

Analysis of mixed growth urine cultures in patients undergoing endoscopic urological procedures at an Australian tertiary hospital

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Introduction & Objectives: Complex urinary tract infections and resistance patterns in the hospital are emerging. This is a challenge to clinicians in preventing post-operative sepsis in patients who require instrumentation of their urinary tract. Of particular is the result of mixed growth in the pre-operative urine culture, which poses a conundrum to treating specialists. The challenge with mixed growth is the lack of isolated organisms or sensitivities run, based on the generalised assumption that this is a contaminate and is often dismissed as so. This is not necessarily the case. The aims of our study were to:

1. Assess the prevalence of mixed growth in patients undergoing endourological procedures
2. Assess the composite of organisms in mixed growth and the type of antibiotics given peri operatively
3. Assess rates of post-operative sepsis for patients with mixed growth
4. Conduct a pilot study to assess the prevalence of multi-drug resistant organisms through the real time PCR testing of antimicrobial resistance genes for patients with mixed growth $>10^8$ organisms/L

Materials & Methods: All positive urine cultures from for Urology patients undergoing endoscopic procedures were assessed from April 2017 to July 2018. Data pertaining to antibiotic treatment pre, during and post procedure including rates of sepsis were collated. Data pertaining to the breakdown of the organisms isolated were also collated if available. As of July 2018, any positive mixed growth specimens ($>10^8$ /L) from patients for undergoing endourological procedure had real time PCR testing for antimicrobial resistance genes.

Results: A total of 213 patients were identified in a period of 12 months with positive pre-operative urine cultures, of which 102 (47%) had mixed growth. There were 41/102 (40%) with $>10^8$ organisms/L, 39/102 (38%) with 10^7 to 10^8 , and only 22/102 (22%) with $<10^7$. Some of the isolates in the mixed growths include pseudomonas, citrobacter, klebsiella, and candidia. We identified 3%(3/102) of patients with pre-operative mixed growth urine had post operative sepsis requiring prolonged hospital stay. In the prospective data, we so far have conducted PCR testing of resistance genes on nine patients of which one patient had extended spectrum beta lactamase detected.

Conclusions: Our study shows that mixed growth of organisms in pre-operative urine cultures is common amongst Urological patients. It shows that majority have high concentration of organisms ($>10^8$ /L), some of which have low susceptibilities to commonly used peri-operative antibiotic prophylaxis, and is composed of common urological pathogens. In the prospective study we have already identified PCR testing can pick up strains of multi resistant organisms in mixed growth. Further studies need to be performed to better understand the role of PCR testing, and also to create better guidelines in managing mixed growth in the pre-operative urine culture.