

Bacteriological Study of Post-Operative Wound Infections in IPD of Surgery in a Tertiary Care Teaching Hospital

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ABSTRACT

Background: The postoperative wound infection varies from 1 to 9 percent, depending on the surgical procedure. Due to postoperative wound infection, the length of stay in hospital increases. It also increases the cost of the procedure and is associated with significant morbidity. *Staphylococcus aureus* is the causative agent in 15 to 20% of these infections, though the pathogen isolated differs according to the surgical site.

Methods: The population of study was 200. Among 200 cases 29 cases got bacterial infection. This study was conducted in Department of surgery and the patients were recruited on the basis of inclusion and exclusion criteria.

Results: In this study we were included total 200 cases. We found that 78 cases of clean wound followed by clean contaminated 54, contaminated 38 & 30 dirty wound. Prevalence of infection was 14.5%.

Conclusion: Post-operative wound infections are a serious medical problem that has to be tackled due to its increased morbidity, mortality and medical care costs. An active surveillance program is recommended.

Keywords: Post –operative wound, Contaminated wound, Organism


INTRODUCTION

It has been reported by World Health Organization (WHO) that hospital acquired infections to be one of the major infectious diseases having an enormous economic impact worldwide.¹ It is estimated that such infections affect around 2 million people annually resulting in 5% to 15% of them requiring hospitalization.²

The postoperative wound infection varies from 1 to 9 percent, depending on the surgical procedure. Due to postoperative wound infection, the length of stay in hospital increases. It also increase the cost of the procedure

and is associated with significant morbidity.³ *Staphylococcus aureus* is the causative agent in 15 to 20% of these infections, though the pathogen isolated differs according to the surgical site.⁴ Risk factors which may responsible for acquiring an infection can be divided into host factors, surgical and environmental factors, and microbial characteristics. Host factors which may contribute to an increased risk of infection are age, prolonged pre-operative length of stay, and concurrent infection at another body site.⁵ Increased infection risk may cause an extended surgical procedure. The wound classification, the use of a razor for hair removal before surgery may also be dependent on the surgeon's technical skill.⁶

Even with advances in operative techniques and a better understanding of the pathogenesis of wound infection and wound healing, surgical site infections continue to be a major cause of morbidity and mortality for patients undergoing operative procedures. It is reported that incidence of wound sepsis in India is from 10%-33%. Though, the incidence of wound complications in the obstetric population fluctuates with rates ranging from 2.8% to 26.6%. 1-3 Surgical site infection (S.S.I.) is a valuable tool to demonstrate the magnitude of the problem.

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On the basis of the above discussion, the present study was undertaken for early recognition of the problem so that early intervention can be done for better management of postoperative wound infections.

METHODS

Study Population:- The population of study was 200. Among 200 cases 29 cases got bacterial infection.

Study Area:- This study was conducted in Department of surgery.

Data collection:- The operative wound was inspected at frequent intervals for clinical evidence of infection. When infection was suspected, three swabs were taken by using sterile cotton swab sticks. One swab was placed in a sterile bulb containing Stuart’s transport medium for isolation of anaerobic organisms. The second swab was used for Gram staining and the third inoculated on plates of Nutrient agar, Blood agar and McConkey’s agar respectively. Swabs in Stuart’s medium were inoculated on blood agar plate containing Gentamicin and incubated in MacIntosh Fildes jar using palladized asbestos catalyst, for 48 hours by evacuation and replacement with 90% hydrogen and 10% carbon dioxide.

Data analysis:-Data were analysed by using Microsoft excel.

RESULTS

In this study we were included total 200 cases. We found that 78 cases of clean wound followed by clean contaminated 54, contaminated 38 & 30 dirty wound. We had done 43 Lower segment caesarean section, 14 Hysterectomy, 25 ENT surgeries, 25 Plastic Surgeries, 25 Orthopedic surgeries, 16 Bowel surgeries, 12 Urological surgeries, 4 Appendectomy, 3 Cholecystectomy, 4 Hernia surgeries, 3 Hydrocele surgeries, 19 Cataract surgeries & 7 other surgeries. Among 200 surgeries we were found 29 infected cases which showed in table 1. We also observed that predisposing factor which were anemia, malignancy, diabetes, chronic illness, immunodeficiency state. We found that 20.6% infected cases with P. aeruginosa followed by E. coli (17.2%), K. pneumonia (10.3%), Bacteroids spp. & Cons 6.8%, S. aureus, Citrobacter & Streptococci which were 3.4%.

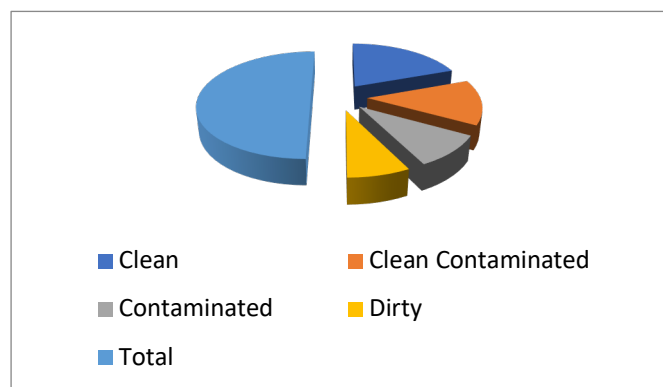


Chart:1 Distribution of cases according to contaminated wound

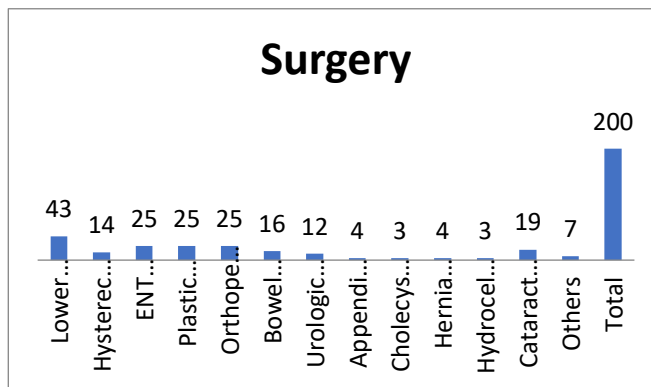


Chart:2 Distribution of cases according to surgery

Table -1 Distribution of cases according to infected cases

Surgery	Frequency	Infected cases
Lower segment caesarean section	43	3
Hysterectomy	14	2
ENT surgeries	25	3
Plastic Surgeries	25	3
Orthopedic surgeries	25	7
Bowel surgeries	16	5
Urological surgeries	12	2
Appendectomy	4	1
Cholecystectomy	3	1
Hernia surgeries	4	1
Hydrocele surgeries	3	-
Cataract surgeries	19	-
Others	7	1
Total	200	29

Table:-2 Distribution of cases according to predisposing factor

Predisposing factor	Infected cases
Anemia	5
Malignancy	7
Diabetes	4
Chronic illness	3
Immunodeficiency state	1
Other	3
Total	23

DISCUSSION

Out of 200 patients, 29 got infected post operatively. The post-operative infection rate was 14.5% in the present study. Many workers have reported the percentage of post-operative wound infections in range of 10% to 76.9%.⁷⁻¹¹ In this study, the rate of post-operative wound infections could be attributed to the progressive trend towards operating the older patients and performing more complicated procedures on contaminated and dirty surgical

sites. Likewise presence of drain led to development of wound infections with increased frequency. Though drainage provides an outlet for collected serum and blood and prevents haematoma formation, reducing the chances of infection still presence of drain for a longer time may act as a pathway for pathogenic bacteria to enter the wound. Thus, it increases the risk of infection. Similarly, in emergency surgeries, the infection rate was high as compared to the elective ones. Similar observations have been found by other studies also.¹²

Table:-3 Distribution of cases according to isolates

Isolates	No. of organism	Percentage
Staphylococcus aureus	1	3.4
CONS	2	6.8
Pseudomonas aeruginosa	6	20.6
Escherichia coli	5	17.2
Klebsiella pneumonia	3	10.3
Proteus spp.	1	3.4
Citrobacter species	1	3.4
Beta haemolytic Streptococci	1	3.4
Bacteroides species	2	6.8
Total	29	100

Higher infection rates were reported in different kind of surgeries such as bowel surgeries (38.46%), orthopaedic surgeries (29%), urological surgeries (25%), cholecystectomy (21.05%) & appendectomy (18.18%).¹³ The reason could be impaired host defenses in these patients and longer hospitalization. In this study, the bacterial isolates obtained indicate a polymicrobial flora. Similar findings were found by other researchers.¹⁴

Many infections are caused by Gram-negative bacilli. Though, the single most common bacterial isolate was *Staphylococcus aureus*. The bacterial isolates commonly found were *Pseudomonas aeruginosa*, *E. coli* and *Klebsiella* species, all known to be hospital pathogens. In the present study, isolation of anaerobic bacteria was very uncommon. The antibiotic sensitivity profile of isolates showed that a large

number of multidrug resistant strains were common in the hospital environment. Hence, it may be stated that post-operative wound infections occur with more frequency. So, more strict steps are needed to reduce the incidence. Whenever the infection occurs, proper laboratory identification of the pathogen along with its sensitivity profile must be obtained to treat the patient with proper antibiotics. It is also important to watch whether it is causing cross infection or resulting in spread as a hospital infection.¹⁵

It was reported that operative time ≥ 240 minutes was related with increased overall complications.¹⁶ In orthopedic surgeries, post-operative infections present a

significant risk and the use of antibiotics increases the population of pathogens exhibiting resistance against them. Silver nanoparticles seem to be a new therapeutic avenue for their safety. They can be implanted in bone cement for the prevention of infections.¹⁷⁻¹⁹

It can be concluded that post-operative wound infections are a serious medical problem. It has to be handled properly due to its increased morbidity, mortality and medical care costs. It is recommended that an active surveillance program should be undertaken.

CONCLUSION

Post-operative wound infections are a serious medical problem that has to be tackled due to its increased morbidity, mortality and medical care costs. An active surveillance program is recommended.

REFERENCES

1. WHO. Surveillance, control and prevention of hospital acquired (nosocomial) infections. Report of an advisory group. 1981 BAC/NIC/81.6.
2. Bock Avalos S. Knocking out nosocomial infections. Nursing 2010 June 24. URL:http://findarticles.com/p/articles/mi_qa3689/is_200411/ai_n9471334/. Accessed August 15, 2013.
3. Voiglio EJ. 14th European Congress of Trauma and Emergency Surgery. Eur J Trauma Emerg Surg. 2013;39(1):S1-62.
4. Perl TM, Roy MC. Postoperative wound infections: risk factors and role of *Staphylococcus aureus* nasal carriage. J chemoth. 1995;7:29-35.
5. Sleet DA, Gielen AC. Injury as a public health problem. Health promotion in practice. 1991;361.
6. Uçkay I, Harbarth S, Peter R, Lew D, Hoffmeyer P, Pittet D. Preventing surgical site infections. Expert review of anti-infective therapy. 2010;8(6):657-70.
7. Prabhakar H, Arora S (1979) A bacteriological study of wound infections. J Indian Med Assoc 73: 145-148.
8. Agrawal PK, Agrawal M, Bal A, Gahlaut YVS (1984) Incidence of Postoperative wound infection at Aligarh. Indian J Surg 46: 326-333.
9. Kowli SS, Naik MH, Mehta AP, Bhalerao RA (1985) Hospital Infection. Ind J Surg 47: 475.
10. Anvikar AR, Deshmukh AB, Karyakarte RP, Damle AS, Patwardhan NS, et al. (1999) A one year prospective study of 3280 surgical wounds. Ind J Med Microbiol 17: 129-132.
11. Murthy R, Sengupta S, Maya N, Shivananda PG (1998) Incidence of postoperative wound infection and their antibiogram in a teaching and referral hospital. Indian J Med Sci 52: 553-555.
12. Tripathy S, Roy N (1984) Post-operative wound sepsis. Indian J Surg 46: 285-288.
13. Yalçın AN, Bakir M, Bakici Z, Dökmetas I, Sabir N (1995) Postoperative wound infections. J Hosp Infect 29: 305-309.
14. Khan MA, Ansari MN, Bana S (1985) Post-operative wound infection. Indian J Surg 47: 383.
15. Smith RL, Bohl JK, McElearney ST, Friel CM, Barclay MM, et al. (2004) Wound infection after elective colorectal resection. Ann Surg 239:599-605.
16. Catanzarite T, Saha S, Pilecki MA, Kim JY, Milad MP (2015) Longer Operative Time During Benign Laparoscopic and Robotic Hysterectomy Is Associated With Increased 30-Day Perioperative Complications. J Minim Invasive Gynecol 22: 1049-1058.
17. Prokopovich P, Leech R, Carmalt CJ, Parkin IP, Perni S (2013) A novel bone cement impregnated with silver-tiopronin nanoparticles: its antimicrobial, cytotoxic, and mechanical properties. Int J Nanomedicine 8: 2227-2237.
18. Martov A, Gravas S, Etemadian M, Unsal A, Barusso G, et al. (2015) Clinical Research Office of the Endourological

Society Ureteroscopy Study Group. Postoperative infection rates in patients with a negative baseline urine culture undergoing ureteroscopic stone removal: a matched case-control analysis on antibiotic prophylaxis from the CROES URS global study. *J Endourol* 29: 171-180.

19. George AK, Srinivasan AK, Cho J, Sadek MA, Kavoussi LR (2011) Surgical site infection rates following laparoscopic urological procedures. *J Urol* 185: 1289-1293.

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