

Role of Topical Usage of Vancomycin Powder in Prevention of Wound Infection in Spinal Surgery

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ABSTRACT

Objective: To determine the efficacy of topical usage of vancomycin powder at wound site to prevent wound infection in spinal surgery.

Material and Methods: A prospective study of 62 patients during a period of 6 months with follow-up of 2 weeks post-operatively was performed at Lahore General Hospital Lahore. Patients were divided into two groups: group A and group B, each containing equal numbers of patients. In group A, only prophylactic intravenous antibiotics were used for 5 days. In group B intravenous antibiotics along with topical Vancomycin powder were used at operative site in spinal surgery.

Results: During period of follow-up in 2 weeks post-operatively, incidence of wound infection in group A patients was 6.42% in comparison to Group B patients which was 2.4%. No adverse effects were documented by direct usage of Vancomycin powder at wound site.

Conclusion: Topical usage of Vancomycin powder at wound site reduces infection rate significantly in spinal surgery.

Key words: Spinal surgery, Topical application, Vancomycin, Wound infection.

Abbreviations: MIC: Mean inhibitory concentration.

INTRODUCTION

Wound infection is a common problem after any surgical procedure. It results in poor outcome of surgical procedure. Multiple factors are related to surgical site wound infection including age of patient, nutrition, prolonged use of steroids, smoking, obesity, diabetes, stress and alcohol use.¹ Hippocrates (Greek physician and surgeon 460-377 BC) known as father of medicine, used vinegar to irrigate the wounds and wrapped dressings around the wound to prevent the wound infection.² His teachings remained unchallenged for years. Wound infection is divided into superficial wound infection and deep wound infection. Superficial wound infection not involving the deep structure like muscles and bone but deep wound involves the deep tissues. Superficial wound infections are treated with daily dressings and antibiotics, deep wound infection require wound debridement and even removal of hardware used during surgery.³

In spinal surgery including laminectomy and discectomy, transpedicular fixation, and spinal fusion procedures wound infection is a disastrous complication leading to prolonged hospital stay antibiotics use and repeated surgeries.⁴ In such settings, most of the infections occur during early post-operative period due to operative seeding and substandard post-operative care.⁵ Despite using post-operative prophylactic antibiotics, improved surgical strategies and post-operative care, surgical wound infections continue to occur. Post-operative spinal wounds lead to longer hospital stay, increased mortality and higher re-operation rates.⁶ Prophylactic intraoperative Vancomycin powder used in the wound bed is a controversial issue where some authors support its use while others negate its use.^{7,8} So, this study was conducted to evaluate the outcome of intraoperative vancomycin powder sprinkled in the wound bed.

MATERIAL AND METHODS

A prospective observational study having 62 patients planned for spinal surgery was conducted during a period of 6 months from January 01, 2013 to June 30, 2013. The patients were recruited from emergency and outdoor department of General Hospital Lahore fulfilling inclusion criteria. Inclusion criteria were all the patients with indication of spinal surgery e.g. laminectomy and dissection, transpedicular fixation and anterior spinal fusion procedures. Exclusion criteria included the patients with known allergic to Vancomycin, previous spinal surgery, pregnant woman, history of Stevens-Johnson syndrome, previous history of infection at surgical site and patient having history of cancer or previous radiation.

The surgery was performed by expert hands and the patients were followed up 2 weeks post-operatively. The patients were divided into two groups: Group A and Group B. both groups had equal numbers of patients. In group A, only prophylactic intravenous antibiotics were used for 5 days. In group B intravenous antibiotics were used along with topical sprinkling of Vancomycin powder at the operative site (on muscles, fascia and subcutaneous; bone or duramatter were not exposed) during spinal surgery. Closed suction drains were placed in transpedicular fixation and anterior fusion procedure. All the patients received standard systemic prophylactic antibiotics 1 hour prior to incision.

RESULTS

Total of 62 patients who underwent spinal surgery were included in the study. Basic data is given in the

Table 1: Descriptive measures of the patients.

Variable	Control Group A	Treatment Group B
Age	40 yr	41.5 yr
Gender	18 M, 13 F	20 M, 11 F
Smoking	17	21
Alcohol	2	1
Diabetes	9	7

Table 1. All the calculations were done manually and using basic tools like Excel. During period of follow-up in 2 weeks post-operatively, incidence of wound infection in Group A patients was 6.42% in compar-

son to Group B patients which was 2.4% (Figure 1). No adverse effects were documented by direct usage of Vancomycin powder at wound site.

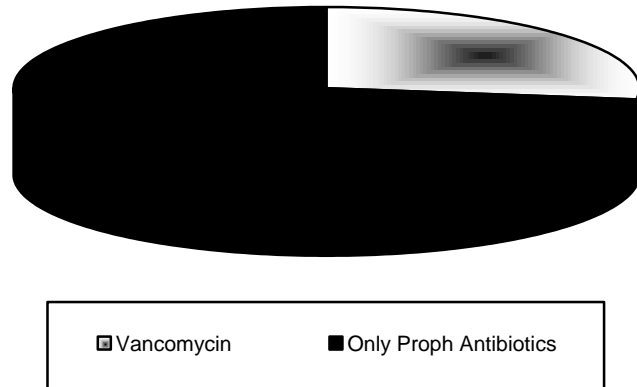


Fig. 1: Wound infection in the patients who were given intraoperative Vancomycin vs. Those who were offered only prophylactic antibiotics.

DISCUSSION

This study shows better outcome with the use of intraoperative Vancomycin powder sprinkled in the wound bed. For the way of explanation, intraoperative Vancomycin powder is superior to other routine prophylactic antibiotics in terms infection control the setting of spinal surgeries reduces the surgical site infection. It also reduces the hospital stay and morbidity. Vancomycin is amphoteric glycopeptides it protects against gram positive organisms. It is available in 500-1000 mg packing with low hospital cost. Local application of Vancomycin can achieve 1000 folds higher concentration than the mean inhibitory concentration (MIC) for MRSA in surgical wound.⁹ No adverse effects were noted in local application of Vancomycin.

However, the intraoperative use of Vancomycin in controversial. Some researchers support its use in spinal surgery to reduce postoperative wound infection while others are against it are in opinion that Vancomycin increases the incidence of wound infection.^{7,8} It has been reported by several studies that prophylactic intraoperative Vancomycin powder has protective effect against wound infection in the setting of spinal surgery.¹⁰ Similarly, Strom et al,¹¹ reported decrease in surgical rate of site infection from 10.9% to 2.5% which was attributable to the use of Vancomycin. Moreover recently, Kim et al,¹² reported safe use of vancomycin powder in the surgical wound in a patient with

end stage renal failure who underwent multilevel laminectomy and instrumented fusion. On the contrary, Ghobrial et al,⁷ conducted a single institution retrospective case series including 981 consecutive patients who underwent spinal surgery in order to evaluate microbial trends at spinal surgical site infections. They demonstrated that prophylactic intraoperative Vancomycin used in wound bed during spinal surgery may increase microbial growth at it may correlate with postoperative seromas. However, being a single institution, retrospective study there are strong chances of bias.

In short, like the present study, a number of studies report protective effect of use of intraoperative vancomycin powder in the wound bed in spinal surgery. The studies which argue against the use of intraoperative use of vancomycin are a few. However, randomized controlled trials at large scale are needed to authenticate the beneficial effects of intraoperative vvancomcin.

CONCLUSION

The use of adjuvant Vancomycin powder is associated with significant reduction in postoperative surgical site wound infections. However, randomized controlled trials at large scale are required to validate the results of this study and to prepared further guidelines.

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