CASE REPORT

Typhoid fever, complicated by myocarditis, in a traveller returning to the UK

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SUMMARY

A 25-year-old male returning traveller presented with sudden onset chest pain. An ECG showed infero-lateral ischaemic changes, with an elevated troponin and inflammatory markers. An echocardiogram showed a normal size left ventricle, dynamic systolic function, structurally normal valves and no regional wall motion abnormality. Angiography revealed normal coronary arteries. A diagnosis of myocarditis was made. Five days later, he developed a significant pyrexia and diarrhoea. *Salmonella typhi* was isolated from blood cultures. The fever and symptoms resolved after 2 weeks of an intravenous third generation cephalosporin and the patient was discharged.

BACKGROUND

With increasing globalisation and intercontinental travel, significant pathogens from developing countries require clinical vigilance in travellers returning from endemic areas. The presentation in this particular case, initially mimicked an acute coronary syndrome and thereafter features more commonly associated with the gastrointestinal symptoms of *Salmonella typhi*. Additionally, the isolated bacterial pathogen in this case is an uncommon cause of myocarditis, a likely explanation for the patient's initial symptomology.

CASE PRESENTATION

A 25-year-old Asian male presented via the emergency department with central chest pain which woke him from sleep. The pain radiated to the right arm and was associated with bilateral arm numbness. The pain eased with aspirin and nitrates. He had travelled to Pakistan 2 months previously and was treated for an unspecified gastrointestinal illness while abroad. He took no regular medication. On admission he was afebrile at 35.8°C, not tachycardic (pulse 70/min) or tachypnoeic, and haemodynamically stable (blood pressure 105/65 mm Hg). The abdomen was initially soft and non-tender with no visceromegaly or adenopathy.

Following coronary angiography the patient became pyrexial (38.5°C) and developed watery diarrhoea. At this time, he developed discomfort on deep palpation in the right hypochondrial region. Bowel sounds were unremarkable and there remained no lymphadenopathy or visceromegaly.

The patient was initially treated as having an acute coronary syndrome, but following a normal angiogram and development of infective symptomology, the focus moved to a diagnosis of toxic myocarditis.

From day 5 he remained markedly pyrexial (figure 1).

INVESTIGATIONS

An electrocardiogram showed T-wave inversion infero-laterally. Chest radiography was normal. Blood tests revealed a raised troponin 2.16 µg/l (normal range 0–0.04), white cell count $6.5 \times 10^9/l$ (neutrophils 3.4) and normal electrolytes, liver function and clotting. C-reactive protein was 5 mg/l (normal range 0–8). Echocardiography showed a normal size left ventricle, dynamic systolic function (ejection fraction of 83%) and no regional wall motion abnormality. Coronary angiography demonstrated normal coronary arteries.

Urine dipstick was negative for leukocytes and nitrites. *S typhi* was isolated on blood cultures and was sensitive to ceftriaxone. Stools were watery and green in colour with *S typhi* isolated. In view of confirmation in both blood and faeces, serological testing for typhoid was not requested.

TREATMENT

Treatment was with intravenous ceftriaxone for 2 weeks (2 g twice daily),

OUTCOME AND FOLLOW-UP

Following treatment with intravenous ceftriaxone for 2 weeks (2 g twice daily), the fever subsided, the ECG normalised and the patient was discharged home. Due to a high clinical suspicion, microbiological evidence and progress with treatment, no further investigations were deemed necessary.

DISCUSSION

Myocarditis may mimic myocardial ischaemia and/or infarction both clinically and electrocardiographically, particularly in younger patients.¹ Any apparent ischaemia associated with myocarditis may be due to localised inflammation or coronary spasm. Myocarditis is often assumed by exclusion of other causes of increased cardiac enzymes and electrocardiographic changes. Cardiac MRI may show myocardial oedema and myocyte damage but is of limited use in confirming a diagnosis. Unfortunately, the gold standard for diagnosis, of endomyocardial biopsy, has a low sensitivity of between 10% and 35%, due to variability in interpretation and sampling error.² Of the pathogens, viruses are most commonly isolated, but bacterial (and unusually *S typhi*), fungal, protozoal and helminth infections have also been implicated.³

The association of myocarditis with *S typhi* was first described in 1884. Typhoidal *Salmonella* is a

To cite: Shah S, Dubrey SW. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2012-008387

Figure 1 Graph showing the characteristic (Wunderlich's) prolonged pyrexia over the 18 days the patient was in hospital.

motile gram-negative bacillus. It is frequently transmitted via the faeco-oral route and less commonly via urine, sexual exposure or through consumption of contaminated seafood. Typhoid usually presents with a systemic illness and, perhaps surprisingly, with little or no diarrhoea. Typhoid fever is characterised by severe systemic illness with a marked pyrexia and abdominal pain.⁴ The fever characteristically displays a stepped escalation and prolonged plateau phase, termed a Wunderlich's curve. Without treatment around 10% of cases develop complications, the most severe of which include internal haemorrhage and bowel perforation. Around 1 in 20 of those surviving infection without treatment can go on to become asymptomatic carriers.^{5 6}

Treatment is increasingly complicated by emerging drug resistance and has led to the use of third generation cephalosporins or fluoroquinolones. Current vaccines against typhoid used in the UK are only around 75% effective, particularly when bacterial numbers are high.⁴ Therefore, immunised travellers to endemic areas cannot be excluded from consideration of this infection.

A travel history to areas of poor sanitation should raise clinical suspicion. Up to 8% of travellers to developing countries are ill enough to seek healthcare while abroad or after returning home.⁷ The relationship of the UK with the Indian sub-continent (India, Pakistan, Nepal and Bangladesh) explains most cases. China and south-east Asia (Vietnam, Laos and Indonesia) are emerging as high risk areas for British tourists as are always Africa, central and south America.^{5 6}

CONCLUSION

Typhoid remains a real and present threat in the UK and predominantly through travellers returning from countries with socio-cultural links. We present a classic example of typhoid fever complicated by a relatively unusual cause of myocarditis.

Learning points

- ▶ There are around 500 cases of typhoid or paratyphoid each year in the UK.
- ▶ There are approximately 350 cases of typhoid fever each year in the UK.
- ▶ In the UK, most cases occur in Asian patients who have visited relatives and friends in India, Pakistan or Bangladesh.
- ▶ The pattern of pyrexia in typhoid fever is markedly elevated and sustained and has been termed Wunderlich's curve.
- ▶ Typhoid is a recognised but unusual cause of myocarditis in the UK.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Sarda L, Colin P, Boccara F, *et al.* Myocarditis in patients with clinical presentation of myocardial infarction and normal coronary angiograms. *J Am Coll Cardiol* 2001;37:786–92.
- 2 Baughman KL. Diagnosis of myocarditis: death of Dallas criteria. *Circulation* 2006;113:593–5.
- 3 Cooper LT Jr. Myocarditis. *N Engl J Med* 2009;60:1526–38.
- 4 Parry CM, Hien TT, Dougan G, *et al.* Typhoid fever. *N Engl J Med* 2002;347:1770–82.
- 5 Health Protection Agency. *Public health operational guidelines for typhoid and paratyphoid (Enteric fever)*. Chartered Institute of Environmental Health, 2012. http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1317132464189 (accessed 5 Feb 2013).
- 6 Health Protection Agency. *Salmonella typhi and Salmonella paratyphi laboratory results*. March 2011. http://www.hpa.org.uk/web/HPAweb&HPAwebStandard/HPAweb_C/1195733753804 (accessed 5 Feb 2013).
- 7 Steffen R, Rickenbach M, Wilhelm U, *et al.* Health problems after travel to developing countries. *J Infect Dis* 1987;156:84–91.

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