Spondylodiscitis in an imported Romanian rescue dog – an emerging zoonotic risk to humans

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Introduction

• Telephone call – 15 Mar 2017
Outline

• Case report
• The causative agent
• Outbreak team and investigation
• Human infection risk assessment
• Lessons learnt
The patient

• April 2016 – an 18-month-old Romanian "rescue" dog presented to a veterinary clinic in Leicestershire
• Intermittent signs of pain when rising from a sitting position
• Plain radiography was performed in November
Long bones
Thoracolumbar lateral  Nov 2016
D12  D13
Management

• Working diagnosis: spondylodiscitis
• Treatment with amoxicillin/clavulanate for 15 weeks
• Clinical signs resolved with treatment
• Recurred within a month after stopping
Repeat thoracolumbar lateral  Feb 2017
Before amoxicillin/clavulanic acid (Nov 2016)

After amoxicillin/clavulanic acid (Feb 2017)
dos les decepciona la negatividad de tal exploración radiológica, sobre todo porque el resultado negativo del roentgenograma contrasta paradójicamente ante la rica semiología del enfermo. Acontece no rara vez que son precisamente estas formas agudas, rápidamente evolutivas, las que llegan a resolverse antes de que...
Further investigation

• Blood cultures drawn 24 Feb 2017, sent to laboratory 1 for analysis
• Day 7 of incubation: Gram negative coccobacilli seen

• MALDI-TOF identification: *Brucella melitensis*

• Isolate sent to laboratory 2 for confirmation
• Repeat MALDI-TOF: *Brucella melitensis*
Notification

• Public Health England (PHE) notified

• An incident management team was convened:
  • Regional PHE representatives and consultant in health protection
  • Brucella Reference Unit (BRU)
  • Animal and Plant Health Agency (APHA)
  • PHE Gastrointestinal, Emerging and Zoonotic Infections
  • Department of Environment, Food & Rural Affairs (DEFRA)
  • PHE Field Epidemiology Services
  • PHE Colindale
  • Representatives from laboratory 1
  • Representatives from laboratory 2
  • PHE Communications

• Isolate sent to APHA – identified as *Brucella canis* (phenotypic & genotypic methods)
Brucella canis

• Mainly infects canines
• Usual manifestation is genital infection (orchitis, epididymo-orchitis, infertility) and abortion
• Not detected by standard Brucella antibody testing
• Human transmission
  • Uncommon
  • Not usually severe
  • Contact with dogs during birthing
  • Laboratory exposure
• 2 other canine cases reported in the UK in 2017 (prior to this, only 1 case reported)
Risk assessment

- Two laboratories

Brucella Reference Unit (BRU) website
https://www.gov.uk/government/collections/brucella-reference-unit-bru
Possible laboratory exposure to *Brucella*

- Exposure NOT in bacteriology laboratory (e.g., exposure in haematology, biochemistry, blood sciences)
  - NO risk
    - Reassure

  *Specific risks include:*
  - Sniffing bacteriological cultures
  - Direct skin or mucous membrane contact
  - Present when aerosols generated

  **HIGH risk:**
  - Specific risk identified*
    - Individual near (<5 feet) if work on *Brucella* performed on open bench
    - Individual present in laboratory during *Brucella* aerosol generating event
  - Send serology to BRU at: ↑
    - 0 weeks (baseline)
    - 6 weeks
    - 24 weeks
  - Administer post-exposure prophylaxis
Laboratory exposure to *Brucella*

**Exposure in bacteriology laboratory**

**HIGH risk:**
- Specific risk identified*
- OR
- Close (<5 feet) if work on *Brucella* spp.
- Work performed on open bench
- OR
- Stay in laboratory during *Brucella* spp. aerosol generating event

**LOW risk:**
- Other staff in the laboratory at the time of manipulation on open bench but NO high risk exposures

Send serology for **local** storage at: ¥
- 0 weeks (baseline)
- Only send to BRU for testing if becomes symptomatic

*For post-exposure prophylaxis*
HIGH risk:
Specific risk identified* 
OR 
Individual near (<5 feet) if work on *Brucella* spp. performed on open bench 
OR 
Individual present in laboratory during *Brucella* spp. aerosol generating event

Send serology to BRU at: †
- 0 weeks (baseline)
- 6 weeks
- 24 weeks

Administer post-exposure prophylaxis

*Only send if exposure occurred in past 6 weeks.
†Serology should be performed at baseline, at 6 weeks, and at 24 weeks if exposure occurred in past 6 weeks.
Tasks include:
- bacteriological cultures
- skin or mucous membrane
- when aerosols generated

Administer post-exposure prophylaxis

Send serology to BRU at: 🔹
- 0 weeks (baseline)
- 6 weeks
- 24 weeks

Pregnant or possibly pregnant (all cases must be discussed with BRU):
Rifampicin 600mg once daily for 21 days
OR
Rifampicin 600mg once daily with trimethoprim-sulfamethoxazole 160/800mg twice daily and folic acid supplements for 21 days
OR
Ciprofloxacin 500mg twice daily for 21 days
OR
Observation only

Send serology for local storage at: ¥
- only send to BRU for testing if becomes symptomatic
## UK (PHE) vs US (CDC) guidelines

<table>
<thead>
<tr>
<th></th>
<th>UK</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PEP</strong></td>
<td>Doxycycline monotherapy</td>
<td>Combination – doxycycline + rifampicin</td>
</tr>
<tr>
<td><strong>High risk serology</strong></td>
<td>0, 6, 24 weeks</td>
<td>0, 6, 12, 18, 24 weeks</td>
</tr>
<tr>
<td><strong>Low risk serology</strong></td>
<td>Baseline only</td>
<td>0, 6, 12, 18, 24 weeks</td>
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</table>
Rationale

- Compliance with intensive serology testing is poor in low risk patients
- Symptoms often precede seroconversion


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<table>
<thead>
<tr>
<th>Source</th>
<th>No. exposed (n = 167)</th>
<th>No. with LAB (n = 71)</th>
<th>Attack rate (%)</th>
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<tbody>
<tr>
<td>Risk class</td>
<td></td>
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<tr>
<td>High risk</td>
<td>82</td>
<td>36</td>
<td>44</td>
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<td>No PEP</td>
<td>49</td>
<td>36</td>
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<tr>
<td>Low risk</td>
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<td>4</td>
<td>8</td>
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<tr>
<td>No risk(^a)</td>
<td>4</td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>Unknown</td>
<td>29</td>
<td>27</td>
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PEP

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<tr>
<th>PEP</th>
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<tbody>
<tr>
<td>Yes</td>
<td>34</td>
<td>0</td>
<td>0</td>
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<tr>
<td>No</td>
<td>128</td>
<td>66</td>
<td>52</td>
</tr>
<tr>
<td>Unknown</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) “No risk” refers to workers who do not meet the CDC’s high- or low-risk exposure criteria (17).

Traxler *et al.* 2013. A literature review of laboratory-acquired brucellosis
Exposed individuals

• Laboratory 1
  • 12 exposed
    • 4 low risk – baseline serology
    • 8 high risk (3 of which sniffed plates) – serology follow up and offer prophylaxis
      • 6 received doxycycline
      • 1 intolerant of doxycycline
      • 1 pregnant

• Laboratory 2
  • Handled in CL 3 conditions – no risk

• Veterinary exposure – low risk (baseline serology)
• Household exposure – low risk (information only)
Brucellosis: factsheet for laboratory exposure

Introduction

Brucellosis is an infection that humans can get from animals (a zoonosis). It is rare in the UK, and cases are almost always acquired abroad.

Brucellosis can be acquired through various ways:
- eating or drinking unpasteurised dairy products contaminated with brucellosis (most common)
- breathing in brucella organisms in a laboratory or in a slaughterhouse
- contact with infected animals leading to bacteria entering through the skin or mucous membranes

Laboratory workers are at risk of becoming infected from laboratory specimens, usually from working on cultures of Brucella in the bacteriology laboratory.

Is there a risk that I will get brucellosis?

If there has been an exposure to Brucella in your workplace, your manager will work with Public Health England and other national organisations to identify individuals who may be at risk of developing brucellosis. Depending on what you were doing at the time the brucella cultures were handled, you will be told whether your exposure was of low or high risk. High risk exposures usually involve being in close proximity to the cultures or selling the plates.

I have been told that my exposure was "low risk"

If your exposure was low risk, then you will have a blood sample taken. This will be stored for future testing if needed. If you develop any of the symptoms of brucellosis (see below), then you should contact the nominated physician (you will be informed who this is) or your GP. With your consent, your GP will be informed of your exposure. You do not need to take any antibiotics after a low risk exposure.

I have been told that my exposure was "high risk"

If your exposure was high risk, then you will have a blood sample taken when you are first seen by your nominated physician (you will be informed who this is). You will

GP letter:

Dear Dr,

Re: Patient details

I am writing to inform you that Mr/Ms_________ has potentially been exposed to Brucella at their workplace. Public Health England has been informed. After assessing the risk of the exposure, the risk is deemed to be LOW/HIGH. Patients with high risk exposures will be seen by an Infectious Diseases consultant who will advise on management.

Brucellosis should be a possible diagnosis if your patient presents with compatible signs/symptoms (see below for further information), particularly an unexplained febrile illness and/or bone or joint pain.

Yours sincerely,

Further information

NHS choices - [http://www.nhs.uk/Conditions/brucellosis/Pages/Introduction.aspx](http://www.nhs.uk/Conditions/brucellosis/Pages/Introduction.aspx)

GOV.uk - [https://www.gov.uk/guidance/brucellosis](https://www.gov.uk/guidance/brucellosis)

CDC.gov - [https://www.cdc.gov/brucellosis/index.html](https://www.cdc.gov/brucellosis/index.html)
Brucella canis
Holland

https://resource.wur.nl/en/show/Rescuing-a-puppy-abroad-can-be-dangerous-.htm
Imported dog diseases – a dog is not just for Xmas
Selected zoonotic infections from dogs

- *Bordatella bronchiseptica*
- *Echinococcus granulosus/multilocularis*
- Giardiasis
- Leishmaniasis
- Leptospirosis
- Lyme disease, ehrlichiosis, babesiosis
- MRSA
- Rabies
- *Streptococcus canis*
Selected zoonotic infections from dogs

• *Bordatella bronchiseptica*
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• Lyme disease, ehrlichiosis, babesiosis
• MRSA
• Rabies
• *Streptococcus canis*
Lessons learnt

• Always take a travel history
• Imported dog diseases
• Health & safety policy in all labs
• *Brucella canis*
  • Epidemiology poorly understood
  • Greatest risk to humans is through:
    • Laboratory exposure
    • Vet assistance in birthing
  • Not picked up by standard *Brucella* serology
What happened to the dog?
Acknowledgements

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• Jeremy Morgan

References


