Multiorgan Failure from Brucella-Induced Thrombotic Microangiopathy, Pancarditis, and Neurobrucellosis

Anson Chung-Ho Lee[1,2], Wing-Sze Cindy Tse[2]

[1]Department of Microbiology, School of Clinical Medicine, Li Ka Shing Faculty of Medicine, The University of Hong Kong, Hong Kong Special Administrative Region, China

[2]Department of Pathology, Kwong Wah Hospital, Hong Kong Special Administrative Region, China

HKU Med School of Clinical Medicine Department of Microbiology 香港大學微生物學系

醫院管理局 HOSPITAL AUTHORITY

廣華醫院 Kwong Wah Hospital

Introduction

- Brucellosis is rare in low-prevalence regions like Hong Kong.
- We describe a triad of **neurobrucellosis**, **pancarditis** and **thrombotic microangiopathy** in a young immunocompetent patient.
- While neurological and cardiac involvement in brucellosis are well-recognised, Brucella-induced TMA remains rare.

Case Presentation

M/23 Data engineer

- Unremarkable past health.
- Travelled to Fukuoka, Japan 1 week prior to admission.
  - No history of animal contact, intake of unpasteurised milk or undercooked food.
- Family owns a French restaurant.

3 days pre-admission
- Gradual onset of malaise, headache and vomiting

Admission
- Fever
- Generalised tonic-clonic convulsions
- Confusion
- Haemodynamically unstable SVT requiring inotropic support

Post-admission
- **Multiple organ failure**: anuric AKI, hepatitis, myocardial injury, rhabdomyolysis, thrombocytopenia
- **Schistocytes** seen on blood film persistently
- **Haptoglobin undetectable**
- **PT and APTT normal**; **ADAMTS13 activity preserved**

Treatment Progress
- Significant improvement with combination antibiotics
- The hospital stay was complicated by critical illness neuropathy requiring intense rehabilitation
- Discharged after 3 months of hospitalisation

Follow-up
- Prior to discharge (3 months post-admission)
  - MRI brain: resolution of all lesions
  - Echocardiogram: resolution of valvular vegetation and pericardial effusion
  - MRI heart: unremarkable

Completed 6 months of antibiotics

2 years post-discharge
- No recurrence of symptoms
- Able to return to work
- All blood tests remained unremarkable

Brucella Serology (SAT)

	D4	D12	D14	D118
Brucella abortus Ab	<1:20	**1:160**	1:80	1:20
Brucella melitensis Ab	<1:20	**1:160**	1:80	1:20

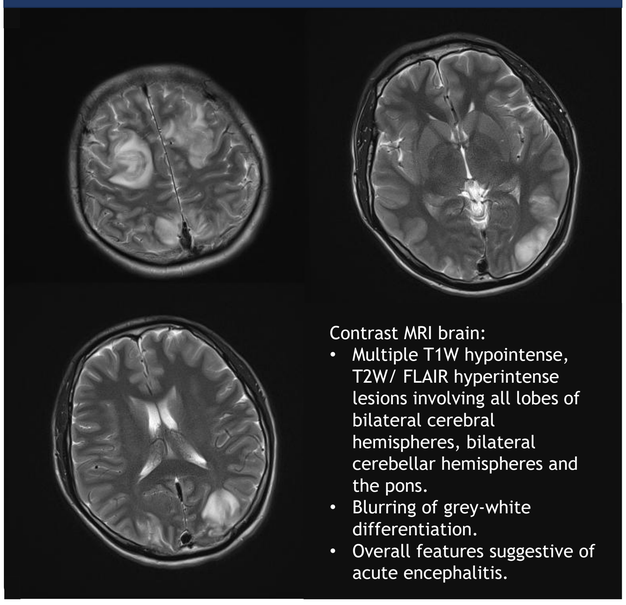
Other Microbiological Investigations

- Blood, urine, respiratory specimen, CSF, bone marrow cultures were **negative**.
- Workup for tuberculosis was **negative**.
- Blood and CSF x 16S rRNA gene sequencing was **negative**.
- Anti-HIV was **negative**.
- Investigations for various viral (e.g. HAV, HBV, HCV, HEV, EBV, CMV, Dengue virus, Japanese encephalitis virus, Hantavirus, SFTSV) and bacterial pathogens (e.g. *Rickettsia* spp., *Leptospira interrogans* , *Coxiella burnetii*) were all **negative**.

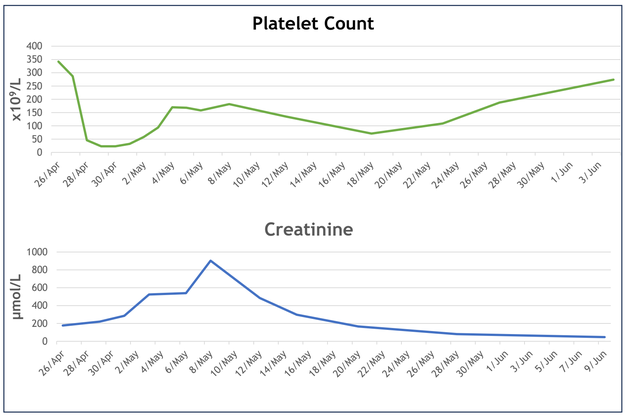
Immunological Investigations

- Comprehensive workup showed **no evidence of underlying autoimmune diseases or immunodeficiencies**.
- **Complement-mediated TMA was excluded** based on normal CH50, AH50, and soluble C5b-9 levels, and negative anti-factor H antibodies.

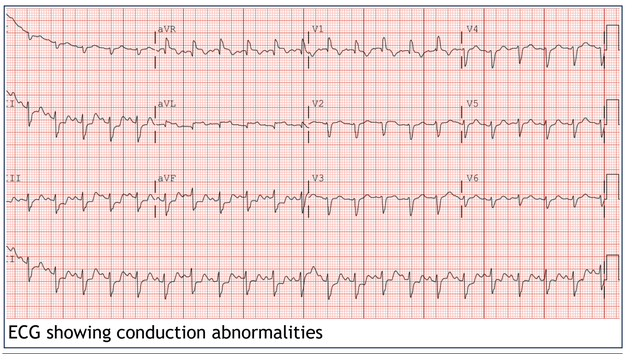
Investigations



Contrast MRI brain:
- Multiple T1W hypointense, T2W/ FLAIR hyperintense lesions involving all lobes of bilateral cerebral hemispheres, bilateral cerebellar hemispheres and the pons.
- Blurring of grey-white differentiation.
- Overall features suggestive of acute encephalitis.



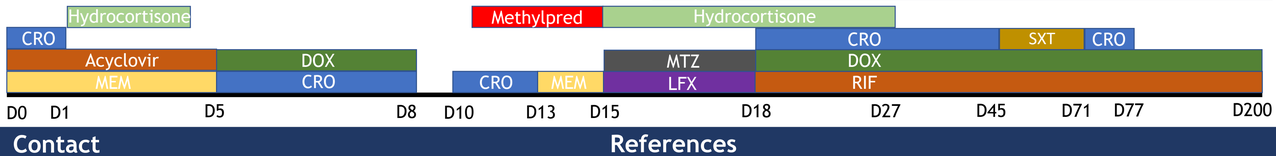
Transthoracic echocardiogram
- Thickening of the mitral valve leaflet with a non-oscillating mass ~0.9x1.1cm attached to the posterior mitral valve leaflet
- Rim of pericardial effusion without tamponade effect
- No significant valvular regurgitation



ECG showing conduction abnormalities

Discussion

- The diagnosis of brucellosis was made based on compatible clinical manifestations combined with Brucella antibody titre of **≥1:160** by standard agglutination test with **≥8-fold rise in titre**.
- Extensive microbiological and immunological workup demonstrated **cross-reactivity** causing a false-positive Brucella serology was **unlikely**.
- Excluding primary causes of TMA, such as thrombotic thrombocytopenic purpura (TTP) and complement-mediated TMA is essential, as disease-specific treatments are available.
- **Targeted antibiotic therapy** is the cornerstone of treatment for brucellosis. **Therapeutic plasma exchange** can be considered as an adjunctive measure in severe cases of TMA.



Contact

Anson Chung-Ho Lee

Email: ansonchl@hku.hk

References

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