National Board of Examinations - Journal of Medical Sciences
Volume 4, Issue 4, Pages 569–582, April 2026
DOI 10.61770/NBEJMS.2026.v04.i04.012

ORIGINAL ARTICLE

# Predictive Ability and Clinical Utility of the SLIC Score for Surgical Decision-Making in Sub Axial Cervical Spine Injuries: A Secondary Data Analysis

V Sureshkumar[1,*] and M. Makesh Kumar

[1]*Associate Professor, Department of Neurosurgery, Govt Mohan Kumaramangalam Medical College, Salem, Tamilnadu*
[2]*Neurosurgery Post Graduate, Government Mohan Kumaramangalam Medical College, Salem, Tamilnadu*

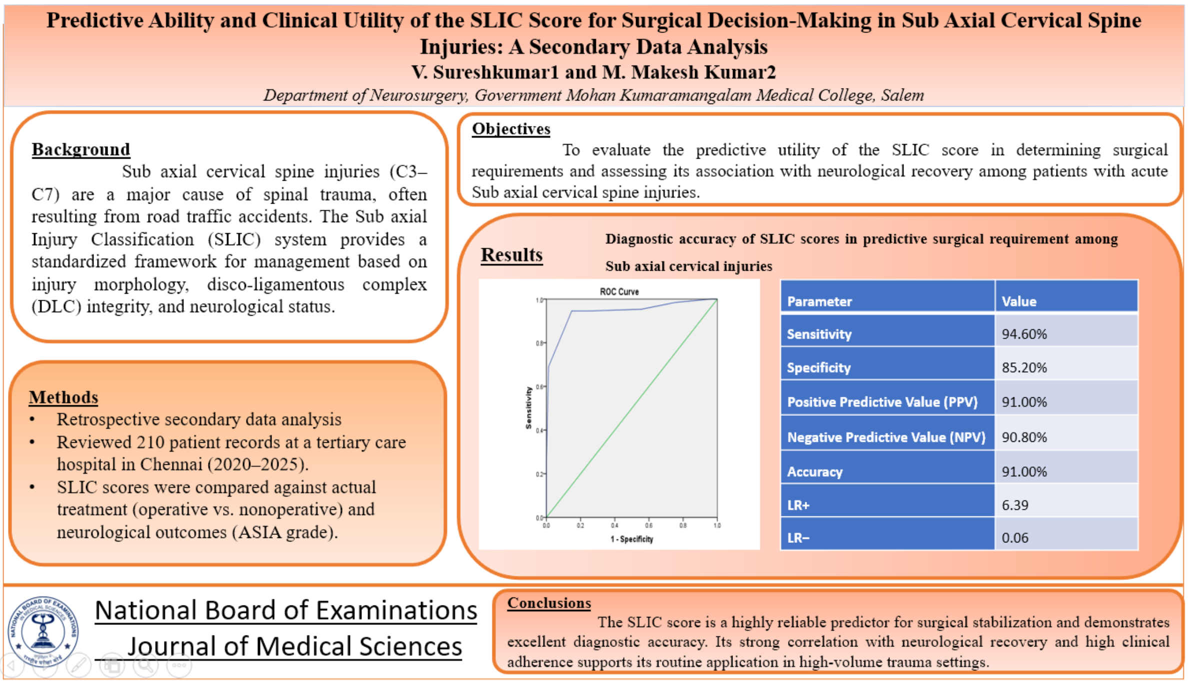
Accepted: 10-March-2026 / Published Online: 3-April-2026

**Abstract**
**Introduction**: Sub axial cervical spine injuries (C3–C7) are a major cause of spinal trauma, often resulting from road traffic accidents. The Sub axial Injury Classification (SLIC) system provides a standardized framework for management based on injury morphology, disco-ligamentous complex (DLC) integrity, and neurological status. **Objective**: To evaluate the predictive utility of the SLIC score in determining surgical requirements and assessing its association with neurological recovery among patients with acute Sub axial cervical spine injuries. **Materials and Methods**: This retrospective secondary data analysis reviewed 210 patient records at a tertiary care hospital in Salem (2020–2025). SLIC scores were compared against actual treatment (operative vs. nonoperative) and neurological outcomes (ASIA grade). **Results**: The mean age was 45.21 years with a 69.5% male predominance, primarily due to road traffic accidents (61.0%). Surgical intervention was performed in 61.4% of patients, who had significantly higher mean total SLIC scores compared to those managed conservatively (7.64 vs. 2.98, $p < 0.001$). Overall, 90.9% of patients received SLIC-appropriate management. Neurological improvement was significantly higher in the surgical group (58.1%) compared to the conservative group (30.9%, $p < 0.001$). ROC analysis for predicting surgical requirement (SLIC > 4) demonstrated an AUC of 0.940, with 94.6% sensitivity, 85.2% specificity, and 91.0% overall accuracy. **Conclusion**: The SLIC score is a highly reliable predictor for surgical stabilization and demonstrates excellent diagnostic accuracy. Its strong correlation with neurological recovery and high clinical adherence supports its routine application in high-volume trauma settings.

**Keywords:** Sub axial cervical spine injury, SLIC score, Surgical stabilization, Neurological outcome

*Corresponding Author: drsuresh33@gmail.com
Email: sivaharivelantry@gmail.com

## Graphical Abstract




## Introduction

Traumatic Sub axial cervical spine injuries (C3–C7) account for a substantial proportion of spinal trauma in low- and middle-income countries, particularly India, where road traffic accidents and falls remain leading etiologies, with mortality rate accounting to 6% [1,2]. Early identification of mechanical instability and neurological compromise is crucial, as these factors directly influence surgical decision-making and long-term functional recovery [3]. In contemporary spine trauma practice, structured injury classification systems are increasingly favored to reduce variability and improve prognostic accuracy [4]. Literatures on Indian tertiary-center data continue to highlight the burden of cervical spine trauma and the need for standardized assessment protocols in high-volume settings [5].

The Sub axial Cervical Spine Injury Classification (SLIC) system, proposed by the Spine Trauma Study Group, integrates three key domains—injury morphology, integrity of the disco-ligamentous complex (DLC), and neurological status—into a cumulative score that guides treatment decisions. Scores ≤3 favor conservative management, ≥5 recommend surgical intervention, and a score of 4 remains equivocal, requiring clinical judgment. [6,7]. Beyond its original intent as a treatment algorithm, multiple contemporary analyses demonstrate that SLIC shows good interobserver reliability and reproducibility in tertiary trauma settings, supporting its routine clinical applicability [8,9].

Literatures from Indian centers suggests that higher SLIC scores correlate with greater mechanical instability, higher likelihood of operative intervention, and more severe baseline neurological deficits, the neurological component of SLIC has demonstrated prognostic relevance, with patients sustaining incomplete spinal cord injuries showing meaningful postoperative neurological improvement following early decompression when appropriately stratified [10,11]. These findings support the hypothesis that SLIC may serve not only as a decision-making tool but also as a predictor of surgical outcomes.

Despite its widespread adoption in tertiary referral centers—where SLIC scoring is routinely integrated with MRI-based DLC assessment and multidisciplinary trauma evaluation—questions remain regarding its independent predictive strength for postoperative recovery, complication rates, and functional outcomes. Furthermore, recent analyses note that SLIC does not explicitly incorporate patient-specific modifiers such as comorbidities, osteoporosis, or polytrauma burden, which may influence surgical prognosis [4,12,13]. In this context, a structured secondary data review is warranted to critically appraise the application of SLIC scoring in predicting surgical outcomes within real-world tertiary care practice.

## Objectives

To evaluate the predictive utility of the Sub axial Cervical Spine Injury Classification and Severity Score (SLIC) in determining the requirement for surgical stabilization among patients with acute Sub axial cervical spine injuries, and to assess the association between baseline SLIC score and postoperative and neurological outcome.

## Methodology

This retrospective secondary data analysis was conducted at a tertiary care teaching hospital in Salem. Medical records, operative registers, and radiological databases of cervical spine injury cases were reviewed for a five-year period from January 1, 2020 to December 31, 2025. The study included all patient records (census sampling) with acute Sub axial cervical spine injuries (C3–C7) during the study period. The study utilized routinely recorded clinical and radiological data generated as part of institutional spine trauma management protocols.

Acute traumatic Sub axial cervical spine injury (C3–C7) confirmed on computed tomography (CT) and/or magnetic resonance imaging (MRI) with adequate clinical and radiological documentation to compute SLIC score were included and patients with Upper cervical spine injuries (C0–C2), Pathological fractures (tumor, infection), chronic injuries, or prior cervical instrumentation and Incomplete records precluding reliable SLIC calculation were excluded.

Data were extracted using a standardized data abstraction proforma. Demographic variables (age, sex), mechanism of injury, injury level, radiological findings, neurological outcome as per American Spinal Injury Association [ASIA] grade [14], SLIC score, treatment modality (operative or nonoperative), and in-hospital outcomes (complications) were recorded. Where SLIC score was not explicitly documented in the medical record, it was retrospectively computed from available imaging and neurological documentation according to established SLIC criteria.

SLIC scoring was determined using three components:

1. Injury morphology (based on CT ± MRI)
2. Integrity of the disco-ligamentous complex (preferably MRI-based assessment)
3. Neurological status (ASIA grade at presentation)

Scores were interpreted as follows:

- <4 (nonoperative recommendation),
- 4 (equivocal), and
- >4 (operative recommendation).

Actual treatment decisions were documented as executed under institutional spine trauma protocols.

Of the 251 records retrieved during the study period, based on the completeness of records, inclusion and exclusion criteria, 210 patient records were included for analysis.

Statistical analysis was performed using SPSS v16.0. Continuous variables were summarized as mean ± standard deviation. Categorical variables were presented as frequencies and percentages. Association between SLIC category and Management, Outcome were assessed using the Chi-square test. Diagnostic performance of SLIC cut-offs (>4) was evaluated by calculating sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV). A p value <0.05 was considered statistically significant.

**Results**

The mean age of the patients in our records were 45.21±16.6 years and with a male predominance (69.5%). Road traffic accidents were the leading cause of injury (61.0%), followed by fall from height (20.0%) and ground-level falls (16.2%), indicating that high-energy trauma was the primary mechanism. Associated injuries were present in 42.9% of patients, most commonly head injury (26.7%). The C5 vertebral level was most frequently involved (37.6%), followed by C6 (22.9%) and C4 (21.0%), reflecting the biomechanical susceptibility of the mid-cervical spine. Table 1 shows the distribution of Injury related variables in the study records.

Table 1. Distribution of Injury variables

| **Injury related Variables** | | **Frequency** | **Percent** |
|---|---|---|---|
| **Mode of Injury** | **Assault** | 6 | 2.9 |
| | **Fall at Ground Level** | 34 | 16.2 |
| | **Fall from Height** | 42 | 20.0 |
| | **RTA** | 128 | 61.0 |
| **Associated Injury** | **Head Injury** | 56 | 26.7 |
| | **None** | 120 | 57.1 |
| | **Polytrauma** | 21 | 10.0 |
| | **Thoracic Injury** | 13 | 6.2 |

| | | | |
|---|---|---|---|
| **Level of Injury** | **C3** | 17 | 8.1 |
| | **C4** | 44 | 21.0 |
| | **C5** | 79 | 37.6 |
| | **C6** | 48 | 22.9 |
| | **C7** | 22 | 10.5 |

Regarding management, 129 patients (61.4%) underwent surgical intervention and 81 (38.6%) were treated conservatively. Surgical procedures included combined approaches (18.1%), corpectomy (15.7%), posterior fixation (14.3%), and ACDF (13.3%), suggesting individualized treatment based on instability and neurological status. Complication rates were relatively low, with 69.0% having no complications; infection and pneumonia each occurred in 10.0% of patients, while implant failure and bed sores were infrequent. Table 2 shows the distribution of management and outcome among the study records.

Table 2. Distribution of Management and Outcome

| **Variable** | | | Frequency | Percent |
|---|---|---|---|---|
| **Management** | **Surgical** | **ACDF** | 28 | 13.3 |
| | | **Corpectomy** | 33 | 15.7 |
| | | **Posterior Fixation** | 30 | 14.3 |
| | | **Combined** | 38 | 18.1 |
| | **Conservative** | | 81 | 38.6 |
| **Complications** | **Bed Sores** | | 14 | 6.7 |
| | **Implant Failure** | | 9 | 4.3 |
| | **Infection** | | 21 | 10.0 |
| | **None** | | 145 | 69.0 |
| | **Pneumonia** | | 21 | 10.0 |

| | | | |
|---|---|---|---|
| **Neurological Outcome (as per ASIA grade)** | **Deteriorated** | 12 | 5.7 |
| | **Improved** | 100 | 47.6 |
| | **No Change** | 98 | 46.7 |

The mean SLIC score was 5.84± 2.87 with mean morphology, DLC, neurology scores were 2.60±1.30, 1.43±0.74 and 1.81±1.08. The SLIC score distribution showed that 64% of patients had scores >4, 32% had scores <4, and 4% scored 4. Figure 1 display the distribution of SLIC score among the study records. Surgery was performed in 129 patients and conservative treatment in 81 patients. Figure 2 display the distribution of management approaches done among the study records.

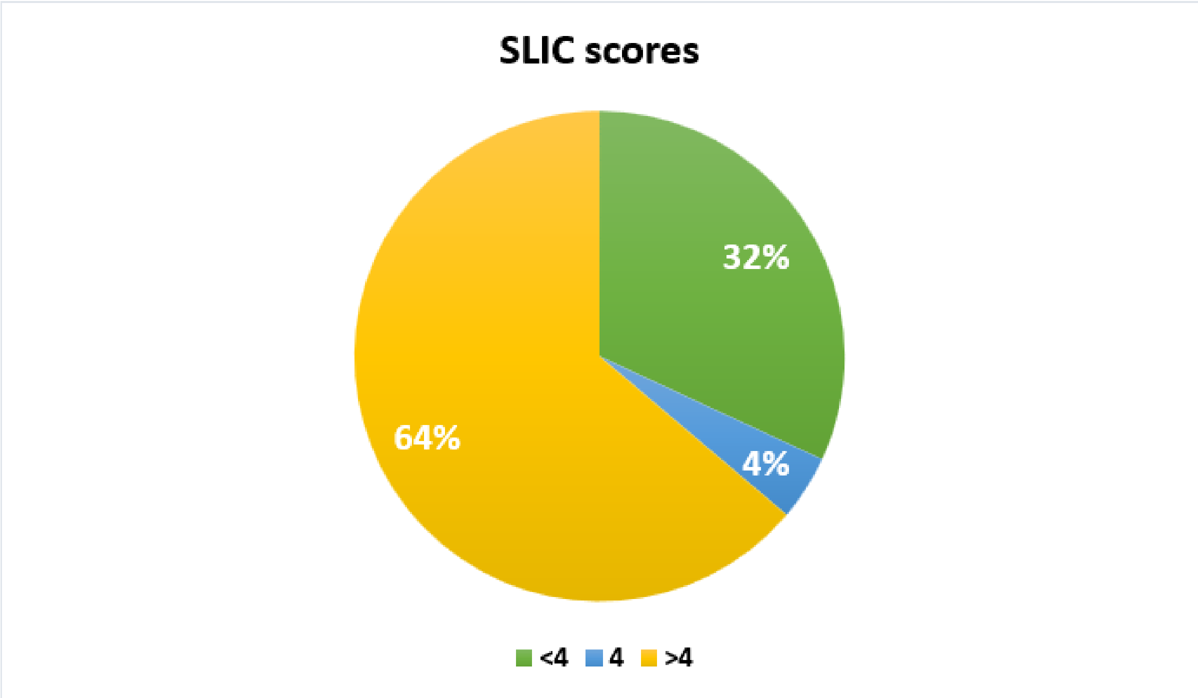



Figure 1. Distribution of SLIC score category among the study records

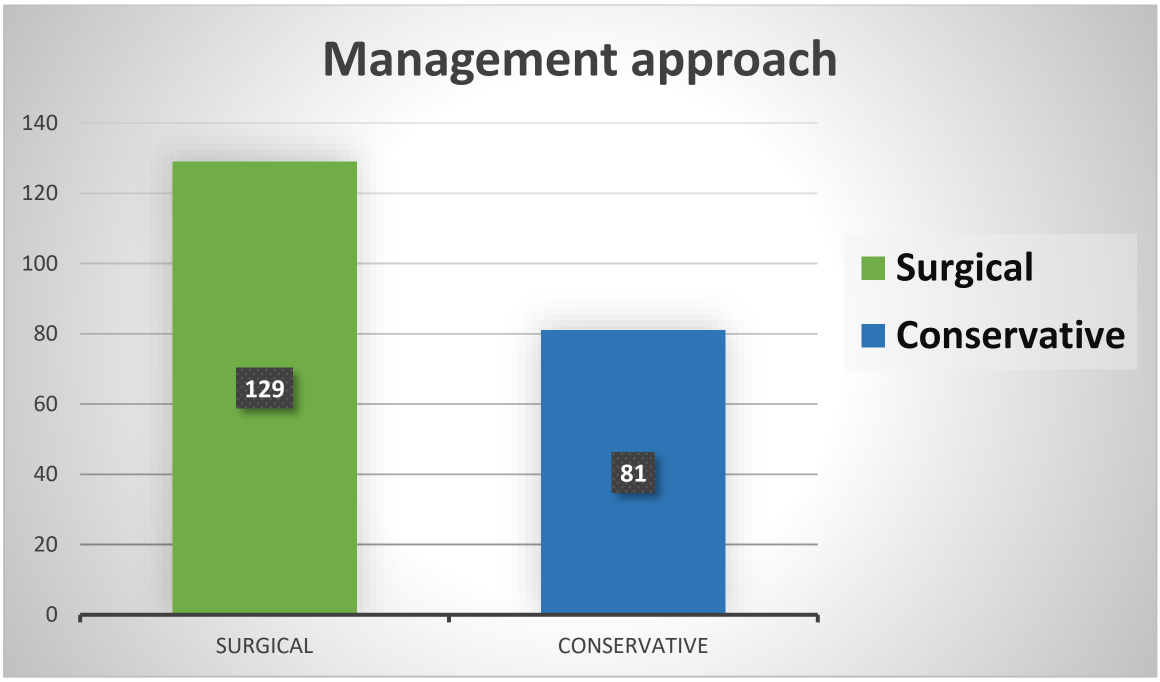



Figure 2. Distribution of management approaches done among the study records

Neurological outcomes were favorable, with 47.6% showing improvement, 46.7% remaining unchanged, and 5.7% deteriorating. Injury morphology was significantly associated with neurological outcome ($\chi^2 = 27.188$, $p = 0.002$), with rotational and translational injuries showing greater improvement. Management modality also showed a significant association ($\chi^2 = 18.14$, $p < 0.001$), as 58.1% of surgically managed patients improved compared to 30.9% in the conservative group. Table 3 shows the association between morphology of the injury and type of management with the Neurological outcome among the study records.

Table 3. Association between morphology of the injury and type of management with the Neurological outcome among the study records

| **Variables** | | **Neurological Outcome** | | | **Total** | **Chi Square Value** | **p value** |
|---|---|---|---|---|---|---|---|
| | | **Deteriorated** | **Improved** | **No Change** | | | |
| **Morphology Type** | **Burst** | 2 | 10 | 24 | 36 | 27.188 | **0.002*** |
| | | 5.6% | 27.8% | 66.7% | 100.0% | | |
| | **Compression** | 2 | 6 | 13 | 21 | | |
| | | 9.5% | 28.6% | 61.9% | 100.0% | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Distraction** | 3 | 39 | 26 | 68 | | |
| | | 4.4% | 57.4% | 38.2% | 100.0% | | |
| | **No abnormality** | 4 | 6 | 13 | 23 | | |
| | | 17.4% | 26.1% | 56.5% | 100.0% | | |
| | **Rotation** | 0 | 18 | 12 | 30 | | |
| | | 0.0% | 60.0% | 40.0% | 100.0% | | |
| | **Translation** | 1 | 21 | 10 | 32 | | |
| | | 3.1% | 65.6% | 31.3% | 100.0% | | |
| **Management** | **Conservative** | 9 | 25 | 47 | 81 | 18.14 | **<0.001*** |
| | | 11.1% | 30.9% | 58.0% | 100.0% | | |
| | **Surgical** | 3 | 75 | 51 | 129 | | |
| | | 2.3% | 58.1% | 39.5% | 100.0% | | |
| **SLIC Score Category** | **<4** | 7 | 19 | 41 | 67 | 20.816 | **<0.001*** |
| | | 10.4% | 28.4% | 61.2% | 100.0% | | |
| | **=4** | 1 | 2 | 6 | 9 | | |
| | | 11.1% | 22.2% | 66.7% | 100.0% | | |
| | **>4** | 4 | 79 | 51 | 134 | | |
| | | 3.0% | 59.0% | 38.1% | 100.0% | | |

*p-value<0.05 – Statistically significant

Table 4 presents the distribution of management strategies according to the Subaxial Injury Classification (SLIC) score among the study records (n = 210). Among patients with a SLIC score ≤ 4 (non-operative category), the majority were managed conservatively (90.8%), while only 7 patients (9.2%) underwent surgical intervention. In contrast, among patients with a SLIC score > 4 (surgical category), most were treated surgically (91.0%), with only 12 patients (9.0%) managed conservatively. Overall, 191 patients (90.9%) received SLIC appropriate management, and only 19 patients (9.1%) required management other way. These findings demonstrate a clear association between higher SLIC scores and operative management, indicating good adherence to SLIC-guided treatment choices in the study records.

Table 4. SLIC & Management Distribution

| **SLIC category** | **Management done** | | |
|---|---|---|---|
| | **Conservative** | **Surgical** | **Grand Total** |
| **≤4 - Non-operative** | 69 | 7 | 76 |
| **>4 - Surgery** | 12 | 122 | 134 |
| **Grand Total** | 81 | 129 | 210 |

Patients who had surgical management had significantly higher morphology, DLC, neurology, and total SLIC scores ($p < 0.001$) and longer ICU stay (3.60±1.70 vs 1.00±0.00 days). Table 5 shows the SLIC scores and duration of ICU stay among management categories in the study records. ROC analysis demonstrated excellent predictive performance of the total SLIC score for surgical management (AUC = 0.940; sensitivity 94.6%, specificity 85.2%, accuracy 91.0% positive predictive value (PPV) of 91.0%, negative predictive value (NPV) of 90.8%, and overall diagnostic accuracy of 91.0%. The positive likelihood ratio (LR+) of 6.39 and negative likelihood ratio (LR−) of 0.06), confirming its strong clinical utility in guiding treatment of cervical spine injuries. Table 6 presents the diagnostic accuracy of SLIC scores in predicting surgical requirement among Sub axial cervical injuries. The ROC analysis identified a SLIC score of >4 as the optimal threshold (By Youden Index) that provided the best balance between sensitivity and specificity for predicting the outcome in our study population. Figure 3 display the ROC curve for SLIC score >4 as cut off value in predicting surgical management.

Table 5. SLIC and ICU stay across management categories

| **Variable** | **Management** | **N** | **Mean** | **t value** | **p value** |
|---|---|---|---|---|---|
| **Morphology Score** | **Conservative** | 81 | 1.42±1.04 | -14.827 | **<0.001*** |
| | **Surgical** | 129 | 3.33±0.82 | | |
| **DLC Score** | **Conservative** | 81 | 0.68±0.54 | -19.306 | **<0.001*** |
| | **Surgical** | 129 | 1.90±0.37 | | |

| | | | | | |
|---|---|---|---|---|---|
| **Neurology Score** | **Conservative** | 81 | 0.88±0.93 | -13.631 | **<0.001*** |
| | **Surgical** | 129 | 2.40±0.69 | | |
| **Total SLIC Score** | **Conservative** | 81 | 2.98±1.98 | -18.773 | **<0.001*** |
| | **Surgical** | 129 | 7.64±1.59 | | |
| **ICU Stay days** | **Conservative** | 42 | 1.00±0.00 | -9.897 | **<0.001*** |
| | **Surgical** | 129 | 3.60±1.70 | | |

*p-value<0.05 – Statistically significant

Table 6. Diagnostic accuracy of SLIC scores in predictive surgical requirement among Sub axial cervical injuries

| **Parameter** | **Value** |
|---|---|
| **Sensitivity** | 94.60% |
| **Specificity** | 85.20% |
| **Positive Predictive Value (PPV)** | 91.00% |
| **Negative Predictive Value (NPV)** | 90.80% |
| **Accuracy** | 91.00% |
| **LR+** | 6.39 |
| **LR−** | 0.06 |

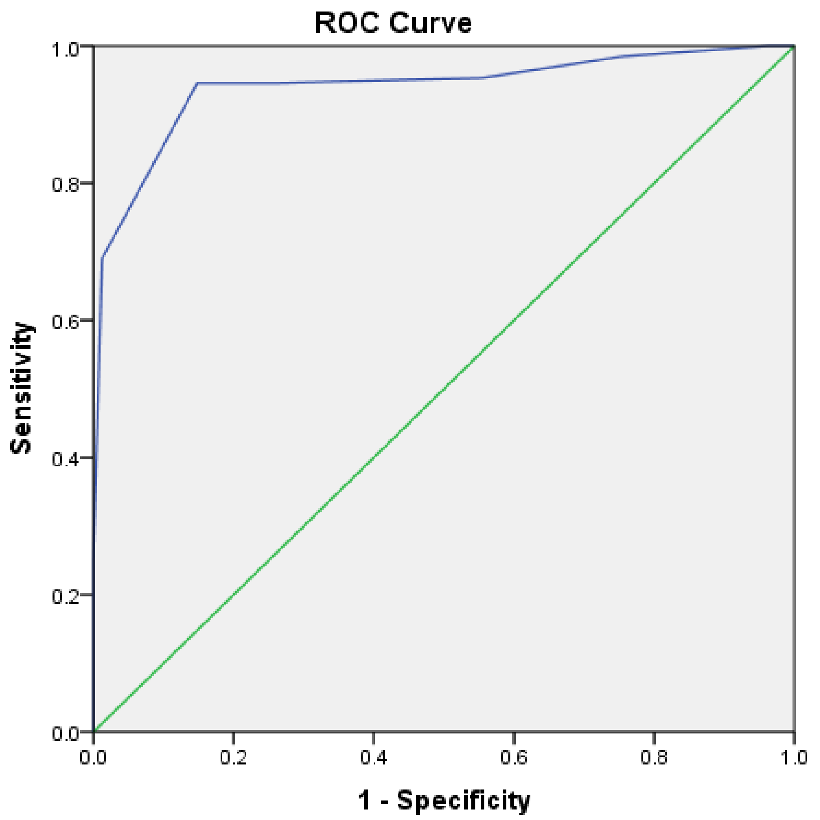



Figure 3. ROC Curve for SLIC >4 in predicting Surgical requirements among Sub axial cervical injuries

**Discussion**

The application of the Subaxial Injury Classification (SLIC) system as a primary tool for clinical decision-making is reinforced by the findings of this study, which demonstrate high diagnostic accuracy and strong adherence to treatment algorithms.

Our study's mean age of 45.21 years and male predominance (69.5%) align closely with previous literature. Mascarenhas et al. reported a similar average age of 49.4 years with a 76.7% male distribution.[15] In contrast, earlier smaller cohorts by Joaquim et al. observed slightly younger means in their non-surgical (41.1 years) and surgical (44.3 years) groups [16]. The predominance of road traffic accidents (61.0%) as the leading etiology mirrors the findings of Sharif et al., who noted that the subaxial spine is highly predisposed to injury due to its substantial motion, with over 50% of injuries occurring between C5 and C7. Our data specifically identified C5 (37.6%) as the most involved level, consistent with the biomechanical susceptibility noted by Sharif et al [8].

The 90.9% rate of SLIC-appropriate management observed in our study is highly congruent with external validation studies. Joaquim et al. [16] reported a 92.1% match between SLIC-proposed and actual treatment, while Samuel et al. found even higher concordance rates of 93.6% for non-surgical and 96.3% for surgical patients [17]. These results collectively validate the SLIC system as a practical classification that provides a consistent algorithm for diagnosis and management, as emphasized by Sharif et al. [8].

Our finding that patients undergoing surgery had significantly higher mean total SLIC scores (7.64 vs. 2.98, $p < 0.001$) is supported by Samuel et al., who reported a similar significant difference (7.14 vs. 2.22, $p < 0.001$) [17]. Furthermore, our study identified that only 9.2% of patients with a score < 4 underwent surgery, matching the 7.1% to 8.3% outlier rates reported by Joaquim et al. for patients treated outside the standard algorithm due to clinical judgment or head injuries [16].

While our methodology integrated MRI-based DLC assessment, Mascarenhas et al. suggest that CT alone may be sufficient for initial triage, yielding a nearly identical AUC (0.88) compared to combined CT and MRI (0.87) [15]. However, Sharif et al. (WFNS Spine Committee) reached a 100% consensus recommending the use of MRI to achieve a more precise classification [8]. Our study's reliance on MRI for scoring the DLC (mean 1.43) likely contributed to its high diagnostic performance, though Mascarenhas et al. warn that MRI may upstage scores due to its high sensitivity but lower specificity for ligamentous injuries [15].

Our study demonstrates that management modality significantly influences neurological recovery, with 58.1% of surgically managed patients showing improvement compared to 30.9% in the conservative group. This is echoed by Joaquim et al. [16], who found that 72% of patients with incomplete deficits improved their ASIA status post-surgery. Sharif et al. further support early surgical intervention (within 12–72 hours) to improve these outcomes [8].

Additionally, the ROC analysis in our study yielded an AUC of 0.94, indicating excellent predictive performance for surgical requirement. This exceeds the "good" accuracy (AUC 0.87–0.88) reported by Mascarenhas et al. [15] and is very much comparable with the findings by Piazza et.al., among pediatric population [18]. This difference may stem from our study's structured secondary data review in a high-volume tertiary center, which may have tighter adherence to standardized protocols than the retrospective cohorts used in earlier validation studies.

It is also to be taken into account that, the modified SLIC score proposed by Hitti et al. also suggests that time to stabilization is a significant predictor of non-operative failure, a variable not captured in the original SLIC system but relevant for clinical practice [19].

## Conclusion

Overall, the findings of this study demonstrate that the SLIC scoring system has high predictive validity, strong diagnostic accuracy, and significant clinical applicability in a tertiary care trauma setting. Higher SLIC scores were consistently associated with surgical management, greater injury severity, and improved neurological outcomes following appropriate intervention, supporting its role as an effective decision-making tool in the management of Sub axial cervical spine trauma.

## Limitations

As a retrospective record-based analysis, the study relied on the availability and completeness of existing clinical documentation, which may have limited the inclusion of potential confounders in analysis. Also, interobserver verification of the SLIC scoring was not performed, as the scores were derived from available clinical and radiological documentation in patient records.

## Author Contributions

VS has contributed to the conceptualization, design of the study, literature search, data acquisition, manuscript editing and review. MM contributed towards data acquisition Statistical analysis, Manuscript review and editing. VS acted as the corresponding author for this manuscript

## Conflicts of interest

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

## Funding

No funding was received for conducting this study.

## Acknowledgements

*Use of AI:* Authors declare the usage of AI tool (Perplexity) for content and language moderation alone.

## References

1. Maheshwari V, Gill M, Mukherjee A, Gadhavi R. A prospective study of subaxial spine injuries: an armed forces experience. Med J Dr DY Patil Vidyapeeth. 2020 Jul–Aug;13(4):368-372. doi:10.4103/mjdrdypu.mjdrdypu_221_19.
2. Zaveri G, Das G. Management of sub-axial cervical spine injuries. Indian J Orthop. 2017 Nov-Dec;51(6):633-652. doi:10.4103/ortho.IJOrtho_192_16.
3. Shaharudin N, et al. The initial assessment and management of cervical spine injuries: a comprehensive review. Cureus. 2025;17(7):e88805.
4. Huang X, Zhang Y, Xiao H, Chen J, Jiang Y. The evolution of cervical spine trauma classification: a paradigm shift from morphological description to clinical decision-making. Front Neurol. 2025 Dec 10;16:1728720. doi:10.3389/fneur.2025.1728720.
5. Venkati GS, Satpaty A, Pandey N, Prasad RS. Observational retrospective study of subaxial cervical spine trauma at tertiary care centre. IP Indian J Neurosci. 2021;7(4):306-310. doi:10.18231/j.ijn.2021.056.
6. Spitnale MJ, Grabowski G. Classification in brief: subaxial cervical spine injury classification and severity score system. Clin Orthop Relat Res. 2020 Oct;478(10):2390-2398. doi:10.1097/CORR.0000000000001463.
7. Joaquim AF, Patel AA, Vaccaro AR. Cervical injuries scored according to the Subaxial Injury Classification system: an analysis of the literature. J Craniovertebr Junction Spine. 2014 Apr;5(2):65-70. doi:10.4103/0974-8237.139200.
8. Sharif S, Ali MYJ, Sih IMY, Parthiban J, Alves ÓL. Subaxial cervical spine injuries: WFNS Spine Committee recommendations. Neurospine. 2020 Dec;17(4):737-758. doi:10.14245/ns.2040368.184.
9. Grin A, Krylov V, Lvov I, Talypov A, Dzukaev D, Kordonskiy A, Smirnov V, Karanadze V, Abdukhalikov B, Khushnazarov U, Airapetyan A, Dmitriev A, Kaykov A, Peyker A, et al. External multicenter study of reliability and reproducibility for lower cervical spine injuries classification systems—part 2: an

analysis of the subaxial cervical spine injury classification and cervical spine injury severity score scale. Global Spine J. 2021 Jan;11(1):99-107. doi:10.1177/2192568219896546.

10. Kumar V, et al. Factors affecting clinical outcomes in traumatic cervical spine injuries in adults: review of recent literature. J Orthop Case Rep. 2025;15(4):252-261.
11. Joaquim AF, Ghizoni E, Tedeschi H, da Cruz HY, Patel AA. Clinical results of patients with subaxial cervical spine trauma treated according to the SLIC score. J Spinal Cord Med. 2014 Jul;37(4):420-424. doi:10.1179/2045772313Y.0000000143.
12. Feature focus: SLIC vs AO Spine classification in spine trauma. Eur Spine J. 2025;2025(s-0045-1805025).
13. Divi SN, Schroeder GD, Oner FC, Kandziora F, Schnake KJ, Dvorak MF, Benneker LM, Chapman JR, Vaccaro AR. AOSpine-Spine trauma classification system: the value of modifiers—a narrative review with commentary on evolving descriptive principles. Global Spine J. 2019 May;9(1 Suppl):77S-88S. doi:10.1177/2192568219827260.
14. Roberts TT, Leonard GR, Cepela DJ. Classifications in brief: American Spinal Injury Association (ASIA) Impairment Scale. Clin Orthop Relat Res. 2017 May;475(5):1499-1504. doi:10.1007/s11999-016-5133-4.
15. Mascarenhas D, Dreizin D, Bodanapally UK, Stein DM. Parsing the utility of CT and MRI in the Subaxial Cervical Spine Injury Classification (SLIC) system: is CT SLIC enough? AJR Am J Roentgenol. 2016 Jun;206(6):1292-1297. doi:10.2214/AJR.15.15492.
16. Joaquim AF, Lawrence B, Daubs M, Brodke D, Patel AA. Evaluation of the subaxial injury classification system. J Craniovertebr Junction Spine. 2011 Jul;2(2):67-72. doi:10.4103/0974-8237.100057.
17. Samuel S, Lin JL, Smith MM, Hartin NL, Vasili C, Ruff SJ, Cree AK, Ball JR, Sergides IG, Gray R. Subaxial injury classification scoring system treatment recommendations: external agreement study based on retrospective review of 185 patients. Spine (Phila Pa 1976). 2015 Feb 1;40(3):137-142. doi:10.1097/BRS.0000000000000666.
18. Piazza MG, Ravindra VM, Earl ER, Ludwick A, Sarriera Valentin G, Dailey AT, Kestle JRW, Russell KW, Brockmeyer DL, Iyer RR. Validation of the Subaxial Cervical Spine Injury Classification score in children: a single-institution experience at a level 1 pediatric trauma center. J Neurosurg Pediatr. 2024 Jul 5;34(4):365-372. doi:10.3171/2024.4.PEDS24102.
19. Hitti FL, McShane BJ, Yang AI, Rinehart C, Albayar A, Branche M, Malhotra NR, Janjua MB, Ali ZS, Schuster JM, Ozturk AK. Predictors of failure of nonoperative management following subaxial spine trauma and creation of modified Subaxial Injury Classification System. World Neurosurg. 2019 Feb;122:e1359-e1364. doi:10.1016/j.wneu.2018.11.048.