CASE REPORT

Mild meningococcaemia, pyrexia protocols and a problematic public health response

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SUMMARY

Meningococcal septicaemia was masked by an acute tonsillitis in a university student presenting to the emergency department. The diagnosis was made as a result of routine blood culture and resulted in the patient being recalled for appropriate treatment. Although the patient was relatively well, public health contact tracing and prophylaxis ensued as per any other case of meningococcal disease. This case highlights the protean manifestations of meningococcaemia and the importance of evidence-based protocols. Blood culture guidelines led to the diagnosis in the absence of clinical suspicion and in sharp contrast to the paucity of evidence informing the public health response in this area.

BACKGROUND

Meningococcal disease causes a significant global burden of illness with approximately 1 200 000 annual cases worldwide, 800 of which occur in the UK.^{1 2} Mild meningococcal disease is poorly understood and may be missed when symptoms mirror viral infections or blood culture protocols are not followed. Currently every reported case of meningococcal septicaemia in the UK generates a generic public health response which involves extensive contact tracing, prophylaxis and wider dissemination of information.² The dearth of research into milder forms inhibits risk assessment and limits the ability of public health bodies to tailor their responses appropriately across the globe.

CASE PRESENTATION

A young university student developed a sore throat, dysphonia and mild dysphagia over 48 h. This constellation of symptoms preceded the onset of rigors, vomiting, drowsiness and myalgia that prompted presentation to a local emergency department (ED). On examination, the patient was feverish at 40°C and her tonsils were found to be large, inflamed and showing evidence of scarring. There was no evidence of peritonsillar abscesses or cellulitis. Cervical lymphadenopathy was present and most prominent on the left side. No photophobia, headache or other findings were recorded.

The student had a history of recurrent tonsillitis but no other medical conditions, medications or relevant family history.

INVESTIGATIONS

White cell count 16.7 (neutrophils 15.5). Blood cultures were taken in line with local guidelines.

DIFFERENTIAL DIAGNOSIS

Chronic recurrent tonsillitis.

TREATMENT

Intravenous fluids and benzylpenicillin were administered despite documented previous adverse reaction to amoxicillin. The patient subsequently developed a diffuse erythematous blanching rash and her vomiting worsened. This was attributed to the medication and prompted a switch to intravenous erythromycin. After this change the rash partially resolved and the vomiting decreased. The patient was kept overnight but was well enough to be discharged the next day on oral erythromycin.

OUTCOME AND FOLLOW-UP

Two days after the date of admission, Gram-negative diplococci were found in the blood cultures and the patient was recalled to the ED. On examination, she was very well showing no signs of systemic inflammatory response syndrome and Kernig sign negative. Additional blood tests showed improving inflammatory markers (white cell count 7.3 and neutrophils 5.6). After discussion with microbiology it was decided that a lumbar puncture was not necessary in light of the clinical picture but intravenous ceftriaxone was started in place of oral erythromycin. She was deemed well enough to continue her course of intravenous antibiotics as an outpatient through the medical admission unit.

The local public health team was informed of the blood culture result. When *Neisseria meningitidis* was isolated close contact tracing was undertaken and nine other students were subsequently counselled, provided with written information and chemoprophylaxed. After discussion with university vice-chancellor a letter was disseminated to all students in the same year group informing them of the situation and encouraging them to seek medical support if they developed the relevant symptoms. The index case remained well and none of the close contacts developed symptoms of meningococcal disease.

DISCUSSION

Meningococcal septicaemia is a relatively common, life-threatening condition with protean manifestations often indistinguishable from viral illness.³ Classical symptoms often develop late and are not always present.^{2 4} *N meningitidis* is a nasopharyngeal commensal in 10% of the population (*ibid*) and although Dudley and Miller⁵ report a case of *N meningitidis* tonsillitis, it is very unusual for this bacterium to cause pharyngeal disease.

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Meningococcal septicaemia is often preceded by a viral pharyngitis which promotes invasion by disrupting the pharyngeal mucosa.^{2–6} It is likely that our patient was a carrier whose tonsillitis predisposed her to invasive disease. None of her initial symptoms were pathognomonic and it is unlikely that closer monitoring would have uncovered the mild meningococcal septicaemia.

All of the patient's symptoms were initially attributed to acute tonsillitis and it is unclear whether the non-specific rash was due to meningococcaemia or an adverse drug reaction. The situation highlights the importance of using appropriate antibiotics as penicillin either compounded the diagnostic difficulties in this case or caused further unwarranted harm. Avoidable adverse drug events (ADEs) remain a costly and ubiquitous problem across the developed world. A number of different professionals are involved in prescribing and administering medicines and errors can occur at any of a number of stages from recording allergy status and medicine reconciliation all the way to dispensing and administering the correct drugs. Interventions to reduce errors are necessarily multifaceted; however, it should be emphasised that every doctor is responsible for the prescriptions he or she signs and should check allergy status whenever he or she writes up a new drug.^{6–7} System-based approaches to error reduction often focus on computerised prescribing which has been shown to significantly reduce adverse events and is endorsed by the General Medical Council (GMC).⁷ The use of decision support software does not negate the need to check allergy status in person but it can provide a useful extra layer of protection against ADEs.^{8–9} The medical team apologised for their mistake and the patient accepted the apology with no apparent erosion of trust in the team or wider medical system. Her retelling of the incident at a later interview was devoid of any accusatory or negative feeling and she reported gratitude for the care that she had received.

Without protocol-driven blood culture collection the diagnosis may never have been made emphasising the importance of performing this investigation even when the source of fever seems obvious.^{10–12} Oral erythromycin offers poor protection against *N meningitidis*¹³ and the medical team acted appropriately in recalling the patient and initiating intravenous ceftriaxone even though the patient remained relatively well throughout the episode.

In conjunction with two other reports of mild meningococcal disease in young adults^{14–15} this case draws attention to the public health response. Currently there is no protocol or precedent for how to handle these cases and in all three situations the respective public health teams defaulted to standard management with broad implications for wider contacts. Whether this 'belt and braces' response is appropriate depends on a number of yet unknown risk factors such as conversion rate from mild-to-serious disease. PCR is much more sensitive than blood culture, has a specificity of around 99% and can be completed in a fraction of the time. With increasing use it is likely that a greater number of mild cases will be detected.¹⁶ Not all laboratories offer the service however and PCR is around seven times more expensive, requires specialist equipment, technician training and does not provide antibiotic sensitivities.

While the medical team was hampered by a low index of suspicion, the patient was safeguarded by robust evidence-based

guidelines. As with much public health work the balance between benefit and harm is finely weighted and a dearth of evidence limits informed risk assessment and decision-making in this area. There is a need for further research on the natural history of mild meningococcaemia in young adults to inform future practice.

Learning points

- ▶ Administering drugs where the patient has a known adverse reaction can impede diagnosis as well as cause unwarranted harm.
- ▶ Mild meningococcal disease in young adults may be masked by concomitant (and predisposing) viral illness.
- ▶ Following evidence-based blood culture guidelines safeguards patients in all manner of settings.
- ▶ There is a need for further mild meningococcal disease research to inform public health practice in this area.

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Competing interests None.

Patient consent Obtained.

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