CASE REPORT

Purpura Fulminans: A rare presentation of *Streptococcus Pneumoniae* infection

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Accepted 7 October 2017

SUMMARY

A previously healthy man presented with fever for 2 days and rapidly progressive purpuric rash for 1 day. He progressed into hypotension, disseminated intravascular coagulation and refractory shock despite resuscitation and early antibiotic commencement. Blood culture grew *Streptococcus pneumoniae*. This case report highlights the fact that purpura fulminans can be a rare presentation of *S. pneumoniae* infection as well.

BACKGROUND

Purpura fulminans is an uncommon condition characterised by small vessel thrombosis and haemorrhagic tissue necrosis resulting from disseminated intravascular coagulation (DIC). Purpura fulminans and DIC are known to lead to significant morbidity and mortality. We describe a patient with purpura fulminans due to *Streptococcus pneumoniae* infection.

CASE PRESENTATION

A 39-year-old man presented with 2 days of fever associated with chills, myalgia, arthralgia, vomiting and diarrhoea. He also complained of breathlessness and epigastric pain on day 2 of illness, which prompted him to present to our hospital. There was no history to suggest that he was immunocompromised. On arrival to the hospital, he was afebrile, but hypotensive with a blood pressure of 79/65 mm Hg and tachycardic with a heart rate of 148 beats per minute. He was tachypnoeic as well. He had poor peripheral perfusion with capillary refilling time of more than 2 s and cold peripheries. Examination of his abdomen and respiratory system was otherwise unremarkable. He developed petechial rash that started over his face and rapidly spreading towards the trunk (figure 1) and bilateral lower limbs (figure 2) on the day of admission.

INVESTIGATIONS

Initial blood investigations revealed thrombocytopenia (platelet $44 \times 10^9/L$) with normal haemoglobin and white cell count. There was presence of severe metabolic acidosis and markedly elevated lactate levels, with evidence of acute kidney injury. His International Normalised Ratio was 8.1 on arrival and there was bleeding tendency in the form of blood-stained suction from endotracheal tube. Further investigations ruled out other endemic tropical infections including leptospirosis, malaria

and dengue fever. Blood for Gram stain was done, which revealed Gram-positive diplococci.

DIFFERENTIAL DIAGNOSIS

The differential diagnoses for purpura fulminans include infection such as *Neisseria meningitidis* infection and group A and B streptococci infection. It can be also associated with congenital or acquired protein C deficiency.

TREATMENT

He was intubated in view of respiratory distress and a fluid bolus of 30 mL/kg was given shortly after arrival. Inotropic support was commenced due to the presence of hypotension refractory to fluid challenge. Broad-spectrum antibiotic (ceftriaxone) was administered within 1 hour of arrival in order to provide adequate antibiotic coverage for *N. meningitidis* infection as well. Fresh frozen plasma was transfused for this patient in an attempt to correct the coagulopathy. However, his condition remained ill and he was hypotensive despite inotropic support. He succumbed to the illness 12 hours after presentation. Blood culture was traced retrospectively and revealed *S. pneumoniae* (serotype 6A).

OUTCOME AND FOLLOW-UP

The patient succumbed to the illness within 24 hours of admission despite early recognition of septic shock and purpura fulminans, which prompted aggressive fluid resuscitation and early administration of a broad-spectrum antibiotic.

DISCUSSION

Purpura fulminans was first described by Guelliot in the 19th century. It has since been classified into neonatal purpura fulminans, idiopathic purpura fulminans and acute infectious purpura fulminans.¹ Our patient was affected by acute infectious purpura fulminans, which is the most common form of the disease. Clinical features of this condition include fever, hypotension and purpura in the setting of DIC.

While classically occurring in meningococcal infection,² *S. pneumoniae* infection with purpura fulminans has been described in the literature as well.^{3,4} Severe acquired protein C deficiency due to infection has been shown to contribute significantly in the development of this condition.⁵

Patients with severe bacterial infection and purpura fulminans should be managed in an

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To cite: Teo HG, Wong JY, Ting TLL. *BMJ Case Rep* Published Online First: [please include Day Month Year]. doi:10.1136/bcr-2017-221150

Figure 1 Purpura over the anterior chest wall and abdomen.

intensive-care setting, with aggressive fluid resuscitation, inotropic support if necessary and early administration of appropriate antibiotics. Other adjunctive treatments such as protein C replacement therapy may have a role in the management of this disease.⁵ Unfortunately, this treatment option is not widely available; in our hospital setting, we only practise the use of fresh frozen plasma transfusion to correct the coagulopathy associated with this condition due to resource limitations.

Our patient was initially treated for purpura fulminans, which was presumed to be due to meningococcal septicaemia. However, the Gram staining of his blood was reported to be Gram-positive diplococci instead of a Gram-negative organism

Figure 2 Purpura noted over the bilateral lower limbs.

as one would expect to be seen in the case of *N. meningitidis*. It is important to determine the causative organism early among patients with purpura fulminans, as it would assist the treating physician in deciding on the subsequent choice of antibiotic. In addition, close contacts of a patient with meningococcal septicaemia would benefit from antibiotic prophylaxis as well.

Learning points

- ▶ Purpura fulminans can occur in a previously healthy man who is presumed to be immunocompetent.
- ▶ Early recognition and resuscitation with fluids and blood products and prompt administration of antibiotic according to survival sepsis campaign are essential in purpura fulminans as it has a high mortality rate.
- ▶ Purpura fulminans can be a rare presentation of *Streptococcus pneumoniae* infection.
- ▶ Peripheral blood smear with Gram stain can be done promptly to identify the causative organism.

Acknowledgements We would like to thank the Director General of Health Malaysia for his permission to publish this article. We also thank the clinical research centre team in Sibru Hospital for their help and support.

Contributors HGT, JYW and TLT wrote the case report and conducted the relevant reviews.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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