Panton-Valentine leucocidin (PVL) in Staphylococcus aureus isolates: Prevalence in healthy carriers and clinical samples in Switzerland

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Background: Panton-Valentine leucocidin (PVL) is a toxin responsible for increased severity in *Staphylococcus aureus* infections. PVL positive isolates originate from clinical infections are rarely reported. Such PVL positive *S. aureus* isolates are distributed among the patients as well as the healthy population, but its frequency is not known in Switzerland. The aim was to measure the frequency of PVL positive *S. aureus* isolates in healthy Swiss carriers and in clinical specimens.

Methods: *S. aureus* isolates from diverse clinical samples were selected retrospectively. Nasal swabs from healthy individuals were collected from a heterogenic population (Fig. 1), and *S. aureus* isolates were analysed for PVL. Detection of the lukS-PV/ lukF-PV genes was done with real time PCR (RIDA PVL kit, rBiopharm on a LighCycler 2.0, Roche).

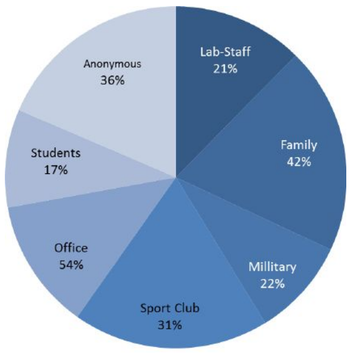

Fig. 1: Demographic distribution of the included healthy individuals with nasal swabs. The percentage of *S. aureus* carriers are indicated in percentages for each category.

Results: Sixty *S. aureus* carriers from 197 nasal swabs of healthy individuals were identified (30.4%). No PVL-positive *S. aureus* was found among the healthy carries. Eighteen of the 60 clinical isolates were tested positive for PVL showing a significant increased frequency ($p < 0.001$) (Fig. 2 A).
Eleven isolates derived from wound swabs, six from biopsies and sterile fluids and one was isolated from a blood culture (Fig. 3). Interestingly, one third (six) of the PVL-positive isolates were Methicillin susceptible S. aureus (MSSA) and the remaining (12) were MRSA (Fig. 2 B).

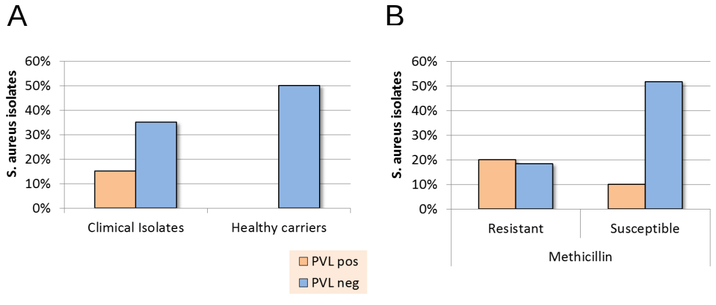

Fig. 2: (A) Comparison of the clinical S. aureus isolates and the isolates from the healthy carriers; (B) the presence of PVL among Methicillin susceptible and resistant isolates

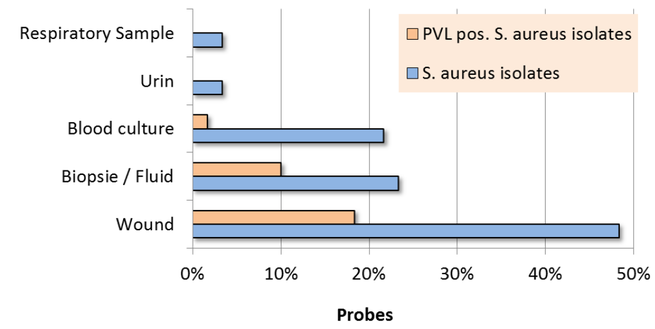

Fig. 3: Percentages from PVL-positive *S. aureus* isolated from different clinical specimens

Conclusions: The frequency of PVL-positive *S. aureus* among the healthy Swiss population (0 out of 60) is significantly low compared to the PVL-frequency in clinical isolates. This suggests that former healthy carriers of PVL have a high risk for severe *S. aureus* infections. Of interest is that not only MRSA but also MSSA do contain the PVL. Such isolates may worsen the clinical outcome and may require an adjusted treatment. Nevertheless, the detection of the lukS-PV/ lukF-PV genes is seldom asked in clinical microbiology laboratories suggesting underestimation of PVL-positive MSSA's.

References:
- Olayemi O. Ayepola et al., Plos 2015
- Christian M. Horvath et al., Schweiz Med Forum 2014
- Beyrouthy R. et al., Med Mal Infect. 2013