The co-relation between Methicillin Resistant Staphylococcus aureus (MRSA) among operation theater staff and the incidence of post-operative Surgical site infections in a tertiary care hospital in Indore, Madhya Pradesh

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Abstract- Background: Methicillin resistant Staphylococcus aureus (MRSA) is a major cause of hospital acquired infections, particularly surgical site infections (SSI). Health care workers especially operation theater (OT) staff, can act as reservoirs and vectors of MRSA transmission.

Aim: To determine the prevalence of MRSA carriage among OT staff and evaluate its co-relation with the incidence of post-operative SSIs due to MRSA.

Methods: A prospective observational study was conducted over twelve months in a tertiary care hospital in Indore. Nasal swabs and hand swabs were collected from OT personnel. Post-operative patients were monitored for SSIs and the isolates were tested for MRSA. Statistical correlation between staff colonization and the SSI incidence was analyzed.

Results: MRSA colonization among OT staff was found to be 11.8%. The overall SSI rate was 9.6% with MRSA accounting for 32.5% of SSI isolates. A significant correlation ($p < 0.05$) was observed between MRSA carriage among OT staff and MRSA associated SSIs.

Conclusions: MRSA carriage among OT staff significantly contributes to post-operative infections. Regular screening and strict infection control practices are essential to reduce transmission.

I.INTRODUCTION

Surgical site infections (SSIs) remain one of the most common healthcare associated infections contributing significantly to post-operative morbidity and prolonged hospital stay. Globally, SSIs complicate approximately 1 – 10 % of surgical procedures.

Staphylococcus aureus is the leading pathogen in SSIs and the emergence of methicillin resistant strains (MRSA) has further complicated treatment due to multidrug resistance. MRSA is responsible for a substantial proportion of post-operative infections and is associated with increased morbidity, mortality and healthcare costs.

Healthcare workers (HCWs), particularly those in operation theaters, play a crucial role in the transmission dynamics of MRSA. Nasal carriage among HCWs serves as a reservoir for infection, facilitating cross-transmission to surgical patients. Studies have shown that MRSA colonization among healthcare workers is an important risk factor for nosocomial infections.

Despite the growing concern, limited data exists, corelating MRSA carriage among OT staff with SSI in central India. This study aims to bridge this gap.

II.OBJECTIVES

Primary objective:
To determine the prevalence of MRSA colonization among operation theater staff.

Secondary Objective:
To determine the incidence of post-operative SSIs due to MRSA.

To assess the correlation between MRSA carriage among OT staff and MRSA- related SSIs.

Study Design
Prospective and observational study.

Study setting
Tertiary care teaching hospital in Indore, Madhya Pradesh.

Study duration

Twelve months

Study Population

Group A: OT staff

Surgeons, Anesthesiologists, Nurses, Technicians, and housekeeping staff.

Group B: Surgical patients

Patients undergoing clean and clean-contaminated surgeries.

Sample size

OT staff: 120

Surgical patients: 600

Inclusion criteria

OT staff:
Working in OT for > 3 months

Willing to participate.

Patients:
Undergoing elective surgery

No pre-existing infection.

Exclusion criteria

Patients with pre-operative infections

Staff on antibiotics in the last two weeks.

Sample collection

OT staff:
Nasal swabs (anterior nares)

Hand swabs.

Patients:
Wound swabs/ pus samples from suspected SSI

III.MICROBIOLOGICAL METHODS

1) Culture on Blood agar and mannitol salt agar
2) Identification of Staphyloccus aureus by –

Gram staining
Catalase test
Coagulase test
MRSA detection:
Cefoxitin disc diffusion method
CLSI guidelines followed.

Data Collection
Demographic data
Type and duration of Surgery
Antibiotic prophylaxis
SSI occurrence within 30 days

Statistical analysis
Chi-square test for association
Pearson co-relation coefficient
p-value < 0.05 considered significant.

IV.RESULTS

Table 1 : MRSA carriage among OT staff

Category	Total	MRSA Positive	Percentage
Surgeons	25	2	8.0%
Nurses	40	6	15.0%
Technicians	30	4	13.3%
Housekeeping	25	2	8.0%
Total	120	14	11.8%

Table 2 : Incidence of Surgical site infection

Total Surgeries	SSI cases	SSI Rate
600	58	9.6%

Table 3 : MRSA in SSI cases

Total SSI	MRSA Positive	Percentage
58	19	32.5%

Table 4 : Correlation Analysis

Parameter	Value
Correlation coefficient	0.68
p-value	<0.05
Interpretation	Significant positive correlation

V.DISCUSSION

The present study demonstrates a notable prevalence (11.8 %) of MRSA colonization among OT staff, consistent with previous Indian studies reporting significant carriage rates among healthcare workers.

The SSI rate of 9.6% falls within the expected range for developing countries. Importantly MRSA accounted for 32.5% of SSIs, highlighting its dominant role in post-operative infections. Similar findings have been reported where MRSA contributes significantly to the SSI burden.

A statistically significant correlation between MRSA carriage among OT staff and MRSA associated SSI suggests a direct transmission link. Healthcare workers can act as asymptomatic carriers, facilitating pathogen spread through inadequate hand hygiene or breaches in sterility protocol.

Previous studies have also demonstrated that MRSA carrier status is a significant risk factor for SSI ($p = 0.041$) supporting our findings.

VI.CONCLUSIONS

MRSA colonization is relatively high among OT staff.
MRSA is a major contributor to Post-operative SSIs.
A strong positive correlation exists between staff carriage and infection rates.

VII.RECOMMENDATIONS

Routine MRSA screening of OT staff
Strict hand hygiene and infection control measures
Periodic decolonoization protocols (eg. Mupirocin)

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