads to reduced hospital stay, reduced blood loss and lesser post-operation complications.

It can also be used for a range of common pediatric procedures such as hernia repairs, appendectomies, pull-through surgery to treat Hirschsprung disease, orchidopexy to treat undescended testis and cholecystectomies.

But such a high level of care brings its costs and disadvantages. A smaller body to operate on means a larger margin for error, which makes surgery more difficult. It also means the treating team has to be highly specialised and skilled to be able to perform said surgery. Laparoscopic surgeries have a steeper learning curve and it has been accentuated even more in the case of paediatric surgeries.

Paediatric laparoscopic procedures are likely to cause an increase in pulmonary and systemic vascular resistance, sudden bradycardia during pneumoperitoneum because of raised intraabdominal pressure, the chances being much more than adults. Children have a high level of vagal tone and occasionally peritoneal stimulation by a blast of insufflated gas or penetration by trocars and laparoscopes can provoke bradycardia or asystole. There can also be ventilation perfusion mismatch. Hypercapnia, high systemic vascular resistance and head low position combine

to elevate intracranial pressure. The insufflated gas leads to increased intraabdominal pressure which in turn, increases the risk of regurgitation. Intraoperatively, there is very little space for the surgeon to work on in a paediatric patient during laparoscopy so there are chances of causing iatrogenic complications like trocar related injuries.

However, these complications are rare and most often occur in children with some other preexisting condition or comorbidity. Hence this should not serve as a point to disregard keyhole surgeries, but perhaps to take a more nuanced approach. Since this is still a procedure in its infancy and there's a way to go, many of the complications I've mentioned now may not even be relevant in the future.

All of these significantly improved the standard of patient care and satisfaction. Especially in India where the socioeconomic status of the patients plays a major role in their future. Socioeconomically, any ugly looking scar on a girl child's body may be the reason her suitor refusing to wed her or demand a high dowry when she grows up as an adult or the girl thinking of taking up a modelling career as a profession in future, Key hole surgery is the right choice [4].

The advent of Robotic surgery adds another dimension to keyhole surgeries as now we can have instruments which work with pinpoint accuracy and opens the field to even more specialities such as oncology in paediatric patients.

Conclusion

“Minimal Access Surgery is the marriage of modern technology and Surgical innovation”

The world is moving at a very fast pace and so is the world of paediatric surgery. Unlike in the past, the innovation in the paediatric anesthesia as well as refinement of the paediatric laparoscopic instruments and gadgets along with advance training of the surgeons in treating complex surgical procedures, paediatric Keyhole surgery is now the accepted and recommended method in our country and they are here to say as compared to the conventional open method. Being a surgeon is a gift of excellence and perhaps laparoscopic surgeries are the way we can express our gift.

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