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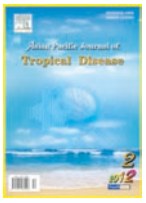

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Screening for mrsa as a preventive approach prior to nasotracheal intubation

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ABSTRACT

Objective: This study was undertaken to determine the carriage of MRSA strains due to nasotracheal intubation into the lower respiratory tract where they can be a potential source of infection leading to high morbidity and mortality. **Materials:** Study was done on 100 patients (50 intubated nasally and 50 intubated orally). Swabs were taken from the anterior nares, throat and tip of the endotracheal tube (ETT tip), cultured on conventional media and sensitivity was determined.**Results:** In study group 1, nasal swabs showed growth of MRSA in 21 (42%) patients and out of these 16 (76%) patients showed growth of MRSA strains from ETT tip. MRSA was not detected from ETT tip in any of the patients in study group 2. Screening for MRSA should be done before intubation by nasal route.

1. Introduction

Nasotracheal intubation is a procedure commonly required for patients undergoing maxillofacial and dental surgeries [1]. There are well documented complications of this procedure like nasal sinusitis, nasal septal and parapharyngeal abscesses [2,3]. Nosocomial pneumonia and septicemia are more frequent in patients with nasotracheal intubation than those intubated orotracheally [4,5].

MRSA is the term used for Methicillin Resistant Stapyhlococcus Aureus which are relatively difficult to treat pathogens. If resistant to Methicillin, these strains are also resistant to Flucloxacillin and all β-lactam antibiotics. Upto 40% of the normal population carry *S.aureus* in the anterior nares for periods ranging from a few weeks to many years and this carriage rate is often increased in hospitalized patients. The increasing incidence of MRSA has been associated with hospital outbreaks leading to considerable morbidity and mortality[6]. Patients with compromised immune systems are at a greater risk of symptomatic secondary infection. MRSA can be detected by swabbing the nostrils of patients and isolating the bacteria found inside. At risk populations include : people with weak immune system (people with HIV/AIDS, transplant recipients, severe asthmatics etc.), diabetics, i.v drug users, use of quinolone antibiotics, young children, elderly, college students living in dormitories and people who spend time in confined spaces.

The present study was done to determine intubation related carriage of bacteria, especially MRSA into trachea mainly on nasotracheal intubation.

2. Material and methods

The study was done in departments of Anesthesiology and Microbiology of J.N. Medical College and Hospital. Hundred patients were included in the study.

Study group 1 comprised of 50 patients who were intubated by nasotracheal route due to conditions that led to difficult mouth opening or requiring more space for the surgical procedure. Study group 2 comprised of 50 patients who were intubated by oral route. Detailed history regarding prior use of antimicrobial agents like β-lactamase inhibitor combination, Fluoroquinolones, Macrolides, Cephalosporins and Vancomycin, steroid therapy, bronchoscopy, diabetes

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and dialysis was recorded from all patients. History of hospitalization was also taken.

2.1. Anaesthetic technique

Informed consent was taken from all the patients. Patients were intubated by nasal route using standard protocol [7]. Difficult airway cart including the instruments of surgical airway techniques (cricothyrotomy, tracheostomy) were kept ready. Nasal patency was checked on both sides and the right naris was selected for Nasotracheal intubation as the bevel of most of the ETT will face the flat nasal septum minimizing damage to the turbinates. We instilled cotton-tip pledgets soaked with 2 % Lignocaine with 1:200000 epinephrine in both the nasal passages 10-15 minutes prior to intubation. Premedication was done with Inj. Ondansetron 0.1 mg/kg intravenous (IV), Inj. Tramadol 2 mg/kg IV and Inj. Midazolam 0.04mg/kg IV. Patients were pre-oxygenated with 100% Oxygen for 3 minutes and induced with Inj. Thiopentone 3-5 mg/kg IV and relaxed with Inj. Succinylcholine 1-1.5 mg/kg IV. Cuffed endotracheal tube PVC type lubricated with sterile cotton soaked Lignocaine jelly was introduced to the half of its length into right nasal passage. The blade of MacIntosh laryngoscope was introduced into the mouth from the right side and advanced upto the faucial pillars. Next the tongue was swept and the blade was moved further to position its tip in the vallecula for lifting the epiglottis. Under visual guidance, Nasotracheal intubation was done pushing the endotracheal tube through the abducted vocal cords with the help of Magill's forceps. Correct placement of the tube was confirmed by capnography and auscultation. Patient was maintained on Oxygen and Nitrous Oxide mixture, Inj. Propofol and Inj. Vecuronium. Vital parameters including the pulse rate, blood pressure and pulse-oximetry were monitored in all patients. After the surgical process, the patients were successfully extubated. Sterility was fully maintained throughout the procedure.

Three swabs were taken from each patient - nasal, pharyngeal and swab from the tip of tube (ETT tip). Throat and nasal swabs were taken prior to intubation and swab from tube tip after procedure was completed and sent to microbiology laboratory in Brain-Heart infusion broth. All three swabs were inoculated on blood agar and McConkey's agar at 37 degree Celsius overnight. The isolates were identified by their characteristic morphological features and by battery of standard biochemical reactions for identification of gram-positive and gram-negative cocci.

MRSA detection was done using Oxacillin disc susceptibility testing using CSLI guidelines (8). A bacterial suspension adjusted to 0.5 MacFarland was inoculated onto Muller-Hinton agar. A filter paper disc containing Oxacillin (Hi-media, India) was placed on the inoculated agar and plates were incubated overnight. The diameter of zone of inhibition was measured and standard criteria for interpretation of results were employed (8). Antimicrobial susceptibility pattern of isolates was determined using Kirby-bauer disc diffusion technique.

3. Results

A total of 100 patients included in the study belonged to different age groups. Thirty-three patients (21 in study group 1 and 12 in study group 2) had shown positive culture for MRSA from nasal swab specimen.

Table 1.
Showing distribution of patients positive for MRSA growth on nasal swab according to rate of isolation from ETT tip after different routes of intubation

Intubation Procedure	MRSA carriage into trachea		Total
	Yes	No	
Nasal intubation	16 (76%)	5 (24%)	21
Oral intubation	0 (0%)	12 (100%)	12
Total	16	17	33

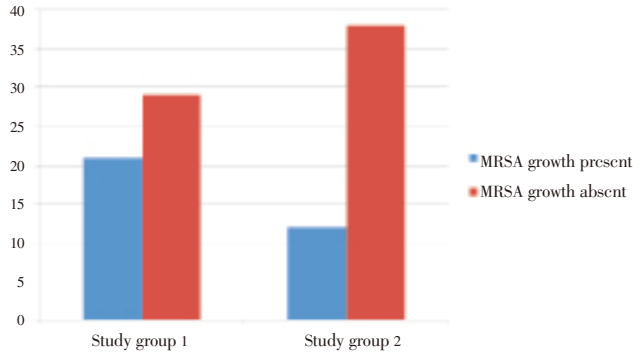

Figure 1. Distribution of MRSA strain in nasal swab specimens

In study group 1 (comprising of 50 patients intubated nasotracheally), general nasal commensal microflora was present on culture examination of their nasal swab specimens. Twenty-one patients (42%) showed colonization with MRSA. Throat swabs of these patients had commensal growth while Streptococcus pyogenes was isolated from throat of 1 patient. On culture examination from ETT tip, MRSA was detected in 16 (76%) patients whose nasal swab culture also showed MRSA. Streptococci were detected in 8 patients.

In study group 2 (comprising 50 patients intubated orotracheally), the ETT tip showed growth of staphylococcus sp and streptococcus sp in 5 patients. Nasal swabs of 12 patients in this group had shown MRSA growth, while none of them had shown MRSA growth on ETT tip culture.

4. Discussion

The results of this study indicate that bacteria are being carried into the trachea more frequently by intubation via nasal route than oral route. Satoshi Takahashi et al 2003 (9) reported carriage of bacteria from nasal cavity into trachea

because of nasal intubation. Other investigators reported that nasal cannulation for endotracheal and gastric intubation is a major risk factor for Nosocomial infection [9-11]

In this study, the nasal carriage rate of MRSA was found to be 33%. Dupeyron et al [12] reported nasal carriage rate of MRSA of 16.3% while Corbella et al (13,14) and Satoshi Takahashi et al [9] reported nasal carriage rate of 22.1% and 13.2% respectively. The high rate of nasal carriage of MRSA found in our study may be due to random selection of patients.

In this study, we found that the transfer rate of MRSA from nares into the lower respiratory tract was 76% (16 out of 21 patients) in patients intubated nasally while none (0 out of 12) of the patients intubated orally showed MRSA growth on ETT tip culture. In study done by Corne P et al (2005) showed nasal carriage of MRSA to be the causative agent of Staphylococcal pneumonia in critically ill patients[15]

MRSA which are carried in anterior nares of normal humans can be carried to trachea during nasotracheal intubation. Chances of transfer of other micro-organisms to trachea are higher when intubation is done by nasal route. To conclude, we suggest screening for MRSA strains by nasal swabs prior to nasal intubation to prevent complication associated with carriage of these organisms to trachea.

Conflict of interest statement

We declare that we have no conflict of interest.

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