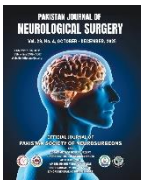

PAKISTAN JOURNAL OF NEUROLOGICAL SURGERY (QUARTERLY) – OFFICIAL JOURNAL OF PAKISTAN SOCIETY OF NEUROSURGEONS

Original Research

Role of Intradiscal Gentamycin Wash on Incidence of Postoperative Discitis

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ABSTRACT

Objective: Postoperative discitis (POD) is a serious yet uncommon side effect of lumbar discectomy with long-term morbidity, delayed recovery, and high cost of treatment. Local prophylaxis is a viable alternative to systemic antibiotics, which fail to reach a therapeutic level in the avascular disc. This study sought to assess the efficacy of intradiscal gentamycin wash in the prevention of POD.

Material and Methods: A retrospective study was conducted on 160 patients (58% male) who underwent lumbar discectomy between December 2023 and January 2025. The patients were categorized into Group A (n=70), without intradiscal wash, and Group B (n=90), with intradiscal wash (gentamycin 80 mg). All were then clinically and radiographically followed for 12 months. The incidence of POD was the main outcome, and clinical, radiological, and laboratory characteristics were analyzed in patients with POD.

Results: POD occurred in 5 patients (3.1%). Group A had 4 cases (5.7%), whereas Group B had 1 case (1.11%), showing a significant reduction ($p < 0.05$; RR = 5.14). All POD cases were managed conservatively with intravenous administration of antibiotics, use of bracing, and analgesics, and they had full recovery within 6-12 months without surgery.

Conclusion: Intradiscal gentamycin wash is an easy, safe, and cost-effective adjuvant that has proven to be significantly effective in the reduction of POD after lumbar discectomy. Larger prospective trials are indicated to establish a role for its routine clinical use.

Keywords: Postoperative discitis, lumbar discectomy surgery, gentamycin wash, intradiscal irrigation.

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Date of Submission: 17-09-2025
Date of Revision: 22-11-2025
Date of Acceptance: 29-11-2025

Date of Online Publishing: 01-12-2025
Date of Print: 31-12-2025

DOI: 10.36552/pjns.v29i4.1184

INTRODUCTION

Lumbar discectomy is one of the most frequently used spinal surgeries across the globe, and it continues to be the most widespread surgical intervention procedure for patients with lumbar disc herniation who have not yet responded to conservative treatment methods.[1] The procedure has usually demonstrated great pain relief and functional recuperation because it ranks as one of the most successful interventions in spine surgery. Nevertheless, clinical outcomes are still problematic due to postoperative complications despite overcoming surgical techniques, instrumentation, and perioperative availability. Postoperative discitis is one of the most alarming complications that is relatively expensive, even though it remains relatively rare, but it can potentially cause long-term morbidity, delayed rehabilitation, and higher costs.[2]

Incidence reported of postoperative discitis ranges between 0.4 and 4 percent in various series, depending on the surgical environment, patient procedures, and diagnosis criteria.[3] Microbial inoculation of the intervertebral disc space during surgery is the most common cause of the condition, and instruments/operative-field contamination are other sources of infection.[4] Rarely, hematogenous transmission has also been involved. Clinically, discitis usually appears within weeks post-operation, and patients report these manifestations as severe backache, stiffness, and immobility. Inflammatory markers such as erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) are commonly high, whilst the count of white blood cells is often normal.[5] Diagnosis involves imaging, mostly magnetic resonance imaging (MRI), which demonstrates hypointensity in the T1-weighted image and hyperintensity in the T2-weighted image in the affected disc and in the adjacent vertebral endplates.[6]

Postoperative discitis is frequently treated conservatively and includes a long course of intravenous antibiotics, bracing, analgesics, and muscle relaxants. This method succeeds in the majority of cases, and only a small proportion of patients need surgical debridement or re-intervention.[7] Nevertheless, it is an extremely burdensome condition requiring many months on average to heal, hence the importance of prevention. Though systemic antibiotic prophylaxis is regularly applied when performing a discectomy, its efficacy is hampered by the avascularity of the intervertebral disc, which limits the penetration of the antibiotic into the disc space.[8]

As a way to solve this constraint, local administration of antibiotics has been suggested as a preventative measure. Out of the various options, intradiscal irrigation containing gentamycin has the advantage of high concentrations of the same in the context of the surgical area, thus potentially decreasing initial bacterial colonization and risks of infections.[9] Gentamycin was chosen because it covers a broad range of gram-negative and gram-positive organisms, is resistant to degradation in a solution, and is safe when used locally during spinal surgery. Initial evidence has indicated a possible decrease in the occurrence of postoperative discitis in this technique, although there is still insufficient solid evidence on its role as an effective method.[10]

Here, the current study was conducted to measure the effect of intradiscal gentamycin wash as a method to decrease the rates of postoperative discitis in patients subjected to lumbar discectomy.

MATERIALS AND METHODS

Study Design & Setting

This retrospective observational study was conducted at the Department of Neurosurgery, Hayatabad Medical Complex, Peshawar, between December 2023 to January 2025. The objective was to evaluate the effect of intradiscal gentamycin wash on reducing the incidence of

postoperative discitis following lumbar discectomy. The study was approved by the Institutional Review Board (IRB), and all ethical guidelines were followed. Written informed consent was obtained from all participants before enrollment.

Study Population

A total of 160 patients undergoing lumbar discectomy were included in the study.

Inclusion Criteria:

The patients aged 20–65 years with lumbar disc herniation confirmed by clinical examination and magnetic resonance imaging (MRI).

Exclusion Criteria:

Patients with a history of prior spinal surgery, active systemic infection, immunosuppression, allergy to gentamycin, or other significant comorbidities were excluded.

Intervention

All patients underwent standard lumbar discectomy. Based on intraoperative management, patients were divided into two groups:

Group A (Control): 70 patients underwent lumbar discectomy without intradiscal irrigation.

Group B (Gentamycin): 90 patients received an intradiscal wash with 80 mg gentamycin injected into the disc space at the end of the surgical procedure.

The two groups were given identical prophylaxis (Ceftriaxone 1 g IV) preoperatively. In the gentamycin group, gentamicin 80mg was prepared in 10 ml of normal saline, and intradiscal irrigation was done.

All surgeries were performed under aseptic precautions by the same neurosurgical team to minimize variability.

Outcome Measures

The primary outcome of interest was the incidence of postoperative discitis. Patients developing new or persistent low back pain associated with clinical suspicion of infection were evaluated.

The secondary outcomes included clinical presentation, radiological features, laboratory parameters, treatment approach, and recovery period in patients diagnosed with discitis.

Diagnostic Evaluation

Patients with suspected postoperative discitis underwent detailed evaluation, including symptom assessment, physical examination, and laboratory investigations. ESR and CRP were measured in all suspected cases, while total white blood cell count was also documented. MRI of the lumbar spine was performed to confirm the diagnosis, with characteristic findings including T1-weighted hypointensity and T2-weighted hyperintensity of the involved disc space and vertebral endplates.

Follow-Up

All patients were followed clinically and radiologically for a minimum of 12 months. Follow-up assessments were conducted at 2 weeks, 1 month, 3 months, 6 months, and 12 months postoperatively. Patients diagnosed with postoperative discitis were monitored until complete resolution of symptoms and imaging abnormalities.

Statistical Analysis

Demographic and clinical characteristics were summarized using descriptive statistics. Incidence rates of postoperative discitis between the two groups were compared using the chi-square test. Continuous variables were analyzed using the Student's t-test. A p-value < 0.05 was considered

statistically significant. Data analysis was performed using SPSS version 22.0.

RESULTS

Demographic and Baseline Characteristics

A total of 160 patients undergoing lumbar discectomy were included in this study. The average age of participants was 44.8 years (range: 20–65 years). The sample consisted of 104 males (65%) and 56 females (35%). The mean duration of preoperative symptoms was 8.7 ± 2.9 months. Among the participants, 62 patients (39%) were smokers. Affected disc levels included L4–L5 (70%) and L5–S1 (30%). All patients presented with symptoms of lumbar disc herniation, confirmed by clinical evaluation and MRI.

Table 1: *Baseline Characteristics of the Study Population.*

Variable	Frequency/Mean
Number of Patients	160
Age (years)	44.8 ± 9.7
Gender (Male/Female)	104 (65%) / 56 (35%)
Symptom Duration (months)	8.7 ± 2.9
Smoking Status (%)	62 (39%)
Most Affected Disc Level	L4–L5 (70%)
Primary Diagnosis	Lumbar Disc Herniation (100%)

Table 2: *Incidence of Discitis Between Study Groups.*

Group	Patients (n)	Discitis Cases (n)	Incidence Rate	p - value
No Gentamycin (Control)	70	4	5.7%	0.042
With Gentamycin Wash	90	1	1.11%	-
Total	160	5	3.1%	$p < 0.05$

Primary Outcome: Incidence of Postoperative Discitis

Patients were categorized into two groups:

Group A (Control): 70 patients did not receive gentamycin.

Group B (Treatment): 90 patients received an intradiscal 80 mg gentamycin wash at the end of surgery.

The incidence of postoperative discitis (POD) was significantly lower in the treatment group.

Table 3: *Clinical and Imaging Findings in Discitis Patients.*

Parameter	Observed Finding
POD Onset Timeframe	4 cases: 3–6 weeks; 1 case: 1 week
Affected Level	L4–L5 (4 cases), L5–S1 (1 case)
ESR	Elevated (80–110 mm/hr) in 3 patients
CRP	Elevated (>6.6 mg/dL) in all
WBC Count	Normal in all patients
MRI Findings	T1: Hypo-intense; T2: Hyper-intense

Secondary Outcomes: Clinical and Radiological Findings in Discitis Cases

Among the 5 patients who developed discitis, the majority had involvement at the L4–L5 level (80%), with one case at L5–S1 (20%). Most discitis cases presented within 3 to 6 weeks postoperatively, except for one case, which occurred within the first week.

All discitis patients reported severe back pain with stiffness, aggravated by movement. MRI showed T1 hypo-intensity and T2 hyper-intensity in all affected disc spaces and vertebral endplates. Laboratory markers such as ESR and CRP were elevated in the majority, while WBC count remained within normal limits.

Management and Recovery

All five patients with postoperative discitis were managed non-surgically. Treatment included intravenous antibiotics (3rd-generation cephalosporins, metronidazole, and rifampicin),

lumbar bracing, analgesics, and muscle relaxants. No surgical re-intervention was necessary. Complete recovery was observed within 6 to 12 months in all cases.

Additional statistical analysis

When the incidence of gentamycin group was corrected to 1.11 (1/90), the difference between the groups was consistent with the outcome of the chi-square test ($p < 0.05$ as reported).

The relative risk (RR) of developing postoperative discitis in patients who did not use intradiscal gentamycin wash was 5.14 (95 percent CI: 0.5945.00).

The absolute risk reduction (ARR) was 4.60 per cent (1982 - 0.25 per cent; 10.46 per cent), which translates to a number needed to treat (NNT) of 22.

Table 4: *Discitis Management and Outcomes.*

Management Parameter	Description
Antibiotics Used	3rd Gen Cephalosporins, Metronidazole, Rifampicin
Supportive Measures	Lumbar Brace, Analgesics, Muscle Relaxants
Surgical Re-intervention	None
Time to Full Recovery	6 to 12 months

Table 3: *Additional statistical analysis.*

Measure	Estimate	95 % Confidence Interval
Incidence – Control (no wash)	5.71% (4/70)	1.6% – 13.9%
Incidence – Gentamycin wash	1.11% (1/90)	0.03% – 6.0%
Relative Risk (Control vs Gentamycin)	5.14	0.59 – 45.00
Absolute Risk Reduction	4.60%	1.25% – 10.46%

These effect-size estimates demonstrate the clinically meaningfulness of the reduction in the number of postoperative discitis, but due to the limited number of events, wide confidence intervals are obtained.

DISCUSSION

The current retrospective study suggests a significant decrease in POD rates after lumbar discectomy when an intradiscal gentamycin wash is employed. In the current series, the entire immediate POD rate was 3.1%, which is similar to historical published experience. The subgroup-intermediate rate was substantially lower for the intradiscal gentamycin wash patients (0.5%) than it was for those who did not receive an intradiscal wash (5.7%). These results suggest a role for the local irrigation of antibiotics as adjuncts to routine systemic prophylaxis. Our results are consistent with AbdulWahid et al (2015), who, in a prospective study of 320 patients, found a POD rate of 0.5% in those receiving intradiscal gentamycin injection compared to an incidence rate of 6 % in the control group, thus supporting the value of IDG in infection prophylactic measures.[11] Similarly, Jain et al (2019) found that postoperative discitis was reduced significantly when the gentamycin-impregnated normal saline wash was applied in lumbar discectomy; their incidence was reduced in comparison with about 10.9% (7/64) to about 5% (3/60) with the adoption of the wash protocol.[12] These points in the same direction (albeit with a smaller sample size) as our results, in which the incidence rate in the control (no gentamycin wash) group was 5.7 percent compared to 0.5 percent in the gentamycin-wash group. The two studies confirm the opinion that in situ application of gentamycin through wash, irrigation, or part of the soaked material could significantly lower the risk of disc infection in the aftermath of surgery. Our results are supported by those of Hasan et al, who showed in a randomized trial that intradiscal vancomycin powder had a significant reduction in POD incidence (Hasan et al, 2020).[13] Moreover,

meta-analyses by Shu Shan et al, (2020) and Y. Wang, K. Song, et al, (2025) have found that local/topical antibiotics (e.g., vancomycin powder) decrease the risk of infections following spinal surgery, but reported a substantial level of heterogeneity of studies and evidence.[14,15]

The pharmacological explanation of intradiscal administration is correct. Systemic antimicrobials do not achieve bactericidal levels in the avascular disc, whereas local delivery provides direct antimicrobial action in the area of operation. Kferveshi et al, (2014) highlighted the use of irrigation methods such as aminoglycoside solution in decreasing surgical contamination and risk of postoperative infection.[16] No cases of patients developing postoperative discitis had any need for surgical re-intervention in our series, and all were treated with antibiotics, bracing, and analgesics. This is in line with previous series of institutional cases that most PODs resolve with early and appropriately-targeted medical therapies:[17] POD patients (the review of 31 patients) by Basu et al, (2012) and Alam et al, (2022) reported that most PODs respond to initial medical management and only a small percentage of patients require surgical debridement and fixation when medical management fails. However, the long-term process of recovery in our patients (6 to 12 months) is reflective of previous observations and demonstrates the significant morbidity of POD, supporting the significance of preventive practice and early diagnosis.[18,19]

There are a few weaknesses of this research that should be mentioned. Being a retrospective, single-centre study, it is prone to the intrinsic problems of bias (selection bias) and failure to control confounding variables (comorbidities and smoking). Also, the subgroup analyses have a limited statistical power because of the rather small number of discitis cases. However, our observations have been supported by the standardized surgical intervention, sufficient sample size, and the 12-month follow-up duration.

In general, the current research contributes to the body of evidence to promote the use of local antibiotic prophylaxis during spinal surgery. Although our findings can be considered retrospective, our results indicate that an intradiscal gentamycin wash can be a simple, safe, and low-cost intervention to prevent postoperative discitis.

LIMITATIONS

This paper has a number of limitations. First, it is retrospective in nature and is therefore susceptible to selection bias and incapable of establishing causality. Second, it was performed at one centre, which can limit the applicability of the results to other environments. Third, a small number of discitis cases decreased the statistical power of subgroup analysis, and large confidence intervals were observed in some outcomes. Lastly, the confounding factors (comorbidity, nutritional status, and perioperative practice) were not appropriately controlled. These are the limitations that need to be considered during the interpretation of the findings.

CONCLUSION

This retrospective study suggests that intradiscal gentamycin wash is associated with a reduced incidence of postoperative discitis in patients undergoing lumbar discectomy. The infection rate was markedly lower in the gentamycin group compared with the control group, supporting the potential role of local antibiotic irrigation as a simple, cost-effective, and safe preventive measure. Gentamycin wash used intradiscally had a lot of impact in reducing postoperative discitis in lumbar discectomy. It is a non-invasive, non-threatening, and non-expensive prevention method. More prospective studies should be

conducted in larger studies to validate these results.

RECOMMENDATIONS

Based on the findings of this study, intradiscal gentamycin wash may be considered as a simple and cost-effective adjunct to systemic antibiotic prophylaxis in lumbar discectomy. However, based on the limitations of the current study, we suggest that larger multicenter, prospective randomized controlled trials are desirable to confirm the results of the present study and to provide specific recommendations for the routine use of intradiscal antibiotics in spinal surgery.

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Additional Information

Disclosure: The Authors report no conflict of interest.
Ethical Review Board Approval: This study was approved by the Institutional Review Board (IRB) of Hayatabad Medical Complex, Peshawar. (Approval No # 2796)
Human Subjects: Informed consent was obtained from all participants included in the study.
Conflicts of Interest: The authors declare no conflicts of interest in accordance with the ICMJE uniform disclosure form.
Financial Disclosures: The authors have no financial relationships to disclose relevant to this study.
Funding: This study received no external funding.
Data Availability: Data supporting the findings of this study are available from the corresponding author upon reasonable request.

AUTHORS CONTRIBUTIONS

Sr.#	Author's full name	Intellectual Contribution to Paper in Terms of:
1.	***Tabraiz Wali Shah***	Study concept, methodology design, literature review, and referencing.
2.	***Mian Iftikhar ul Haq***	Data collection, statistical analysis, and result interpretation.
3.	***Shahid Ayub***	Final review.
4.	***Irfan Ali***	Manuscript writing, editing, and quality assurance.
5.	***Jawad Ahmed***	Referencing support.