ARC Journal of Neuroscience
Volume 8, Issue 3 2025, PP 01-08
ISSN 2456-057X
https://doi.org/10.20431/2456-057X.0803001
www.arcjournals.org

"Efficacy of per-operative application of diluted (0.5%) povidone iodine solution in prevention of early post-operative surgical site infections in prolapsed lumbar intervertebral disc surgery"

***Dr. Md. Ashraful Islam[1], Dr. Urmeeta Dutta[2], Dr. K. M. Zobair Alam[3], Dr. Bibek Gaurab Singh[4], Dr. Mahbuba Akhter[5], Dr. Tayeb Ahmmed[6], Dr. Md. Rahad Ul Islam[7], Prof. Dr. Dhiman Chowdhury[8]**

[1]*Neurosurgeon, Department of Neurosurgery, Bangladesh Medical University, Dhaka, Bangladesh*

[2]*Neurosurgeon, Department of Neurosurgery, Bangladesh Medical University, Dhaka, Bangladesh*

[3]*Neurosurgeon, Department of Neurosurgery, Bangladesh Medical University, Dhaka, Bangladesh*

[4]*Neurosurgeon, Department of Neurosurgery, Bangladesh Medical University, Dhaka, Bangladesh*

[5]*Resident, Department of Endocrinology and Metabolism, BIRDEM General Hospital, Dhaka, Bangladesh*

[6]*Neurosurgeon, Department of Neurosurgery, Bangladesh Medical University, Dhaka, Bangladesh*

[7]*Assistant Professor, Department of Neurosurgery, East West Medical College & Hospital, Dhaka, Bangladesh*

[8]*Professor and Chairman, Department of Neurosurgery, Bangladesh Medical University, Dhaka, Bangladesh*

Received: 17 November 2025 Accepted: 01 December 2025 Published: 04 December 2025

Corresponding Author:** ***Dr. Md. Ashraful Islam, *Neurosurgeon, Department of Neurosurgery, Bangladesh Medical University, Dhaka, Bangladesh*

Abstract

Background: *Surgical site infections (SSIs) remain a significant cause of postoperative morbidity following spinal surgery. The use of antiseptic agents such as povidone-iodine during surgery has been proposed to reduce infection risk. This study aimed to evaluate the efficacy of per-operative application of diluted (0.5%) povidone-iodine solution in preventing early postoperative SSIs among patients undergoing prolapsed lumbar intervertebral disc (PLID) surgery.*

Methods: *This quasi-experimental study was conducted in the Department of Neurosurgery, Bangladesh Medical University, Dhaka, Bangladesh, from August 2023 to February 2025. A total of 46 patients diagnosed with prolapsed lumbar intervertebral disc (PLID) who underwent fenestration and discectomy and met the predefined selection criteria were included in this study. The participants were divided into two equal groups: Group A (intervention, n = 23), who received per-operative application of 0.5% povidone-iodine solution, and Group B (control, n = 23), who underwent surgery without the use of per-operative povidone-iodine*

Results: *In this study, the mean age was comparable between the two groups (p > 0.05), with the majority of participants aged 39–58 years. Males were more prevalent, comprising 78.3% of Group A and 69.6% of Group B. Postoperative total leukocyte counts showed no significant differences between the groups. ESR levels remained largely below 75 mm/h, with a significant difference observed on the 30th postoperative day (p = 0.03). CRP levels normalized faster in Group A compared to Group B, also showing a significant difference on the 30th day (p = 0.03). The incidence of surgical site infection (SSI) was 0.0% in Group A and 17.4% in Group B (p = 0.03), demonstrating the effectiveness of povidone-iodine in reducing postoperative infections. Microbiological analysis identified Staphylococcus aureus in one of the infected cases (50%), confirming its role as a common pathogen in postoperative spinal infections.*

Conclusion: *The per-operative application of diluted (0.5%) povidone-iodine solution effectively reduced early postoperative surgical site infections following single-level fenestration and discectomy for prolapsed lumbar intervertebral disc. Its efficacy, simplicity, and cost-effectiveness make it a valuable preventive measure in spinal surgery, highlighting its potential role as a practical strategy to minimize postoperative infections.*

Keywords: *Povidone-iodine, Surgical site infection, PLID, Discitis, Neurosurgery*

1. Introduction

Spinal surgeries are among the most frequently performed procedures in neurosurgical practice, with prolapsed lumbar intervertebral disc (PLID) surgery constituting a major portion of these operations. [1] Surgical site infections (SSIs) remain one of the most common postoperative complications following spinal surgery. SSIs after PLID surgery can have serious consequences, including prolonged hospital stay, delayed recovery, increased pain, and complications such as discitis, functional loss, or motor deficits. These infections not only impose significant physical and psychological distress on patients but also contribute to increased healthcare costs and strain on family and community resources. [2,3]

In efforts to address this critical issue, several institutions worldwide have investigated the causes and preventive strategies for SSIs. The U.S. Centers for Disease Control and Prevention (CDC), through its National Nosocomial Infections Surveillance (NNIS) system, has developed standardized definitions and classifications for SSIs, providing evidence-based recommendations for their prevention. According to the CDC, SSIs are defined as infections occurring within 30 days of surgery (or up to one year if an implant is used) and affecting either the incision or deep tissues at the surgical site. [4] SSIs are broadly categorized into incisional and organ/space types. Incisional SSIs are further divided into superficial and deep forms based on the depth of tissue involvement, while organ/space SSIs affect areas beyond the incised body wall layers that were opened or manipulated during surgery. [5] Among causative organisms, *Staphylococcus aureus* and *Staphylococcus epidermidis* are the most frequently implicated, typically introduced into the wound during surgery. [6] *S. aureus* accounts for approximately 32% of all SSIs, with 88% of these classified as deep incisional or organ/space infections. [7] SSIs following PLID surgery are particularly challenging, often necessitating prolonged antibiotic therapy, repeated wound management, or surgical debridement, leading to increased morbidity and healthcare burden. [2] The most commonly performed spinal procedure is fenestration and discectomy, which relieves compression from lumbar disc herniation. The reported incidence of SSIs following spinal surgery ranges from 1% to 14%, while postoperative discitis after PLID surgery occurs in 4% to 10% of cases. [1,8] Therefore, it is imperative for surgeons to employ effective preventive measures to minimize postoperative wound infections.

According to Luna et al. (2017), perioperative antibiotic therapy is widely used to prevent SSIs in spinal surgery. [9] In addition, several perioperative adjuncts have been adopted to further reduce infection rates, including silver-impregnated dressings, closed wound vacuum drainage, intraoperative wound irrigation with povidone-iodine (PVP-I), hydrogen peroxide or saline, and the use of ultraclean air systems in the operating room. [10,11] The World Health Organization (WHO), CDC, and Infectious Diseases Society of America (IDSA) recommend irrigating the surgical wound with an aqueous PVP-I solution before closure to prevent SSIs. [12] Povidone-iodine (PVP-I) is a widely used antiseptic for skin, mucous membranes, and wounds. It is a complex of polyvinylpyrrolidone and triiodide ions, where iodine forms a reversible complex with the carrier polymer povidone, which itself has no microbicidal effect. [14,15] In aqueous solution, free iodine is gradually released from this complex, establishing an equilibrium that provides sustained antimicrobial action. [15] However, PVP-I can exhibit cytotoxic effects on fibroblasts, osteoblasts, and chondrocytes, with toxicity being concentration- and time-dependent. [13] Therefore, a diluted solution (0.5%) was chosen in this study, prepared from commercially available 10% PVP-I mixed with normal saline, to maintain safety while ensuring efficacy.

Several studies have demonstrated that diluted PVP-I is both safe and effective for intraoperative wound irrigation in spinal surgery, showing strong bactericidal activity compared to other irrigants such as antibiotics, chlorhexidine, or soap. [9,14,15] Interestingly, lower concentrations of PVP-I (0.5–4%) result in a paradoxical increase in free iodine release, thereby enhancing antimicrobial activity. [16] Although the use of diluted PVP-I for wound irrigation is supported internationally, there is currently no established national guideline for its use in spinal surgery in our country. Therefore, the present study aimed to evaluate the efficacy of 0.5% povidone-iodine solution as a per operative wound irrigant in PLID surgery.

2. Methodology & Materials

This quasi-experimental study was conducted in the Department of Neurosurgery, Bangladesh

Medical University, Dhaka, Bangladesh, over a period of eighteen months, from August 2023 to February 2025. A total of 46 patients diagnosed with prolapsed lumbar intervertebral disc (PLID) who underwent fenestration and discectomy and met the predefined selection criteria were included in this study.he participants were divided into two equal groups: Group A (intervention, n = 23), who received per-operative application of 0.5% povidone-iodine solution, and Group B (control, n = 23), who underwent surgery without the use of per-operative povidone-iodine.

These were the following criteria for eligibility as study participants:

2.1. Inclusion Criteria

Patients meeting the following criteria were included in the study:

- Patients aged above 18 years.
- Patients who underwent single-level fenestration and discectomy for prolapsed lumbar intervertebral disc (PLID) during the study period.
- Patients who gave informed written consent.

2.2. Exclusion Criteria

- Patients with recurrent PLID requiring repeat surgery.
- Patients with a known hypersensitivity to povidone-iodine.
- Patients presenting with features of systemic infection.
- Cases with intradural spinal space-occupying lesions.
- Patients with chronic illnesses or who were immunocompromised.
- Patients diagnosed with uncontrolled diabetes mellitus.
- Patients who sustained iatrogenic thecal sac or nerve root injury during surgery.

2.3. Data Collection Procedure

Data were collected using a structured data collection sheet. Voluntary written informed consent was obtained from each patient and/or their legal guardian or responsible family member after a full explanation of the study objectives, procedures, and purpose.

A purposive sampling technique was used. Patients who fulfilled the selection criteria were divided into two groups:

- **Group A (Intervention group):** Received intraoperative wound irrigation with 0.5% povidone-iodine solution.
- **Group B (Control group):** Did not receive povidone-iodine irrigation; standard surgical protocol was followed.

Both groups of patients underwent fenestration and discectomy according to the standard surgical protocol, with strict adherence by the operating surgeon. Postoperative care was provided uniformly for all patients as per standard departmental practice. Follow-up evaluations were carried out on the 1st, 4th, and 7th postoperative days in the Department of Neurosurgery, and subsequently up to the 30th postoperative day in either the inpatient or outpatient department. During each follow-up, patients were examined for clinical signs and symptoms of surgical site infection, and laboratory investigations including total white blood cell count (TC-WBC), erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), and pus culture (if indicated) were performed. Magnetic resonance imaging (MRI) of the lumbosacral spine with contrast was advised in suspected cases of surgical site infection.

2.4. Statistical Analysis

All data were recorded systematically in a pre-formatted data collection form. Quantitative data were expressed as mean and standard deviation, and qualitative data were expressed as frequency distribution and percentage. The data were analyzed using the Independent t-test and chi-square test. A P-value <0.05 was considered significant. Statistical analysis was performed by using SPSS 23 (Statistical Package for Social Sciences) for Windows version 10. This study was ethically approved by the Institutional Review Board of Bangladesh Medical University.

3. Results

Table 1. *Distribution of the study patients according to age groups (n=46)*

Age group (years)	**Group A (n=23)**	**Group B (n=23)**	**P-value**
19-38	9 (39.1%)	7 (30.4%)	0.66^{*}
39-58	11 (47.8%)	14 (60.9%)	
59-78	3 (13.0%)	2 (7.8%)	
Mean±SD	43.0±12.25	43.48±10.23	0.88^{**}
Gender			

Male	18 (78.3%)	16 (69.6%)	0.50*
Female	5 (21.7%)	7 (30.4%)	

P-value obtained by *Chi-square test and **Independent Samples t-test. P<0.05 is considered as a level of significance

Intervention group: With per-operative application of 0.5 povidone iodine solution.

Control group: Without per-operative application of 0.5 povidone iodine solution.

Table 1 shows the age and gender distribution of participants in Group A (intervention) and Group B (control). Participants aged 19–38 years comprised 39.1% of Group A and 30.4% of Group B; those aged 39–58 years were 47.8% and 60.9%, and 59–78 years were 13.0% and 7.8%, respectively. The mean ages were 43.0 ± 12.25 years (Group A) and 43.48 ± 10.23 years (Group B), with no significant difference. Males accounted for 78.3% (n=18) in Group A and 69.6% (n=16) in Group B, and females for 21.7% (n=5) and 30.4% (n=7), respectively (p=0.50), showing no significant gender difference.

Table 2. *Distribution of the study patients according to PLID level in two groups (n=46)*

PLID	Group A (n=23)	Group B (n=23)	P-value
L 3/4	1 (4.3%)	0 (0.0%)	0.517
L 4/5	16 (69.6%)	15(65.2%)	
L 5/S1	6 (26.1%)	8 (34.8%)	

P-value obtained by chi-square test

Table 2 presents the distribution of prolapsed lumbar intervertebral disc (PLID) levels in Group A and Group B (n=23 each). In Group A, 4.3% had L3/L4, 69.6% L4/L5, and 26.1% L5/S1 prolapse; in Group B, 0.0% had L3/L4, 65.2% L4/L5, and 34.8% L5/S1. No cases occurred at L1/L2 or L2/L3 in either group. There was no significant difference between groups (p = 0.517).

Table 3. *Comparison of TC-WBC between two groups (n=46)*

Total count	Group A (n=23)	Group B (n=23)	P-value
1st POD			
>11000 /mm³	5 (21.7%)	2 (8.7%)	0.21
<11000 /mm³	18 (78.3%)	21 (91.3%)	
4th POD			
>11000 /mm³	2 (8.7%)	2 (8.7%)	0.10
<11000 /mm³	21 (91.3%)	21 (91.3%)	
7th POD			
>11000 /mm³	1 (4.3%)	2 (8.7%)	0.55
<11000 /mm³	22 (95.7%)	21 (91.3%)	
30th POD			
>11000 /mm³	0 (0.0%)	2 (8.7%)	0.14
<11000 /mm³	23 (100.0%)	21 (91.3%)	

P-value obtained by chi-square test

Table 3 compares total leukocyte count (TLC) between Group A and Group B across postoperative days (PODs). On POD 1, elevated TLC (>11,000/mm³) was seen in 21.7% of Group A and 8.7% of Group B (p = 0.21). By POD 4, 8.7% in both groups had elevated counts (p = 0.10). On POD 7, elevations were 4.3% in Group A and 8.7% in Group B (p = 0.55). By POD 30, all patients in Group A and 8.7% in Group B had elevated counts, with no significant difference (p = 0.14).

Table 4. *Comparison of ESR between two groups (n=46)*

ESR	Group A (n=23)	Group B (n=23)	P-value
1st POD			
More than 75 mm/hour	0 (0.0%)	0 (0.0%)	-
Less than 75 mm/hour	23 (100%)	23 (100%)	
4th POD			
More than 75 mm/hour	0 (0.0%)	0 (0.0%)	-
Less than 75 mm/hour	23 (100%)	23 (100%)	
7th POD			
More than 75 mm/hour	0 (0.0%)	2 (8.7%)	0.14

Less than 75 mm/hour	23 (100%)	22 (91.3%)	
30th POD			
More than 75 mm/hour	0 (0.0%)	4 (17.4%)	0.03
Less than 75 mm/hour	23 (100.0%)	19 (82.6%)	

P-value obtained by chi-square test

Table 4 compares erythrocyte sedimentation rate (ESR) between Group A and Group B across postoperative days. On PODs 1 and 4, all patients in both groups had ESR <75 mm/hour. By POD 7, 8.7% of Group B showed elevated ESR, with no significant difference (p = 0.14). On POD 30, 17.4% of Group B had elevated ESR, while all Group A patients remained below the threshold, showing a significant difference (p = 0.03).

Table 5. *Comparison of CRP between two groups (n=46)*

CRP	**Group A(n=23)**	**Group B (n=23)**	**P-value**
1st POD			
High (>5 mg/L)	23 (100.0%)	23 (100.0%)	-
Low (<5 mg/L)	0 (0.0%)	0 (0.0%)	
4th POD			
High (>5 mg/L)	3 (13.0%)	4 (17.4%)	0.68
Low (<5 mg/L)	20 (87.0%)	19 (82.6%)	
7th POD			
High (>5 mg/L)	0 (0.0%)	4 (17.4%)	0.03
Low (<5 mg/L)	23 (100%)	19 (82.6%)	
30th POD			
High (>5mg/L)	0 (0.0%)	4 (17.4%)	0.03
Low (<5mg/L)	23 (100.0%)	19 (82.6%)	

P-value obtained by chi-square test

Table 5 compares the C-reactive protein (CRP) levels between Group A (intervention) and Group B (control) across different postoperative days (PODs). On the 1st POD, all patients in both groups exhibited elevated CRP levels (>5 mg/L). By the 4th POD, elevated CRP levels persisted in 3 patients (13.0%) in Group A and 4 patients (17.4%) in Group B, with no statistically significant difference (p = 0.68). However, by the 7th and 30th PODs, CRP levels had normalized in all patients of Group A, while 4 patients (17.4%) in Group B continued to show elevated levels, indicating a statistically significant difference (p = 0.03).

Table 6. *Comparison of signs of the SSIs between two groups (n=46)*

Signs	**Group A (n=23)**	**Group B (n=23)**	**P-value**
Localized pain			
Yes	0 (0.0%)	4 (17.4%)	0.03
No	23(100.0%)	19(82.6%)	
Localized swelling			
Yes	0 (0.0%)	2 (8.7%)	0.14
No	23(100.0%)	21(91.3%)	
Purulent discharge			
Yes	0 (0.0%)	2 (8.7%)	0.14
No	23(100.0%)	21(91.3%)	
Increase local temperature			
Yes	0 (0.0%)	4 (17.4%)	0.03
No	23(100.0%)	19(82.6%)	

P-value obtained by chi-square test

Table 6 compares the clinical signs observed between Group A (intervention) and Group B (control), highlighting their frequency and statistical significance. Localized pain and increased local temperature were significantly more common in Group B, each occurring in 4 patients (17.4%), compared to none (0%) in Group A (p = 0.03). Localized swelling and purulent discharge were also noted in 2 patients (8.7%) of Group B but were absent in Group A; however, these differences were not statistically significant (p = 0.14).

Table 7. *Comparison of Surgical Site Infection (SSI) in between Intervention and Control Groups (n=46)*

SSI	**Group A (n=23)**	**Group B(n=23)**	**P-value**
Yes	0(0.0%)	4(17.4%)	0.03
No	23(100.0%)	19(82.6%)	

P-value obtained by chi-square test

Table 7 illustrates the incidence of surgical site infection (SSI) between the two study groups. In Group A (intervention), no participants developed SSI (0.0%), whereas in Group B (control), 4 participants (17.4%) experienced post-operative infection. Consequently, all patients in Group A (100%) remained infection-free compared to 82.6% in Group B. The observed difference was statistically significant (p = 0.03), indicating that the use of diluted povidone-iodine was effective in reducing SSIs. On imaging evaluation, MRI of the lumbosacral spine with contrast revealed characteristic findings of infection in the affected patients, including hypointensity on T1-weighted images, hyperintensity on T2-weighted images, and contrast enhancement of the disc and adjacent paraspinal soft tissue, consistent with discitis and surgical site infection.

Table 8. *Distribution of the patients by organism from culture and sensitivity of pus (n=2)*

Name of organism	**Number of patients**	**Percentage (%)**
Staphylococcus aureus	1	50%
None	1	50%
Total	2	100%

Table 8 presents data on the distribution of organisms in two patients, showing the number of cases and corresponding percentages. *Staphylococcus aureus* was detected in one patient (50%), while no organism was identified in the other (50%). The total number of patients is two, accounting for 100%.

4. Discussion

This study included 46 patients who underwent single-level prolapsed lumbar intervertebral disc (PLID) surgery at the Department of Neurosurgery, Bangladesh Medical University (BMU). The participants were divided into two equal groups: Group A (intervention, n = 23), who received per-operative application of 0.5% povidone-iodine solution, and Group B (control, n = 23), who underwent surgery without the use of per-operative povidone-iodine. The present study evaluated the efficacy of per-operative application of diluted (0.5%) povidone-iodine solution in preventing early postoperative surgical site infections (SSIs) following single-level prolapsed lumbar intervertebral disc (PLID) surgery. Surgical site infections remain one of the most concerning postoperative complications, as they can significantly increase morbidity, prolong hospital stays, and raise healthcare costs by up to four to thirteen times for otherwise simple lower back surgeries [14]. Advances in pharmacology, sterile techniques, and the prophylactic use of antibiotics have substantially reduced SSI incidence [17]. Nonetheless, adjunctive measures such as intraoperative antiseptic irrigation are gaining importance in spinal surgery [10]. Povidone-iodine, a broad-spectrum antiseptic, has shown efficacy against various pathogens, including methicillin-resistant *Staphylococcus aureus* (MRSA), particularly at dilutions between 0.5–4% [14,18]. In this study, the mean age in Group A was 43.0 ± 12.25 years, while in Group B it was 43.48 ± 10.23 years, with no significant difference (p > 0.05). The majority of patients were aged 39–58 years, consistent with findings by Machino et al. (2022), who reported that PLID is more common after the age of 40 and increases with aging due to progressive dehydration and loss of elasticity of the nucleus pulposus [19,20]. Male predominance was observed in both groups (78.3% in Group A and 69.6% in Group B), similar to the study by Ansari et al. (2010), where males accounted for 76% of cases [21]. This trend likely reflects the greater involvement of men in physically demanding occupations that predispose them to spinal stress and injury. The most commonly affected level was L4/L5, followed by L5/S1, which aligns with the observations of Ozgen et al. (2017) [22]. Statistical analysis revealed no significant difference in the distribution of affected levels between the groups (p = 0.517). Postoperative leukocyte count analysis showed no significant differences between the two groups at various postoperative intervals. On the 1st POD, elevated counts (>11,000/mm³) were noted in 21.7% of Group A and 8.7% of Group B (p = 0.21), which normalized in nearly all patients by the 30th POD. Zare et al. (2021) reported that elevated white blood cell counts occur in less than 50% of SSI cases, supporting the finding that WBC count alone is an unreliable marker for early infection detection [23]. Erythrocyte sedimentation rate (ESR) monitoring revealed a significant difference between groups by the 30th POD (p = 0.03), with elevated values persisting in 17.4% of

Group B but none in Group A. This finding is in line with Zare et al. (2021), who observed that ESR may rise postoperatively due to tissue trauma but tends to normalize within 2–4 weeks unless infection develops [23]. C-reactive protein (CRP) proved to be a more sensitive and reliable biomarker for early detection of SSIs. In this study, CRP was elevated in all patients on the 1st POD but normalized by the 7th and 30th PODs in all Group A patients, while 17.4% of Group B remained elevated ($p = 0.03$). These findings suggest that CRP is a cost-effective and valuable indicator of postoperative infection, consistent with prior studies [23].

According to the CDC (2023) criteria for SSIs, clinical indicators include localized pain, swelling, purulent discharge, and increased local temperature. In the current study, none of the patients in Group A developed these signs, while 4 patients (17.4%) in Group B exhibited localized pain and increased temperature ($p = 0.03$). Two of these patients also presented with swelling and purulent discharge. MRI of the lumbosacral spine confirmed infection in all 4 patients, showing typical features of discitis—T1 hypointensity, T2 hyperintensity, and contrast enhancement of the disc and adjacent paraspinal tissues. The incidence of SSI was 0% in the intervention group and 17.4% in the control group, a statistically significant difference ($p = 0.03$).

These results are consistent with findings by Cheng et al. (2005), who reported SSI rates of 0% in the povidone-iodine group and 3.4% in the control group ($p = 0.0072$) [14], and Chang et al. (2006), who observed infection rates of 0% and 4.8%, respectively ($p = 0.029$) [11]. The slightly higher infection rate in the control group of the present study may be attributed to poorer personal hygiene and lower socioeconomic conditions. Among the four infected patients in Group B, two exhibited purulent discharge; *Staphylococcus aureus* was cultured in one case (50%), while no growth was detected in the other (50%). This is consistent with Chiang et al. (2014), who identified *Staphylococcus aureus* and *Staphylococcus epidermidis* as the most common causative organisms in spinal SSIs [7]. Given that povidone-iodine demonstrates potent antimicrobial activity even against methicillin-resistant strains [14], these findings support the hypothesis that diluted (0.5%) povidone-iodine irrigation is an effective and low-cost intervention for reducing SSIs, particularly those caused by Gram-positive organisms such as *Staphylococcus aureus*. Overall, the present study supports the beneficial role of per-operative diluted povidone-iodine irrigation in reducing postoperative SSIs in spinal surgery, consistent with international literature.

5. Limitations of the Study

This study was conducted on a population from a single center, which may not represent the overall scenario of the entire country. The use of a purposive sampling technique may have introduced selection bias. Additionally, there were challenges in maintaining communication with patients during follow-up, which could have affected data completeness.

6. Conclusion and Recommendations

The study findings show that per operative use of diluted (0.5%) povidone-iodine solution proved effective in reducing early postoperative surgical site infections (SSIs) following prolapsed lumbar intervertebral disc (PLID) surgery. The study also demonstrated a significantly lower incidence of SSIs in the intervention group compared to the control group, suggesting that povidone-iodine irrigation may play a vital role in minimizing postoperative complications and improving surgical outcomes. Further multicenter studies should include routine postoperative infection surveillance to evaluate the continued effectiveness of povidone-iodine in preventing SSIs and to detect any emerging resistance or complications.

Conflict of interest: None declared

Ethical approval: This study was ethically approved

References

[1] Lin HH, Chou PH, Ma HH, Chang YW, Wang ST, Chang MC. Efficacy of Povidone Iodine Solution in the Prevention of Surgical Site Infections in Minimally Invasive Instrumented Spinal Fusion Surgery. *Glob Spine J*. 2022;12(6):1058–65. https://doi.org/10.1177/2192568220975385

[2] Schuster JM, Rechtine G, Norvell DC, Dettori JR. The Influence of Perioperative Risk Factors and Therapeutic Interventions on Infection Rates After Spine Surgery: A Systematic Review. *Spine*. 2010;35(Suppl):S125–S137. https://doi.org/10.1097/BRS.0b013e3181d8342c

[3] Badia JM, Casey AL, Petrosillo N, Hudson PM, Mitchell SA, Crosby C. Impact of surgical site infection on healthcare costs and patient outcomes: a systematic review in six European countries. *J Hosp Infect*. 2017;96(1):1–15. https://doi.org/10.1016/j.jhin.2017.03.004

[4] Centers for Disease Control and Prevention. Surgical site infection (SSI) event. Atlanta, GA: CDC; 2023. p.1–32.

[5] Mangram AJ, Horan TC, Pearson ML, Silver LC, Jarvis WR; Hospital Infection Control Practices Advisory Committee. Guideline for prevention of surgical site infection, 1999. *Infect Control Hosp Epidemiol*. 1999;20(4):247–80.

[6] Abdullah KG, Attiah MA, Olsen AS, Richardson A, Lucas TH. Reducing surgical site infections following craniotomy: examination of the use of topical vancomycin. *J Neurosurg*. 2015;123(6):1600–4. https://doi.org/10.3171/2014.12.JNS142092

[7] Chiang HY, Herwaldt LA, Blevins AE, Cho E, Schweizer ML. Effectiveness of local vancomycin powder to decrease surgical site infections: a meta-analysis. *Spine J*. 2014;14(3):397–407. https://doi.org/10.1016/j.spinee.2013.10.012

[8] Jain M, Sahu RN, Gantaguru A, Das SS, Tripathy SK, Pattnaik A. Post-operative Lumbar Pyogenic Spondylodiscitis: An Institutional Review. *J Neurosci Rural Pract*. 2019;10(03):511–8. https://doi.org/10.1055/s-0039-1697887

[9] De Luna V, Mancini F, De Maio F, Bernardi G, Ippolito E, Caterini R. Intraoperative Disinfection by Pulse Irrigation with Povidone-Iodine Solution in Spine Surgery. *Adv Orthop*. 2017;2017:7218918. https://doi.org/10.1155/2017/7218918

[10] Ruder JA, Springer BD. Treatment of Periprosthetic Joint Infection Using Antimicrobials: Dilute Povidone-Iodine Lavage. *J Bone Joint Infect*. 2017;2(1):10–14. https://doi.org/10.7150/jbji.16448

[11] Chang FY, Chang MC, Wang ST, Yu WK, Liu CL, Chen TH. Can povidone-iodine solution be used safely in a spinal surgery? *Eur Spine J*. 2006;15(6):1005–14.

[12] Monstrey SJ, Govaers K, Lejuste P, Lepelletier D, Ribeiro De Oliveira P. Evaluation of the role of povidone-iodine in the prevention of surgical site infections. *Surg Open Sci*. 2023;13:9. https://doi.org/10.1016/j.sopen.2023.03.005

[13] Newton Ede MP, Ashleigh M Phil, Philp A PhD, Richardson SM PhD, Mohammed S MD, Jones SW PhD. Povidone-Iodine has a profound effect on in vitro Osteoblast proliferation and metabolic function and inhibits their ability to mineralize and form bone. *Spine*. 2016;41(9):729–34.

[14] Cheng MT, Chang MC, Wang ST, Yu WK, Liu CL, Chen TH. Efficacy of dilute betadine solution irrigation in the prevention of postoperative infection of spinal surgery. *Spine*. 2005;30:1689–93.

[15] Bigliardi PL, Alsagoff SAL, El-Kafrawi HY, Pyon JK, Wa CTC, Villa MA. Povidone iodine in wound healing: A review of current concepts and practices. *Int J Surg*. 2017;44:260–8. https://doi.org/10.1016/j.ijsu.2017.06.073

[16] Meehan JP. Dilute Povidone-Iodine Irrigation: The Science of Molecular Iodine (I2) Kinetics and Its Antimicrobial Activity. *J Am Acad Orthop Surg*. 2025;33:65–73. https://doi.org/10.5435/JAAOS-D-24-00471

[17] Barker FG. Efficacy of prophylactic antibiotic therapy in spinal surgery: a meta-analysis. *Neurosurgery*. 2002;51(2):391–401.

[18] Reimer K, Wichelhaus TA, Schäfer V, Rudolph P, Kramer A, Wutzler P, et al. Antimicrobial effectiveness of povidone-iodine and consequences for new application areas. *Dermatology*. 2002;204(Suppl 1):114–20.

[19] Machino M, Nakashima H, Ito K, Tsushima M, Ando K, Kobayashi K, et al. Influence of Age and Gender on Intervertebral Disk Degeneration and Height in the Thoracolumbar Spine. *Spine Surg Relat Res*. 2022;6(4):379–87.

[20] Jordon J, Konstantinou K, O'Dowd J. Herniated lumbar disc. *BMJ Clin Evid*. 2009;2009.

[21] Ansari A, Mondle MS, Hossain MA. Abnormalities in plain x-ray findings of lumbosacral spine in prolapsed lumbar intervertebral disc. *Med Today*. 2010;22(1):6–11.

[22] Ozgen S, Konya D, Toktas OZ, Dagcinar A, Ozek MM. Lumbar disc herniation in adolescence. *Pediatr Neurosurg*. 2007;43(2):77–81.

[23] Zare A, Sabahi M, Safari H, Kiani A, Schmidt MH, Arjipour M. Spinal Surgery and Subsequent ESR and WBC Changes Pattern: A Single Center Prospective Study. *Korean J Neurotrauma*. 2021;17(2):136. https://doi.org/10.13004/kjnt.2021.17.e33

Citation: *Dr. Md. Ashraful Islam et al. "Efficacy of per-operative application of diluted (0.5%) povidone iodine solution in prevention of early post-operative surgical site infections in prolapsed lumbar intervertebral disc surgery". ARC Journal of Neuroscience, 2025; 8(3): 01-08. DOI: https://doi.org/10.20431/2456-057X.0803001.*