

Life Threatening Sepsis While on High Dose Steroids Requiring Extra-Corporeal Membrane Oxygenation

Abstract:

C Orr, C McCarthy, C Gunaratnam, G Kearns
Beaumont Hospital, Beaumont, Dublin 9

Abstract

We present a case of life-threatening streptococcal sepsis in a young man with a history of Behçet's disease within two weeks of commencing high dose corticosteroid therapy for an exacerbation of Behçet's disease.

Case Report

A 33 year old male, originally from Eritrea and living in Ireland for two years, presented to the emergency department with severe shortness of breath, several episodes of haemoptysis, and generalised, non-focal chest pain. Little was known about his background medical history, but that he had been told he had Behçet's disease, and two weeks earlier his corticosteroid dose was increased to treat an exacerbation of his joint pains. He had no symptoms at the time to suggest a viral aetiology. He was now taking prednisolone 60mg daily, which had been increased from his maintenance dose of 10mg. He was also taking azathioprine 100mg daily, increased at the same time as the prednisolone, from 50mg daily. He was also anti-coagulated with warfarin for recurrent deep vein thrombosis. His blood pressure, heart rate, respiratory rate, temperature and oxygen saturation were normal on presentation. His first laboratory results are depicted below (Table 1).

The chest radiograph showed marked opacification of most of the left hemithorax, and less marked opacification at the lower zone of the right hemithorax. Co-amoxiclav was commenced given the radiographic findings. The patient continued to have episodes of frank haemoptysis. His INR was 7.83. He deteriorated rapidly over the following two hours, becoming tachycardic, profoundly hypotensive and very difficult to oxygenate. He required intubation and ventilation. It was thought that there was a pulmonary haemorrhage. The INR was reversed with Vitamin K and Octaplex and a computerised tomography (CT) thorax was emergently arranged. A representative image is displayed below (Figure 1).

Figure 1: Computerized tomography thorax; this representative image shows complete opacification of the left lung field and more limited opacification of the right lung consistent with pneumonia

The images displayed extensive, dense lung consolidation. No features suggestive of the presence of alveolar haemorrhage could be seen. The patient was brought to the Intensive Therapy Unit and, in light of the CT result, antimicrobials were continued. Oxygenation and ventilation remained a difficulty 24 hours into admission despite high frequency oscillatory ventilation on 100% oxygen. The patient developed multiple organ failure and required high inotropic support. The urine pneumococcal antigen was positive, and streptococcus pneumoniae was identified in respiratory secretions. The patient had a normal functioning spleen. All blood cultures were sterile. Polymerase chain reaction for influenza was negative, and the patient tested negative for HIV. The patient was transferred to another hospital where extra-corporeal membrane oxygenation was available. He returned to our hospital several days later and was successfully weaned off a non-invasive positive airways pressure machine. The radiographic changes resolved in parallel with his clinical improvement. He made a full recovery and was sent home on methotrexate with follow up at a rheumatology clinic.

Discussion

Systemic corticosteroid therapy is associated with a dose-dependent increase in the risk of infection, especially with common bacterial, viral and fungal pathogens. Corticosteroids act by several complex molecular mechanisms to cause severe suppression of the immune system. They inhibit the expression of genes coding for many cytokines (eg IL-7), reducing T-cell proliferation, and inducing immature T-cell apoptosis.¹ The causal role of glucocorticoids in serious infections is well established.^{2,3} One large meta-analysis of controlled trials in which glucocorticoids or placebo were given, reported that infection occurred significantly more often with steroid therapy (12.7 versus 8.0 percent with placebo, relative risk 1.6).² A dose dependence was noted in both the corticosteroid and placebo treated groups, which suggests that the activity of the underlying disease is also a risk factor for infection. With respect to azathioprine, bacterial infections usually occur in the clinical setting of leukopenia.^{4,5} This was not the case in our patient.

In the largest study to date reporting on outcomes in patients with Behçet's disease, following 387 patients over twenty years, 42 patients died. Pulmonary artery aneurysm was given as the most likely cause of death in 9 cases, with massive haemoptysis in 3 of these cases. In the same report, sepsis did not feature as a cause of death in any patient. This case highlights the need to be aware of the significant risk of sepsis in patients taking high dose corticosteroids.

Correspondence: C Orr
Beaumont Hospital, Beaumont, Dublin 9
Email: carlorr@physicians.ie

References

1. Leung DY, Bloom JW (January 2003). Update on glucocorticoid action and resistance. *J. Allergy Clin. Immunol.* 111: 3-22
2. Stuck AE, Minder CE, Frey FJ. Risk of infectious complications in patients taking glucocorticoids. *Rev Infect Dis* 1989; 11:954-63
3. Huscher D, Thiele K, Gromnica-Ihle E, Heine G, Demary W, Dreher R, Zink A, Buttgereit F. Dose-related patterns of glucocorticoid-induced side effects. *Ann Rheum Dis* 2009; 68:1119
4. Pinals RS. Azathioprine in the treatment of chronic polyarthritis: longterm results and adverse effects in 25 patients. *J Rheumatol* 1976; 3:140
5. Singh G, Fries JF, Spitz P, Williams CA. Toxic effects of azathioprine in rheumatoid arthritis. A national post-marketing perspective. *Arthritis Rheum* 1989; 32:837
6. Kural-Seyahi E, Fresko I, Seyahi N, Ozyazgan Y, Mat C, Hamuryudan V, Yurdakul S, Yazici H. The long-term mortality and morbidity of Behçet's syndrome: a 2-decade outcome survey of 387 patients followed at a dedicated center. *Medicine (Baltimore)* 2003, 82:60-76