

THE PREVALENCE OF MRSA AMONG THE LYING-IN WOMEN AND THEIR NEW-BORN INFANTS IN TWO MATERNITIES FROM IASI

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Abstract. Methicillin-resistant (MRSA) is a risk factor of nosocomial infection (NI) with compromised hosts, including neonates. **Objective.** The objective of our study was to compare the prevalence of MRSA infections in the new-born(s) and in the laying – in woman, in two maternities from Iasi city. **Materials and methods.** There have been studied 161 new-born(s) and 381 lying-in woman in the A maternity; 1049 new-born(s) and 768 lying – in woman were studied in B maternity. *S. aureus*, was identified by classical methods, inclusive latex-agglutination test, and was isolated from: pharynx exsudates, vaginal discharges and *lochia rubra*. Sensitivity testing to methicillin was made with 5µg disks, using NCCLS standard. **Results.** Methicillin-sensitive *Staphylococcus aureus* (MSSA) were identified in 23% (15 / 53) and 77% were identified like MRSA from the all of isolates (53), in A maternity; in B maternity, MSSA and MRSA represented 53.6% and 46.4% (19 / 41) respectively, from 41 isolates tested. **Conclusions.** The new-born(s) represent a risk group for severe infections with MRSA; specific measures like nasal ointment with mupirocin and antiseptic solutions for the skin lesions must be performed concerning control strategies and the prevention of MRSA transmission in neonate unit.

Key words: MRSA, new-born(s), laying-in woman, nosocomial infections, mupirocin

Rezumat. SARM (*S. aureus* rezistent la metilicină) este un factor de risc pentru infecțiile nosocomiale (IN) la gazdele imunocompromise, inclusiv la nou-născuți. **Obiectiv.** Obiectivul studiului a fost de a compara prevalența infecțiilor cu SARM la nou-născuți și la lehuze, în două maternități din municipiul Iași. **Material și metode.** În maternitatea A au fost testați 161 nou – născuți și 381 lehuze, iar în maternitatea B, 1049 nou-născuți și 768 lehuze. *S. aureus* a fost identificat prin metodele clasice, inclusiv testul de latexaglutinare și a fost izolat din: exsudate faringiene, secreții vaginale și lohii. Testarea sensibilității la metilicină a fost realizată utilizând microcomprimate de 5 µg, conform standardului NCCLS. **Rezultate.** În maternitatea A, 23% din izolate au fost identificate ca SARM (*S. aureus* sensibil la metilicină) și 77% au fost SARM. În maternitatea B, 53,6% tulpini au fost identificate ca SARM și 46,4% au fost SARM. **Concluzii.** Nou-născuții reprezintă un grup de risc pentru infecțiile severe cu SARM; prevenirea transmiterii SARM în maternități presupune aplicarea de măsuri specifice cum sunt: badijonarea nazală cu mupirocin și utilizarea de soluții antiseptice pentru leziunile cutanate.

Cuvinte cheie: SARM, nou – născuți, lehuze, infecții nosocomiale, mupirocin

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INTRODUCTION

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a risk factor of nosocomial infection (NI) with compromised hosts, including neonates. Control of the dissemination of MRSA in hospitals relies on the timely identification of these organisms and then the early institution of appropriate infection control measures. Children, including premature neonate are high risk group for MRSA severe infection, especially from intensive care unit.

OBJECTIVE

The objective of our study was to compare the prevalence of MRSA infections in the new-born(s) and in the laying-in woman, in two maternities from Iași city.

MATERIALS AND METHODS

There have been studied 161 new-born(s) and 381 lying – in women, in A maternity and in B maternity 1049

new-born(s) and 678 lying-in women, between January – March of 2005.

Pathological products: pharynx exsudates, vaginal discharges and *lochia rubra*.

Isolation was made on blood agar culture media with salt and manitol (Chapman culture media).

Identification was performed using the microscopical and cultural characteristic, catalaze test, coagulase test, fermentation of manite and latex agglutination (*Staph Pastorex-Plus*) (1). Sensitivity testing to methicillin was made with methicillin disks (5µg), using NCCLC standard (*National Committee for Clinical Laboratory Standards*).

RESULTS

19 isolates were tested for the sensitivity to methicillin from 61 isolates of *S. aureus* at new-born(s) (37.8%), in A maternity. A number of 6 strains (31.6%) were identified as methicillin-sensitive *S. aureus* (MSSA) and 19 of them (68.5%) were identified as MRSA.

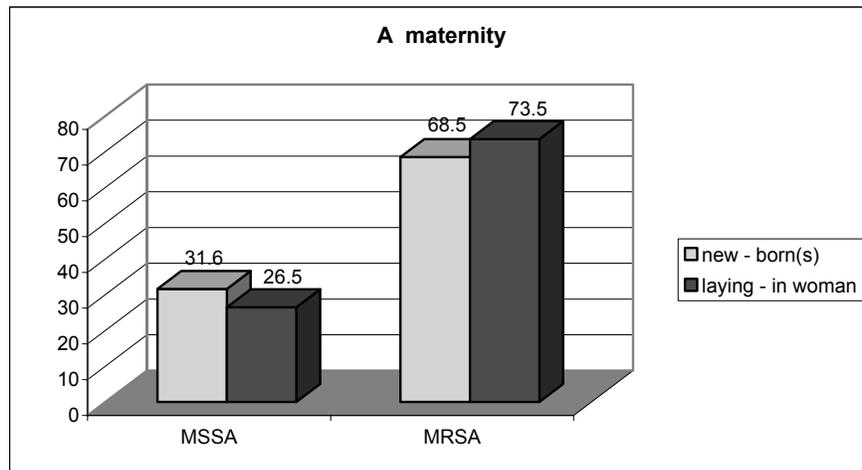


Fig. 1. Isolates testing to methicillin in A maternity

There have been identified 78 isolates (20.5%) in the lying – in women; testing to methicillin revealed that 9 (26.5%) isolates were MSSA, and 25 (73.5%) were MRSA.

In B maternity there have been tested 29 from 110 identified strains at the

new-born(s): 14 (48.2%) were MSSA and 15 isolates (51.8%) were MRSA.

In the lying – in women there have been identified 20 isolates; 12 strains were tested for the sensitivity to methicillin: 8 strains (66.6%) were MSSA and 4 strains (33.3%) were MRSA.

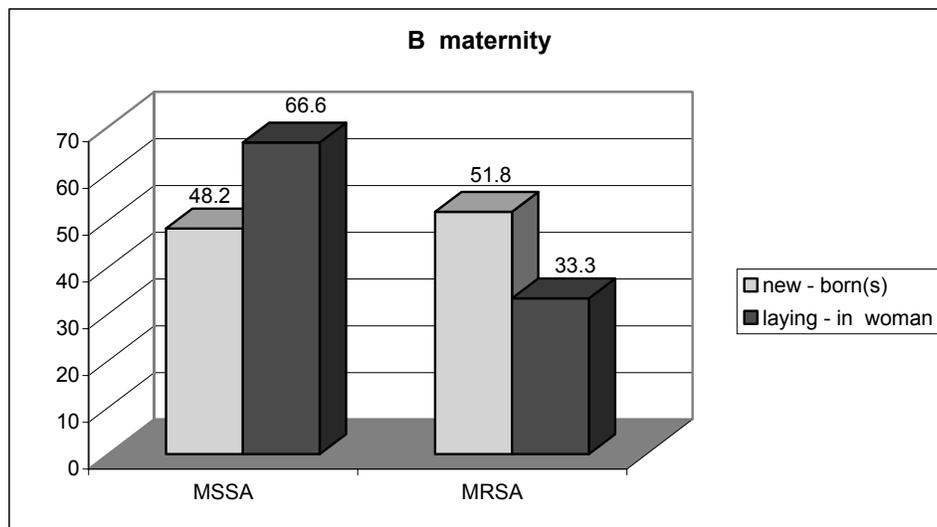


Fig. 2. Isolates testing to methicillin in B maternity

MSSA was identified in 23% (15/53) and 77% was identified like MRSA from the all of isolates (53), in A maternity. In B maternity, MSSA represented 53.6% and MRSA, 46.4% (19/41) from 41 isolates tested.

DISCUSSION

The main etiologic agents of NI were MRSA in both maternities, proved by the higher prevalence of MRSA at the

new-born(s) in these units: 68.43% versus 51.8% new-born(s).

The increase value of MRSA identified at the new-born(s) (51.8% - 15/29), in B maternity in comparison with the low number of the isolated identified at the lying – in women (33% - 4/12), make us to conclude that the hospital environment is the possible source of contamination for the new-born(s) (MRSA carriers from the hospital's staff).

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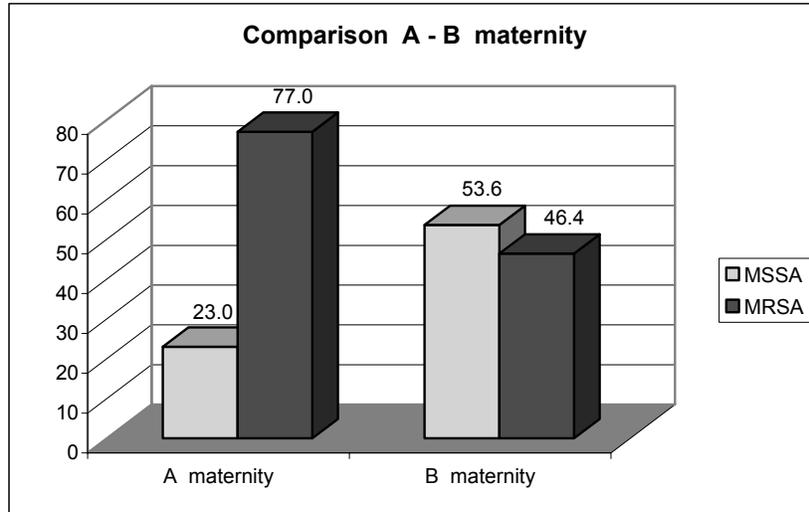


Fig. 3. Isolates testing to methicillin

It is important to mention that lately, in this maternity, the main agents of NI were gram negative bacilli, explaining the decrease number of identified MRSA.

Data from the literature mention generally that the main cause of the new-born(s) contamination is the transmission of MRSA from the mother.

Testing the carrier mothers and their treat with mupirocin for the sterilization, represent a good prevention method.

Nasal carriage of *S. aureus* is an important risk factor for *S. aureus* infections (2). Mupirocin nasal ointment is presently the treatment of choice for decolonizing the anterior nares. However, recent clinical trials show limited benefit from mupirocin prophylaxis in preventing nosocomial *S. aureus* infections, probably due to (re)colonization from extranasal carriage sites. The acquisition of exogenous strains after mupirocin treatment is a common phenomenon. The finding

warrants the use of mupirocin only in proven carriers for decolonization purposes. Mupirocin is effective overall in decolonizing nasal carriers but less effective in decolonizing extranasal sites (3, 4).

MRSA infections in normal new-born nurseries have also become a serious problem in pediatric departments. MRSA which can colonize in the new-born baby just after birth is passed on to the new-born by carrier medical staff too. It was found to be of great importance that infant's mothers hold and nurse their babies immediately after birth, and start breast-feeding while still in the delivery room. Furthermore, the most appropriate and ideal new-born nursery is one where mother and child are roomed together and there is little intervention by the hospital. In neonatal care, it is of most importance to treat carriers of MRSA

bacteria, and to inhibit the spread of the bacterium in babies by taking standard precautionary measures (3).

Since 1998, strains of highly virulent, community-associated, methicillin-resistant *S. aureus* (CA-MRSA), which are distinct from the typical nosocomial MRSA (NA-MRSA), have been reported (2, 4). CA-MRSA is susceptible to numerous antimicrobial agents, in contrast to the multidrug-resistant (MDR) NA-MRSA phenotype, because it carries the staphylococcal cassette chromosome *mec* (SCC*mec*) type IV or V, rather than type I, II or III (3). The high virulence of CA-MRSA has been linked to Panton-Valentine leukocidin (PVL), a virulence factor found in most of these strains (5). Keller N reported a nosocomial MRSA outbreak in a neonatal intensive-care unit (NICU), by a non-MDR MRSA strain that carries the SCC*mec* type IV (6).

This study demonstrated the necessity for future researches regarding CA-MRSA *versus* typical NA-MRSA.

The main source of MRSA in hospital environment is represented by healthcare providers that may become transient or persistent MRSA carriers whilst working in hospitals in which MRSA is endemic (7, 8). They may then become a source of infection for patients as well as their own families. Many authors recommend that healthcare providers should be examined for MRSA if a MRSA epidemic occurs in hospital. The families of any such carriers should also be examined for MRSA (8).

In our previous studies the prevalence of MRSA in healthcare providers was 25-28% (unpublished data) (9).

Related to healthcare providers, environmental control around neonatal patients is an important strategy in order to prevent NI in the NICU (7).

Person to person transfer *via* hand contact by medical personnel was found to be the most frequent mode of transmission identified in the outbreak of MRSA NI in the NICU. The main strategy for control of the outbreaks and elimination of the MRSA from all children, mother and healthcare provider carriers was successful after intensive surveillance and control measures. These included (a) strict isolation and cohorting; (b) hand washing between patients contact to prevent transmission; (c) treatment of the carrier state in health care workers and patients with safe and effective topical agents such as mupirocin (7).

CONCLUSIONS

1. The prevalence of MRSA in these two hospital units varied between 51.8% ÷ 68.5% in new-born(s) and between 33 ÷ 73.5% in mothers.
2. There was no prove for the explanation of MRSA transmission from mother to child; the new-born(s) seems to become contaminated from the hospital environment sources.
3. The new-born(s) represent a risk group for severe infections with MRSA.
4. The main strategy for the control of the outbreak and elimination of the MRSA from hospital units included

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- (a) strict isolation and cohorting; (b) hand washing between patient contacts to prevent transmission; (c) treatment of the carrier state in health care workers and patients with safe and effective topical agents such as mupirocin.
5. Specific measures must be performed for the control and the prevention of MRSA transmission in neonate unit the control: the screening of pregnant women, cultivation of pathologic product from any suspected lesions, feeding of the new-born(s) with treated milk, nasal ointment with mupirocin and antiseptic solutions for the skin lesions.
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