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AIR BACTERIOLOGY OF OPERATION THEATRE COMPLEXES FROM A TERTIARY CARE HOSPITAL IN RELATION TO ROLE OF INFECTION CONTROL PRACTICES

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ABSTRACT
Background: Surgical site infections (SSI) are common nosocomial infection with variable incidence of 0.5%-15% worldwide depending on type of surgery performed. Per-operative contamination of wound is known to be a major risk factor for SSI and source of infection are multifarious varying from type of operation, surgeon's skill, immune status of patient to contamination of environment. **Material and Methods:** Microbial air contamination was evaluated in 15 Operation Theatres (OT's) using settle plates method with objective to measure the index of microbial air contamination and assess the impact of infection control practices in controlling these infections. **Conclusion:** It is concluded that microbiological surveillance of operating theatres plays an important role in reducing bacterial contamination consequently reducing surgical site infections.

KEYWORDS: Air bacteriology, Infection control, Surveillance.

INTRODUCTION
Surgical site infections (SSI) are common nosocomial infection with variable incidence of 0.5%-15% worldwide depending on type of surgery performed.[1] The superficial SSI are comparatively easier to treat but deep ones can become complicated or even be life threatening. Per-operative contamination of wound is known to be a major risk factor for SSI and source of infection are multifarious varying from type of operation, surgeons skill, immune status of patient to contamination of environment.[2] Wound infections acquired in the operation theatre can be prevented by improving bacteriological quality of air.[3] The present study was conducted for period of one year in 15 operation theatre in 1100 bedded tertiary care hospital with aim to analyze degree of contamination in operation theatre with effective continuous surveillance and increased Information Education and Communication (IEC) activities pertaining to infection control practices.

MATERIAL AND METHODS
The study was conducted for a period of one year in Dr.RML Hospital & PGIMER, a tertiary care hospital and major referral center in North India. It has bed capacity of 1100 with all Clinical Departments and super specialty in Neurosurgery, Pediatric surgery etc. The study sites were 15 operation theatres. Settle plate method was adopted using pre-incubated blood agar plates. The plates were labeled with site, time and date of sample collection. After exposure for 1 hour, the plates were taken to laboratory and incubated at37°C for 24hours. Next day colonies were counted and identified as per standard guidelines.[4] The concentration of airborne bacteria was expressed as cfu/m^3. Pathogenic isolates were tested for antibiotic susceptibility as recommended by the National Committee for Clinical Laboratory Standards.[5]

RESULTS
A total of 180 samples taken repeatedly from 15 different OT's were processed and isolates were *Staphylococcus aureus* (2.7%), *Coagulase negative Staphylococcus aureus* (4%) and rest were contaminants 168(93-3%) (isolates other than pathogens) and amongst them commonest was *Bacillus spp* (84%). Public traffic record was not attempted as was highly variable concerning duration of stay in running OT's. There were no gram negative rods isolated during study period. The isolation rate of pathogens from our OTs before implementation of strict infection control measures and appropriate scheduling for collection of samples was *Staphylococcus aureus* (16%), *Coagulase negative Staphylococcus aureus* (26.7%), *Acinetobacter spp* (2.03%) and *Klebsiella spp* (0.3%) in period of one year.[6]

DISCUSSION
Bacterial contamination of operating room is a contributing factor for high prevalence of nosocomial

infections.[7] The critical areas in healthcare though regularly disinfected require regular monitoring of infection control practices. As documented in present study, continuous surveillance and increased IEC activity for infection control resulted in decreased pathogens from 20% to 2%. In a teaching hospital like ours; bacterial contamination has to be regularly surveyed as overcrowding by medical students / staff is an established factor for increased rate of bacterial contamination.[6] Though settle plate method is a crude measure of airborne contamination but provides a cost effective way of monitoring and used for prompt intervention measures to be instituted in requisite sampled areas. Training of staff and students for hand hygiene has to be emphasised to reduce bacterial contamination and eventually lower rate of nosocomial infections.[8,9] Role of active surveillance is thereby again stressed upon as it increased compliance for infection control measures and proved effective in bringing down number of samples to be tested as pathogen isolated rate was low and lessening the need for repeated sample after instituting corrective measures like thorough cleaning or fumigation. Stress is now being laid upon modular OT but traffic control in these critical areas along with effective infection control measures cannot be overlooked.

CONCLUSION

The microbiological surveillance of operating theatres plays an important role in reducing bacterial contamination consequently reducing surgical site infections. It should be a regular practice in the hospital and must be included in the accreditation process to improve the quality of the operation theatres.

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