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Relationship between Overcrowding, Other Markers of Poverty and Community Acquired Methicillin Resistant *Staphylococcus aureus*

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Antecedents

The presence of CA-MRSA (methicillin resistant community acquired *Staphylococcus aureus*) in Latin America was first published in Uruguay in 2003. Since then, several articles have been published in Argentina, mainly in children [1-4].

Two recent articles showed transmission of CA-MRSA at community level.

The first study [5] demonstrated transmission of CA-MRSA in deprived areas of London. There was a linkage with overcrowding. It also showed continued arrival of these strains to the hospital setting. An important share of Methicillin resistant *Staphylococcus aureus* was not associated with hospital acquisition.

In the second of these studies [6], the factor associated strongly with the incidence of staphylococcal disease was overcrowding. Disparities in community CA-MRSA was not explained by racial causes.

Annual invasive CA-MRSA incidence was 4.59/100,000 among whites and 7.60/100,000 among blacks (rate ratio: 1.66, 95% CI, 1.52-1.80). The racial disparity in invasive CA-MRSA rates was almost entirely mediated by socioeconomic factors. MRSA was associated with poverty and overcrowding. This could guide strategies for reducing racial disparities in CA-MRSA rates.

Not exactly in the same line of investigations there is one very recent study [7,8] that shows that differential infection risk may be explained by neighborhood Socioeconomic Status (nSES) disparities in sepsis incidence, as higher nSES is associated with lower infection hospitalization rates.

Even though in this study were not defined microorganisms it is known that the 3 main causal agents of community acquired sepsis are *Escherichia coli*, *Staphylococcus aureus* and *Streptococcus pneumoniae*.

Local Experience (José C. Paz, Buenos Aires, Argentina)

From year to year we diagnose sporadic cases of wound infection post cesarean interventions. They were caused by CA-MRSA. We also diagnose frequent cases of SSTI. CA-MRSA is clearly acquired at community level.

We studied familiar SSTI at community level as the presence of any of the following conditions: suppurative lesions, wound infections, consultations or prior hospitalizations for these diseases, isolation of *Staphylococcus aureus* by culture in a member of the family, treatment with Beta-lactams, cephalexin, co-trimoxazole, clindamycin, erythromycin, azithromycin or clarithromycin for SSTI, mupirocin treatment, and drainage of suppurative lesions. We could determine a statistical association of these infections with familial overcrowding and location of the home at the poorer neighborhoods.

In the poorer neighborhoods (with unsatisfied basic needs (NBI) >9.7%), 66 of 129 households (51.2%) had a history of SSTI. When neighborhood NBI was <9.7%, the history of SSTI appeared in 37 of 119 (31.1%) (p=0.0019).

Discussion

Presence of CA-MRSA should always be suspected in infections associated with overcrowding and living in poor neighborhoods.

A history of SSTI can be easily correlated with the presence of CA-MRSA. The mobile genetic element determinant of resistance staphylococcal cassette chromosome MEC type IV or V and two virulence factors characteristic of this pathogen 1-Panton Valentine Leucocidine, G-hemolysin–have been identified in several studies in Argentina, especially in pediatric patients [2-4].

By means of geo-referencing we tried an approximation to the epidemiology of the CA-MRSA, in particular its association with the socioeconomic level of the population. We found a 41.3% of the homes of the party with history of SSTI. The percentage of households with extreme overcrowding (NBI 3) detected was 22.3%, higher than 12% observed for José C. Paz in the census of 2010 [9,10]. The association between SSTI and overcrowding was highly significant.

Also, in families living in neighborhoods of Jose C. Paz where the percentage of NBI was>9.7%, presence of SSTI was significantly higher.

For this reason, we always suggest questioning these families about SSTI. The presence of CA-MRSA reached a level not expected at the beginning of our investigation.

Conclusions

Taking all this studies in combination we suggest the following recommendations:

- Each clinical case of a SSTI should be treated with 10 days with non-beta-lactamic antibiotics as suggested by a recent article [11], investigate the dissemination in the family of the infection, treat the patients discovered in the family, explain the measures of hygiene and control, if possible, to block the reentry of the organism by means of hand hygiene and the use of alcohol gel.
- Any community sepsis with previous abscesses or skin lesions should be treated with antibiotics that cover the CA-MRSA, especially if the patient refers family history of SSTI or comes from overcrowded home or disadvantaged socioeconomic zones.
- Restrict Caesarean births to those who are clearly indicated and, in the event of a family history of SSTI, belonging to a home with

extreme overcrowding or living in an area of disadvantaged socioeconomic zones, one could contemplate adding vancomycin to antibiotic prophylaxis. This recommendation should be evaluated in depth in each programmatic area. Current literature is talking lately about expanding prophylaxis by indicating azithromycin. Very few authors recommend the use of vancomycin, especially in cases of penicillin allergy [12-16].

- In the same way we suggest evaluating the coverage of CA-MRSA in the treatment of infectious complications linked to abortion and ectopic pregnancy.

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