Imipenem resistant Pseudomonas aeruginosa in King Edward VIII Hospital

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Introduction

- Pseudomonas aeruginosa is one of the leading pathogens implicated in healthcare acquired infections and there are limited therapeutic options for pseudomonal infections due to increasing antimicrobial resistance.
- Carbapenems are used when other antimicrobial options are exhausted.
- Resistance of P. aeruginosa to antimicrobials used for primary treatment has been shown to correlate with an adverse clinical outcome

  Harris A Clin Infect Dis, 1999

- This bacteria may be involved in various different infections including respiratory, urinary, wound, and blood stream infections.

Introduction

- South African studies on blood culture isolates of Pseudomonas aeruginosa show imipenem resistance rates of 31%.

  Singh-Moodley, JIDC, 2018

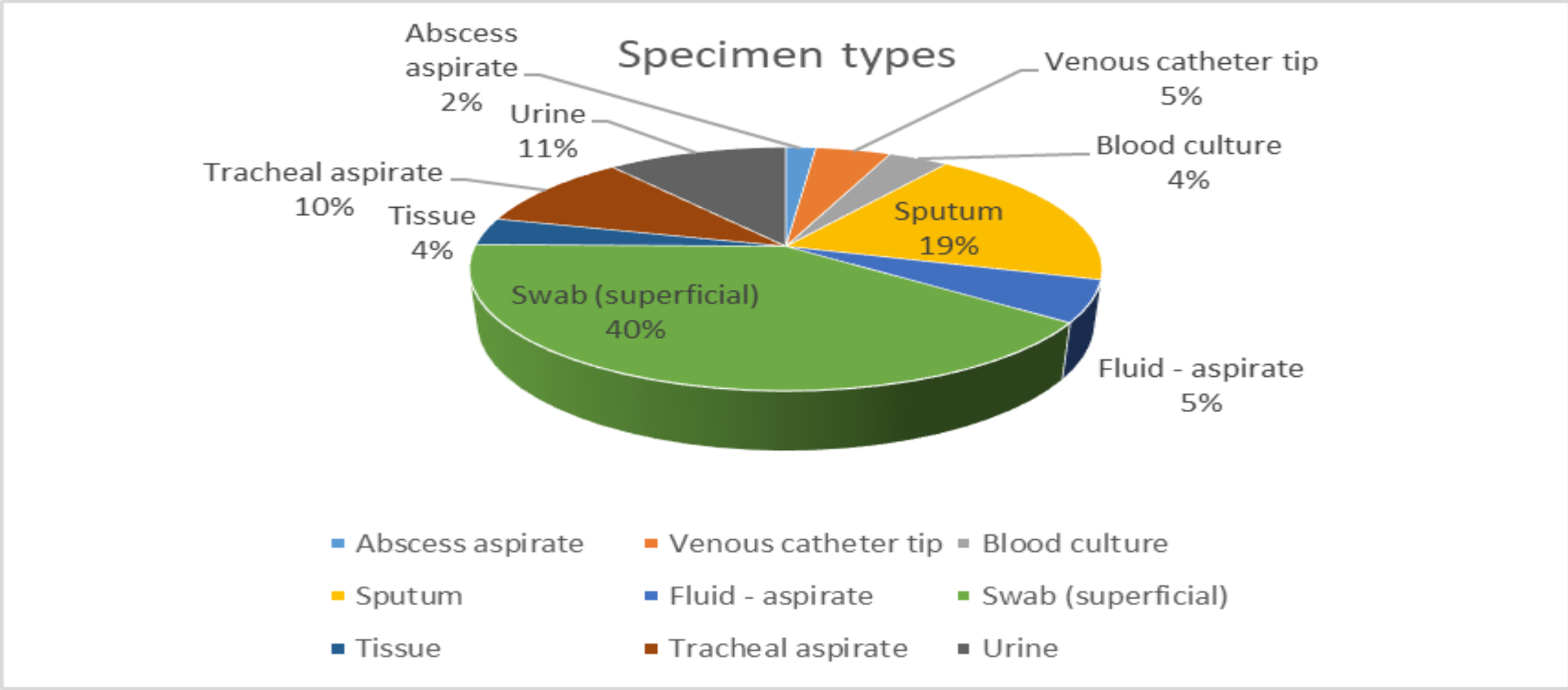
- Less is known about the resistance rates of Pseudomonas aeruginosa from specimen types other than blood cultures in South Africa.
- This study aims to describe the resistance rates of P. aeruginosa from various specimen types at King Edward VIII Hospital(KEH), a tertiary care facility.
- Imipenem use at KEH is guided by specialist prescription or microbiology results showing resistance to other classes of antimicrobials.
- By limiting unnecessary carbapenem use it is hoped that drug resistance could be curbed.

Methods

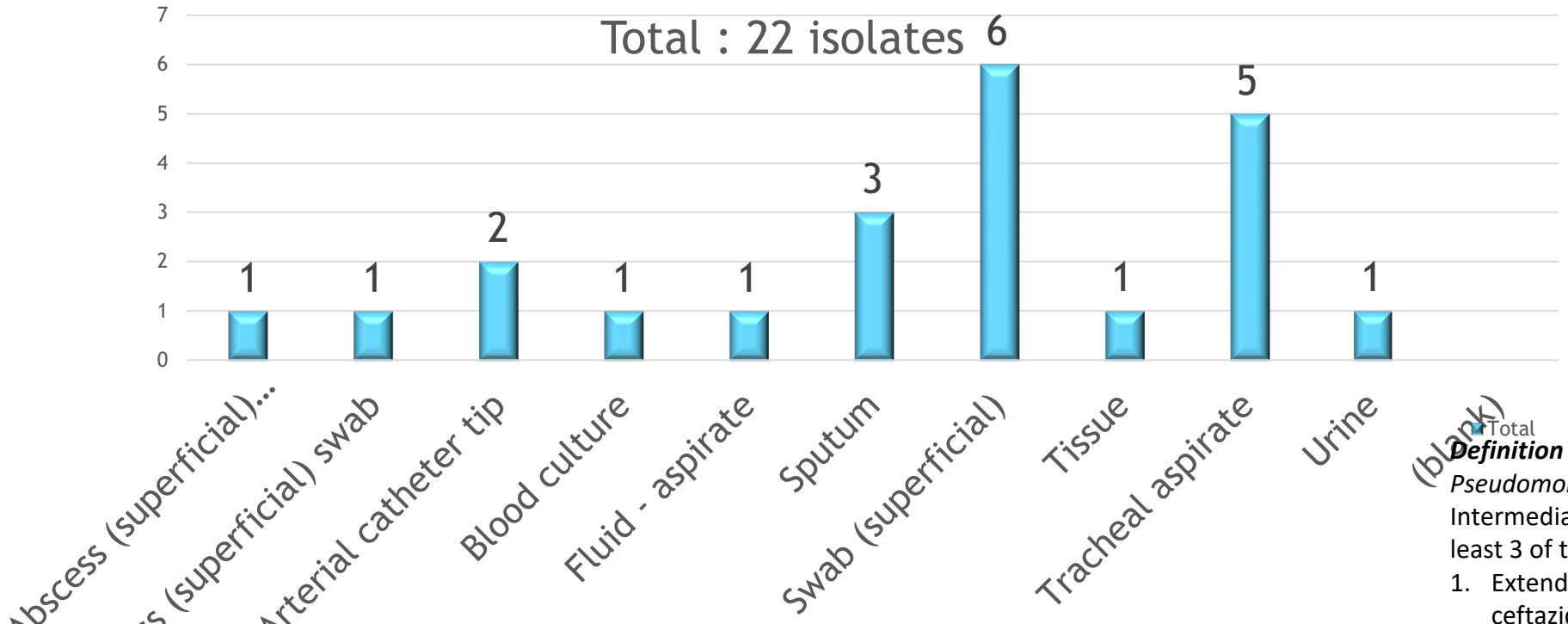
- This retrospective study was performed at the National Health Laboratory Services, King Edward VIII Hospital over a 6-month period (January-June 2018).
- Consecutive, non-duplicate Pseudomonas aeruginosa isolates from different specimen types were analyzed from the computerized database.
- Identification and susceptibility testing was performed using the Vitek 2 automated system according to laboratory standard operating procedure.

Results
Specimen types : all isolates

- A total of 108 non duplicate P. aeruginosa isolates were analyzed.



Multidrug resistant and Imipenem resistant isolates : specimen types



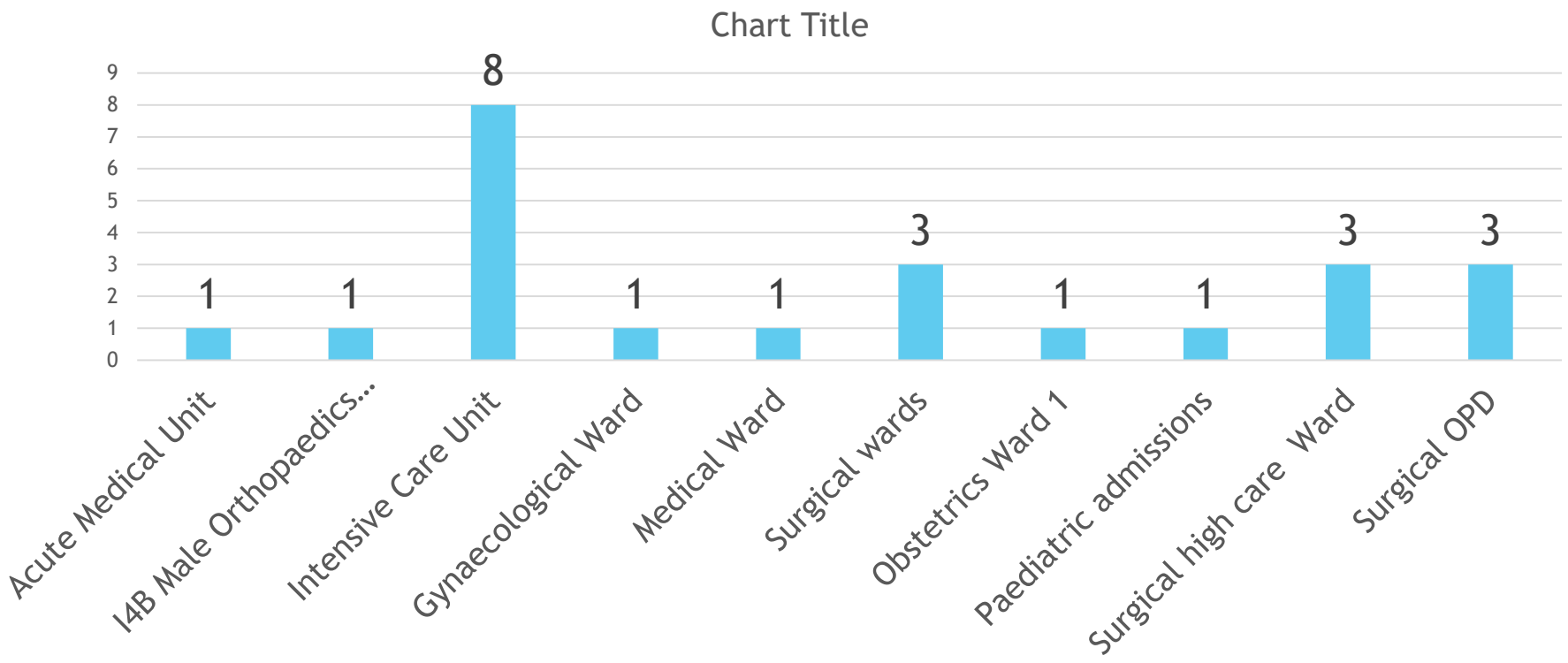
Definition of MDR

Pseudomonas aeruginosa that has tested either Intermediate (I) or Resistant (R) to at least 1 drug in at least 3 of the following 5 categories:

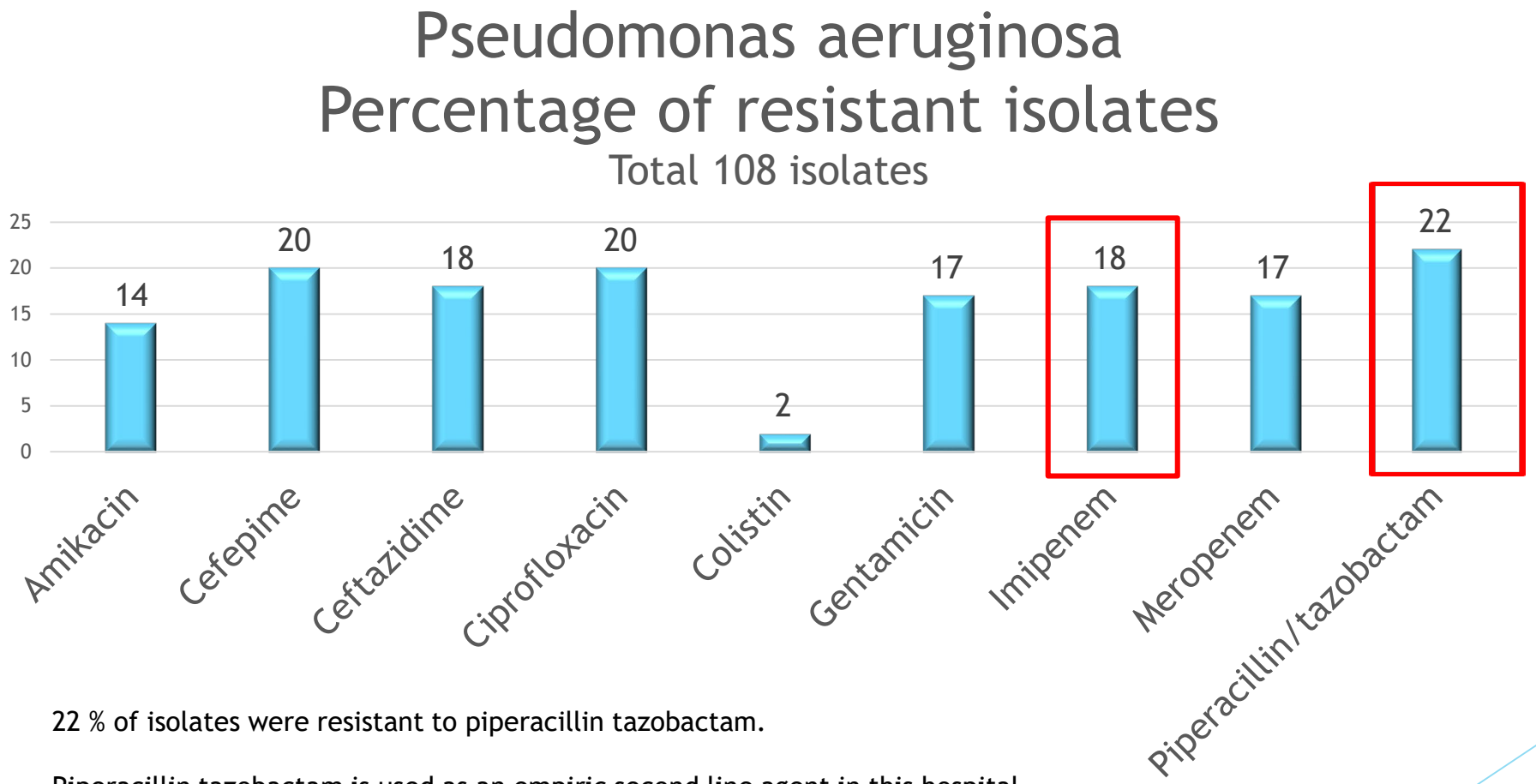
1. Extended-spectrum cephalosporin (cefepime, ceftazidime)2. Fluoroquinolones (ciprofloxacin, levofloxacin) 3. Aminoglycosides (amikacin, gentamicin, tobramycin) 4. Carbapenems (imipenem, meropenem, doripenem) 5. PIP/PIPTAZ

   (piperacillin, piperacillin/tazobactam)

Number of MDR/Imipenem resistant isolates per ward



Pseudomonal Antibiogram



22 % of isolates were resistant to piperacillin tazobactam.

Piperacillin tazobactam is used as an empiric second line agent in this hospital

18 % of isolates were resistant to Imipenem.

Results

- 19 (18%) of isolates from various specimens were resistant to imipenem.
- The majority of imipenem resistant isolates 7/19(37%) were from patients in the intensive care unit who had been given multiple courses of antibiotics.
- Resistance rates to: piperacillin tazobactam were 22 (20%); to ciprofloxacin were 21 (19%); to amikacin were 15(14%) and to ceftazidime were 19 (18%).
- There were only 4 blood culture specimens and only 1/4(25%) was resistant to imipenem.

Conclusion

- Rates of resistance to Imipenem (25%) were lower than those observed in blood cultures nationally (31%).
- The 22 % resistance to piperacillin tazobactam is similar to the 20 % found in the INFORM (International Network for Optimal Resistance Monitoring) program in the United States between 2012 and 2015.
- The presence of Imipenem resistant and multidrug resistant P. aeruginosa in superficial wounds and respiratory samples is of concern as lateral spread can occur due to poor infection control practices.
- ICU has the highest burden of pseudomonal infections, as well as of MDR P. aeruginosa isolates due to patients exposure to multiple antibiotics.
- Unnecessary carbapenem use should be discouraged to prevent antibiotic resistance.
- Continued surveillance is crucial to detect trends in resistance as well as to strengthen infection control and antimicrobial stewardship programs.