IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 20, Issue 2 Ser.3 (February. 2021), PP 31-37
www.iosrjournals.org

Evaluation of Role of Antibiotic Prophylaxis in Elective Sugeries in Osmania General Hospital

Dr.K.Rani[1*], Dr.K.Ananthababu[2], Dr.B.Nagender[3]
[1*]*Assistant Professor, Department of General Surgery, Osmania Medical College and Osmania General Hospital, Koti, Hyderabad.*
[2]*Professor, Department of General Surgery, Siddipet Medical College, Siddipet.*
[3]*Professor, Department of General Surgery, Osmania Medical College and Osmania General Hospital, Koti, Hyderabad.*
Corresponding Author: Dr.K.Rani

Abstract
Introduction: *Surgical site infections (SSIs) are the most common nosocomial infection, accounting for 38% of all infections among surgical patients Studies corroborate that increased length of hospital stay and cost are associated with SSIs. A patient who develops an SSI while hospitalized has a greater than 60% greater risk of being admitted to the intensive care unit, is 15 times more likely to be readmitted to the hospital within 30 days after discharge, and incurs and attributable extra hospital stay of 6.5 days, leading to a direct cost of an additional $3000 per infection. SSIs due to Methicillin-resistant S. aureus (MRSA) in particular have also been shown to have a higher mortality than those due to Methicillin-sensitive strains of the organism.*
Materials and Methods: *A detailed history was ascertained and entered in the proforma. A detailed previous history was recorded. Past history of intake of any drugs, antibiotics, and any history of previous hospitalization, associated illness and habits and diet were recorded in detail. Significant family history was also recorded. General physical examination was carried out in detail, considering features suggestive of anaemia and jaundice. Any sites of focal infection were also looked for. Examination of the other systems and of the part concerned was done in detail. Routine laboratory work up was carried out preoperatively of all the patients. Culture swabs were taken on the 3rd postoperative day, the 5th post-operative day and the 7th postoperative day, if the wound was showing purulent discharge or any other signs of infection. Antibiotics were continued if the wound showed signs of infection and the cases were followed up and further swab was taken for culture.*
Results: *The present study involved 100 patients who underwent various surgical procedures in Department of General Surgery, Osmania General Hospital. All the surgeries performed were elective cases and all patients subjected to this study were having normal general workup. All the patients were studied from the time of their admission till they were discharged and followed up to 3 wks postoperatively.*
Conclusion: *Surgical wound infections are common and consume a considerable portion of health care finances. Although surgical wound infections cannot be completely eliminated, a reduction in the infection rate to a minimal level could have significant benefits, by reducing postoperative morbidity and mortality, and wastage of health care resources.*
Key Words: *Surgical site infections, MRSA, nosocomial infection*

Date of Submission: 25-01-2021 Date of Acceptance: 10-02-2021

I. Introduction

Surgical site infections (SSIs) are the most common nosocomial infection, accounting for 38% of all infections among surgical patients Studies corroborate that increased length of hospital stay and cost are associated with SSIs.[1] A patient who develops an SSI while hospitalized has a greater than 60% greater risk of being admitted to the intensive care unit, is 15 times more likely to be readmitted to the hospital within 30 days after discharge, and incurs and attributable extra hospital stay of 6.5 days, leading to a direct cost of an additional $3000 per infection. SSIs due to Methicillin-resistant S. aureus (MRSA) in particular have also been shown to have a higher mortality than those due to Methicillin-sensitive strains of the organism.[2]

Over the past 20 years, the efficacy of antibiotic prophylaxis in clean surgery has been well established. The guiding principle of systemic antibiotic prophylaxis is the belief that antibiotics in the host tissues can augment natural immune defense mechanisms and help to kill bacteria that are inoculated into the wound.[3] Every effort should be made to ensure that adequate antibiotic levels are maintained above the minimum inhibitory concentration (MIC) of the pathogens of concern throughout the surgical procedure.[4]

Surgical antimicrobial prophylaxis should be administered so as to ensure adequate tissue levels of antimicrobials from the time of the initial surgical incision until closure.[5] The efficacy of prophylactic antibiotics has now been verified for most major surgical procedures with a wide variety of antimicrobials, when care has been given to provide adequate serum and tissue levels of antibiotics during the surgical procedure. Perioperative antibiotics and aseptic techniques have become routine aspects of care in most major surgical procedures.[6]

AIMS AND OBJECTIVES

AIM:

To obtain precise information on the optimal time window for surgical antimicrobial prophylaxis

OBJECTIVES:

1. To obtain precise information on the optimal time window for surgical antimicrobial prophylaxis.
2. Comparing single dose IV broad spectrum antibiotic pre-operatively v/s 5 days IV for prophylaxis post-operatively.

II. Materials And Methods

Place of Study: The study was conducted in the Department of General Surgery, Osmania General Hospital.
Study Design: Cross sectional study.
Study period: October 2018 To August 2019.
Study Population: All the patients who were admitted as In patients for surgical treatment for various diseases in the department of General Surgery, Osmania General hospital.
Study Sample Size: A total of 100 patients were enrolled in the study. The patients were divided into two groups.
Group I patients received a single dose of 1gm ceftriaxone IV on table at the time of induction of anesthesia and no IV antibiotics was given for 24hrs after surgery. Further, half of these patients received dose half-an-hour before incision and the other half received dose one hour before incision.
Group 2 patients received No antibiotics preoperatively but received 1gm ceftriaxone IV at 12th hourly intervals after surgery for a minimum of 5 days.
METHODOLOGY:
A total of 100 patients who were satisfying the inclusion criteria were enrolled into study.
Inclusion criteria:
1. Elective surgical procedures in clean and clean-contaminated cases.
2. Age between 12 – 60 years
3. Patients who are willing to give an informed written consent.

Exclusion criteria:
1. Age <12 years and > 60 years
2. Patients who are not willing to participate in the study.
3. Patients with immune deficient states.
4. Patients with conditions like diabetes, Hypertension, Tuberculosis, arterial diseases which effect wound healing.

III. Procedure:

A detailed history was ascertained and entered in the proforma. A detailed previous history was recorded. Past history of intake of any drugs, antibiotics, and any history of previous hospitalization, associated illness and habits and diet were recorded in detail. Significant family history was also recorded. General physical examination was carried out in detail, considering features suggestive of anaemia and jaundice. Any sites of focal infection were also looked for.

Examination of the other systems and of the part concerned was done in detail. Routine laboratory work up was carried out preoperatively of all the patients. Culture swabs were taken on the 3rd postoperative day, the 5th post-operative day and the 7th postoperative day, if the wound was showing purulent discharge or any other signs of infection. Antibiotics were continued if the wound showed signs of infection and the cases were followed up and further swab was taken for culture.

Group I patients received a single dose of 1gm ceftriaxone IV on table at the time of induction of anesthesia and no IV antibiotics was given for 24hrs after surgery. Further, half of these patients received dose half-an-hour before incision and the other half received dose one hour before incision.
Group 2 patients received No antibiotics preoperatively but received 1gm ceftriaxone IV at 12th hourly intervals after surgery for a minimum of 5 days.

All the patients were watched closely in the postoperative period. Temperature was recorded 6th hourly. Postoperatively pain whether decreasing or not was noted. Dressings were inspected daily. Routinely dressing was changed on the 3rd postoperative day and the wound was inspected. Dressings if showed soakage, or signs of infection, were changed as and when needed. Wounds which showed minimum serous discharge were regularly dressed. Patients were advised to follow up. The wounds which showed purulent discharge were dressed regularly and appropriate antibiotics were given.

Routine follow up was done in all the cases. During follow up the following points were assessed,

- History of taking antibiotics after the discharge.
- Wound was inspected.
- Any sites of infections were noted.
- Routine general and systemic examination was carried out.

Data Entry and Analysis:
The data was entered in Microsoft Excel 2010 version. Data was analyzed using Microsoft Excel 2010 and Epi Info 7.2.1.0. Descriptive and inferential statistical analysis were used in the present study. Results on continuous measurements were presented on Mean ± SD (Min-Max) and results on categorical measurements were presented in Number (%). Significance was assessed at 5% level of significance.

Ethical Clearance:
Ethical clearance was obtained from the Institutional Ethical Committee, Osmania Medical College, Hyderabad.

IV. Results

The present study involved 100 patients who underwent various surgical procedures in Department of General Surgery, Osmania General Hospital. All the surgeries performed were elective cases and all patients subjected to this study were having normal general workup. All the patients were studied from the time of their admission till they were discharged and followed up to 3 wks postoperatively.
The results of the study are as follows:

Age group (years)	Total Number of cases	Percentage
12-20	**23**	**23**
21-30	**41**	**41**
31-40	**24**	**24**
41-50	**09**	**09**
51-60	**03**	**03**
Total	**100**	**100**

Table 1: showing the age distribution of study population

Majority of the study population belonged to the age group of 21-30 years(41%) followed by 31-40 years (24%) and 12-20 years (23%). 9 % belonged to age group of 41-50 years and 3 % belonged to age group of 51-60 years.
About 65% of the cases fall between 21-40 yrs. The youngest patient was of 12 years of age and the oldest patient was of 58 years of age.

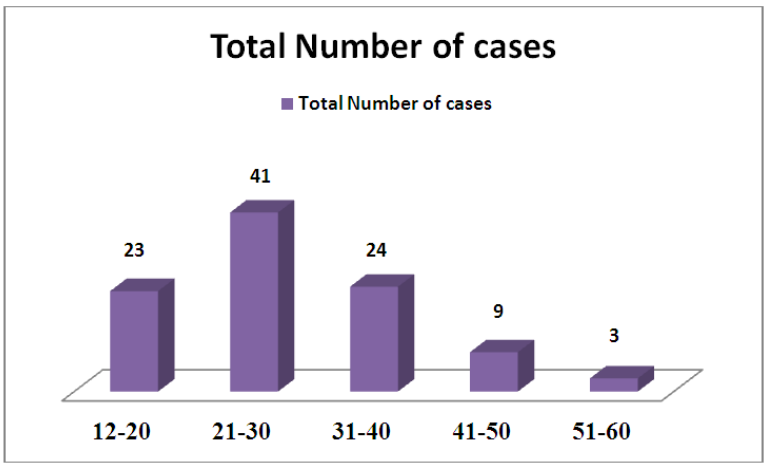

Figure 1: Age distribution of study population

Types of surgery	Total Number of cases	Percentage
Appendectomy	**13**	**13**
Herniorrhaphy	**21**	**21**
Excisions	**14**	**14**
Cholecystectomy	**09**	**09**
Surgery for varicose veins	**07**	**07**
Surgery for benign breast disease	**05**	**05**
Thyroidectomy	**15**	**15**
Anatomical repair of hernia	**07**	**07**
Hydrocoele	**09**	**09**
Total	**100**	**100**

Table 2: Type of surgery done

Out of total surgical procedures, 21% were herniorapphy, 15% were thyroidectomies, 14%were excisions, 13% were appendectomies, 9% were hydroceles and cholecystectomies each, 7% were surgery for varicose veins and anatomical hernia repairs each and 5% were surgeries for benign breast disease.

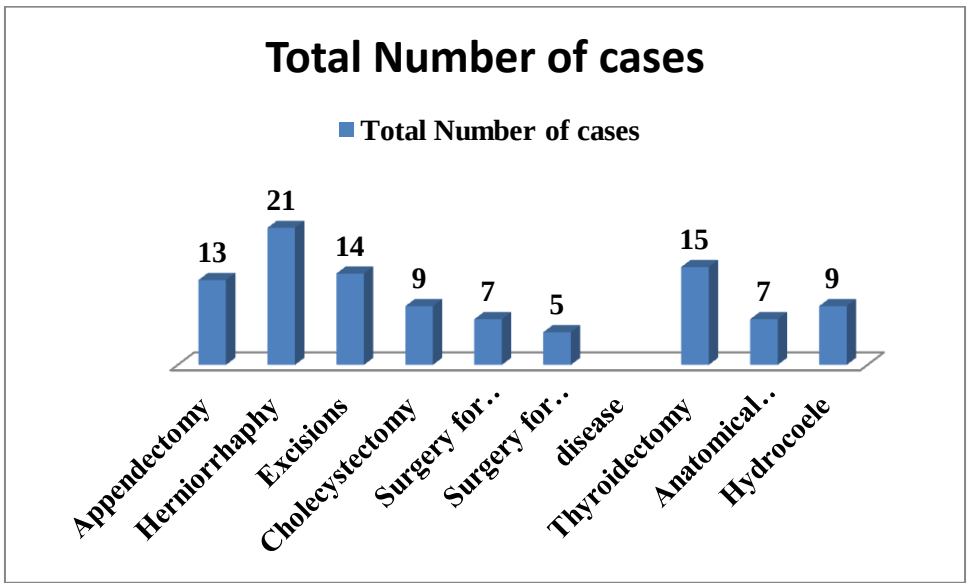

Figure 2: Type of surgeries

	No. of infected wounds	Total no. of patients	Percentage (%)
Group I	4	50	8
Group II	6	50	12
Total	10	100	10

Table 3: Infection rates among the study groups

Out of 100 cases studied, only 10 cases showed SSIs accounting for 10% SSI rate.
Among Group I, 8% of the cases were infected. Among group II, 12% of the cases were infected.

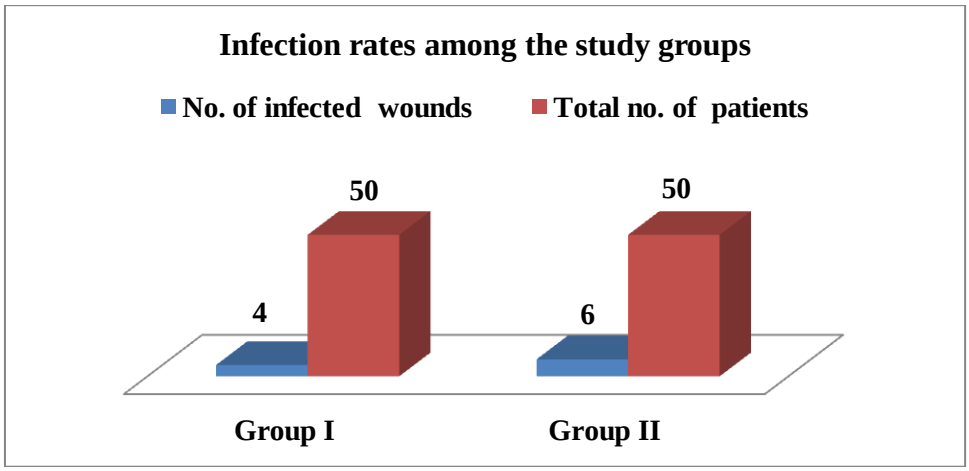

Figure 3: Infection rates among the study groups

	½ hour before incision	1 hr before incision	Total
Infected	1	3	4
Non infected	24	22	46
Total	25	25	50
Percentage	4	12	8

Table 4: Timing of antibiotic prophylaxis among group I

Among group I cases, 50% had antibiotic prophylaxis half an hour before incision and 50% had antibiotic prophylaxis one hour before surgery. Among the cases who received antibiotic prophylaxis half an hour before surgery, only one case was infected. Among the cases who received antibiotic prophylaxis one hour before surgery, three cases were infected. The infection rate was less among the group who received antibiotic prophylaxis half an hour before surgery.

Age group (years)	Infected cases	Percentage
12-20	01	10
21-30	04	40
31-40	05	50
Total	10	100

Table 5: Age group of infected cases

Among the total infected cases, 50% belonged to the age group of 31-40 years, 40% belonged to age group of 21-30 years and 10% belonged to 12-20 years.

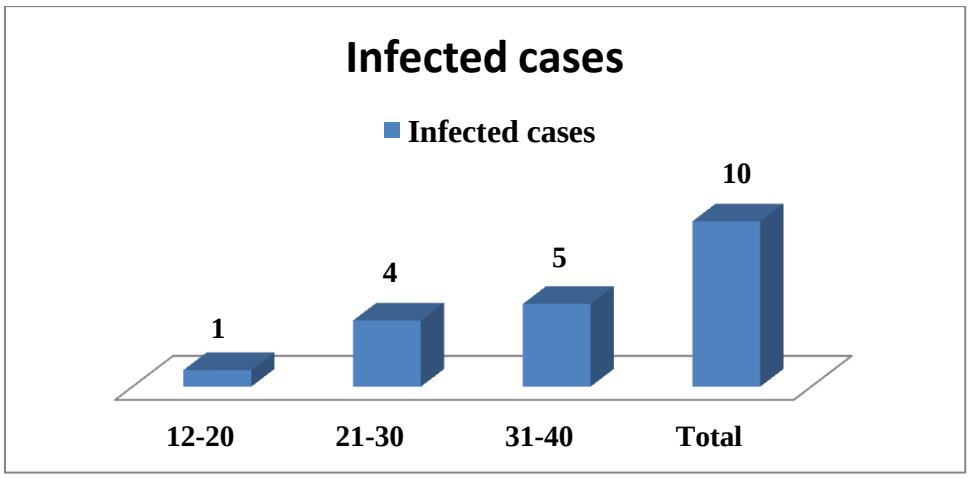

Figure 4: Age group of infected cases

Gender	Infected	Percentage (%)
Male	04	40
Female	06	60
Total	10	100

Table 6: Gender distribution of infected cases

Out of total infected cases, 40% were males and 60% were females.

Types of Surgery	Number of infected cases
Appendectomy	2
Herniorraphy	4
Cholecystectomy	2
Anatomical repair	2
Total	10

Table 7: Infected cases according to type of surgery

	Maximum stay (days)	Minimum stay (days)	Average (days)	Association T test
Infected cases	**14**	**6**	**10.5**	T test value is 14.1343, P value is <0.0000001
Non-infected cases	**7**	**1**	**4.5**	

Table 8: Duration of stay among both infected and non infected cases

The maximum stay of 14 days was noted and a minimum stay of 6 days was noted for infected group. Among the infected cases group the mean duration of stay was 10.5 days, Standard deviation is 2.6 days.

The maximum stay of 7 days was noted and a minimum stay of1 day was noted for non infected group. Among non infected group, the mean duration was 4.5 days. Standard deviation is 1.5 days.

There was increase in duration of stay in the wound infected cases. The difference between the duration of stay in the hospital among both the groups is statistically significant with p value of <0.0000001

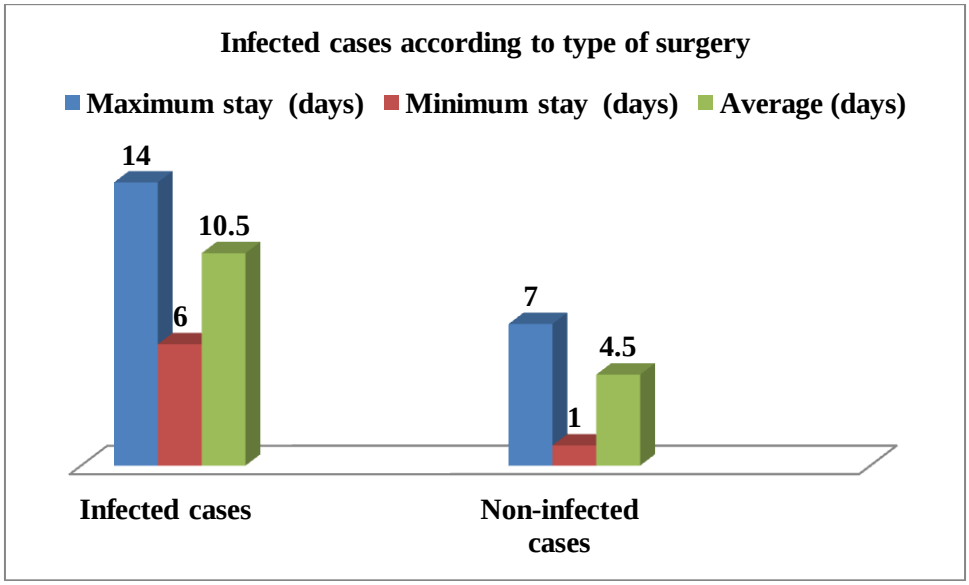

Figure 5: Infected cases according to type of surgery

V. Discussion

Wound infection is one of the most commonly occurring surgical complication and affects up to 5% of all surgical procedures. They are denoted as surgical site infection (SSI) and represent a quarter of all nosocomial infections. SSI adds to the morbidity in terms of hospital stay, pain, reintervention, and cost.[7] Several risk factors have been identified, which contribute to SSI-intrinsic (patient related) or extrinsic (procedure related). Many of the patient related factors are non-modifiable such as age, medical comordities (diabetes, chronic renal failure etc.), but extrinsic issues can certainly be influenced. These procedure related factors include antibiotic prophylaxis, fluid management, and skin disinfection.[8]

Use of prophylactic antibiotic is a common practice to avoid SSIs; 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.[9]

Antibiotic prophylaxis is also accepted for clean surgeries were prosthetic material is used and where the presence of infection poses a threat, but controversy remains regarding certain clean surgeries.[10]

A Cochrane meta-analysis on prophylactic use of antibiotics for elective hernia repair was published in 2012. The total number of patients included in this meta-analysis was 7,843 from 17 studies (prophylaxis group: 4,703, control group: 3,140). The overall infection rates were 3.1% in the prophylaxis group, and 4.5% in the control group (Odd Ratio 0.64, 95% confidence interval [CI] 0.5-0.82). Based on the results of this systematic review, the administration of antibiotic prophylaxis for elective inguinal hernia repair cannot be universally recommended. Neither can the administration be recommended against when high rates of wound infection are observed.

In a similar Cochrane mete-analysis (2010) for a commonly performed procedure that is laparoscopic cholecystectomy, which included 11 studies having 1664 patients observed that the number of SSIs was similar in the two groups: 24 of 900 (2.7%) patients in the prophylaxis group had a SSI against 25 of 764 (3.3%) in the no-prophylaxis group. This meta-analysis could not find sufficient evidence to support or refute the use of antibiotic prophylaxis to reduce SSI or global infections in patients with the low anesthetic risk, low co-morbidities, and low-risk of conversion to open surgery, and undergoing elective laparoscopic cholecystectomy.

Another meta-analysis including a total of nine studies (2,260 participants) evaluated pre-operative antibiotic compared to no antibiotic or placebo for breast surgery. The review concluded that prophylactic antibiotics administered pre-operatively significantly reduce the incidence of SSI for patients undergoing breast cancer surgery without reconstruction (pooled risk ratio 0.71, 95% CI 0.53-0.94).

Several guidelines have been recommended based on the evidence in the literature regarding strategies to prevent SSI, but evidence based medicine and clinical practice is often wide.

VI. Conclusion

Surgical wound infections are common and consume a considerable portion of health care finances. Although surgical wound infections cannot be completely eliminated, a reduction in the infection rate to a minimal level could have significant benefits, by reducing postoperative morbidity and mortality, and wastage of health care resources. A pre-existing medical illness, prolonged operating time, the wound class, and wound contamination strongly predispose to wound infection. A single preoperative dose of antibiotic is as effective as a full 5-day course of therapy assuming an uncomplicated procedure. Prophylactic antibiotics can be administered within 30 minutes prior to incision and have a desired safety from surgical site infection.

References

[1]. Zumla A. Mandell, Douglas, and Bennett's principles and practice of infectious diseases. The Lancet Infect Diseases. 2010;10(5):303-4.
[2]. 2. Boyce JM, Potter-Bynoe G, Dziob ek L. Hospital reimbursement patterns among patients with surgical wound infections following open heart surgery. Infect Control Hosp Epidemiol. 1990;11(2):89-93.
[3]. Hidron AI, Edwards JR, Patel J, Horan TC, Sievert DM, Pollock DA, et al. Antimicrobial-resistant pathogens associated with healthcare-associated infections: annual summary of data reported to the National Healthcare Safety Network at the Centers for Disease Control and Prevention, 2006-2007. Infect Control Hosp Epidemiol. 2008;29(11):996-1011.
[4]. Anderson DJ, Sexton DJ, Kanafani ZA, Auten G, Kaye KS. Severe surgical site infection in community hospitals: epidemiology, key procedures, and the changing prevalence of methicillin-resistant *Staphylococcus aureus*. Infect Control Hosp Epidemiol. 2007;28(9):1047-53.
[5]. Steinberg JP, Braun BI, Hellinger WC, Kusek L, Bozikis MR, Bush AJ, et al. Timing of antimicrobial prophylaxis and the risk of surgical site infections. Ann Surg. 2009;250(1):10-6.
[6]. Taylor EW, Ridgway GL. Infections in surgery, International Congress & Symposium. Series 234, London, 1998: 1-80.
[7]. Fraenkel G. some historical notes on infection in surgery. Watts MJ et al. infection in surgery- Basic & Clinical Aspects. New York, 1981: 27-37.
[8]. Garner JS. CDC guideline for prevention of surgical wound infections, 1985. Superceeds guideline for prevention of surgical wound infections published in 1982. (Originally published in 1995). Revised. Infection Control 1986; 7(3):193-200.
[9]. Simmons BP. Guideline for prevention of surgical wound infection. Infection Control 1982; 3:185-196.
[10]. Alerany C, Campany D, Monterde J, et al. Impact of local guidelines and an integrated dispensing system on antibiotic prophylaxis quality in a surgical centre. *J Hosp Infect.* 2005; 60:111–7.

Dr.K.Rani, et. al. "Evaluation of Role of Antibiotic Prophylaxis in Elective Sugeries in Osmania General Hospital. "*IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 20(02), 2021, pp. 31-37.