

Evolution of antimicrobial resistance (AMR) in patients receiving Outpatient Parenteral Antimicrobial Therapy (OPAT)

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Introduction: The use of intravenous broad-spectrum antimicrobials in the community has increased with the expansion of the Outpatient Parenteral Antimicrobial Therapy (OPAT) service. Once-daily intravenous antimicrobials at home facilitate early discharge from hospital but can be a driver in antimicrobial resistance (AMR) development.

Method: This prospective cohort study quantified carriage of gut bacteria, associated with AMR, in OPAT patients at Addenbrooke's hospital, Cambridge. 10 healthy controls and 20 patients (receiving 2 weeks of ceftriaxone/daptomycin) provided stool samples at enrolment, weekly throughout treatment and at 3 months.

We isolated bacteria with AMR from stool samples, using differential, chromogenic agar and confirmed identification (MALDI-TOF) and antimicrobial susceptibility (disc and VITEK platform.) We examined the gram-negative bacteria in samples over time, to compare changes in Minimum Inhibitory Concentration (agar dilution method, EUCAST breakpoints) for ceftriaxone, ciprofloxacin and gentamicin.

Results: 90% of ceftriaxone-receiving patients, 30% of daptomycin-receiving patients and 10% of healthy controls carried gram-negative antibiotic-resistant gut bacteria during the study, including 20% of patients at 3 months post-antimicrobial therapy. Cultured resistant bacteria included *Escherichia coli* (AmpC and ESBL producing,) *Enterobacter cloacae*, *Citrobacter freundii*, *Citrobacter amalonaticus*, *Pseudomonas aeruginosa*, *Aeromonas veronii* and *Klebsiella pneumoniae* (AmpC producing.) 70% of patients carried vancomycin-resistant *Enterococcus faecium* during the study and 15% at 3 months post-antimicrobial therapy.

Discussion: The risk of carrying gut bacteria with AMR is higher in OPAT patients compared to the general population. Broad-spectrum OPAT options are not without potential risk: Alternatives include narrow-spectrum intravenous inpatient and oral options.