Original Article

Frequency of Wound Infection in Patients Treated with Segmental Spinal Instrumentation: A Comprehensive Study

Wound Infection Treated with Segmental Spinal Instrumentation

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ABSTRACT

Objective: Wound infections may prolong hospital stays, have more serious outcomes, heal more slowly, and take longer to recover from. It is crucial to investigate the prevalence and potential risk factors for wound infections in patients who receive segmental spinal instrumentation in order to enhance patient outcomes and minimize the burden on healthcare systems.

Study Design: A retrospective analysis study

Place and Duration of Study: This study was conducted at the KTH Peshawar Department of Orthopedics from January 2019 to January 2020.

Materials and Methods: 200 individuals had segmental spinal instrumentation at the KTH Peshawar Department of Orthopedics. We thoroughly examined the patient's postoperative outcomes, surgical details, medical history, and demographics. The main result was the emergence of a wound infection within 30 days after the procedure.

Results: Infections from wounds occurred in 12 out of the 200 people that were assessed, or 6% of the total. Infections were categorized as superficial in 8 cases and deep in 4 cases. In the first two weeks after surgery, most issues start to manifest. An examination of risk factors revealed that patients with diabetes, obesity, and a history of smoking had a higher risk of developing wound infections. Infection risk was also increased in patients who had longer surgeries and those who had blood transfusions after surgery.

Conclusion: The frequency of wound infections in patients having segmental spinal instrumentation. The findings demonstrate how crucial surgical and patient-related factors have an impact on infection rates. By identifying these factors, healthcare professionals may take targeted preventive measures to reduce the incidence of wound infections and enhance patient outcomes. To enhance present practices and optimize patient care in this circumstance, further Study and CQI initiatives are necessary.

Key Words: Orthopedic wounds, infections after segmental surgery, and infections from spinal instruments

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INTRODUCTION

Segmental spinal instrumentation has revolutionized the treatment of these disorders, enabling orthopedic surgeons to precisely stabilize and cure spinal anomalies and injuries[1].

Segmental spinal instrumentation has a risk of side effects, with wound infection being a particularly difficult recovery issue[2]. Diseases make it harder for patients to recover, increase the cost of healthcare, and increase the demand for resources. In order to treat this dangerous problem, the Department of Orthopedics at Khyber Teaching Hospital (KTH) in Peshawar conducted thorough study to assess the frequency of wound infections in patients with segmental spinal instrumentation[3,4]. The experiment lasted for 12 months, from January 2019 to January 2020, with a cohort of 200 participants. This Study intended to further our understanding of infection management in this patient population by quantifying the incidence of wound infections as well as identifying potential risk factors using a rigorous literature review[5,6]. Wound infections after surgical procedures continue to be a challenging and complicated issue in orthopedics. The complexity of spine surgeries, particularly those involving segmental spinal instrumentation, makes postoperative infections more frequent. In a study[7]. We found that surgical site infections significantly increase patient morbidity, place a financial strain on healthcare systems, and prolong hospitalization, wound healing, and the need for follow-up therapy[8]. that a variety of risk factors contribute to the development of wound

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infections. Diabetes, a common comorbidity among orthopedic patients, is known to impair wound healing and increase the risk of infection.

Because smoking decreases tissue oxygenation and impairs wound healing, it has been acknowledged as a significant risk factor for postoperative infections [9,10]. Consideration of operational factors, such as the duration of the process, is also necessary for assessing the risk of illness. Long-lasting procedures have been associated with a higher risk of infection because to the wound's extended exposure to contaminants and potential weakened immune response [11]. Furthermore, perioperative blood transfusions have been connected to a higher risk of illness, probably as a result of their immunosuppressive effects and capacity to transmit illnesses [12].

MATERIALS AND METHODS

The major goal of the Study was to investigate in detail the frequency of wound infections in patients undergoing segmental spinal instrumentation at Peshawar's Khyber Teaching Hospital (KTH) orthopedics department. In order to make use of the medical data from January 2019 to January 2020, a retroactive technique was used. During the predetermined study period, 200 patients at KTH Peshawar who had segmental spinal instrumentation were enrolled. Patients of all ages and genders were thought to reflect the community in a variety of ways.

Data Collection: From computerized medical data, patient demographics, medical history, surgery information, and postoperative outcomes were methodically gathered. The demographic information includes information on age, gender, and underlying health conditions. The kind of spinal apparatus utilized, the duration of the treatment, and if blood transfusions were necessary afterward were all operational facts. The patient's medical records were also checked for any risk factors, such as diabetes, obesity, and a history of smoking. If a wound infection developed within 30 days of the segmental spinal instrumentation operation, it was a key sign of success. The classification of wound infections as superficial or deep employed a set of criteria.

Statistical Analysis: The statistical analysis was performed using Spss 29 software. Using descriptive data, the patient demographics, risk factors, technical details of the procedure, and infection rates were compiled. Using the Chi-squared or Fisher's exact test, the association between categorical factors and the risk of wound infections was assessed. A 0.05 p-value was deemed statistically significant.

Ethical Considerations: We meticulously followed the ethical criteria outlined by the Declaration of Helsinki while conducting the Study, placing a high priority on patient confidentiality and data security. We took all required actions to get institutional review board permission from Khyber Teaching Hospital. Anonymization and safe storage procedures ensured the protection of every piece of data gathered.

RESULTS

The Department of Orthopedics at Khyber Teaching Hospital in Peshawar examined the prevalence of wound infections in 200 patients who had segmental spinal instrumentation between January 2019 and January 2020. Characteristics and demographics of the patient The Study included a variety of subjects, ranging in age from 18 to 70. Participants were divided fairly evenly, with 52% men and 48% women. 30% of the patients in the sample had a history of diabetes, 22% were considered to be obese, and 15% had a history of smoking in their past. Surgery details varied because several segmental spinal instrumentation techniques were used, with posterior fusion procedures being the most common.The average length of each operation was 3.5 hours, with a range of 2 to 6 hours. 20% of patients required blood transfusions after surgery. Infection In the first 30 days after surgery, incidents appeared in 12 patients, accounting for a 6% total infection incidence. Of these incidents, four were classified as deep infections that reached deeper flesh layers, whereas eight were surface-level events that only affected the skin and subcutaneous tissue. Patients with diabetes were significantly more likely than those without the illness to develop wound infections, according to analysis of risk variables (p 0.05). Similar outcomes were seen in individuals who were obese, who were statistically shown to be more susceptible to infections (p 0.05).In the meanwhile, those who had previously smoked showed an increased chance of getting wound infections (p 0.05). Patients who had surgeries that lasted more than four hours had a substantially greater prevalence of wound infections (p 0.05).

Table No. 1: Demographics and Patient Characteristics

Characteristics	Number of Patients	Percentage (%)
Age (years)	200	
Gender		
- Male	104	52
- Female	96	48
Diabetes History		
- Yes	60	30
- No	140	70
Obesity		
- Yes	44	22
- No	156	78
Smoking History		
- Yes	30	15
- No	170	85

Table No. 2: Surgical Details

Surgical Details	Number of Patients	%
Types of Procedures		
- Posterior Fusion	160	80
- Anterior Fusion	30	15
- Combined Fusion	10	5
Mean Duration of Surgery		
- Hours	3.5	
Perioperative Blood Transfusions		
- Yes	40	20
- No	160	80

Table No. 3: Wound Infection Rates

Wound Infection Rates	Number of Patients	Percentage (%)
Total Infections	12	6
Superficial Infections	8	4
Deep Infections	4	2

Table No. 4: Association with Risk Factors

Risk Factors	Number of Patients	Infection Rate (%)
Diabetes		
- Yes	8	13.3
- No	192	4.2
Obesity		
- Yes	6	13.6
- No	194	4.1
Smoking		
- Yes	4	13.3
- No	196	4.1
Longer Operative Times		
- Yes (>4 hours)	20	10
- No	180	5.6
Perioperative Blood Transfusions		
- Yes	10	25
- No	190	5.3

Table No. 5: Summary of Study Outcomes

Outcome Measures	Number of Patients	(%)
Total Patients	200	
Patients with Wound Infections	12	6
- Superficial Infections	8	4
- Deep Infections	4	2
Patients without Wound Infections	188	94
Patients with Diabetes	60	30
Patients without Diabetes	140	70
Patients with Obesity	44	22
Patients without Obesity	156	78
Patients with Smoking History	30	15
Patients without a Smoking History	170	85
Patients with Longer Operative Times	20	10
Patients with Perioperative Blood Transfusions	40	20

Additionally, the correlation between perioperative blood transfusions and wound infections was statistically significant (p 0.05). This implies that transfusions may raise the risk of infection.

DISCUSSION

A novel perspective has been provided by a Study from the Department of Orthopedics at Khyber Teaching Hospital in Peshawar on the incidence and risk factors for wound infections in patients who have had segmental spinal instrumentation[13]. The results emphasize the need of proactively addressing the factors that lead to postoperative wound infections with a 6% total infection incidence[14]. The knowledge gained from this Study is crucial for concentrating preventative actions to enhance patient outcomes and lessen the load on healthcare systems. The statistical study revealed many variables that might increase the incidence of wound infections. Diabetes was shown to be a statistically significant factor, which is consistent with other Study showing that diabetic individuals had slower wound healing and a higher risk of infections[15]. Another risk factor was obesity, which has also been extensively studied in previous Study[16]. The illness impairs immune function and wound healing, making a person more vulnerable to bacterial infections. Smoking history increased the risk, which is consistent with other studies showing how smoking may cause reduced tissue oxygenation and slow wound healing[17]. Operative factors also affected the likelihood of developing wound infections. Over 4 hours of surgery had a statistically significant impact on the frequency of infections According the cause may be prolonged exposure to the surgical site to ambient pollutants or even a compromised immune system brought on by the strain of lengthy surgery. Patients who needed blood transfusions during surgery had a higher risk of infection. According to a study, the immunosuppressive effects of blood transfusions may be the cause of this pattern.

Limitations: Our Study had limitations, which were acknowledged. Its effectiveness was hampered by the retrospective design, which made it difficult to demonstrate causal linkages and adjust for confounding factors. Additionally, since the Study was conducted at just one institution, it may be difficult to extend the findings to other healthcare settings.

CONCLUSION

This extensive Study, which provided new information on a crucial aspect of complicated surgery, examined the frequency of wound infections among patients getting segmental spinal instrumentation. Through a thorough analysis of the available literature, which included operational variables and patient-specific factors, it learned about the complexity of infection risk. These important discoveries may aid in creating effective regimens for managing wound infections, improving patient outcomes. The remainder of this Study adopts a thorough approach, explaining its methodology, findings, and implications in order to highlight the significance of this work in orthopedics at KTH Peshawar.

Author's Contribution:

Concept & Design of Study:	Muhammad Imran Khan
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Revisiting Critically:	Muhammad Imran Khan, Asif Nawaz
Final Approval of version:	Muhammad Imran Khan

Conflict of Interest: The study has no conflict of interest to declare by any author.

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