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RESEARCH ARTICLE

Study on Timely Administration of Antibiotic Prophylaxis Practice in Surgical Procedures at a Tertiary Care Teaching Hospital, South India

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ABSTRACT

Surgical site infections (SSI) are an important cause of morbidity and mortality and increased costs in today's health care environment .These events represent the most common nosocomial infections in surgical patients. The overall incidence of SSIs has been reported to be 2% to 5% in patients undergoing clean extra-abdominal procedures and up to 20% for intra-abdominal procedures. We prospectively evaluated the timely administrated antibiotic prophylaxis, in 61 patients who underwent elective 'contaminated' and 'clean contaminated' surgical procedures at tertiary care teaching Hospital in South India between February 2014 to May 2014. Clean, and dirty or infected wound surgeries were excluded in the study. All the cases included in the study were compared with standard American Society of Health-System Pharmacists (ASHP) therapeutic guidelines for antimicrobial prophylaxis in surgical procedures. The administration of antibiotic within 60 minutes before the time of incision is considered as timely administration. The incidence of Post-operative infection is also documented. Of the 61 cases evaluated 16 (26.22%) cases were only administered with antibiotic surgical prophylaxis, of these only 1 case (6%) received timely antimicrobial prophylaxis within 60 minutes before the time of incision as per the guideline. The overall incidence of Post-operative infection was found to be 11.47% in the study site, during the study period. The overall incidence of post-operative infection is less in antimicrobial prophylaxis administered cases when compared to non-administered cases.

KEYWORDS

Antimicrobial Prophylaxis, Surgical Site Infections, Post-Operative Infections, Timely Administration

INTRODUCTION

Surgical site infections (SSI) are an important cause of morbidity and mortality and increased costs in today's health care environment. These events represent the most common nosocomial infections in surgical patients[1]. The overall incidence of SSIs has been reported to be 2% to 5% in patients undergoing clean extra-abdominal procedures and up to 20% for intra-abdominal procedures[2]. Preoperative antibiotic prophylaxis has repeatedly been shown to be effective in reducing SSI[3-4]. Administration of antibiotics within 1 hour prior to surgical incision has been associated with lower infection rates[5]. It is also important to re-dose antimicrobial agents, particularly cephalosporin's, during lengthy procedures. Antimicrobial prophylaxis contributes to the reduction in incidence of SSI. Specific recommendations are available regarding the choice of the antibiotic, duration of

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prophylaxis, and timing of the first dose[6,7,8,9]. Available evidence suggests that administration of the first dose as near to the incision time as possible will achieve a decreased likelihood of SSI. The efficacy of PAs in reducing the risk of SSI was first demonstrated in both animal and clinical studies in the1960s. It is estimated that 40% to 60% of SSIs are preventable with proper prophylactic antibiotic administration1. But therapeutic levels of antibiotics must be present at the time of the incision to achieve effective prophylaxis. Timing of Prophylactic Antibiotics administration is critical, with both early and late PA administration associated with increased SSI rates[10].

The risk of developing a surgical wound infection is largely determined by three factors: the load, type of microbial contamination of the wound and host susceptibility[11]. The interaction between these three will help in determining the risk of SSI in a surgery. Antimicrobial resistance has been a problem in the field of surgery, as advances in control of infections have not completely eradicated this problem[12].

This study was undertaken to ascertain the prevalence of "timely" antibiotic delivery, as described above, in a teaching hospital. The intent was to provide meaningful process of- care information to hospitals for quality improvement efforts. Given the difficulty in accurately assessing wound infections and that postoperative infections often occur after the patient leaves the hospital,[l2] wound infection data was not collected. The data was obtained from retrospective chart review and as such, it is possible that some antibiotics were provided but not documented in the medical record.

MATERIAL AND METHODS

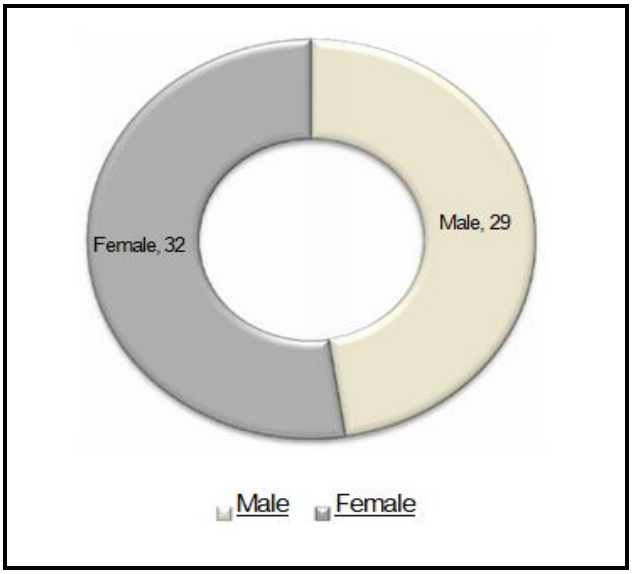
A Prospective Observational study was conducted to determine the incidence of timely administered antimicrobial prophylaxis in 61 patients who underwent elective 'contaminated' and 'clean contaminated' surgical procedures at tertiary care teaching Hospital in South India between February 2014 to May 2014. Clean, and dirty or infected wound surgeries were excluded in the study. The list of planned surgical procedure was collected from the department of general surgery by the investigators one day prior to surgery. Patient demographics and other details were collected using the standard (case Report Form) CRF.

The cases were observed & evaluated for the timely administration of antibiotic prophylaxis as per The American Society of Health-System Pharmacists (ASHP) Therapeutic guidelines 5 requirement. The common barriers for timely administration included inappropriate antibiotic ordered, antibiotic given too early, antibiotic not ordered, and antibiotic not immediately available for administration. Patients were observed for any sign of post-operative infection from the day of procedure and till the date of discharge. Patients or patient care giver's name and contact were taken to ease the follow up for any signs of Infection for 30 days from the date of surgery. If any sign of infection is present, the common pathogens are determined through culture and sensitivity testing.

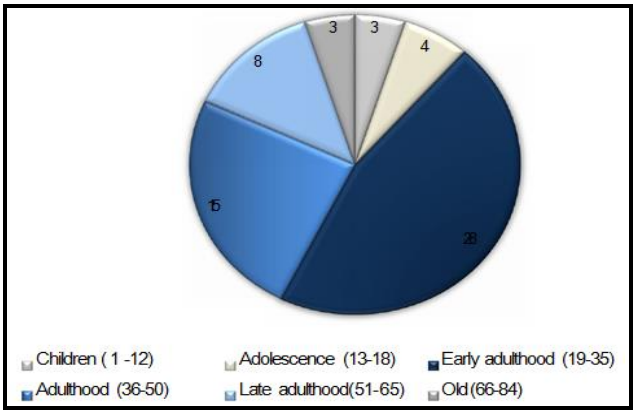
RESULTS AND DISCUSSION

A total number of 61 patients were observed in a study period of 4 months and the following evaluations were made from the observed data.

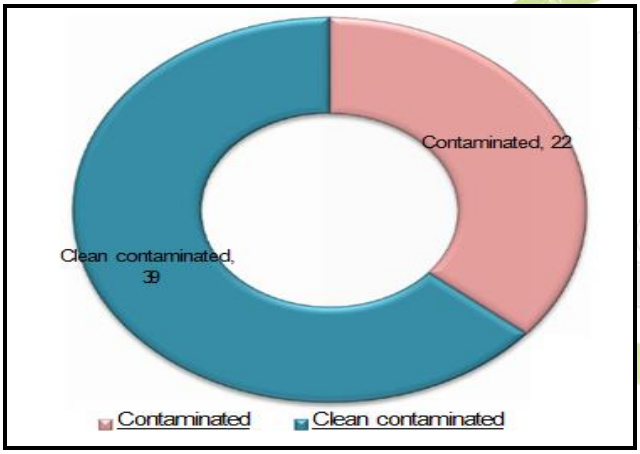
Of the 61 patients underwent various surgical procedures, the female populations were more (32 female patients - 52.45%), than male population in the study.



The age distribution of study subjects are tabulated below. The early adulthood comprised a maximum amount of population (46%), followed by adulthood 24.59%, late adulthood 13.11%, and others.



Of the 61 different types of surgeries, 25 cases underwent contaminated surgery and remaining 36 cases underwent clean contaminated surgery.



In contaminated surgeries, the incision and discharge and fissurectomy comprised a maximum contribution of 32% each, followed by, lateral sphincterectomy 20% and others 16%.

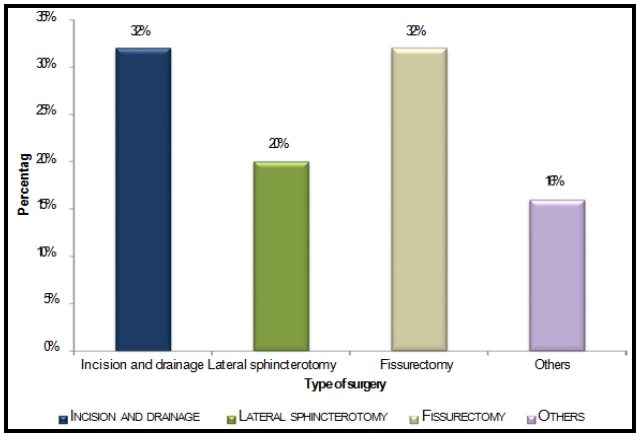
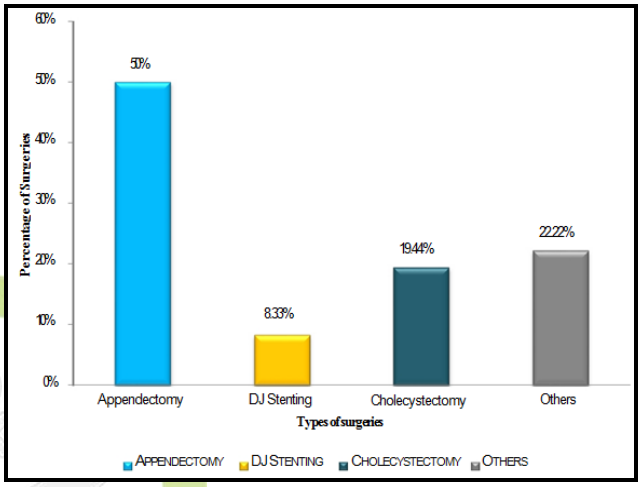
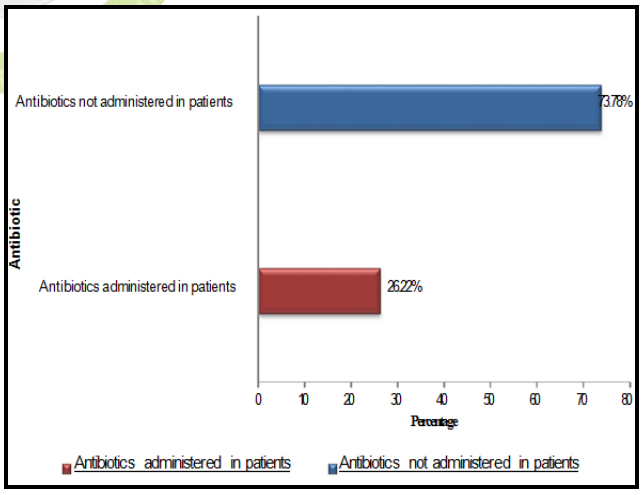


Figure below shows the different types of clean contaminated surgeries. It includes 18 appendectomy cases (50%), followed by cholecystectomy 7 cases (19.44%), Double J stenting 3 cases(8.33%),others surgeries (22.22%) like, implant removal, colostomy, Percutaneous Nephro Lithotomy (PCNL), hemithyroidectomy, Primitive cutaneous neuroendocrine carcinomas (PCNC) with cystolithotomy, Transurethral Resection of the Prostate (TURP) comprising 1 each.

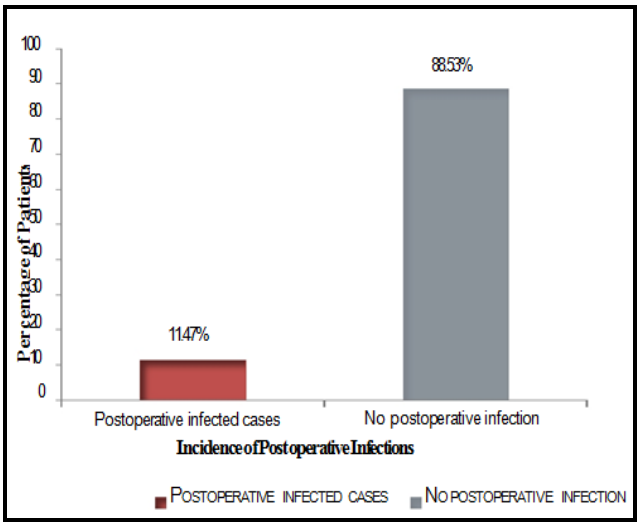


Antibiotic prophylaxis was administered only in 16 cases (26.22%), out of total 61 patients observed during the study period.

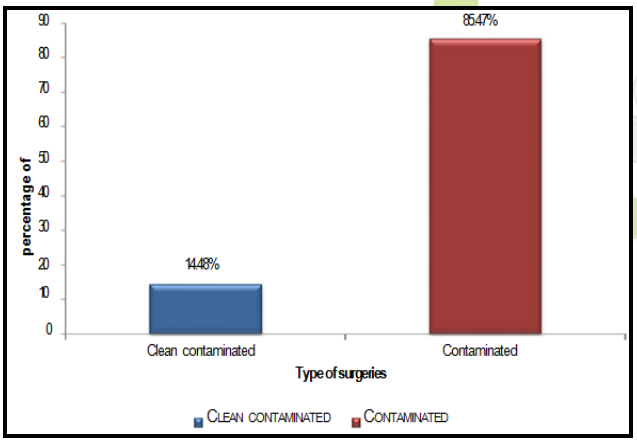


Though 16 cases administered with antibiotic prophylaxis, the timely administration (60 minutes before the time of incision) was observed only in 1 case (6%), as per ASHP guideline for Surgical Prophylaxis. The patients were observed for any symptoms of Post-operative infections.

Of the 61 cases, 7 cases(11.47%) found experience one or more symptoms of post-operative infection, confirmed by the culture and sensitivity test.



The incidence of post-operative infection, in clean contaminated and contaminated cases, shows 14.48% of post-operative infected cases were of clean contaminated and 85.47% were of contaminated.



Incidence of post-operative infection in timely and non-timely antibiotic administered patients shows that all the post operatively infected cases were not administered with timely antibiotics.

Category	Number	Percentage (%)
Timely Administration	0	0
Non- Timely Administration	7	100

CONCLUSION

There are considerable variations in the use of antimicrobial surgical prophylaxis in the study hospital. The incidence of timely administered prophylactic antibiotics in the study hospital was found to be very low (6%), and incidence of post-operative infection was found in non- timely administered antibiotic prophylaxis cases. The common pathogens causing the post- operative infections were E.coli and Staphylococcus aureus. This concludes, timely administration of prophylactic antibiotics decreases the risk of post-operative infection. The overall incidence of post-operative infection is less in antimicrobial prophylaxis administered cases when compared to non-administered cases.

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