



Research Article

TO DETERMINE THE ASSOCIATION BETWEEN ANEMIA AND OCCURRENCE OF SURGICAL SITE INFECTION IN A TERTIARY HOSPITAL

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ABSTRACT

Objective: Surgical site infection is one of the common problems encountered in surgical patients despite advances in antisepsis and asepsis. The aim of the study is to determine the association between anemia and occurrence of surgical site infection in a tertiary hospital in Jammu and Kashmir, India.

Method: The study was carried between Nov 2009 to October 2010. Data was collected from the patient admitted in surgery. All patients were followed up for 30 days for development of surgical site infection. Infected cases were identified on the basis of NNIS guidelines.

Results: Out of 700 patients, 122 (17.42%) patients were found to be clinically infected (17.42%). Among 122 patients who got infected, 46 patients (37.7%) had anemia. 12 (26.08%) patients had preoperative anemia and were build up before surgery and 34 (73.91%) patients had post operative anemia. 2 cases (4.34%) had severe anemia. 27 (59%) cases had moderate anemia, 17 (36.66%) cases had mild anemia.

Conclusion: In summary, this study suggested that anaemia (Hb < 12 g/dL) was associated with an increased risk of incisional SSI after elective surgery, and correcting preoperative anaemia before surgery should be considered. Prospective high-quality studies were needed to confirm our findings in the future.

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INTRODUCTION

Surgical site infections (SSIs) are considered to be the most common nosocomial infections among surgical patients and constitute a heavy and potentially preventable economic burden on healthcare providers. Preoperative anaemia has also been associated with increased morbidity and mortality. In surgical patients, pre-operative hemoglobin levels were shown to be inversely related to operative mortality. Surgical site infections (SSI) frequently cause morbidity and mortality among inpatients of hospitals. Several studies have demonstrated an increased length of hospitalisation and the associated financial implications for patients with SSI compared with non infected patients having similar surgical procedures. The prevalence varies from hospital to hospital and across different countries. When surgical patients with nosocomial SSI died, 77% of the deaths were reported as related to the infection and the majority (93%) were serious infections involving organs or spaces accessed during the operation. Total quality management in hospitals is gaining emphasis these days.

Control of postoperative complications is an essential component of total quality management. In this context it becomes important to determine the prevalence of surgical site infections, assess the magnitude of the problem and provide a rationale to set priorities in infection control in the hospitals. Not many studies are done in India in this direction. In India, SSIs are one of the leading causes of morbidity and mortality. The SSI rate in India widely varies and depending on setting, ranges from 1.6% to 38%. This variability can be due to differences in the characteristics of the hospital population, differences in clinical procedures, infection control measures, and hospital environment. As anaemia is quite prevalent in the Himalayan foothills we have undertaken a study to assess preoperative and postoperative anaemia association with surgical site infection.

Aim and Objectives

To study association of anaemia in surgical site infection.

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MATERIAL AND METHODS

The study was conducted for the period of 1 year in Department of general surgery, ASCOMS, Sidhra jammu.

Patients admitted in surgery department of the hospital for undergoing various surgical procedures were enrolled in study after fulfilling the eligibility criteria including a written informed consent after explaining the study to the patient.

Exclusion criteria

1. Incision and drainage of abscesses, carbuncle and infected sebaceous cyst.
2. Anorectal abscess and oral operations.

In the post operative period the wound was frequently inspected for the presence of

1. Redness and induration around margins.
2. Oedema of the margins.
3. Presence of a discharge from the wound.

And the wound was classified as per the NATIONAL NOSOCOMIAL INFECTIONS SURVEILLANCE (NNIS) system (1996)

Our focus would remain on a non microbiological cause that is anaemia.

Statistical analysis was done using Microsoft Excel, SPSS 13 software. Those risk factors that were univariately significant using chi-square analysis at $p < 0.05$ were entered into binary logistic regression equation to evaluate the risk of each factor when adjusted for other factors.

RESULTS

In this study total of 122 patients among the total of 700 who were operated upon developed surgical site infections. Out of which only 46 (37.7%) patients had anaemia and all of them developed surgical site infections, 12 (26.08%) patients had preoperative anemia and build up before surgery with allogenic blood transfusion. 6 (13.04%) had perioperative blood transfusion. Out of these 46(37.7%), 2 (4.34%) patients had severe anaemia, 27 (59%) cases had moderate anaemia and 17 (36.6%) had mild anaemia.

Nature of operation in all these patients were routine/ elective.

Out of 46 patients - 36 patients were females and 10 patients were male.

42 surgeries were performed in abdominal region and 4 were performed in inguinoscrotal region.

It was also found that 12 patients who were given blood transfusion had longer hospital stay thus pointing out towards the more risk of infections in blood transfused patients post surgery.

Out of these 46 anaemic patients, 10 patients had hypertension and 5 patients had diabetes. 6 patients had both diabetes and hypertension. 5 patients who had both anaemia and diabetes had a hospital stay of 15+3 days.

The duration of surgery in 38 surgeries were 40-60 minutes and in 2 surgeries were more than 1 hour and 6 surgeries were 3-4 hours.

DISCUSSION

Anaemia is known to be a predictor of adverse outcome in surgical patients. In the present study both preoperative and postoperative anaemia has significantly influenced the occurrence of surgical site infections. Naveen, *et al* found that out of 37 anaemic patients, 23 (62.16%) developed Surgical site infections.

Liu liu, *et al.* suggested that patients with preoperative anaemia had significantly higher risk of incisional SSI than non-preoperative anaemia patients.

In our study patients who had preoperative anaemia had severe surgical site infection and longer hospital stay as compared to post operative anaemia patients. Baron *et al.* analysed 39,309 non-cardiac surgery patients, and they found that preoperative anaemia significantly increased risk of postoperative mortality, and resulted in prolonged hospitalisation. Although increasing evidence suggested that Preoperative anaemia was associated with poor outcomes after surgery, the mechanisms remain unclear. Experimental studies have confirmed that anaemia induced decreased oxygen delivery, elicited multiple organ hypoxia, like the brain and kidney, and finally caused organ dysfunction. Consistent to the findings of experimental studies, clinical trials have proved that anaemia caused acute kidney injury and increased post-operative infection, which were closely associated with anaemia-induced hypoxia. Similarly, increased risk of incisional SSI was observed in preoperative patients in the present study. Besides, preoperative increased risk of allogenic blood transfusion which suppresses cellular immunity and causes SSI. Janssen *et al.* analysed 3721 patients who underwent laminectomy and/or arthrodesis of the lumbar spine. This study showed that blood transfusion increased 3-fold risk of SSI. In our study we found that 13.04% who had perioperative anaemia developed surgical site infections. Dunneet *al* determined that preoperative anaemia was an independent risk factor for major morbidity and mortality, in a very large sample size of 6301 non-cardiac surgical patients. Malone and coworkers investigated several potential predictors of SSI and demonstrated a significant independent association between postoperative, but not preoperative anaemia and SSI in non-cardiac surgical patients. When comparing such studies, however, differences in definition and severity of anemia must be recognized.

The present study has some limitations. First, this study is retrospective and encounters some inherent bias.

CONCLUSION

In summary, this study suggested that anaemia (Hb < 12 g/dL) was associated with an increased risk of incisional SSI after elective surgery, and correcting preoperative anaemia before surgery should be considered. Prospective high-quality studies were needed to confirm our findings in the future.

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