Section: Neurosurgery

Original Research Article

POST OPERATIVE INFECTION IN CERVICAL SPINE SURGERY PATIENTS: A TERTIARY CARE CENTRE EXPERIENCE

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ABSTRACT

Background: Occurance of infection in any post-surgical patient almost always depends on the pre and post op care given to patient, his own immune system response and adhering to the strict asepsis protocol of the institute. If any of these things are at fault, post-operative patients are highly likely to develop the infection. The aim of this study is to assess the rate of infection in post op patients of cervical spine surgery in collaboration with Dept of Microbiology of our institute. **Materials and Methods:** We carried out a cohort study of 1594 patients who underwent cervical spine surgery from 2014 to 2024. With inclusion criteria being cervical patients operated in Neurosurgery OT for Disc and other spondylotic pathologies, who were managed in post op ICU for certain period. The institute hospital infection control committee was ensuring proper antibiotic coverage, local hygiene and control of infection in hospital wards ICUs and Ots. Patients were followed up for 6 months post op. **Result:** Four of our patients developed infective complication after anterior cervical approach and two patients out of 182 in posterior approach group patients had infection. Serous discharge, wound gaping, hematoma and abscess formation were some of the presentations. **Conclusion:** In elective surgery group with good ASA scores in our study in anterior cervical group the infection rate was found to be near to 0.28% while in posterior group it was seen around 1.09%. Meticulous pre and post op care is warranted to reduce the rate of this infection.

INTRODUCTION

Post operative wound infection also called as surgical site infection. Due to various factors any wound can get infected in a post op period, cervical spine SSI is not so common as such but can occur in few. SSI generally depend on two things i.e factors associated with patient and the type of care he/she received in the hospital.[1] Patient predisposing factors include Diabetes, immunocompromised status, preexisting hiv/ hbv infection, tuberculosis, old age, chronic alcoholism, Improper nutrition in post op period, unattended patients.[2-4] Factors depending on hospital environment include, their adherence to aseptic practices, antibiotic protocol, hospital infection control committee protocol. SSI accounts to near about 18-20% of nosocomial infections,[5-6] and of all the patients undergoing surgery nearly five percent develop infection increasing their hospital stay. In cervical spine surgery many studies have shown that in both anterior and posterior approach combined is around 3.5 percent but in anterior approach alone this incidence comes down to near about 1%.

The hospital infection control committee protocol comprises various measures to reduce the rate of infection in post op patients which includes aseptic measures,[7-8] i.e washing of hands before any care given to patients, proper scrubbing before operation by surgeon, assistant and staff nurse, maintaining aseptic measures in OT, proper disposal of medical waste, restricting the entry of staff in OT other than required in the operation, Administration of pre and post procedure antibiotics, proper coverage of antibiotics according to the hospital protocol. Excessive use of antibiotics should be discouraged to prevent development of multidrug resistant organisms.[9-12] Hence active participation of hospital infection control committee is a must to bring down the rate of infection. Our aim in this study was to study the incidence rate of surgical site infection in cervical spine surgery patients and to study the measures to reduce the infection rate in these patients.

MATERIALS AND METHODS

This study is done at Tertiary care centre hospital, Maharashtra. In this study we studied retrospectively

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cervical spine surgery patients for last 10 year period from 2014 to 2024. Our inclusion criteria was Cervical spine patients operated at our institute electively and managed post op in our ICU. Exclusion criteria included Patients requiring emergency surgery and those in whom ICU facility was not provided in immediate post op period. In our study group patient age ranged from 40 to 60, out of which 894 were the males while 700 were females. Weight range of our patients was from 60 to 90 with BMI from 26 to 30. 154 of our total patients had pre existing diabetes mellitus.

This was Retrospective observational study carried out after necessary permissions. Data collected by studying medical records of spine surgery patients at our institute and also data available with department of microbiology in their records. Data from infection control committee also collected to corroborate our primary data.

The parameters that were studied include anterior or posterior approach, with or without instrumentation, number of spinal level involved, wheather its primary surgery or redo surgery, time required for surgery, use of various tubings in and around the body, steroid use. Various scores used to assess the patient response include ASA score, APACHE score, TISS-Therapeutic intervention scoring system.

Table 1

Attribute	Number of Patients
1. Number of Spinal Levels	
One	924
Two	566
Three	104
2. Approach	
Anterior	1412
Posterior	182

Infection control regime included proper antibiotic administration and hygienic practices. The first line of antibiotic in our setting is ceftriaxone 1g administered at the time of induction and in bd dosing thereafter for 3 days, in case of patient having other comorbidities and suspected of having a chance of infection Amikacin was added along with ceftriaxone in 500 bd dosing for 3 days. Hygienic practices included Proper hand washing as per protocol by any person performing any procedure, proper wearing of caps/ masks/ gowns, maintenance of sterile environment, amc/ cmc of OT equipments as per standards, proper dressing of surgical wound, infected patients to be isolated from others to prevent infection spreading, proper disposal of biomedical waste, cleaning of ICU/ward and hospital premises.

RESULTS

Total 1594 patients were studied, 4 patients developed wound infection in post op period. Out of these two patient developed deep seated infection of the hardware, two patient developed lytic lesions in adjacent vertebrae. In all these patients there was discharge from the wound. Deep infection was noticed after fourteen days of infection while lytic lesions were noticed 10 days post op. The causative organism in both the cases is found to be staphylococcus aureus. All these 4 patients were found to have diabetes. Other infection like complications occurred but no growth of organism was found. These complications included in Table2. They include serous discharge, wound gaping, post op hematoma and swelling.

Table 2

Complication	Number of patients
Delayed healing of surgical wound	34
Discharge from the wound	18
Gaping of wound	4
Swelling	8
Hematoma	2
Osteomyelitis	2

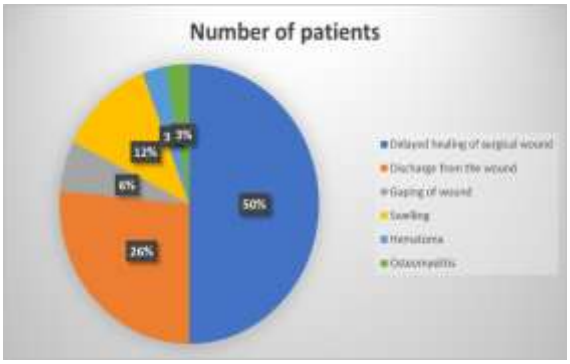

Figure 1

DISCUSSION

In many studies the rate of infection is found to be 2-12%, which indicates there is a considerable risk of patient getting infection if proper care is not taken.[13-14] Patients getting infection depends of both his attributes and the type of aseptic care provided in the hospital environment. Patient infection rate in any hospital indicated towards the type of aseptic practices and proper antibiotic protocol of any hospital but patient factors and duration of surgery also contributes to the infection rate.[15] And hence it

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warrants that every hospital must develop a multimodel program to curb the incidence of infection which can be prevented by proper sanitation methods, hygienic practices, preventing contamination of wounds. Surgical invasiveness index,[16] takes into account the following parameters to indicate the risk of infection. 1. Number of spinal level 2. Anterior or Posterior approach 3. Blood loss during the surgery 4. Time required for surgery, higher the score higher are the chances of infection. The main aim of all the care provided is to have a good patient outcome but the health system battles many hurdles to achieve that goal which include increased stay of patient in hospitals due to complications, need of extra care, increased patient care cost. The main thing is the adherence of the hospital infection control committee protocol that needs to be followed by everyone involved in patient care from the time of patient admission to his/her discharge.

We included both anterior and posterior approaches in our study. A total of 1594 patients during the period of 10 years were included in this study. We used CDC SSI guidelines to choose out patients. During the one year follow up period in post op 4 cases were having infection in anterior approach which amounts to only 0.28 percent. This low incidence is probably due to the overall low incidence of infection in anterior cervical approach.[17] In one study comprising 452 cases of anterior cervical approach no infection was found. In anterior cervical approach mostly degenerative cases are operated also there is little blood loss as only 18 patients received blood transfusion which may be the reason for lower rate of infection.[18] Although some studies show that blood transfusion has nothing to do with rate of infection but blood transfusion may directly translate into the duration of surgery. Also our study group was a low risk group for infection due to low ASA score of 1-2. Also our study population was of lower age group, had relatively low body mass index, and did not have other complications of surgery so short duration of surgery. As all our patients were of elective surgery group that may have played role in having less incidence of infection as all preop planning, intraop care and post op management was all meticulously done which may have contributed to the lower rate of infection. In another study of 39893 patients rate of infection was 1.6% in both anterior and posterior approaches combined, in our study this rate was 0.38%. One more study had enrolled 965867 patients as a systematic review and they found the rate of infection was 1.2%, In another study of only anterior approach of 1015 patients the rate of infection was found to be 0.1%. The low rate of infection may also be attributed to the fact that the location of cervical spine is far from the other contaminating sites such as perineal flora, and other excreatory sites which may be assumed due to the fact that there is high rate of infection in lumbosacral region due to proximity of the perineal region. Incidence in lumbosacral region using the same infection control protocol was about eight percent. Other risk factors that increase the chance of infection are serous discharge from the wound, gaping of wound. The factors that need to be looked after include proper wound care, timely dressing of the wound, timely administration of antibiotics. Sterility of wards, ICU and OT are of utmost importance as it directly contributes to the reduction of infection.[19-20]

In our study limiting factors include good ASA score as compared to other studies which had higher infection rate owing to higher ASA score, we also did not take into consideration the other factors like smoking habits, nutritional level and other relatable factors. It is because we did not have many patients of infection which can be studied for other relatable factors as causes of infection hampering the prospect of comparative analysis. Also as this study was carried out at single centre only we did not have any comparative group from other institute having their own infection control protocol. Low incidence of infection rate in our study may also be due to some other unknown factors other than those we took into consideration in our protocol.

CONCLUSION

In elective cervical spine surgery patients with good ASA scores, having degenerative spine problems the infection rate can be kept to minimum if we adhere to the hospital infection control protocol strictly at individual as well as institute level. Our study showed low infection rate in both anterior and posterior approaches which is comparable to many other studies on the same topic. Maintaining sterility, proper antibiotic prophylaxis and avoiding other complications which can increase the hospital stay are the key to the infection control.

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