



## BACTERIOLOGICAL PROFILE OF SURGICAL SITE INFECTION IN RURAL HOSPITAL IN R.R DISTRICT.

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### ABSTRACT

**BACKGROUND:** Surgical site infections (SSI) are second most important nosocomial infections, As the prevalence is more in developing countries this study was conducted to know the bacteriological profile of surgical site infection, various predisposing factors, antibiogram.

**METHODS:** 200 swabs were collected from clinically diagnosed cases of surgical site infection. Two sterile cotton swabs were used to collect the samples, One for gram stain and other for culture.

Culture done on Blood agar, MacConkeys agar, nutrient agar for isolation. Biochemical tests were done for further speciation. Antibiotic sensitivity done by Kirby-bauers disc diffusion test using Mueller Hinton agar according to standard guidelines. Detection MRSA was done according to CLSI guidelines.

**RESULTS:** Out of 200 samples, 27 showed aerobic bacterial growth. Majority of SSI was by single organism either gram positive cocci or gram negative bacilli.

Most common isolate was Staphylococcus aureus 11(40.7%) others were Klebsiella 07(25.9%), Pseudomonas 03(11.1%), E.coli 02(7.4%), Proteus, CoNS, Acinetobacter, Enterococci were 01(3.7%) each.

**CONCLUSION:** SSI increasing because various factors like poor hygiene, emergence of drug resistant organism. Most common organism isolated from SSI was Staphylococcus aureus. MRSA noted 9.09% cases. SSI can be prevented by giving adequate antibiotic prophylaxis prior to operations. Proper hand wash in between dressing patients can cause significant reduction in number of cases SSI.

**KEYWORDS:** SSI, surgical site infection, staphylococcus aureus, mrsa, post operative wound infection, antibiotic susceptibility.



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## INTRODUCTION

Surgical site infection (SSI) is an infection that occurs after surgery in a part of body where surgery took place. It can sometimes be superficial involving skin only and also deeper tissue.<sup>1</sup> Surgical site infections (SSI) are second most common type of nosocomial infections.<sup>2</sup> SSI resulting in longer hospitalization and higher treatment costs. Studies have shown that average stay doubles the cost of hospitalization and was correspondingly increased when post operative surgical wound infection developed.<sup>3</sup> The overall incidence of wound sepsis in India is from 10-33%. Relative resistance to antibiotics, relatively more virulent strains and capacity to adapt quickly to changing environment make the pathogens acquired in hospitals a matter of concern.<sup>4</sup> SSI is caused by different groups of microorganisms, most commonly isolated aerobic microorganisms includes *S. aureus*, CoNS, *Enterococci*, *E. coli*, *P. aeruginosa*, *Klebsiella pneumoniae*, *Enterobacter*, *Pr. mirabilis*, other streptococci, *Candida*, *Acinetobacter*.<sup>3,4,5</sup>

Because of increasing rate of emergence of MRSA from wound infections and surgical site infections, this study was conducted to know the bacteriological profile of SSI at our institute.

## MATERIALS AND METHODS<sup>5,6,7,8</sup>

The study was done over a period of time of 1 year from Nov 2011 to Dec 2012. A total of 200 samples were sent to microbiology department from various department of MIMS Medchal AP, rural hospital were processed. Inclusion criteria: swabs from patients having post operative wound infection, clinically diagnosed with signs and symptoms. Exclusion criteria:

samples from infected wounds, burns, wound, non-invasive drainage of pus. Pus samples were collected with 2 sterile disposable cotton swabs with one swab Grams stain performed & other was immediately inoculated onto Blood agar & MacConkey's agar media and incubated at 37°C for 48 hrs. After incubation, identification of bacteria from positive cultures was done with standard microbiological techniques which includes Grams stain, biochemical reactions. The antibiotic sensitivity testing of all isolates was performed by modified Kirby-Bauer's disc diffusion method on Mueller-Hinton agar using antibiotics of Hi media according to CLSI guidelines. MRSA detection done using cefoxitin disc 30 µg according to CLSI guidelines.

## RESULTS

A total of 200 samples were collected from clinically diagnosed patients of surgical site infection from various departmental wards, most samples were from surgical wards others were from OBG, Orthopedic and ENT postoperative wards. Out of 200 samples 27 samples were culture +ve (13.5%). Most common age group was 50 yr (12) patients were infected. From 200 cases 143 (71.5%) male, 57 (28.5%) females. 20 male patients (13.9%) & 6 female patient (10.52%) developed SSI. High rate of bacterial growth was seen in sample collected from surgical wards followed by orthopedics. Majority of wound were infected with single organism. Gram +ve cocci 64% and Gram negative bacilli 36%.

**Table 1**  
**showing male female ratio.**

	Total	SSI	Percentage
Male	143	20	13.9
Female	57	06	10.52

**Table 2**  
*comparison of patients with and without prophylaxis in SSI*

Patients on Antibiotics prophylaxis.	178	10.1%
Patients not on any antibiotic prophylaxis	22	40.9%

**Table 3**  
*total no of positive cases from clean and clean contaminated wounds.*

Srl	Category	no. isolates from infected wound	Percentage
1	CLEAN CUT	11(162)	6.7%
2	CLEAN CONTAMINATED	16(38)	42.1%
TOTAL		27(200)	13.5%

**TABLE 4**  
*predisposing factors*

FACTOR	NUMBER(N=61)	INFECTED CASES	PERCENTAGE
DIABETES MELLITUS	30	19	63.3%
MALIGNANCY	6	1	16
HYPERTENSION	5	2	40
ALCOHOILICS	3	1	33
PATIENTS ON STEROIDS	6	2	33
SMOKERS	11	2	18.18
TOTAL	61	27	44.2%

**Table 5**  
*Various Organism isolated from samples*

ISOLATES	Total No.	Percentage
S.aureus	11	40.7
Klebsiella spp	07	25.9
P.aeruginosa	03	11.1
E.coli	02	7.4
Proteus	01	3.7
CoNS	01	3.7
Acinetobacter	01	3.7
Enterococci	01	3.7
Total	27	

**Table 6**  
*Organisms isolated from various surgeries*

Isolates	Isolates							
	S.aureus	K.pneumoniae	P.aeruginosa	E.coli	Acinetobacter	CoNS	Proteus	Enterococci
Appendectomy (7)	2	2	1	1	-	1	-	-
Hernia (3)	3	0	0	0	-	-	-	-
Hydrocele(2)	1	-	1	-	-	-	-	-
LSCS(2)	1	-	0	-	1	-	-	-
Mastoidectomy (3)	2	-	1	1	-	-	-	-
Bowel surgery (7)	0	4	0	-	-	-	1	1
Orthopedics(3)	2	1	0	-	-	-	-	-
Eye surgery(0)	0	0	0	-	-	-	-	-
Total (27)	11	07	03	02	1	1	1	1

**Table 7**  
**Sensitivity Pattern of isolates from surgical site infection.**

Antibiotics	s.aureus	Klebsiella	CoNS	E.coli	pseudomonas	acinetobacter	proteus	enterococci
Penicillin	1	-	1	-	-	-	-	1
Gentamicin	9	3	1	1	3	1	1	1
Cotimoxazole	-	3	-	1	2	-	-	-
Cefuroxime	-	-	-	-	-	-	-	-
Oxacillin	7	-	2	-	-	-	-	1
Erythromycin	6	-	1	-	-	-	-	1
Vancomycin	11	-	1	-	-	-	-	1
Cefoxitin	10	4	1	2	-	-	1	1
Ampicillin	4	-	1	1	-	0	0	1
Amikacin	9	7	1	2	3	1	1	1
Cefotaxime	7	6	1	2	3	1	1	1
Piercillin-tazobactam	6	7	1	2	3	1	1	-
Ciproflox/levoflox/lomeflox	2	5	1	1	3	1	1	1
Amoxy-clav	6	-	1	-	-	1	1	-
Imipenem-	-	7	-	2	3	1	1	-
Cephlexin	2	-	1	-	-	-	-	-

## DISCUSSION

As wound infection is becoming the major hospital acquired infection, hospital environment plays a major role for causing wound infection. In our study, 13.5% of samples showed bacterial growth which is in correlation with study done by suchitra joyece B et al<sup>3</sup> showed the prevalence of SSI 12%. The most common isolate was s.aureus(40.7.3%) followed by klebsiella 7(25.9%) pseudomonas 3(11.1%), E.coli 2(7.4%), proteus 1 (3.7%), CoNS 1(3.7%) and acinetobacter & enterococci 1(3.7%) each. In a similar study conducted at vinayaka mission karaikal by A.Ramesh & Ms.R Dharini<sup>9</sup> the most common isolate was s.aureus followed by klebsiella most common among gram negative bacilli. similar study was conducted in TUTH showed 82.5% bacterial growth and 13 different bacterial species of which S.aureus was predominant(57.7%) followed by E.coli(11%) and CoNS(3%)<sup>10</sup>. In Study done by Hayath Kownhar et al shows rate of s.aureus as 37% which corresponds to our study where s.aureus is 40.7%, but MRSA was shown to be 21. 7% by them but we found only 9.09%<sup>11</sup>. In our study most of the enterobacteraceae members and pseudomonas were susceptible

to amakicin third generation cephalosporins and piperillin with tazobactem . In case of gram positive bacteria the highly effective antibiotics were oxacillin, erythromycin, vancomycin, amoxy-clav & least effective antibiotics were penicillin & cephalixin. The incidence of methicillin-resistant S.aureus in our study was 1(9.09%).this finding is in accordance with the reported incidence of 10% MRSA in a study which was conducted by Gaythree naik at kasturba medical college,Mangalore showed an incidence of 9.6%<sup>12</sup> Prevalence of pseudomonas was less in our study compared to study conducted by K prabhat ranjan et al which showed pseudomonas 29.6%<sup>13</sup>.

## CONCLUSION

Surgical site infection are increasing due to emergence of MRSA among Staphylococcus aureus and ESBL's among gram negative bacilli. Aerobic bacterial growth were seen in samples collected from surgery wards followed by orthopedics. S.aureus(40.7%)was the predominant isolated followed by

Klebsiella(25.9%),Pseudomonas(11.1%), E.coli(7.4%) .MRSA incidence in our study was 9.09% . Due to increased hospital stay associated with SSI and the drug resistant organisms further adds up to increase mortality and morbidity.An early detection and intervention is of great importance in surgical

patients.The Hospitals should take steps in educating health care worker about hand washing and hygiene practice in health care setup. Hospitals should regularly screen for MRSA among their staff and treat those who are carriers.

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