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Infectious mononucleosis complicated by peritonsillar abscess and postural orthostatic tachycardia syndrome: A case report

Kaspar L Yaxley

Abstract

An unusual case of infectious mononucleosis complicated by both peritonsillar abscess and postural orthostatic tachycardia syndrome is reported. The patient was diagnosed with Epstein–Barr virus infection early in the disease course by her primary care doctor. She subsequently developed a peritonsillar abscess requiring hospitalisation. Recovery was complicated by the development of postural orthostatic tachycardia syndrome. However, resolution was achieved over the course of approximately 1 year, via conservative measures including graded exercise therapy, without resorting to pharmacotherapy.

Keywords

Otolaryngology, cardiovascular, infectious diseases, peritonsillar abscess, postural orthostatic tachycardia syndrome

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Introduction

Infectious mononucleosis is typically caused by acute infection with Epstein–Barr virus (EBV) and is particularly common among adolescents and young adults. It typically presents with pharyngitis, fever, fatigue and cervical lymph node enlargement. Other manifestations include abdominal pain, nausea, vomiting, rash and palatal petechiae. It typically self-resolves over several weeks without sequelae.[1] However, there are also numerous reported complications that can affect almost any organ system. In this patient, the condition was complicated by two lesser known complications, namely, an acute complication of peritonsillar abscess (PTA) and a chronic complication of postural orthostatic tachycardia syndrome (POTS). The purpose of this case report is to increase awareness of and vigilance for these complications.

Case report

A 17-year-old female presented to our hospital emergency department with a 4-day history of worsening bilateral throat pain, more severe on the left side with radiation to her ipsilateral ear, jaw and neck. Over the same period, she reported the development of trismus, snoring and odynophagia. On the day of presentation, she also complained of nausea and moderate left-sided upper abdominal pain. She had a history of recurrent tonsillitis from the age of 9 to 13 years, but no other significant past medical history. The only regular medication she took was the combined oral contraceptive pill.

The patient had originally presented to a primary care doctor 1 week earlier with a 3-day history of tonsillar swelling and 1 week of sore throat, fever, lethargy and headache. A heterophile antibody test was positive for EBV viral-capsid antigen (VCA) antibodies IgM and IgG and negative for EBV nuclear antigen (EBNA) antibody IgG, suggesting recent EBV infection. The patient returned several days later complaining of worsening throat pain and she was prescribed a short course of prednisolone 25 mg once daily for 3 days. Despite this, symptoms continued to worsen, resulting in her presentation to hospital.

On examination in the emergency department, vital sign assessment demonstrated a temperature of 36.9°C, heart rate of 78 beats/min, blood pressure of 116/80 mmHg, respiratory rate of 18 breaths/min and oxygen saturation of 99% on room air. There was no evidence of respiratory

Royal Perth Hospital, Perth, WA, Australia

Corresponding Author:
Kaspar L Yaxley, Royal Perth Hospital, Perth, WA 6000, Australia.
Email: kaspar.yaxley@gmail.com

distress, stridor or drooling. She had bilateral tonsillar swelling with purulent exudate. The swelling was most significant at the left tonsil and in her left soft palate with uvular deviation towards the right. She had associated tender level 2 cervical lymphadenopathy on the left and was unable to touch her chin to chest. Abdominal examination revealed mild right and left upper quadrant tenderness with guarding but no rebound tenderness or palpable organomegaly. She was not jaundiced, and her respiratory and cardiovascular examinations were unremarkable.

A full blood count, renal function and lipase were normal. Her liver function tests demonstrated a serum alanine transaminase of 47 U/L and gamma-glutamyl transferase of 50 U/L, and she had a mildly elevated C-reactive protein of 20 mg/L. Her serum beta-human chorionic gonadotropin (HCG) was negative and urinalysis was unremarkable.

The otorhinolaryngology team were consulted who subsequently drained 8 mL of pus from a left tonsillar collection. She was commenced on intravenous fluids, intravenous dexamethasone, benzyl penicillin 1.2 g, 6 hourly and intravenous metronidazole 500 mg, 12 hourly before admission to hospital for further observation. Admission was complicated by recurrence of left-sided tonsillar pain on day 2 with a further 4 mL of purulent material being drained from the left tonsil. Furthermore, her abdominal pain persisted, with radiation to her left shoulder, and she complained of presyncope despite ongoing intravenous fluid administration. An abdominal ultrasound was performed revealing mild splenomegaly (14 cm in major diameter) but no intraperitoneal fluid or other abnormal findings. She had no postural blood pressure drop, and a lying 12-lead electrocardiogram (ECG) showed sinus rhythm with no ischaemic changes, arrhythmias or other abnormalities.

She demonstrated clinical improvement after several days of antibiotics and no recurrence of her PTA. Her abdominal pain also improved although her light-headedness persisted. The patient's tonsillar aspirate grew *Streptococcus anginosus* sensitive to penicillin and she was discharged on phenoxymethylpenicillin 500 mg, 12 hourly for 10 days.

At follow-up 2 weeks post discharge, her tonsillar symptoms and abdominal pain had resolved. Her liver function tests had also normalised. However, over the next 3 months, she reported ongoing lethargy, nausea, headaches and presyncope, with symptoms resolving in the recumbent position. She was referred to an outpatient cardiology service for a 24-hour Holter monitor and echocardiogram. The former demonstrated no evidence of an underlying arrhythmia and the latter showed normal left ventricular function with no valvular abnormalities. However, her heart rate was observed to increase from 76 beats/min supine to 122 beats/min on initial standing to 134 beats/min after 5 minutes of standing with simultaneous reproduction of her presyncopal symptoms. Thyroid function, serum cortisol and a 24-hour urine metanephrine and catecholamine tests were all unremarkable. Her presentation was felt to be consistent with POTS and she was advised to increase her salt and water intake and avoid prolonged upright posture.

Over the next 3 months, she was able to tolerate low-intensity exercise in a recumbent position. However, she continued to complain of fatigue, poor concentration and mild light-headedness with prolonged standing. She demonstrated persisting orthostatic tachycardia (from 82 beats/min supine to 126 beats/min after 5 minutes of standing) without a postural blood pressure drop. A tilt-table test confirmed the diagnosis demonstrating a peak heart rate of 128 beats/min after 10 minutes of tilt compared to 78 beats/min in initial supine position. Given some symptomatic improvement and tolerance of mild physical activity, a decision was made to avoid pharmacotherapy. She instead trialled a graded exercise programme with the assistance of a physiotherapist. This led to significant improvement with gradual progression over the following several months to higher intensity upright exercise. At 11 months post discharge, she reported complete resolution of her orthostatic symptoms and was participating in school sports again. On re-examination, she no longer demonstrated an orthostatic tachycardia. She reported mild residual fatigue, but this had minimal impact on her daily function.

Discussion

Infectious mononucleosis caused by EBV infection is associated with a wide range of complications. These include airway obstruction (secondary to oropharyngeal inflammation), hepatosplenomegaly, meningoencephalitis and haemolytic anaemia.[1] Less common and atypical complications include splenic rupture,[2] myopericarditis,[3] acute kidney injury (most commonly acute interstitial nephritis),[4] pancreatitis and acalculous cholecystitis.[5]

PTA is a common complication of bacterial tonsillitis but a rare complication in infectious mononucleosis.[6] The pathogenesis of this complication in the setting of infectious mononucleosis is unknown. Concurrent infection with EBV may facilitate tonsillar tissue penetration by certain bacteria.[7] EBV infection is known to impair humoral immunity, which may suppress the immunoglobulin coating of bacteria located on tonsillar tissue.[8] It may also induce a transient decrease in T-cell-mediated immunity.[9,10] It has also been proposed that recurrent tonsillitis may lead to blockage of the common duct from Weber's glands, leading to salivary gland infection and abscess formation.[8,11]

While antibiotics are not usually indicated for viral infections such as infectious mononucleosis, their benefit in preventing secondary bacterial infection is also unknown. Other than group A Streptcococci, there is substantial evidence to implicate the anaerobic bacteria *Fusobacterium necrophorum* in PTA,[12] particularly among patients aged 15–24 years.[13] A previous randomised controlled trial suggests anaerobic antibacterial agents such as metronidazole may reduce duration of hospital stay in cases of severe infectious mononucleosis.[14] However, *F. necrophorum* is

usually susceptible to penicillin,[15] so addition of metronidazole may not be necessary or it may provide benefits via suppression of unknown bacteria or other mechanisms.

The patient had also been commenced on a short course of prednisolone prior to her hospitalisation. A 2015 Cochrane review found insufficient evidence that steroids improve symptoms in infectious mononucleosis, while it was inconclusive as to whether they increase the risk of complications such as peritonsillar cellulitis and PTA.[16] In the absence of clear benefit and given the possibility of adverse effects, they are therefore not recommended for routine use.[17] This is separate from the issue of steroid use after PTA development, such as intravenous dexamethasone administration in hospitalised patients. However, studies which consider this indication are also inconsistent with regard to benefits and adverse outcomes.[18]

POTS is characterised by a sustained increase in heart rate by 30 beats/min or more (⩾40 beats/min in patients aged 12–19 years) within 10 minutes of standing or on head-up tilt-table test. This is usually accompanied by symptoms such as light-headedness, fatigue and exercise intolerance.[19] Some definitions require symptoms to be present for at least 6 months.[20] This must be demonstrated to occur in the absence of orthostatic hypotension, distinguishing POTS from vasovagal syncope in which a precipitous drop in blood pressure is observable on upright positioning. POTS may be considered a chronic condition as opposed to the acute and episodic nature of vasovagal syncope.[21]

The aetiology of POTS is uncertain, but a number of mechanisms have been proposed. Increased sympathetic activity appears to be a common feature.[22,23] Cardiovascular deconditioning, which can occur within as short a period as 20 hours of bed rest, is also commonly implicated.[24] Neuropathic POTS, thought to account for at least half of cases,[22] is characterised by distal, predominantly lower extremity denervation which may impair vasoconstriction and increase gravitational venous pooling. Volume dysregulation, in which there is dysfunction of the renin–angiotensin system with inadequate renal sodium retention and low plasma volumes, has also been observed.[25] Renin and aldosterone levels are known to fluctuate during the menstrual cycle, which may partially explain why POTS is more common among young females.[26] Antecedent viral illness has been reported,[22] suggesting autoimmune-mediated molecular mimicry or a non-specific persistent immune system activation may play a role.[27,28] A specific infectious trigger, however, has not been identified, and a wide variety of infections along with other potential immune system–activating events such as vaccination, surgery and trauma have been implicated.[28]

Progressive exercise training has been demonstrated to lead to improvement or resolution of POTS.[29] However, pharmacotherapy with medications such as propranolol, midodrine or fludrocortisone is often required, especially where symptoms are severe.[20] In this patient, however, remission was achieved without medication. While it is difficult to determine whether the condition would have self-resolved, this case supports the use of physical reconditioning, at least as an initial trial and especially in young patients with no other physical limitations or co-morbidities.

Conclusion

PTA and POTS are two infrequent but important complications of infectious mononucleosis. The exact pathophysiological pathway via which these develop is uncertain. However, given their potential impact on patient morbidity, it would be prudent to raise awareness among clinicians and educate patients with regard to their possibility with a low threshold for referral to hospital or specialist care if either is suspected.

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ORCID iD

Kaspar L Yaxley https://orcid.org/0000-0003-2415-8390

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