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ANTIBIOTIC PROPHYLAXIS AND SURGICAL SITE INFECTIONS IN HERNIA PATIENTS – AN OBSERVATIONAL STUDY IN A PRIVATE AND GOVERNMENT TERTIARY CARE HOSPITALS

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ABSTRACT

Background: Surgical site infections are one of the most common causes of nosocomial globally resulting in high morbidity and mortality. The irrational prescription of antibiotics is responsible for the development of resistance to micro organisms along with economical burden to the patients. **Aim**: To evaluate the incidence of postoperative wound infections of patients undergoing hernia surgeries and to study the prescription pattern of prophylactic antibiotics in private and government tertiary care hospitals. **Materials and methods**: An observational study where patients undergoing hernia surgeries admitted in the surgical wards of private and government tertiary care hospital by selecting 30 patients from each hospitals. Data was analyzed using Microsoft Office Excel 2007 and values were presented descriptively. **Results**: The overall prevalence of surgical site infections in this study was 21.66%. Mean age in both the hospitals was 42(±14.23) and 49.6(±16.79) respectively and sex was 09:01and 12:01 respectively. Cephalosporins (71.73%) and Aminoglycosides (13.04%) were the most commonly prescribed class of antibiotics. The mean average duration of prescription was 2.43(±0.95) to 06 days and follow-up was 3.62(±10.1) to 09 days. **Conclusion**: Urgent steps like specific guidelines, training and monitoring the use of prophylactic antibiotics are needed to correct some irrational approaches to prevent the causing burden to the patients.

KEYWORDS: Antibiotic prophylaxis, surgical site infections, hernia repair.

INTRODUCTION

Surgical wound infection is one of the most commonly occurring surgical complications. Infection of a wound may result from a number of factors both intrinsic and extrinsic to the patients. Although many of the intrinsic factors cannot be modified, the external ones can certainly be influenced. In particular those related to aseptic conditions, surgical technique and peri-operative care. However even under the most scrupulous aseptic conditions and with a careful technique, post-operative wound infection still presents a very serious problem.

Surgical site infection (SSI) accounts for 20% of all healthcare associated infections.[1] Approximately 5% of patients undergoing surgery develop SSI.[2] SSI results in failure of wound healing with subsequent increased treatment cost, a greater likelihood of admission to the intensive care unit, prolonged hospital stay and higher post-operative mortality.[3,4] In particular, studies have demonstrated an extra 7-10 days inpatient stays in those with SSI.[4-6]

The use of antibiotic prophylaxis to avoid infectious complications of surgery is very common in surgical practice. However, indiscriminate use of antibiotics can lead to problems including an increase in costs and the emergence of resistant micro-organisms. The benefits of antibiotic prophylaxis either in clean-contaminated, contaminated and dirty surgery are universally accepted but in case of clean surgery it is generally accepted in when the placement of prosthetic materials, or the presence of infection poses a significant risk to the patient. Nonetheless, controversy remains about the use of antibiotics in some types of clean surgery.

Surgery of inguinal hernia is one of the most common techniques performed in a general surgical service making up approximately a third of total interventions.[7] This type of surgery is considered clean and it has been estimated that the rate of post-operative infection should not be greater than 2%.[8-11]

Currently, the use of antibiotic prophylaxis is recommended for elective open mesh inguinal hernia repair.[8,9 &11] However this treatment is not universally accepted. For hernia repair not involving prosthetic material, the antibiotic prophylaxis is not recommended in the absence of risk factors, but the controversy arises when wound infection rates exceed the expected figures.[12-14] Therefore, there is interest in SSI and its prevention amongst surgeons and

amongst many other healthcare professionals, because of the increase patient morbidity and the associated financial burden. This study will depict a clear picture of use of prophylactic antibodies and the rate of SSIs in hernia patients in two tertiary care hospitals.

MATERIALS AND METHODS

Study design and data collection

An observational study was conducted in 60 patients undergoing hernia surgeries admitted in the surgical wards of Government and Private hospitals, Davangere with 30 patients from each hospital.

Postoperative surgical wound infection was considered by the presence of at least one of the following criteria:

1. Purulent drainage from the surgical site with or without laboratory confirmation.
2. At least one of the following signs or symptoms of infection like pain or tenderness, local swelling, redness or heat and a superficial incision deliberately opened by surgeon, unless the incision in culture-negative.
3. An abscess or other evidence of infection is found on a direct examination, during reoperation, or by the histopathology or radiology examination.
4. Diagnosis of surgical site infection by the surgeon or attending physician.

Inclusion criteria

All patients of either sex of any age undergoing hernia surgeries admitted to the surgical wards of Government and Private Hospitals, Davangere, Karnataka.

Exclusion criteria

Patients with diabetes, tuberculosis and obesity are excluded from the study.

Demographic details like patient's age, sex and data related to prescription pattern, average number of drugs used per patient, duration of treatment was collected in standard case study forms.

Collected data was analyzed by frequency, percentage, mean and standard deviation. Statistical software used was Graph Pad.

RESULTS AND DISCUSSION

Out of 60 patients, 26 (86.66%) were male and 4 (13.33%) were female in private hospital and 28 (93.33%) were male and 2 (6.66%) were female in government hospital. The mean

age and sex of patients was 49.6 (SD=16.79) and 12:01 in private and in government hospital 42 (SD=14.23) and 09:01 respectively. The distributions of age and sex groups are shown in figure 1 and 2.

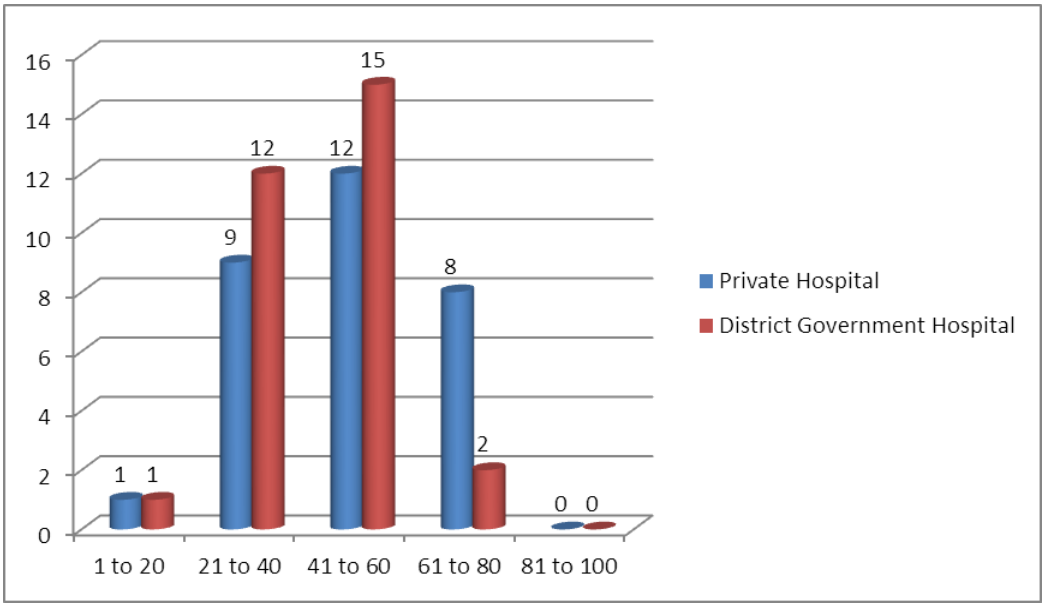

Figure 1: Bar Chart showing age distribution in two different hospitals

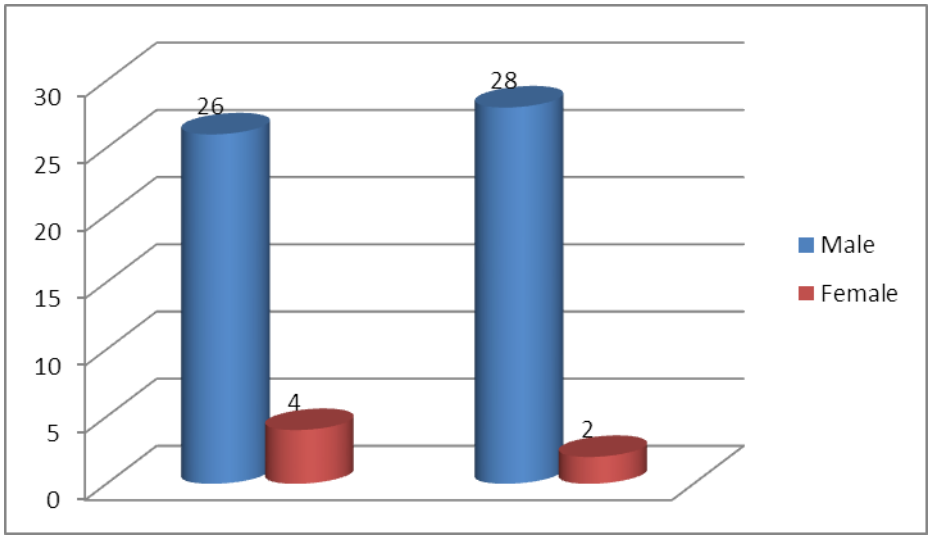

Figure 2: Bar Chart showing sex wise distribution in two different hospitals

In private hospital, out of 30 patients, 16 were diagnosed for inguinal hernia surgery, 14 were diagnosed as other types of hernia surgery and in government hospital, 23 were diagnosed for inguinal surgery and 7 were diagnosed as other types of hernia surgery.

All the 60 patients received the prophylactic antibiotics preoperatively and post operatively. Some patients are received more than one antibiotic. Total 15 numbers of antibiotics were

prescribed, consists classes of Cephalosporins, Aminoglycosides, Fluoroquinolones, Tetracycline, Pencillin, Macrolide and few Fixed Dose Combinations. Most common used antibiotics were Cefotaxim (in 36 cases) and followed by Ceftriaxome (in 14 cases) and least administered antibiotics were Ceftazidime, Cefdinir, Ciprofloxacin, Doxycyclin, Ampicillin, respectively. Drug prescription pattern and average duration of antibiotics prescription is mentioned in the table 1.

Table 1: Drug prescription pattern and average duration of prescription

Prescribed Antibiotics	Total No. of Cases	No. of Cases		Average Duration of R_x	
		Private	Government	Private	Government
CEPHALOSPORINS					
Cefotaxim	36	13	23	2.43±0.95	2.43±0.95
Ceftriaxone	14	08	06	3.75+1.83	2.5±0.5
Cefixime	08	06	02	03	03
Cefuroxime	06	05	01	4+1.66	03
Ceftazidime	01	01	0	5	--
Cefdinir	01	01	0	5	--
AMINOGLYCOSIDES					
Amaikacin	12	09	03	4+1.66	03
FLUOROQUINOLONES					
Ciprofloxacin	01	01	00	05	--
TETRACYCLINE					
Doxycycline	01	01	00	06	--
PENCILLIN					
Amoxicillin	03	00	03	--	3.67+0.94
Ampicillin	01	01	00	03	--
MACROLIDE					
Azithromycin	03	03	00	3.67+1.15	--
F DC					
Amoxycillin+Clavulinic acid	04	04	00	2.75±1.7	--
Cefixime+Cloxacillin	01	01	00	10	--

The mean duration of follow-up days was 6.13 (SD=2.33) in private and 3.62 (SD=1.01) in government hospital. Total 13 numbers of patients developed surgical site infections in both private and government hospitals.

DISCUSSIONS

In this study it clearly shows the slight increase in rate of postoperative surgical site infections in clean surgeries also even after the administration of prophylactic antibiotics. In the private hospital, drug prescription pattern shows the usage of higher antibiotics which are of much higher price and this will increase the emergence of antimicrobial resistance, super-infection, and the risks of toxic and adverse drug reactions along with the increase of cost of

therapy. Prophylaxis with the broad spectrum antibodies like Fluroquinolones or fourth or third generation Cephalosporins should not be prescribed. For surgical prophylaxis it is important to select an antibiotic with narrowest antibacterial spectrum to reduce the emergence of resistance and also because broad spectrum antibiotics may be required later if patient develops serious sepsis. First generation Cephalosporins like Cefazolin is the best agent for surgical prophylaxis. But in this study, 71.73% patients received broad sepectrum Cephalosporins like Cefotaxim, Ceftriaxone, Cefixime. This simply reflects the non-adherence to the recommendations or either the less availability or less aware to the recommended guidelines.

Also study results shows the only usage of prophylactic antibiotics will not reduce the surgical site infections but also preoperative assessment to optimize underlying disease such as diabetes mellitus, aseptic techniques in the operating theatre also contribute in developing surgical site infections. So preoperative, intraoperative and postoperative management can modify the risk for developing surgical site infections.

CONCLUSION

Excessive and inappropriate use of antibiotics in health care facilities and the communities contributes to development of antibiotic resistance. Multiple antibiotics are available and information or a standard guideline about antibiotic use pattern is necessary to formulate a constructive approach to the problem of inappropriate drug use. Additional study is needed to answer questions such as what constitutes a real risk factor, selective use of antibiotics according to patient risk factors, the cost effectiveness of prophylactic antibiotics and late onset infection, among other questions. This approach might finally reduce the burden to the patients.

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