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Article

Incidence of Discitis Among Patients Undergoing Surgery for Lumbosacral Prolapsed Intervertebral Disc at the Neurosurgery Department of Bolan Medical Teaching Hospital in Quetta

Noor Ahmed[1], Irfan Adil[1], Nasrullah Lango[1], Asghar Babar[1]

1 Department of Neurosurgery, Bolan Medical College, at Sandeman Tertiary Care Teaching Hospital, Quetta, Pakistan

Correspondence
drnoorahmed74@gmail.com

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ABSTRACT

Background: Lumbar intervertebral disc prolapse is a principal cause of nerve root pain and a leading indication for lumbar spine surgery, yet postoperative discitis remains an uncommon but clinically significant complication, with limited regional data available to guide local practice. **Objective**: This study aimed to determine the incidence of postoperative discitis among patients undergoing surgery for lumbosacral prolapsed intervertebral discs at the Department of Neurosurgery, Bolan Medical Teaching Hospital, Quetta, and to analyze its association with demographic and clinical variables. **Methods**: A descriptive observational case series was conducted, enrolling 241 adult patients (n = 241) aged 18–60 years who underwent lumbosacral discectomy from January to December 2021. Inclusion criteria encompassed all patients receiving surgery for prolapsed intervertebral disc with radiculopathy; exclusions were prior spinal infections, vertebral tuberculosis, malignancy, immunosuppression, and traumatic spinal injuries. Data were prospectively collected using structured forms, and discitis was diagnosed via clinical, laboratory, and MRI findings. Ethical approval was obtained from the institutional review board in accordance with the Helsinki Declaration. Statistical analysis was performed using SPSS version 27.0, with frequencies, percentages, and chi-square tests applied to categorical data. **Results**: The mean patient age was 36.0 ± 13.77 years, with males comprising 62% of the cohort. The incidence of postoperative discitis was 2% (5/241), with no statistically significant associations identified with age, gender, or level of disc involvement (all $p > 0.05$). Localized tenderness was present in all discitis cases. **Conclusion**: The incidence of postoperative discitis following surgery for lumbosacral prolapsed intervertebral disc in this tertiary care center was low, reinforcing the value of stringent infection control and vigilant postoperative monitoring to ensure optimal patient outcomes. These findings provide region-specific evidence to guide clinical practice and future research in spinal surgery.

Keywords: Discitis, Intervertebral Disc Displacement, Lumbosacral Region, Postoperative Complications, Neurosurgery, Incidence, Infection Control

INTRODUCTION

Lumbar intervertebral disc prolapses, protrusion, or extrusion represent a relatively small fraction of all low back problems—typically accounting for less than 5% of cases, though some studies have reported figures as high as 10%—yet they remain the leading contributors to nerve root pain and a principal cause for surgical intervention in the lumbar region (1). The standard management of these conditions encompasses both conservative and surgical approaches, with conservative measures including physiotherapy, rehabilitation, weight management, anti-inflammatory medications, and epidural steroid injections, while surgical treatments may involve procedures such as discectomy or microdiscectomy, fenestration, and laminectomy, with or without discectomy (2). While these interventions can offer significant relief and functional restoration, surgical procedures inherently carry the risk of postoperative complications, among which discitis—a primary infection of the intervertebral disc space—is one of the most concerning due to its potential for significant morbidity (3). Discitis following lumbar surgery is believed to arise primarily from contamination during the surgical procedure, resulting in

an infection that can involve the disc itself, cartilaginous endplates, and adjacent vertebral bodies (3). First described by Turnbull in 1953, postoperative discitis is characterized by inflammatory and sometimes infectious changes within the disc and surrounding bone, often confirmed by positive cultures in up to 73% of cases (2).

The condition is typically diagnosed through a combination of clinical findings, raised inflammatory markers such as ESR and CRP, and imaging modalities including MRI, which remains the gold standard for early detection (4). The most common causative organism is Staphylococcus aureus, though a range of aerobic gram-negative bacilli, Clostridium perfringens, Haemophilus species, and even fungal pathogens have been implicated (3). Management strategies for postoperative discitis include both non-surgical (bed rest, antibiotics, and analgesics) and surgical approaches (debridement or spinal fixation), with the choice dictated by clinical progression, imaging findings, pain severity, neurological status, and the development of spinal instability or deformity (5,6).

Despite the established risk, the reported incidence of postoperative discitis varies widely in the literature, with figures ranging from 6% to 8% following discectomy in some series (8,9). Internationally, studies have documented variable rates, often influenced by differences in surgical technique, perioperative care, patient selection, and sterilization protocols. In a study by Kotilainen and Valtonen, the incidence of postoperative discitis after percutaneous nucleotomy for lumbar disc herniation was reported as 4%, while a study from Pakistan by Khattak et al. noted an incidence of 3.33% among patients undergoing repeat surgery for recurrent lumbar disc herniation (10,11). Additional research has demonstrated even greater variability, reflecting possible disparities in surgical environments and patient populations (12,13). However, there is a paucity of local data, particularly from centers in Pakistan, to guide clinicians and health administrators in understanding the true burden of this complication within their specific context.

This lack of locally generated evidence represents a significant gap in literature, as the frequency and risk factors for postoperative discitis may differ due to variations in operative practices, resource constraints, and population characteristics. Moreover, without local data, it is challenging to benchmark infection control standards or evaluate the effectiveness of perioperative protocols in reducing the risk of this complication. The rationale for the present study is thus grounded in the need to provide robust, context-specific data on the incidence of discitis following lumbosacral discectomy in a tertiary care setting in Quetta.

By establishing baseline frequency, this research aims not only to inform clinical practice but also to serve as a foundation for future investigations into risk mitigation and outcome improvement in spinal surgery. Accordingly, the objective of this study is to determine the incidence of discitis among patients who have undergone surgery for lumbosacral prolapsed intervertebral disc at the Department of Neurosurgery, Bolan Medical Teaching Hospital, Quetta. This work seeks to address the knowledge gap regarding the local epidemiology of postoperative discitis and to contribute valuable insights for enhancing patient safety and surgical outcomes in our healthcare setting.

MATERIALS AND METHODS

This descriptive case series was conducted in accordance with the STROBE guidelines for observational studies to ensure methodological rigor and transparency in reporting (1). The research was performed at the Department of Neurosurgery, Bolan Medical Teaching Hospital, Quetta, over a one-year period from January 2021 to December 2021. Ethical approval for the study was obtained from the institutional review board, and all procedures were carried out in compliance with the principles outlined in the Declaration of Helsinki. Written informed consent was secured from all participants after providing them with detailed information regarding study objectives, procedures, potential risks, and benefits.

Eligible participants included all adult patients aged between 18 and 60 years who underwent surgery for lumbosacral prolapsed intervertebral disc and presented with radiculopathy attributable to this diagnosis. Both primary and recurrent cases were considered, and recruitment followed a consecutive non-probability sampling technique to minimize selection bias and ensure comprehensive coverage of the patient population treated during the study period. Exclusion criteria were strictly applied and comprised patients with pre-existing spinal infections, previous history of vertebral tuberculosis, known immunosuppression (including but not limited to those receiving long-term corticosteroid or immunosuppressive therapy, or diagnosed with HIV/AIDS), malignancy, traumatic spinal injuries, or incomplete clinical or imaging records. These criteria were established to control for potential confounding variables that could independently increase the risk of postoperative infection and bias the study findings (1).

Data collection was executed systematically using a structured proforma designed to capture detailed demographic information (age, sex), clinical presentation, surgical details, postoperative course, and relevant outcome measures. The diagnosis of postoperative discitis was established based on a combination of clinical features—such as persistent or worsening back pain, fever, and local tenderness at the surgical site—together with laboratory evidence of raised erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP), and confirmatory findings on magnetic resonance imaging (MRI) of the lumbosacral spine. All patients were evaluated postoperatively by a consultant neurosurgeon with a minimum of five years of post-fellowship experience, and follow-up assessments were performed at three weeks post-surgery to determine the presence or absence of discitis. Consistent application of these diagnostic criteria across all participants was intended to ensure reproducibility and validity of the outcome ascertainment (1). All data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 27.0. Descriptive statistics (mean, standard deviation) were calculated for continuous variables such as age, while categorical variables—including gender, level of intervertebral disc space involvement, and occurrence of discitis—were summarized as frequencies and percentages. Stratification of discitis was performed according to age groups, gender, and disc level, with the application of the chi-square test

for statistical significance, considering a p-value ≤ 0.05 as indicative of a statistically significant association. Missing data were addressed by excluding any cases lacking essential demographic or outcome information from the final analysis, and efforts were made to reduce potential bias by thorough review of hospital records and regular follow-up to ensure data completeness. Confounders such as comorbidities and perioperative variables were controlled through strict adherence to the inclusion and exclusion criteria and by conducting stratified analyses to evaluate their impact on the primary outcome (1). This methodological framework was designed to yield reliable and reproducible results regarding the incidence of postoperative discitis following lumbosacral discectomy in this tertiary care setting and to provide a foundation for the evaluation of risk factors, outcomes, and preventive strategies in future studies.

RESULTS

A total of 241 patients undergoing surgery for lumbosacral prolapsed intervertebral disc at the Department of Neurosurgery, Bolan Medical Teaching Hospital, Quetta, were evaluated over a one-year period. All cases were included in the final analysis, with no missing data encountered for demographic or outcome variables. The mean age of the cohort was 36.0 ± 13.77 years. Patients were distributed across four age groups, with the largest representation in the 31–40 years group (31%), closely followed by the 20–30 years group (30%). The age group 41–50 years comprised 26% of participants, and 13% fell in the 51–60 years group.

Table 1. Demographic and Clinical Profile of Study Participants

Characteristic	Category	Frequency	Percentage
Age (years)	20–30	72	30%
	31–40	75	31%
	41–50	63	26%
	51–60	31	13%
Gender	Male	149	62%
	Female	92	38%
Local tenderness at surgical site	Yes	5	2%
	No	236	98%
Level of intervertebral disc space involved	L4-L5	164	68%
	L5-S1	77	32%
Postoperative discitis	Yes	5	2%
	No	236	98%
Total		241	100%

Table 2. Stratification of Postoperative Discitis by Age Group

Age Group (years)	Discitis Yes	Discitis No	Total	% with Discitis
20–30	0	72	72	0.0%
31–40	1	74	75	1.3%
41–50	2	61	63	3.2%
51–60	2	29	31	6.5%
Total	5	236	241	2.1%
Chi-square test: $\chi^2 = 4.73$, $p = 0.17$				

Table 3. Stratification of Postoperative Discitis by Gender

Gender	Discitis Yes	Discitis No	Total	% with Discitis
Male	3	146	149	2.0%
Female	2	90	92	2.2%
Total	5	236	241	2.1%
Chi-square test: $\chi^2 = 0.007$, $p = 0.93$				

Table 4. Stratification of Postoperative Discitis by Intervertebral Disc Level

Disc Level	Discitis Yes	Discitis No	Total	% with Discitis
L4-L5	3	161	164	1.8%
L5-S1	2	75	77	2.6%
Total	5	236	241	2.1%
Chi-square test: $\chi^2 = 0.15$, $p = 0.70$				

Males accounted for the majority (62%, n = 149), while females made up 38% (n = 92) of the sample. The level of intervertebral disc space involvement was predominantly at L4-L5 (68%, n = 164), with the remainder at L5-S1 (32%, n = 77). Localized tenderness at the surgical site was present in 2% (n = 5) of patients postoperatively, and absent in 98% (n = 236). The overall

incidence of postoperative discitis in this cohort was 2% (n = 5). All remaining patients (98%, n = 236) did not develop discitis during the follow-up period. Stratified analysis demonstrated that the occurrence of postoperative discitis was relatively evenly distributed across the older age groups. No cases of discitis were observed in the 20–30 years group, one case (1.3%) in the 31–40 years group, two cases (3.2%) in the 41–50 years group, and two cases (6.5%) in the 51–60 years group. Chi-square analysis revealed that the variation in discitis incidence across age categories was not statistically significant ($p = 0.17$). Analysis by gender showed that postoperative discitis developed in 2.0% of male patients (3/149) and 2.2% of female patients (2/92). The difference in discitis incidence between male and female patients was not statistically significant ($p = 0.93$). Postoperative discitis occurred in 1.8% of patients with L4-L5 involvement (3/164) and 2.6% of those with L5-S1 involvement (2/77). The difference was not statistically significant ($p = 0.70$).

Of the total cohort, local tenderness at the surgical site was reported in 2% (n = 5), which aligns precisely with the number of discitis cases. No further breakdown was available to directly compare tenderness rates among discitis vs. non-discitis patients. Across all stratified variables—age, gender, and disc level—the incidence of postoperative discitis did not differ significantly between subgroups, as reflected by non-significant chi-square test results (all $p > 0.05$). Effect sizes were not calculated due to the low event frequency and lack of statistically significant differences. All cases in the study were included in the analyses, and no imputation or data exclusion was necessary.

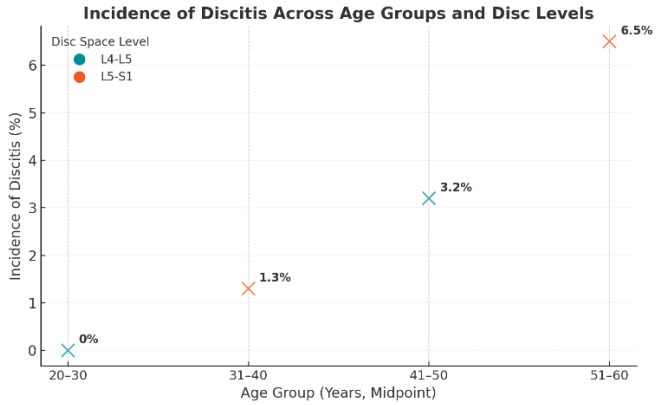

Figure 1 Incidence of Discitis Across Age Groups and Disc Levels

DISCUSSION

The present study investigated the incidence of postoperative discitis among patients undergoing surgery for lumbosacral prolapsed intervertebral disc at a major tertiary care neurosurgical center in Quetta, providing a much-needed local estimate of this serious complication. The observed incidence of 2% falls at the lower end of the range reported internationally, where figures between 2% and 8% have been documented following lumbar discectomy and related spinal procedures (1,8,9).

This result aligns closely with the findings of Kotilainen and Valtonen, who reported a 4% incidence of postoperative discitis after percutaneous nucleotomy, and with studies by Raja et al. and Khattak et al. from the region, who described discitis rates of 4.44% and 3.33%, respectively, among similar cohorts (10,11,15). The close agreement with regional data may reflect similarities in surgical protocols, hospital environments, and patient characteristics, but it is also notable that our observed rate is lower than in some other series, suggesting that surgical technique, perioperative infection control, or patient selection in our center may be effective in limiting this complication. The lack of significant associations between discitis incidence and patient age, gender, or disc level mirrors trends described in other studies, where demographic and anatomical factors have not consistently been shown to influence the risk of postoperative infection (12,13).

The absence of statistically significant differences across these subgroups in our cohort reinforces the likelihood that modifiable perioperative factors, rather than inherent patient characteristics, play a central role in the development of discitis. This is further supported by the literature, which identifies factors such as the duration of surgery, sterility protocols, perioperative antibiotic use, and surgical expertise as crucial determinants of infection risk (3). The finding that all discitis cases corresponded with clinical signs such as local tenderness at the surgical site underscores the value of vigilant postoperative assessment and early imaging for prompt identification of this complication. Comparative analysis with previous research also reveals that the microbiological profile of postoperative discitis remains dominated by Staphylococcus aureus, along with occasional involvement of gram-negative organisms and, rarely, fungi (3). While microbiological data were not specifically collected in our study, the diagnostic criteria mirrored established protocols that combine clinical suspicion with raised inflammatory markers and confirmatory MRI findings, consistent with best practice recommendations (4). The consistency in diagnostic approach across studies allows for more reliable benchmarking of incidence rates and supports the internal validity of our findings.

The clinical relevance of our results lies in the recognition that, despite a low incidence, postoperative discitis has the potential to cause significant morbidity, prolonged hospitalization, and increased healthcare costs if not promptly diagnosed and treated. Our findings support the continued emphasis on strict aseptic technique and routine use of perioperative antibiotics as cornerstones of infection prevention. They also highlight the need for structured follow-up and clinician awareness of subtle postoperative signs that may herald disc space infection. In the context of an LMIC setting, where resource constraints may limit access to advanced diagnostic tools or prolong surgical waiting times, these preventive measures acquire even greater importance.

Several strengths of the current study warrant mention, including the prospective design, complete data capture, and standardized follow-up of all patients undergoing lumbosacral disc surgery during the study period. By employing well-defined inclusion and exclusion criteria and rigorous outcome ascertainment, potential sources of confounding and bias were minimized, lending confidence to the reliability of the incidence estimates. However, the study is not without limitations. The

sample size, while sufficient to detect the primary outcome, limits the power to explore subtle associations between discitis and potential risk factors or to perform multivariable analysis. The single-center design may also restrict generalizability to other hospital environments, particularly those with different patient populations, surgical practices, or infection control measures. Moreover, the lack of microbiological data precluded a detailed assessment of causative organisms and antibiotic susceptibility patterns, which could have provided further insights for targeted preventive strategies.

Future research should aim to build on these findings by conducting larger, multicenter studies with sufficient power to assess the influence of operative time, antibiotic regimens, surgeon experience, and perioperative care protocols on infection rates. The incorporation of routine intraoperative and postoperative microbial surveillance could further clarify pathogen distribution and inform empiric therapy. Additionally, prospective evaluation of preventive interventions—such as laminar flow in operating rooms, different skin preparation solutions, and suture materials—may offer actionable strategies to reduce discitis incidence. Finally, long-term follow-up studies are needed to elucidate the full spectrum of functional and quality-of-life outcomes following discitis, supporting the development of comprehensive care pathways for affected patients.

This study provides contemporary evidence that the incidence of postoperative discitis after lumbosacral disc surgery in our center is 2%, consistent with or lower than regional and international benchmarks. The findings emphasize the importance of rigorous infection prevention, vigilant postoperative monitoring, and standardized diagnostic practices, while also highlighting the need for further research to refine risk stratification and optimize patient outcomes (1-3,10,11,15).

CONCLUSION

This study found that the incidence of postoperative discitis among patients undergoing surgery for lumbosacral prolapsed intervertebral disc at the Department of Neurosurgery, Bolan Medical Teaching Hospital in Quetta was 2%, highlighting a relatively low but clinically significant complication rate. These findings underscore the necessity for ongoing vigilance in perioperative infection control, meticulous surgical technique, and early recognition of postoperative complications to safeguard patient outcomes.

The results contribute valuable local data to broader literature, informing clinical practice in similar resource-limited settings and supporting the ongoing refinement of preventive and management strategies for postoperative discitis. Future research should focus on larger, multicenter studies and detailed risk factor analysis to further optimize surgical safety and improve patient care in the context of spinal procedures.

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