Paediatric Bone and Joint Infections: causative organisms and antibiotic treatment

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Background

Osteomyelitis (OM) is uncommon in children in Western populations¹. Resistant and virulent organisms including MRSA and Panton-Valentine Leukocidin-producing (PVL) *Staphylococcus aureus*, which causes leucocyte destruction and tissue necrosis, make effective treatment challenging², often requiring the use of longer courses of multiple antibiotics, some with toxic side effect profiles. Current data suggest the incidence of PVL-producing *Staphylococcus Aureus* is low in the UK and more commonly associated with MSSA than in North America³. This epidemiological evidence also suggests that children with PVL positive musculoskeletal infections are more likely to require surgical intervention.

Aim: to establish the incidence of causative organisms in OM & the antimicrobial therapy used, including agent & duration.

Methods

31 paediatric patients from Sandwell and West Birmingham Hospitals NHS Trust coded as OM or SA between 2010 and 2016 were identified retrospectively. Data were accessed from casenotes (n=21) and electronically.

Rates of OM or SA caused by PVL-producing *Staphylococcus aureus* were compared to recent literature and patients' treatment reviewed.

Results

There were 31 patients treated empirically for OM. 23 of the presentations were radiologically confirmed cases of OM. The age range was 2 weeks - 16 years. (Median 8 years). Positive microbiology included blood cultures (n=8) and Intra-operative samples (n=11). The PVL status of intra-operative samples is unknown. MSSA was the most common organism. 5 patients had PVL-producing *staph. aureus* in blood cultures. (Fig. 1).

All patients with PVL-producing *staphylococcus* infections required operative management; 2 had multi-focal disease. These patients also had comparatively higher inflammatory markers than the other cases. All patients with PVL-producing MSSA strains received antibiotic combination therapy with at least three iv antibiotics. Flucloxacillin was part of the regime in all cases (Fig. 2). These patients also required longer antibiotic courses (median 12 weeks vs 6 weeks for non-PVL).

Culture result	n
Blood culture	25
<i>Staphylococcus aureus</i>	
MSSA	5
MRSA	1
PVL-producer	5 (including MRSA)
<i>Streptococci</i>	
<i>Strep. pneumoniae</i>	1
<i>Strep. agalactiae</i>	1
Sterile	17
Intra-operative sample (Not tested for PVL)	11
MSSA	10
MRSA	1

Conclusion

83% of *staphylococci* in blood cultures were PVL-producers, a higher proportion than suggested by other European data³. These patients provide a treatment challenge, often requiring broader-spectrum antibiotic therapy. Therefore, obtaining samples for culture and testing for PVL-production is essential to optimise therapy. Our patients had no long-term disability, though 2 of 5 patients had multi-focal disease. Sample size was small, however, our results correlate with the previously demonstrated low incidence of PVL-positive MRSA in Britain³. Our unit does not routinely test for PVL status in samples other than blood cultures. However, given the relatively high prevalence of this toxin producing organism, clinicians should have a high index of suspicion and test accordingly.

References

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