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Public Health Wales

A Wee Problem

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Mr M

- 61 year old man
- Long history of large kidney stone in single right kidney
- Multiple episodes of UTI, with multiple courses of antibiotics
- Long-term antibiotic prophylaxis, including nitrofurantoin and trimethoprim

Mr M’s surgery

- Admitted on 29th Dec for laser lithotripsy of stone with insertion of ureteric stent
- Septic post-operatively
  - Treated with 7 days of piperacillin/tazobactam and gentamicin
- Clinically improved
  - Further 7 days of ciprofloxacin, then continue prophylactic trimethoprim until further procedure on 26th Jan

Mr M comes back

- Further laser lithotripsy and change of stents on 26th Jan
- Septic post-operatively
  - Started on meropenem
- Clinically improved

Mr M's positive blood culture

- Blood culture from 27th Jan flagged positive on 29th
  - GNB ?coliform from aerobic bottle
- Clinically well on meropenem
- Small fragment of stone still in-situ
  - Surgeons felt likely to pass on it's own
- WBC 21.4, neut 19, CRP 291

Mr M’s positive blood culture

- Isolate identified as *Pseudomonas aeruginosa* by MALDI-ToF
- Decreased zone sizes to all antibiotics on first line disc set
  - cip, ceftaz, imi, mero, pip/taz, gent
- Patient refusing to stay in hospital as clinically very well
  - Discharged on high dose ciprofloxacin

Initial actions

- Isolate sent for MIC determination and resistance mechanism evaluation at Specialist Antimicrobial Chemotherapy Unit
- Infection Prevention and Control team informed
  - Recent admissions reviewed to determine number of patients exposed to potential multi-drug resistant organism (MDRO)
  - Patient isolated in cubicle and nursed with strict contact precautions

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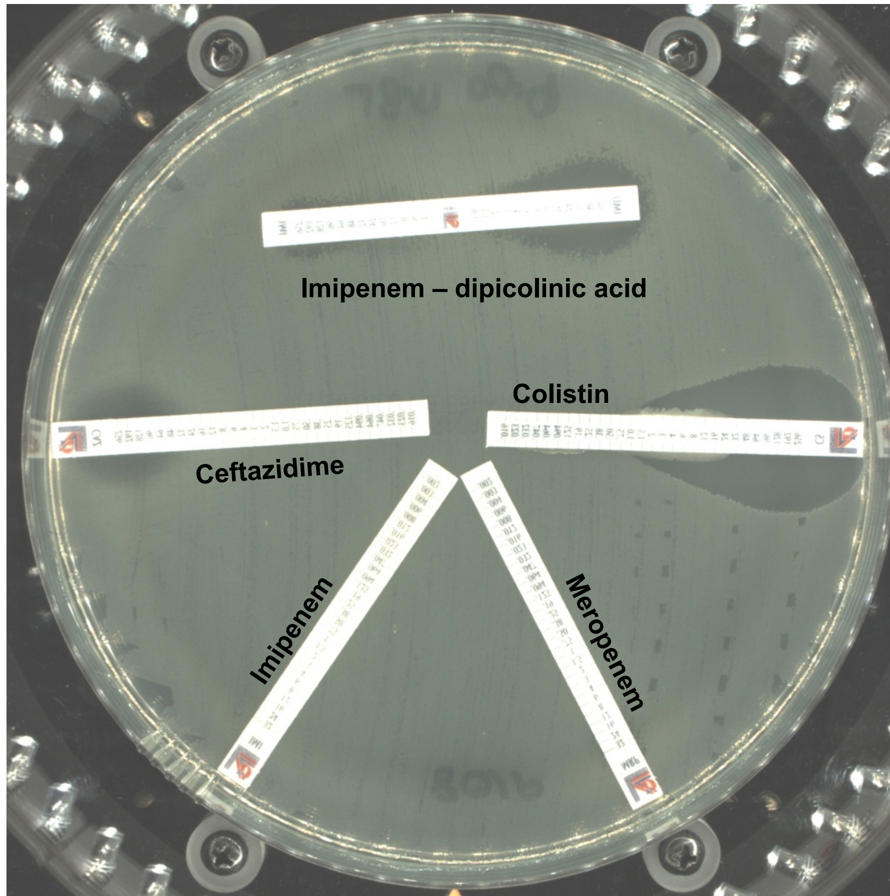
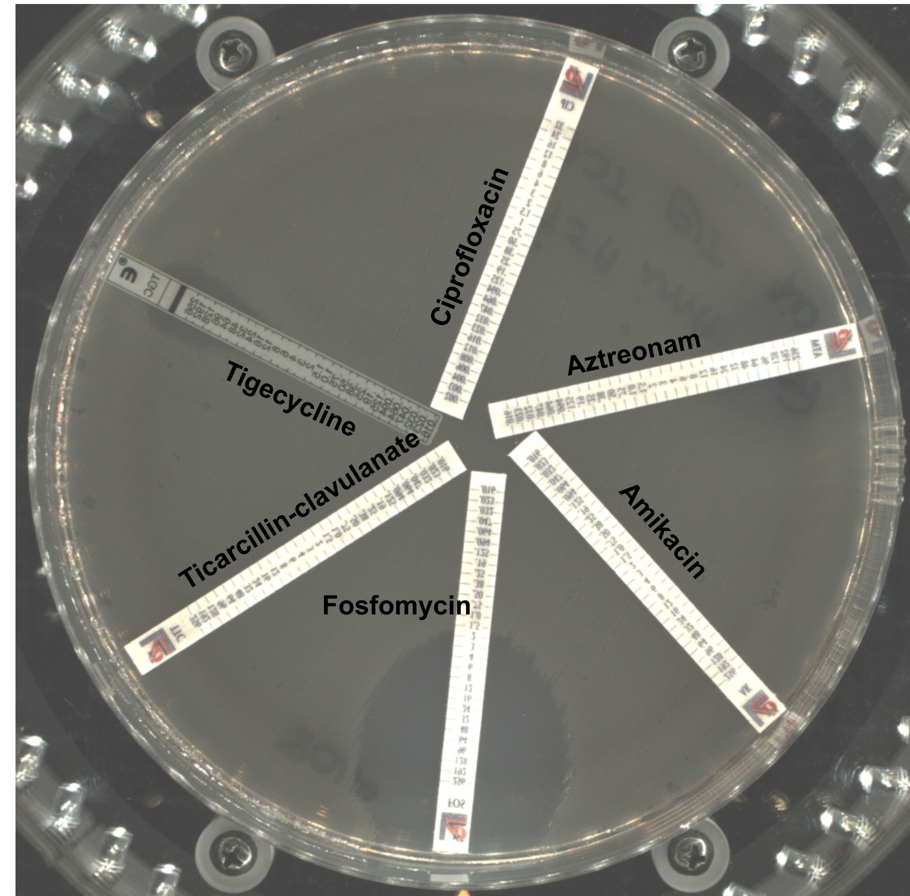
SACU results

- MIC results (E-test)
  - Ceftazidime >256mg/L – Resistant
  - Imipenem >32mg/L – Resistant
  - Meropenem >32mg/L – Resistant
  - Colistin 1mg/L – **Susceptible**
  - Amikacin >256mg/L – Resistant
  - Aztreonam 48mg/L – Resistant
  - Ciprofloxacin >32mg/L – Resistant
  - Doxycycline >256mg/L – No clinical breakpoint available
  - Fosfomycin 3mg/L – No clinical breakpoint available
  - Piperacillin/tazobactam 128mg/L – Resistant
  - Ticarcillin/clavulanate >256mg/L – Resistant
  - Tigecycline 48mg/L – No clinical breakpoint available
  - Tobramycin >256mg/L – Resistant

Phenotypic tests





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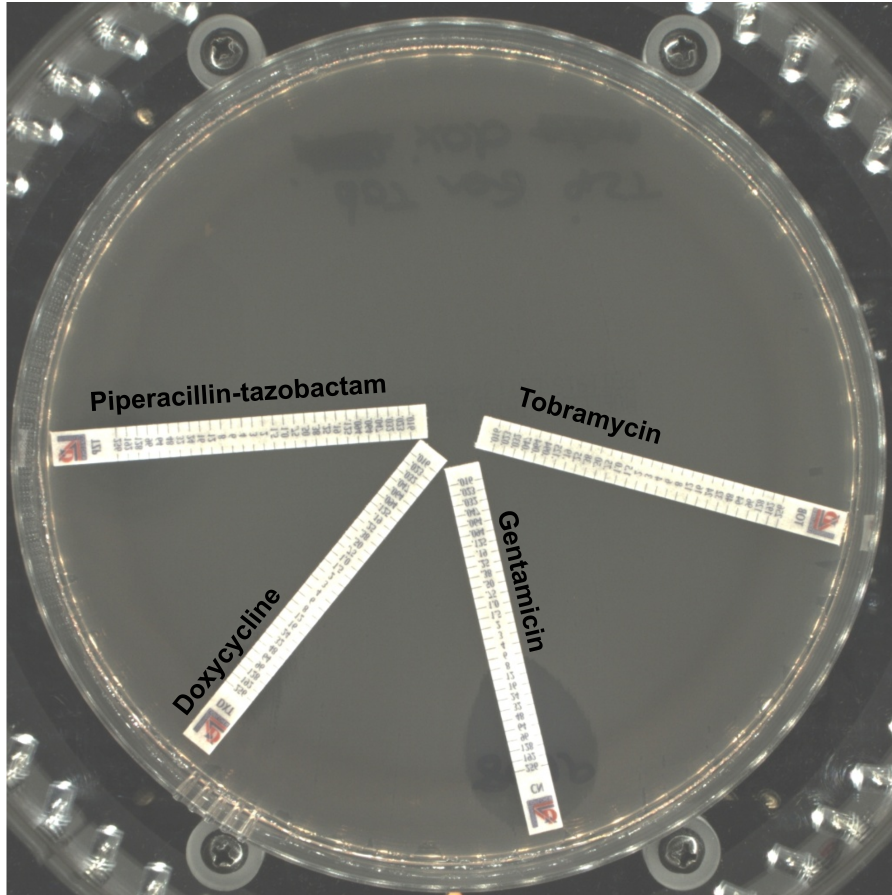
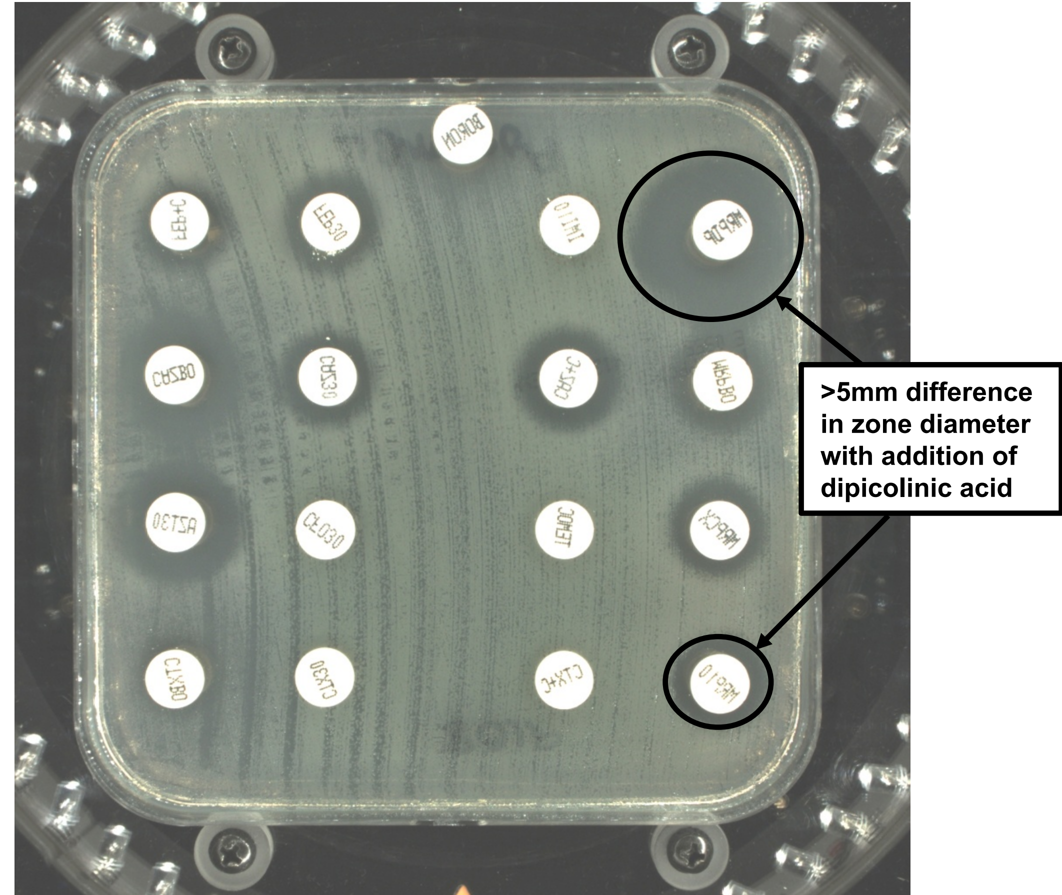
Phenotypic tests





SACU results

- Gradient strip and ROSCO interpretation
  - Inhibition of carbapenem resistance by dipicolinic acid
- Genotypic tests
  - VIM positive by PCR

Mr M comes back

- Readmitted overnight on 15th Feb
  - Septic
  - CT showed severe hydronephrosis due to obstruction by multiple renal stones
  - Started on meropenem and gentamicin
  - Ureteric stent inserted as emergency to relieve obstruction
  - Admitted into cubicle with contact precautions

Mr M deteriorates

- Ongoing clinical deterioration
  - Remains septic and pyrexial on meropenem
  - Gentamicin stopped due to worsening acute kidney injury
- IV colistin added
- Rapid clinical improvement

Mr M gets the runs

- Develops diarrhoea on 16th Feb
  - 5 episodes type 7 stool
- Stool sample sent 17th Feb
  - GDH positive, CDT positive

Clinical conundrum

- Problem 1
  - Carbapenemase –producing *P.aeruginosa* bacteraemia
- Problem 2
  - *C.difficile* associated diarrhoea
- Need to balance appropriate antibiotic treatment for bacteraemia against risk of perpetuating or worsening CDAD

Antibiotic plan

- Stop meropenem
  - Broad spectrum antibiotic likely to worsen CDAD
- Continue IV colistin
  - Only antibiotic with microbiological evidence of effectiveness against *P.aeruginosa* in bloodstream
- Start oral vancomycin
  - CDAD assessed as moderate severity, but multiple other medical issues

Mr M remains in hospital

- Continues to pass stone fragments
- Clinically well on IV colistin
- Renal function improving
- Diarrhoea improving
- Remains isolated with contact precautions

Ongoing antibiotic plan

- Further procedure for lithotripsy, stone retrieval and stent change
- Remain well and apyrexial post-operatively on colistin and oral vancomycin
- Added oral fosfomycin for further antibiotic cover as remaining stones likely to provide ongoing source of infection

Mr M goes home

- Stents removed and no further procedures planned
- Colistin stopped after 10 days
- Oral fosfomycin to continue for one month to reduce chance of further symptomatic infection

Main clinical issues

- Carbapenemase producing *P.aeruginosa* likely secondary to extensive previous antibiotic exposure
  - Limited treatment options for patient presenting significantly unwell
  - Requires isolation and strict infection control practices
  - Complicated by antibiotic-related CDAD

Thanks for listening

- Questions?