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RESEARCH ARTICLE

BACTERIAL ISOLATES INFECTING WINDPIPE: KEYNOTES OF WINDPIPE

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ABSTRACT

Purpose: Bacterial infections in the lower respiratory tract especially due to Gram negative bacilli, has remained a major complication of endotracheal intubation in patients requiring ventilator equipments. The aim of present cross sectional study was to determine the presence or absence of bacterial infections in tracheal tubes and determination of their antimicrobial susceptibility pattern.

Method: A total of 150 inpatients were included. The Endotracheal tubes were vortexed and semiquantitative culture was performed. Inoculation was done on 5% Sheep blood agar and Mac-conkey's agar media, followed by overnight aerobic incubation at 37°C. Phenotypic confirmation and resistotyping of the isolates were done by Vitek-2 AES following CLSI 2014 interpretation criteria.

Results: Out of total 150 collected samples, 120 were culture positive (80%). Out of total 120 culture positive cases, in 30 cases, multiple bacteria were isolated (25% of culture positive cases). 56 *Klebsiella pneumoniae*, 25 *Enterobacter aerogenes*, 19 *Acinetobacter baumannii* complex, 8 *Pseudomonas aeruginosa* and 12 *Staphylococcus aureus* were isolated. Among total 118 isolates, 40 were Extended spectrum beta lactamase producer (ESBL) (33.89%) and it was comprised of 26 *Klesiella pneumoniae* and 14 *Enterobacter aerogenes*. 39 were Carbapenemase producers among whom 19 were *Klebsiella pneumoniae*, 14 *Acinetobacter baumannii* and 6 *Pseudomonas aeruginosa*. All of the Gram negative isolates were sensitive to Polymyxin-B, Colistin and Tigecycline. Among 12 isolated *S. aureus*, 8 (66.67%) were Methicillin resistant (MRSA). None of the Gram positive isolate was resistant to Vancomycin or Linezolid.

Conclusion: This study indicates the emergence of multidrug resistance in a tertiary care health set up

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INTRODUCTION

Nosocomial infections or hospital-acquired infections (HAI), are major public health problem world-wide, accompanied by high rate of morbidities and mortalities among hospitalized patients⁽¹⁾. The burden of HAI is already a substantial health problem in developed countries, where it affects from 5% to 15% of inpatients in regular wards and 50% or more in patients admitted in intensive care units (ICUs). In developing countries, the magnitude of the problem has remained underestimated or even unknown mostly because HAI diagnosis is complex and surveillance activities to guide interventions require expertise and enough resources⁽²⁾. The most frequent nosocomial infections are infections of surgical wounds, urinary tract infections and lower respiratory tract infections. According to World Health Organisation (WHO) study, the highest prevalence of nosocomial infections occurs in intensive care units and in acute surgical and orthopaedic wards. Infection rates are higher among patients

with increased susceptibility because of old age, underlying diseases, or chemotherapy⁽³⁾. Bacterial infections in the lower respiratory tract especially due to Gram negative bacilli, has remained a major complication of endotracheal intubation in patients requiring ventilator equipments^(4, 4). The aim of present study was to determine the presence or absence of bacterial infections in endotracheal tubes and determination of their antimicrobial susceptibility patterns.

MATERIALS AND METHODS

In this cross sectional study, a total of 150 patients were included. Specimens were collected from endotracheal tubes of patients with endotracheal aspiration. The Endotracheal tubes were vortexed and semiquantitative culture was performed. Inoculation was done on 5% Sheep blood agar and Mac-conkey's agar media followed by overnight aerobic incubation at 37°C. Phenotypic confirmation and resistotyping of the isolates were done by Vitek-2 AES; Vitek-2 AES following

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CLSI 2014 interpretation criteria (5). Standard statistical methods were used (prevalence).

RESULTS

Out of total 150 collected samples, 120 were culture positive (80%). Out of total 120 culture positive cases, in 30 cases, multiple bacteria were isolated (25% of culture positive cases). 56 *Klebsiella pneumoniae*, 25 *Enterobacter aerogenes*, 19 *Acinetobacter baumannii* complex, 8 *Pseudomonas aeruginosa* and 12 *Staphylococcus aureus* were isolated.

Among total 118 isolates, 40 were Extended spectrum beta lactamase producer (ESBL) (33.89%) and it was comprised of 26 *Klebsiella pneumoniae* and 14 *Enterobacter aerogenes* whereas 39 were Carbapenemase producers. 19 *Klebsiella pneumoniae*, 14 *Acinetobacter baumannii* and 6 *Pseudomonas aeruginosa* were Carbapenemase producer. All of the Gram negative isolates were sensitive to Polymyxin-B, Colistin and Tigecycline.

Among 12 isolated *S. aureus*, 8 (66.67%) were Methicillin resistant (MRSA). None of the Gram positive isolate was resistant to Vancomycin or Linezolid.

DISCUSSION

Out of total 150 collected samples, 120 were culture positive (80%). Out of total 120 culture positive cases, in 30 cases, multiple bacteria were isolated (25% of culture positive cases). Majority of the isolates was *Klebsiella pneumoniae* (56 out of 120 i.e, 46.67%). All of the Gram positive isolates were *Staphylococcus aureus*. Nosocomial infections are a serious concern in teaching hospitals in Ahvaz, Iran and many other parts of the World (6). In the study of Khosravi et al., *Enterobacter* spp. and *P. aeruginosa* were the most prevalent bacteria isolated from endotracheal tubes where as in the study of Adair et al., *Enterobacter* spp., *P. aeruginosa*, and *S.aureus* were mostly isolated (7).

Among total 118 isolates, 40 were Extended spectrum beta lactamase (ESBL) producers (33.89%). 26 out of 56 isolated *Klebsiella pneumoniae* was ESBL producer (46%) where as 14 out of 19 isolated *Acinetobacter baumannii* were Carbapenemase producer. All of the Gram negative isolates

were sensitive to Polymyxin-B, Colistin and Tigecycline. Among 12 isolated *S. aureus*, 8 (66.67%) were Methicillin resistant (MRSA). None of the Gram positive isolate was resistant to Vancomycin or Linezolid. This high level of antimicrobial resistance is comparable to the studies of Khosravi et al and Gladstone et al (1,8)

CONCLUSION

In conclusion, this study indicates the emergence of multidrug resistance in a tertiary care health set up. So, there is a need to improve the effectiveness of integrated infection control programs to control and manage nosocomial infections caused by highly resistant organisms.

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