

Original Research

Risk factors associated with Methicillin- resistant Staphylococcus aureus infection in children

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ABSTRACT:

Background: To assess the risk factors associated with MRSA infection in children. **Materials & methods:** A total of 60 patients were enrolled. The primary objective was to identify clinical variables that could differentiate MRSA and MSSA (Methicillin-sensitive Staphylococcus aureus) infection in children (0-10 years) treated with confirmed Staphylococcus infections. **Results:** Out of 48 subjects, 29 (60.5%) were MSSA. Proportion of cases with leucocytosis was significantly higher in MRSA as compared to MSSA. **Conclusion:** This study shows significant results of occurrence of leucocytosis in MRSA as compared with MSSA cases.

Keywords: Staphylococcus aureus, MRSA, risk factors.

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INTRODUCTION

Staphylococcus aureus (*S. aureus*) is one of the most common gram-positive pathogens causing neonatal infections. ⁽¹⁾ In the last decades, an increasing number of infections due to methicillin-resistant *S. aureus* (MRSA) have been reported worldwide, especially in developing countries. In Asia, more than half of the *S. aureus* infections in neonates were found to be resistant to methicillin. ⁽²⁾ It is shown previously that MRSA accounted for 59.8% of all *S. aureus* bloodstream isolates in Chinese NICUs. ⁽³⁾ Neonatal infections due to *S. aureus*, especially MRSA, continue to be a major cause of neonatal fatality and increased medical expenditure. ⁽⁴⁾

In hospitals, antimicrobial resistance leads to increased healthcare costs primarily due to a higher morbidity and mortality from infectious diseases, and increased length of stay. This has been demonstrated, among other pathogens, for methicillin resistant *Staphylococcus aureus* (MRSA). ⁽⁵⁾ In defined healthcare settings the relationship between antimicrobial consumption and MRSA is well established and was found to be dose-dependent. ⁽⁶⁾ Colonisation with MRSA is associated with a 4-fold increase of infection. ⁽⁷⁾

MATERIALS & METHODS

A total of 60 patients were enrolled. The primary objective was to identify clinical variables that could differentiate MRSA and MSSA (Methicillin-sensitive *Staphylococcus aureus*) infection in children (0-10 years) treated with confirmed *Staphylococcus* infections. Isolates were identified as *S. aureus* using standard microbiological methodology from blood, pus, urine, CSF (cerebrospinal fluid) and pleural fluid. Informed consent was taken from parents. Results were obtained and analysed.

RESULTS

Out of 60 patients, 48 isolates were *Staphylococcus aureus*. Out of 48, 29 (60.5%) were MSSA. Proportion of cases with leucocytosis was significantly higher in MRSA as compared to MSSA. P-value was significant as lower than 0.001. Risk factors were mentioned as according to the age group. The hospitalized cases and the cases of spread of *S. aureus* infection by coming in contact with such patients came out to be non applicable.

Table1: Lab. investigations during hospital stay

Variables	MRSA N= 19	MSSA N= 29	P- value
Anaemia	5 (26.3%)	9 (31.1%)	0.4
Leucocytosis	13 (68.5%)	15 (51.2%)	<0.001

Table2: Risk factors in certain age group of children (1- 10 Years)

Risk factors	MRSA N= 19	MSSA N=29
Hospitalization in prior to 12 month	4 (21%)	5 (17.2%)
History of minor trauma	3 (15.7%)	5 (17.2%)
Contact with potential <i>S. aureus</i> infected patient	0	1 (3.4%)

* Risk factors are not applicable in certain age group

DISCUSSION

Anaemia was defined as reduction of the hemoglobin concentration below the range for age and sex. Leukocytosis was defined as white blood cell (WBC) count >2 SD above the mean for age. Multi-centre retrospective study on a cohort of patients that underwent microbiological diagnostics in Belgium during 2005. The bacteriological results retrieved from 17 voluntary participating clinical laboratories were coupled with the individual antimicrobial consumption patterns (July 2004-December 2005) and other variables as provided by pooled data of health insurance funds. Multivariate analysis was used to identify risk factors for MRSA colonization/infection. A total of 6844 patients of which 17.5% died in the year 2005, were included in a logistic regression model. More than 97% of MRSA was associated with infection (clinical samples), and only a minority with screening/colonization (1.59%).^(8,9) In a study, 48 isolates were staphylococcus aureus. Out of 48, 29 (60.5%) were MSSA. Proportion of cases with leucocytosis was significantly higher in MRSA as compared to MSSA. P- value was significant as lower than 0.001.

A study compared a group of hospitalized neonates with culture confirmed methicillin-resistant *S. aureus* (MRSA) infections to a group with methicillin-sensitive *S. aureus* (MSSA) based on antimicrobial susceptibility reports. We used multivariable regression analysis to determine the risk factors for neonatal MRSA infections. There was no difference in the ratio of local to systemic infections or mortality between the two groups. Prior use of antibiotics for more than 48 hours was an independent risk factor for neonatal acquisition of MRSA infections, while exclusive breast milk feeding was a protective factor against MRSA infections.^(10,11) Risk factors were mentioned as according to the age group. The hospitalized cases and the cases of spread of *S. aureus* infection by coming in contact with such patients came out to be non applicable.

CONCLUSION

This study shows significant results of occurrence of leucocytosis in MRSA as compared with MSSA cases.

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