SAS Journal of Surgery
Abbreviated Key Title: SAS J Surg
ISSN 2454-5104
Journal homepage: https://www.saspublishers.com

OPEN ACCESS

Orthopaedic Surgery

Evaluation of the Management of Postoperative Discitis by Surgical Intervention

Dr. Md. Sariful Hasan[1*], Dr. Md. Mahmudul Hasan[2], Dr. Mohammad Humayun Rashid[3], Dr. T. A. Manzer[4], Dr. Md. Shohidullah[5], Dr. Jannatul Mawa Sweety[6]

[1]Assistant Professor, Department of Orthopaedic Surgery, East West Medical College & Hospital, Dhaka, Bangladesh
[2]Assistant Professor, Department of Orthopaedic Surgery, East West Medical College & Hospital, Dhaka, Bangladesh
[3]Assistant Professor, Department of Neurosurgery, East West Medical College & Hospital, Dhaka, Bangladesh
[4]Assistant Professor, Department of Urology, East West Medical College & Hospital, Dhaka, Bangladesh
[5]Junior Consultant, Department of Orthopaedic Surgery, Government Employee Hospital, Dhaka, Bangladesh
[6]HMO, Department of Dermatology & Venereology, Kurmitola General Hospital, Dhaka, Bangladesh

DOI: https://doi.org/10.36347/sasjs.2025.v11i02.028 | **Received:** 18.12.2024 | **Accepted:** 21.01.2025 | **Published:** 24.02.2025

***Corresponding author:** Dr. Md. Sariful Hasan
Assistant Professor, Department of Orthopaedic Surgery, East West Medical College & Hospital, Dhaka, Bangladesh
Email: sarifulhasan48@gmail.com

Abstract **Original Research Article**

Background: Postoperative discitis is a rare but serious complication following spinal surgery, characterized by infection and inflammation of the intervertebral disc space. It often presents with back pain, fever, and neurological deficits, necessitating prompt diagnosis and management. While conservative treatments are standard, surgical intervention is considered in severe cases. This study aimed to evaluate the outcomes of surgical management in postoperative discitis. ***Methods:*** This prospective observational study was conducted at the Department of Orthopaedic Surgery, East West Medical College & Hospital, Dhaka, Bangladesh from July 2022 to July 2024. A total of 47 patients, regardless of age or gender, diagnosed with post-operative discitis and treated at the mentioned hospital were enrolled in the study through purposive sampling. Demographic and clinical data were collected and analyzed using MS Office tools. ***Results:*** The largest group of patients (40.4%) was aged 31-40 years, with 66% being male. All patients experienced persistent pain and neurological deficits. Over half (62.7%) had unipolar diathermy burns as a perioperative complication. The most common cultured organisms were Escherichia coli (23.4%), Methicillin-resistant staphylococcus aureus (19.1%), and Methicillin-susceptible staphylococcus aureus (17%). According to the modified Kirkaldy-Willis criteria, outcomes were Excellent in 34.0%, Good in 42.6%, Fair in 19.1%, and Poor in 4.3%. ***Conclusion:*** Unipolar diathermy burn is a very common procedural challenge in managing postoperative discitis by surgical intervention. Escherichia coli (23.4%), Methicillin-resistant staphylococcus aureus (19.1%), and Methicillin-susceptible staphylococcus aureus are the most common causative organisms for postoperative discitis. Early diagnosis and intervention are the key to effective management of such discitis.

Keywords: Fever with chills, Postoperative discitis, Staphylococcus aureus, Surgical Intervention, Spine, Tenderness.

INTRODUCTION

Discitis, an infection of the intervertebral disc space that occurs post-surgery, primarily affects the nucleus pulposus and subsequently involves the cartilaginous endplate and adjacent vertebral body. This rare complication was first identified as a distinct clinical condition by Ley Turnbull in 1953 [1]. The reported incidence of post-surgical discitis is around 0.2%. Pain is the most frequently observed symptom, characterized by persistent discomfort that intensifies at night, although up to 15% of affected individuals may experience no pain [2]. Typically, patients initially report relief following surgery, but over time, they experience a gradual resurgence of back pain, ranging from mild to severe, often accompanied by a recurrence of their pre-operative symptoms. The onset of increasing back pain typically occurs within 1 to 4 weeks post-surgery, although the range can vary from as early as 2 days to as late as 10 weeks [3]. This pain is often disproportionate to physical findings and may be accompanied by referred pain radiating to the buttocks, thighs, legs, groin, perineum, or abdomen. Fever is less frequently observed, occurring in approximately 50% of cases [4]. In most instances, the surgical incision site appears normal, with fewer than 10% of patients exhibiting signs of incisional infection, such as erythema, dehiscence, or purulent discharge [3]. Discitis is a severe complication that can

lead to significant morbidity and a mortality rate of 0.06%, often due to associated conditions like septicemia, myocardial infarction, pneumonia, or embolism [5]. Several factors have been implicated in the pathogenesis of discitis. Patient-related factors include advanced age, trauma, diabetes, malnutrition, immunosuppression, malignancy, obesity, smoking, and prolonged hospital stays [6]. A wide variety of microorganisms have been linked to post-surgical discitis, with Staphylococcus aureus being the most common causative agent, followed by other Staphylococcus species and anaerobic organisms. Less frequently, pathogens such as Streptococcus viridans, Escherichia coli, Pseudomonas aeruginosa, Mycobacterium tuberculosis, fungi, and others are identified. Potential sources of microbial infection include direct bacterial inoculation during surgery, contamination of the incision site in the immediate postoperative period, or hematogenous spread of the pathogen [7]. Prophylactic antibiotics have been firmly established as an effective measure to reduce the risk of surgical site infections [7]. The infection rate varies depending on the type and site of surgery. For PLID discectomy in the lumbosacral region, the incidence of post-surgical discitis ranges from 0.5% to 5% [9]. Surgical site infections following decompression laminectomy, discectomy, and fusion are reported at approximately 3% or lower; however, this rate increases to up to 12% with the inclusion of instrumentation. Another study noted infection rates for discectomy between 0.5% and 5% [10]. Fusion procedures without instrumentation are associated with infection rates of 0.4% to 4.3%, whereas the use of internal fixation significantly raises the risk of discitis, with rates ranging from 6.6% to 8.7% [11]. Diagnosing discitis promptly is often challenging and cannot rely solely on history, physical examination, laboratory tests, or imaging studies. Laboratory markers such as ESR, C-reactive protein, and blood culture, along with imaging techniques like plain radiographs, MRI, CT, and radionuclide scans, play a crucial role in diagnosis. Among these, C-reactive protein and ESR are the most sensitive markers for detecting infections and monitoring treatment response [12]. MRI is considered the imaging modality of choice for diagnosing spinal infections, including discitis. Most cases can be effectively managed with targeted antibiotic therapy based on culture results and spinal immobilization, resulting in favorable long-term outcomes. However, patients who fail to respond to conservative treatment may require surgical debridement followed by antibiotic therapy for optimal recovery. The widespread implementation of pre-operative prophylactic antibiotics has significantly decreased the incidence of postoperative infections, including discitis, following spinal surgery [13]. Studies reveal that patients who received prophylactic antibiotics had a lower risk of developing post-operative discitis compared to those who did not receive antibiotics. For established post-operative discitis, there is no universally standardized treatment protocol, and management strategies often differ among surgeons and across regions. However, most experts recommend immobilization with an orthosis, combined with a six-week course of intravenous targeted antibiotics, followed by an additional six weeks of oral antibiotics [14].

METHODOLOGY

This prospective observational study was conducted at the Department of Orthopaedic Surgery, East West Medical College & Hospital, Dhaka, Bangladesh from July 2022 to July 2024. A total of 47 patients, irrespective of age or gender, diagnosed with post-operative discitis and treated at the specified hospital, were included in the study. A purposive sampling technique was used for sample selection. Postoperative discitis was diagnosed based on specific clinical signs, laboratory results, and radiographic findings, with all patients receiving initial intravenous antibiotics. Written consent was obtained from all participants before data collection. According to the inclusion criteria of this study, patients of both genders, regardless of age, who underwent single-level lumbar discectomy and developed postoperative discitis were included. Conversely, patients who had redo surgery for disc herniation or underwent multi-level discectomy were excluded as per the exclusion criteria. Functional outcomes were assessed using the modified criteria of Kirkaldy-Willis [14]. Demographic and clinical information of the participants were recorded, and the data were analyzed using MS Office.

RESULT

In this study, the largest proportion of patients (40.4%) were in the 31-40 year's age group. Additionally, 29.8%, 19.1%, and 10.6% of patients were from the 18-30, 41-50, and ≥51 year's age groups, respectively. As per the gender distribution, nearly two-thirds of the patients (66%) were male. In this study, it was found that all patients (100%) experienced persistent pain and neurological deficits (PPND), followed by pain associated with movement (RPM) in 91.5%, fever with chills in 89.4%, tenderness over the spine in 85.1%, paravertebral muscle spasm (PMS) in 83.0%, difficulty in walking in 80.9%, superficial surgical site infection (SSSI) in 57.4%, impairment of leg sensation (ISL) in 10.6%, and impairment of bladder and bowel function (IBB) in 10.6%. In analyzing the patient-related risk factors, it was observed that nearly half of the patients (44.7%) had a smoking habit, followed by diabetes mellitus (23.4%), obesity (19.1%), malnutrition (8.5%), and immunosuppressive conditions (4.3%). In this study, the distribution of perioperative procedural complications revealed that more than half of the patients (62.7%) experienced unipolar diathermy burns, followed by curettage of the end plate (27.7%). Additionally, local antibiotics were used in 48.9% of cases, local steroids in 31.9%, and cottonoid in 38.3%. The positive cultured organisms in the study were primarily Escherichia coli (23.4%), followed by Methicillin-resistant

staphylococcus aureus (MRSA) (19.1%) and Methicillin susceptible staphylococcus aureus (MSSA) (17%). Other organisms identified included Pseudomonas aeruginosa (14.9%), Staphylococcus epidermidis (8.5%), and Mycobacterium tuberculosis (6.4%). Less frequent were Klebsiella (4.3%), Candida albicans, Aspergillus, and Enterococcus faecium (2.1% each). According to the modified criteria of Kirkaldy-Willis, the outcomes were categorized as follows: Excellent in 34.0% of cases, Good in 42.6%, Fair in 19.1%, and Poor in 4.3%.

Table 1: Age of the patients (N=47)

Age (Years)	n	%
18-30 Yrs.	14	29.8%
31-40 Yrs.	19	40.4%
41-50 Yrs.	9	19.1%
≥51 Yrs.	5	10.6%

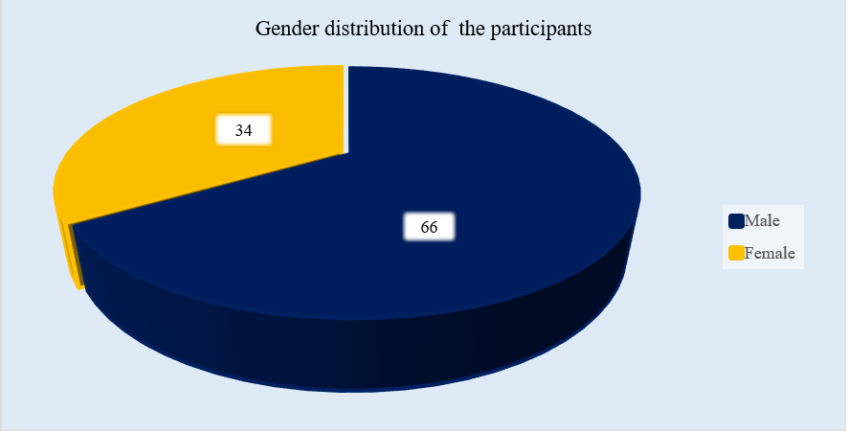

Figure I: pie chart showed gender wise patients distribution (N=47)

Table 2: Clinical presentation of patients (N=47)

Findings	n	%
PPND	47	100%
RPM	43	91.5%
Fever with chills	42	89.4%
Tenderness over spine	40	85.1%
PMS	39	83.0%
Difficulty in walking	38	80.9%
SSSI	27	57.4%
ISL	5	10.6%
IBB	5	10.6%

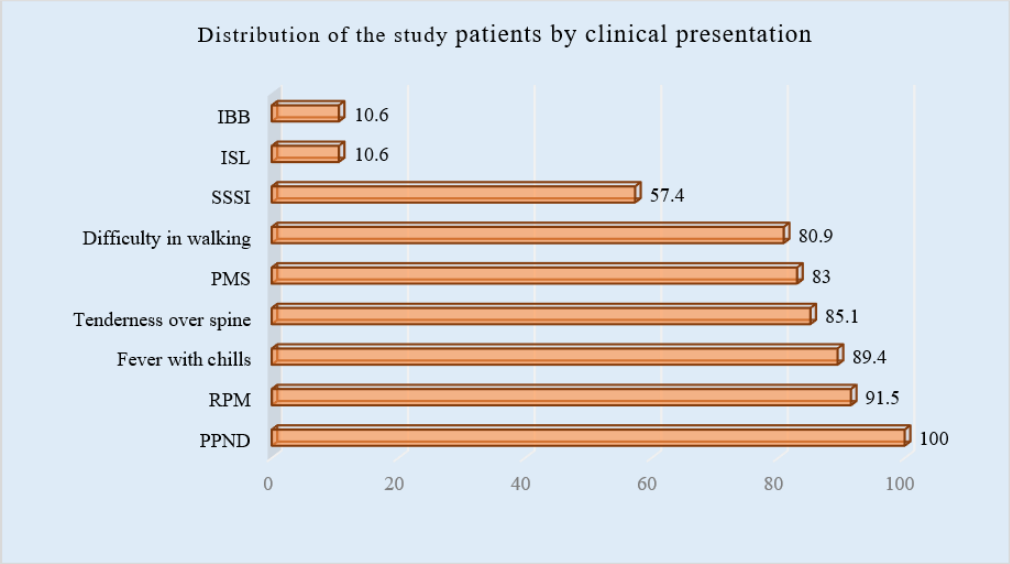

Figure II: Bar chart showed clinical presentation wise patients (N=47)

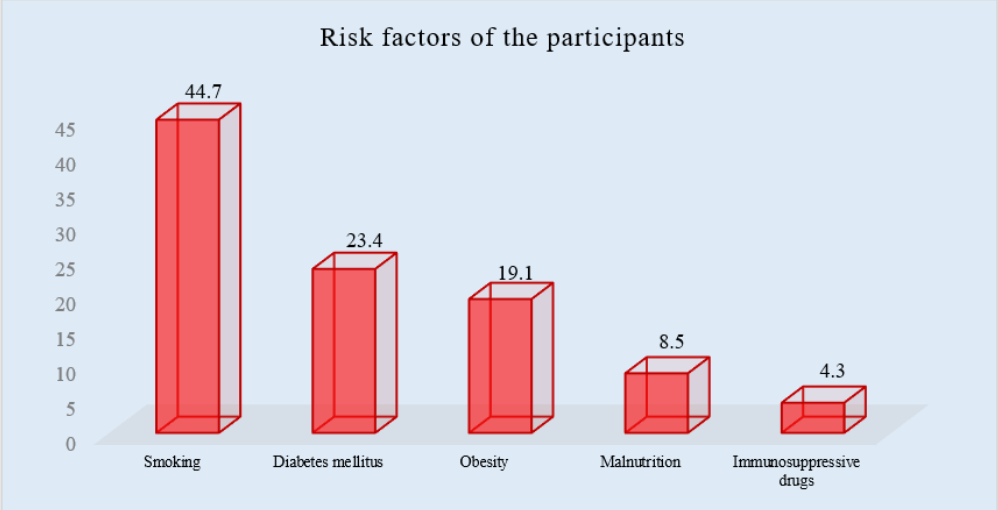

Figure III: Column chart showed patient-related risk factors (N=47)

Table 3: Per-operative procedural complications (N=47)

Complications	n	%
Unipolar diathermy burns	29	61.7%
Curettage of the end plate	13	27.7%
Use of local antibiotics	23	48.9%
Use of local steroid	15	31.9%
Use of cottonoid	18	38.3%

Table 4: Positive cultured organisms (N=47)

Organisms	n	%
MSSA	8	17.0%
MRSA	9	19.1%
Staphylococcus epidermidis	4	8.5%
Escherichia coli	11	23.4%
Enterococcus faecium	1	2.1%
Pseudomonas Aeruginosa	7	14.9%
Aspergillus	1	2.1%
Candida Albicans	1	2.1%
Klebsiella	2	4.3%
Mycobacterium tuberculosis	3	6.4%

Table 5: Outcomes as per the modified criteria of Kirkaldy-Willis (N=47)

Outcome	n	%
Excellent	16	34.0%
Good	20	42.6%
Fair	9	19.1%
Poor	2	4.3%

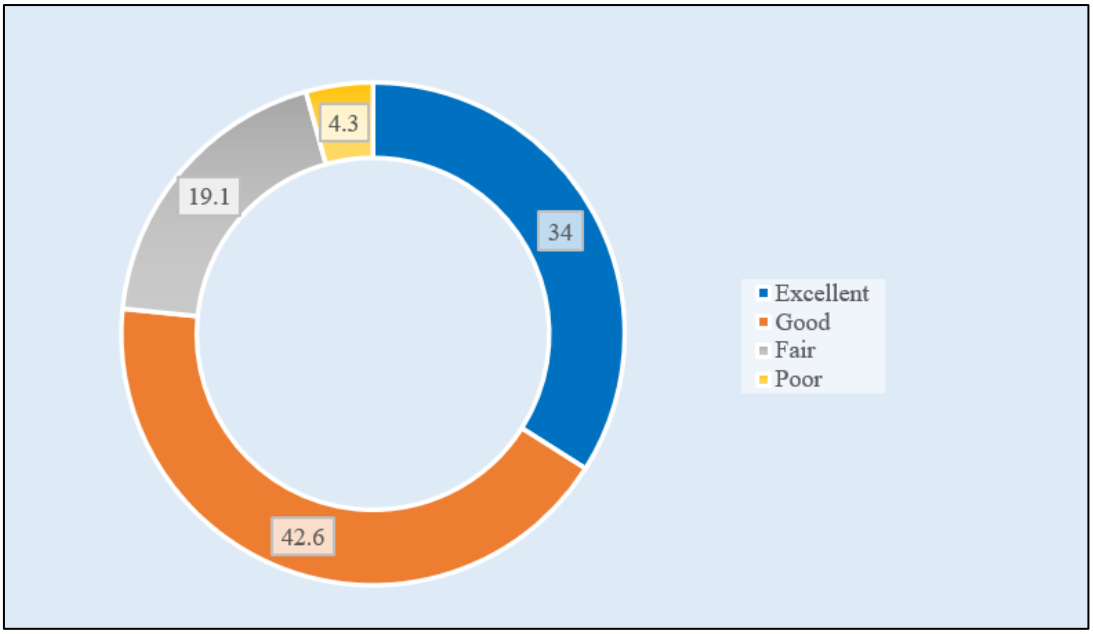

Figure IV: Ring chart showed outcomes as per the modified criteria of Kirkaldy-Willis (N=47)

DISCUSSION

In this study, the highest proportion of patients (40.4%) were in the 31-40 years' age group. Additionally, 29.8%, 19.1%, and 10.6% of patients belonged to the 18-30, 41-50, and ≥51 years' age groups, respectively. A nearly similar age range was observed in another study [15]. Upon analyzing the gender distribution, it was found that nearly two-thirds of the patients (66%) were male. Similar results were observed in another study [16]. In this study, all patients (100%) experienced persistent pain and neurological deficits (PPND), with 91.5% reporting pain associated with movement (RPM), 89.4% experiencing fever with chills, 85.1% reporting tenderness over the spine, 83.0% with paravertebral muscle spasm (PMS), and 80.9% experiencing difficulty in walking. Such a trend was supported by another previous study [15]. In our study, analyzing the patient-related risk factors, it was observed that nearly half of the patients had a smoking habit, followed by diabetes mellitus, obesity, malnutrition, and immunosuppressive conditions. These findings were aligned with the findings of a previous study [6]. In this study, the distribution of perioperative procedural complications showed that more than half of the patients experienced unipolar diathermy burns, followed by curettage of the end plate. Local antibiotics were administered in nearly half of cases. In the study conducted by [15] comparative management was observed. In our study, the most commonly cultured organisms were Escherichia coli (23.4%), followed by Methicillin-resistant Staphylococcus aureus (MRSA) (19.1%) and Methicillin-susceptible Staphylococcus aureus (MSSA) (17%). Other identified organisms included Pseudomonas aeruginosa (14.9%), Staphylococcus epidermidis (8.5%), and Mycobacterium tuberculosis (6.4%). Less frequently, Klebsiella (4.3%), Candida albicans, Aspergillus, and Enterococcus faecium (2.1% each) were found. Comparative findings were observed in another study [17]. In this study, based on the modified criteria of Kirkaldy-Willis, the outcomes were categorized as follows: 34.0% of cases were classified as Excellent, 42.6% as Good, 19.1% as Fair, and 4.3% as Poor. Such results were supported by the findings of another study [18]. The choice of surgical approach is influenced by factors such as the severity of the infection, the presence of comorbidities, and the anatomical location of the affected disc. Studies have shown that early surgical intervention can lead to faster resolution of symptoms and reduced long-term complications [19]. In some cases, combining surgical intervention with targeted antibiotic therapy has been shown to yield superior results, particularly in reducing recurrence rates [20]. However, surgical management is not without risks, including the potential for reinfection, hardware failure, and adjacent segment degeneration [21]. In developing countries like Bangladesh, the management of postoperative discitis is further complicated by challenges such as delayed diagnosis, limited access to advanced imaging facilities, and variability in surgical expertise. These factors often lead to suboptimal outcomes, underscoring the need for region-specific data and tailored treatment protocols [22]. Furthermore, the lack of standardized guidelines for managing postoperative discitis exacerbates the variability in clinical outcomes [23].

CONCLUSION & RECOMMENDATION

Unipolar diathermy burns are a common challenge encountered in the management of postoperative discitis following surgical intervention. The most prevalent causative organisms for postoperative discitis include Escherichia coli (23.4%), Methicillin-resistant Staphylococcus aureus (19.1%), and Methicillin-susceptible Staphylococcus aureus.

Early diagnosis and prompt intervention are crucial for the effective management of postoperative discitis, preventing complications, and ensuring optimal recovery outcomes. Timely antimicrobial therapy and surgical measures, when necessary, are essential for controlling infection and mitigating the impact of this condition on patient health.

REFERENCES

1. Turnbull, F. (1953). Postoperative inflammatory disease of lumbar discs. *Journal of Neurosurgery*, *10*(5), 469-473.
2. Torda, A. J., Gottlieb, T., & Bradbury, R. (1995). Pyogenic vertebral osteomyelitis: analysis of 20 cases and review. *Clinical Infectious Diseases*, *20*(2), 320-328.
3. Rawlings III, C. E., Wilkins, R. H., Gallis, H. A., Goldner, L. J., & Francis, R. (1983). Postoperative intervertebral disc space infection. *Neurosurgery*, *13*(4), 371-376.
4. Mylona, E., Samarkos, M., Kakalou, E., Fanourgiakis, P., & Skoutelis, A. (2009, August). Pyogenic vertebral osteomyelitis: a systematic review of clinical characteristics. In *Seminars in arthritis and rheumatism* (Vol. 39, No. 1, pp. 10-17). WB Saunders.
5. Samandouras, G. (Ed.). (2010). *The neurosurgeon's handbook*. Oxford University Press, USA.
6. Rechtine, G. R., Bono, P. L., Cahill, D., Bolesta, M. J., & Chrin, A. M. (2001). Postoperative wound infection after instrumentation of thoracic and lumbar fractures. *Journal of orthopaedic trauma*, *15*(8), 566-569.
7. Dubousset, J. (1994). Late infection with CD instrumentation. *Orthop Trans*, *18*, 121.
8. Bassewitz, H. L., Fischgrund, J. S., & Herkowitz, H. N. (2000). Postoperative spine infections. In *Seminars in Spine Surgery* (Vol. 12, No. 4, pp. 203-211). WB SAUNDERS COMPANY.
9. Ball, J. R., Hurlbert, R. J., & Winn, H. R. (2011). *Youmans neurological surgery*. Elsevier.
10. MASSIE, J. B., HELLER, J. G., ABITBOL, J. J., MCPHERSON, D., & GARFIN, S. R. (1992). Postoperative posterior spinal wound infections. *Clinical Orthopaedics and Related Research®*, *284*, 99-108.
11. Roberts, F. J., Walsh, A., Wing, P., Dvorak, M., & Schweigel, J. (1998). The influence of surveillance methods on surgical wound infection rates in a tertiary care spinal surgery service. *Spine*, *23*(3), 366-370.
12. El-Gindi, S., Aref, S., Salama, M., & Andrew, J. (1976). Infection of intervertebral discs after operation. *The Journal of Bone & Joint Surgery British Volume*, *58*(1), 114-116.
13. Fouquet, B., Goupille, P., Jattiot, F., Cotty, P., Lapierre, F., Valat, J. P., ... & Benatre, A. (1992). Discitis after lumbar disc surgery: features of "aseptic" and "septic" forms. *Spine*, *17*(3), 356-358.
14. Paine, K. W. E., Cauchoix, J., Mcivor, G., & Willis, W. K. (1974). Lumbar spinal stenosis. *Clinical Orthopaedics and Related Research®*, *99*, 30-50.
15. Das, S., Mahmood, E., Alam, M. J., Rashid, M. M., & Mitra, P. K. (2014). MANAGEMENT OF POSTOPERATIVE DISCITIS: A STUDY ON 20 CASES OF PROLAPSED LUMBER INTERVERTEBRAL DISC (PLID) OPERATION IN A TERTIARY LEVEL HOSPITAL IN BANGLADESH. *Journal of Dhaka Medical College*, *23*(2).
16. Alam, M. S., Haroon, K., Quddus, G. R., Farzana, T., Kaisar, K., Hossain, S. Z., ... & Hasan, M. M. (2022). Management of Postoperative Discitis Following Lumber Discectomy. *Bangladesh Journal of Neurosurgery*, *12*(1), 6-11.
17. Krishnan, A., Dave, B. R., Degulmadi, D., Mayi, S., Rai, R., Bang, P., ... & Krishnan, P. (2024). Early Intervention in Post-operative Infectious Spondylodiscitis: Outcome of Aggressive Transforaminal Lumbar Interbody Fusion. *Malaysian Orthopaedic Journal*, *18*(3), 16.
18. Ahsan, M. K., Hasan, M. S., Khan, M. S. I., & Sakeb, N. (2021). Management of post-operative discitis following discectomy in a tertiary-level hospital. *Journal of Orthopaedic Surgery*, *29*(1), 2309499020988213.
19. Menz, B. D., Charani, E., Gordon, D. L., Leather, A. J., Moonesinghe, S. R., & Phillips, C. J. (2021). Surgical antibiotic prophylaxis in an era of antibiotic resistance: common resistant bacteria and wider considerations for practice. *Infection and Drug Resistance*, 5235-5252.
20. Jabbar, R., Szmyd, B., Jankowski, J., Lusa, W., Pawełczyk, A., Wysiadecki, G., ... & Radek, M. (2022). Intramedullary spinal cord abscess with concomitant spinal degenerative diseases: a case report and systematic literature review. *Journal of Clinical Medicine*, *11*(17), 5148.
21. Atesok, K., Vaccaro, A., Stippler, M., Striano, B. M., Carr, M., Heffernan, M., ... & Papavassiliou, E. (2020). Fate of hardware in spinal infections. *Surgical Infections*, *21*(5), 404-410.
22. Aguirre, A. S., Haro, E., Campodónico, A., Mendoza, A., Bahamonde, B., & Romero, V. I. (2024). Navigating phenylketonuria management to improve it in Latin America: a systematic literature review and applicability analysis. *Frontiers in Nutrition*, *11*, 1390133.
23. Yang, Y., Yan, X., Li, W., Sun, W., & Wang, K. (2020). Long-term clinical outcomes and pain assessment after posterior lumbar Interbody fusion for recurrent lumbar disc herniation. *Orthopaedic surgery*, *12*(3), 907-916.