

New transmission routes and genotypic diversity: are we looking at a new MRSA?

SURVEILLANCE OF STAPHYLOCOCCUS AUREUS COLONIZATION IN A REMOTE AFRICAN PYGMY POPULATION FROM 2009 TO 2013

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Objectives

Nasal colonization by *Staphylococcus aureus* is source and risk factor for subsequent infections. While emergence of new clones is well studied in the so-called developed world, the picture of *S. aureus* population dynamics is unclear in developing countries, particularly in regions where medical care is virtually absent. We therefore started a *S. aureus* cohort study in a remote Pygmy population in Gabon, Central Africa in 2009.

Methods

The same Babongo pygmy population (Waka National Park, Gabon) was visited in 10/2009, 10/2011 and 8/2013 to take nasal and pharyngeal swabs which were screened for *S. aureus*. We included all Babongo or mixed blood Babongo/Bantu, no exclusion criteria were applied. Duplicate isolates according to *spa* typing were removed from analysis. Demographic data were recorded using a standardized questionnaire. Species confirmation and antimicrobial susceptibility testing were done using Vitek-2 automated test systems. All isolates were screened for Panton-Valentine leukocidin (PVL) encoding genes and were genotyped (*spa* typing, multilocus sequence typing). A minimal spanning tree was constructed using MLST data and the Prim's algorithm as implemented in <http://pubmlst.org>.

Results

The number of participants was equal in all sampling periods (2009: n=100, 2011: n=103, 2013: n=104) which represents approximately 30% of all pygmies living in the study area. In total, 48.8% (n=150) were female, the median age was 14 years (range: 0.08-84). While resistance rates to tetracycline were stable (2.6-5.9%), resistance rates increased for penicillin (2009: 35.3%; 2013: 46.2%) and for cotrimoxazole (2009: 11.8%; 2013: 20.5%). *S. aureus* belonging to ST45 (n=4) were emerging since 2011, which were characterized by a positive cefoxitin-screen (Vitek-2), betalactamase inhibition by sulbactam, absence of *mecA* and *mecC*; thus, categorizable as borderline oxacillin-resistant *S. aureus* (BORSA). The proportion of PVL-positive isolates decreased markedly (2009: 55.9%; 2011: 52.8%, 2013: 43.2%), which was mainly associated with the disappearance of PVL-positive isolates belonging to ST30, ST121 and ST80 (Figure). Major MLST STs (ST1, 15, 5, 88) were present in each year. No clone which newly occurred in 2011 (ST101, ST2263, ST2264) was detected again in 2013.

Conclusion

Also in a still remote human population, *S. aureus* colonization is subject to dynamic changes of circulating clonal lineages comprising stable occurrence of predominant clones as well as ups and downs of non-succeeding clones. Despite the rare contact of Babongo Pygmies with civilization, resistance rates to penicillin and cotrimoxazole are increasing, particularly after 2011. This might be related to observed high lumbering activity by foreign concession holders in the study region during this period. The emergence of potential BORSA isolates is worrisome in a region where sufficient antimicrobial treatment is not guaranteed.

