Clinical and Molecular Epidemiology of Nosocomial *Acinetobacter baumannii* Bloodstream Infections

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Introduction

- *Acinetobacter baumannii* (Ab) bloodstream infection is associated with devastating outcomes (mortality rates 15-80%).
- The relation between microbial properties such as molecular type and outcome is obscure and is hampered by insufficient metadata.
- We thus sought to study the clinical and molecular epidemiology of Ab-BSI in an endemic setting.
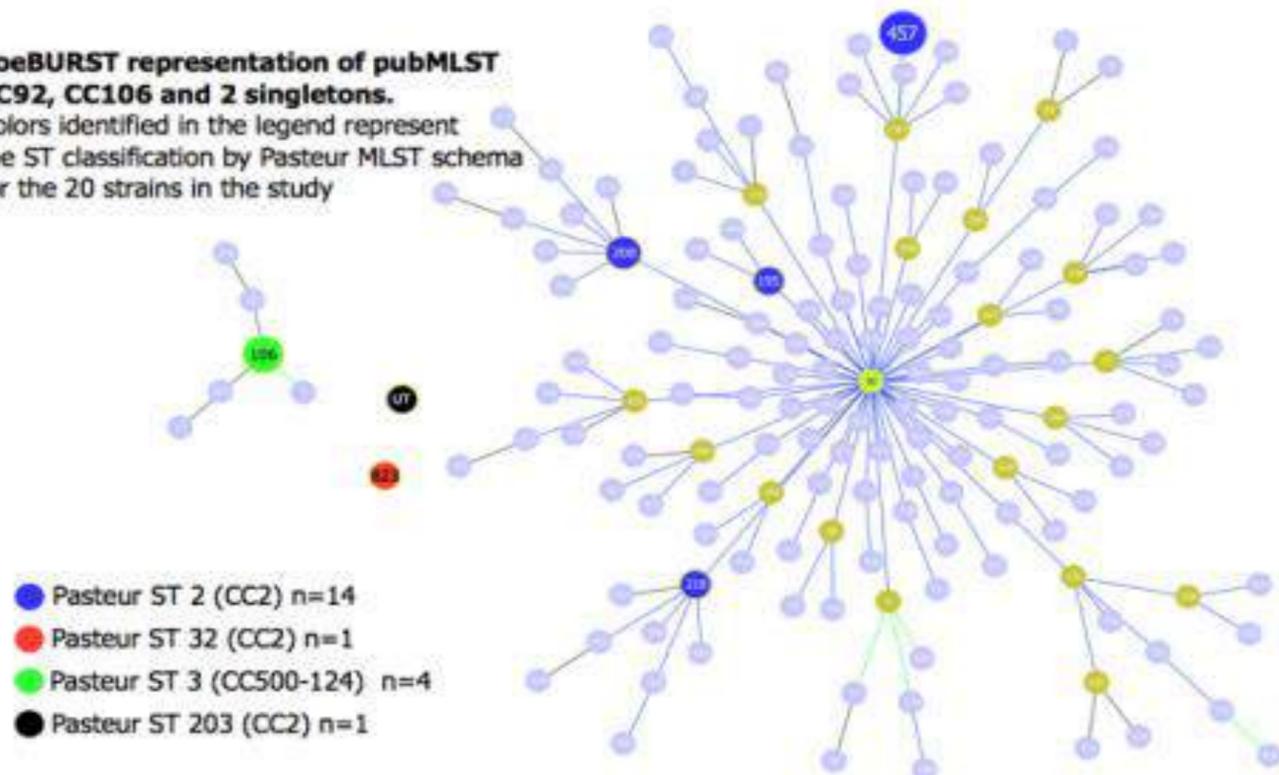
Methods

- Nosocomial Ab-BSI cases (2013/14) treated at AHMC were studied.
- Isolates were identified as Ab by VITEK-2 and confirmed by 16S *rRNA*, 16S-23S ITS, *rpoB* and *gyrB* sequencing .
- STs were determined using both Pasteur and pubMLST multi-locus sequence typing schemes.
- The International clone (IC) ('EU clones') was inferred from ST data.

Results

- Twenty cases with complete data were analysed.
- The median age was 66 years (range 0-86), mean Charlson score was 5.2±3.6 and 45% were LTCFs residents. Mean Pitt score 3.6±2.9.
- Pneumonia was the most common clinical syndrome (50%) followed by primary BSI, skin and soft tissue & UTIs.
- Most Ab were carbapenem-resistant (90%) and XDR per definition (80%).
- IC II – ST2 was the dominant circulating clones in that patient cohort (Fig. 1).
- Four Pts died immediately (<24h), 4 died within 2-7 days, and 12 (60%) survived >1 week (overall in-hospital mortality 50%).
- MLST demonstrated 4 clones per Pasteur (2, 3, 32, & 203) and 6 clones per Oxford (106, 195, 208, 218, 457, 823), corresponding to IC II (70%) & III (21%).
- All Pts who died immediately were infected with Ab ST457 (IC-II), corresponding with immediate mortality rates of 40% and 0% among ST457 and other STs, respectively (p<0.05)

Figure 1 – Comparison of typing by Pasteur and Oxford schemes

goeBURST representation of pubMLST CC92, CC106 and 2 singletons.
Colors identified in the legend represent the ST classification by Pasteur MLST schema for the 20 strains in the study

- ● Pasteur ST 2 (CC2) n=14
- ● Pasteur ST 32 (CC2) n=1
- ● Pasteur ST 3 (CC500-124) n=4
- ● Pasteur ST 203 (CC2) n=1

Conclusions

- This first MLST analysis of Ab BSI in Israel employing both schemes, show IC II and III are predominant.
- MLST recognised several unapparent Ab BSI clusters, especially when the pubMLST scheme was applied.
- Notably, the Pasteur scheme lacked resolution to discriminate within ST2 isolates.
- A subset of Ab-BSI patients died immediately (within 24h) and our observation suggests that specific Ab clones may be associated with immediate mortality.
- This warrants further study across different settings and by mapping of genomic virulence determinants of Ab.

Additional info