Bacteroides
not that fragile
A CASE REPORT

Ana Soares, 01/12/2017
History

48 years old male

- Infected pressure ulcers overlying his buttock areas
- Previous admissions for treatment of right ischial osteomyelitis
- Previous antibiotics
  - Co-Amoxiclav
  - Ceftriaxone
  - Piperacillin-Tazobactam
  - Clindamycin
Past medical history

- Spastic paraparesis of neuromyelitis optica diagnosed in 2013
  - Now bedbound
- Previous pulmonary embolism + deep vein thrombosis
  - Rivaroxaban
- Monoclonal gammopathy of unknown significance
- Oropharyngeal dysphagia
- Anaemia and hypoalbuminaemia
- Long term urinary catheter (urinary retention)
- Safeguarding issues (non-compliance with medical and nursing interventions)

Ana Soares, 01/12/2017
<table>
<thead>
<tr>
<th>Observations / Investigations</th>
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</thead>
<tbody>
<tr>
<td><strong>On examination</strong></td>
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<tr>
<td>- Blood pressure 95/63 mmHg</td>
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<tr>
<td>- Grade IV pressure ulcer both buttocks</td>
</tr>
<tr>
<td>- discharging pus</td>
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<tr>
<td>- surrounding cellulitis</td>
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<tr>
<td><strong>Blood tests</strong></td>
</tr>
<tr>
<td>- WBC: 5.33x10^9/L</td>
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<tr>
<td>- CRP: 243mg/L</td>
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</table>

**Ceftriaxone + Clindamycin**
Culture results

Wound swab
- *P. mirabilis*
  - S Ceftriaxone
  - (R Co-Amoxiclav)
- *E. faecalis*
  - S Amoxicillin
Evolution

Day 8
- Septic
  - Blood pressure 95/70 mmHg
  - Heart rate 119
  - Afebrile
- Blood cultures taken

Day 10
- Still not improving
- No culture results yet

Gentamycin added

Ceftriaxone → Ertapenem
(Clindamycin stopped)

From anaerobic bottle of blood culture:
*Bacteroides vulgatus* (S Metronidazole)
Evolution

Day 13
- Deteriorating
- Transferred to ICU

  + Teicoplanin

- Improved
- After 2 days stepped down to the ward

Day 20
- Again deteriorating
- Septic
  - febrile (39.3°C)
  - GCS 8/15
- Transferred to ICU

Ertapenem → Meropenem
  + Gentamycin
Magnetic resonance imaging

- Deep ulceration and a sinus tract of the left buttock extending to the posterior hip joint with likely septic arthritis and osteomyelitis within the great trochanter.
- Several soft tissue defects, some with gas, overlying the sacrum, insufficiency fractures involving the right sacral alar, superior and inferior pubic rami, and also a left femoral neck fracture.

Computed Tomography scan

- Large soft tissue defect of the left buttock extending to and communicating with the hip joint and left femoral fracture site, with a complex collection centred on the joint
CT scan
CT scan
Blood cultures

From anaerobic bottle (2 out of 4 bottles):

*Bacteroides thetaiotaomicron* (S Metronidazole)

Metronidazole started
Bacteroides sp

General features

- Gram negative rods
- Anaerobes
- Non-spore forming
- Predominant organisms in gastrointestinal tract normal flora
- Metabolize different types of sugars
- Adapt to different environments
- Complex interaction with intestinal cells and immune system
- Fundamental role in balance of gut microbiome
**Bacteroides sp**

**Virulence (++B. fragilis)**
- Adherence
- Relative aerotolerance
- Enterotoxin (some strains)
- Lipopolysaccharides and capsular polysaccharides of varying structure
- Interaction with other pathogens
- Resistance mechanisms to all classes of antibiotics

**Infection sites**
- Intra abdominal
- Gynaecological
- Skin and soft tissue
- Bone and joint
- Lung
- Brain
- Blood
Bacteroides thetaiotaomicron

More predominant than B. fragilis in gastrointestinal tract flora
Less frequently isolated as a pathogen

Proportion of anaerobic infections that involve particular species of Bacteroides - Wadsworth Anaerobe Collection database (> 3000 clinical specimens from which a Bacteroides species was isolated)

Wexler, HM; Clinical Microbiology Reviews, 2007; 20: 593-621
<table>
<thead>
<tr>
<th>Antimicrobial</th>
<th>MIC</th>
<th>Susceptibility Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metronidazole</td>
<td>0.094</td>
<td>Susceptible</td>
</tr>
<tr>
<td>Co-amoxiclav</td>
<td>&gt;256</td>
<td>Resistant</td>
</tr>
<tr>
<td>Piperacillin/Tazbactam</td>
<td>12.0</td>
<td>Intermediate</td>
</tr>
<tr>
<td>Meropenem</td>
<td>4.0</td>
<td>Intermediate</td>
</tr>
<tr>
<td>Clindamycin</td>
<td>&gt;256</td>
<td>Resistant</td>
</tr>
<tr>
<td>Chloramphenicol</td>
<td>12.0</td>
<td>Resistant</td>
</tr>
<tr>
<td>Linezolid</td>
<td>8.0</td>
<td>No breakpoint data available</td>
</tr>
<tr>
<td>Moxifloxacin</td>
<td>&gt;32</td>
<td>No breakpoint data available</td>
</tr>
<tr>
<td>Tigecycline</td>
<td>0.5</td>
<td>No breakpoint data</td>
</tr>
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**B. thetaiotaomicron**

MDR (Multidrug-resistant)
Further management

- Girdlestone procedure
  - Excision of the left femur head and extensive soft tissue debridement

- Tissue sample
  - *Pseudomonas aeruginosa*
    - S Ceftazidime, S Piperacillin/Tazobactam, R Meropenem
  - *Enterococcus faecium (VRE)*
    - S Daptomycin, S Linezolid, R Teicoplanin, R Vancomycin
Further management / outcome

- Plan for 12 weeks of antibiotics
  - *Piperacillin/Tazobactam + Daptomycin*
  - Aspiration pneumonia

- Discharged after 9 weeks
- Completed 3 more weeks of treatment as outpatient
  - *Ceftazidime + Daptomycin*

- One month later readmitted with urosepsis, developed aspiration pneumonia and died after two weeks.
Summary

- 48M, complex past medical history
- Several courses of antibiotics
  - Co-Amoxiclav, Ceftriaxone, Piperacillin/Tazobactam, Clindamycin
- Sepsis
  - Not fully resolving despite treatment escalation
    - Ceftriaxone + Clindamycin + Gentamycin
    - Ertapenem + Teicoplanin
    - Meropenem + Gentamycin
- Complex skin/soft tissue/bone/joint polymicrobial infection
  - Aggressive surgical treatment
  - Prolonged antibiotic treatment
    - Inpatient: 2/52 Metronidazole + 9/52 Piperacillin/Tazobactam + Daptomycin
    - Outpatient: 3/52 Ceftazidime + Daptomycin
Think Bacteroides

- Patients on long term antibiotic treatments more likely to be colonized with resistant strains

- Metronidazole - still the best option?
  - increasing reports of resistant strains

- Susceptibility testing and surveillance of clinically significant bacteria is already in place for most significant pathogens
Acknowledgments
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Thank you!