Unusual presentation of more common disease/injury

Tuberculous mediastinal abscess as a paradoxical reaction in an immunocompetent individual

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Summary

A 22-year-old man, diagnosed 7 weeks before with pulmonary tuberculosis and started on antitubercular therapy, presented with non-exertional retrosternal chest pain since the past week. He was diagnosed on the strength of thoracic radiograms and CT imaging to have a mediastinal abscess, which was percutaneously drained. He was continued on the same regimen of drugs. Analysis of the fluid obtained was suggestive of tuberculous aetiology. Steroids were not required.

BACKGROUND

Paradoxical reactions in tuberculosis constitute an under-reported and misleading phenomenon, and are capable of generating considerable diagnostic confusion, especially when encountered in immunocompetent patients. We hope to add to the existing medical literature on this topic, by contributing a previously unreported manifestation of paradoxical reaction. The fact that it occurred in a previously healthy, immunocompetent individual adds to its unusualness.

CASE PRESENTATION

A 22-year-old premorbidly healthy man, presented with low-grade fever since the past 3 months. After appropriate evaluation, he had been initiated by a local physician on antitubercular drugs (rifampicin 600 mg PO qD, isoniazid 300 mg PO qD, pyrazinamide 1500 mg PO qD, ethambutol 800 mg PO qD) on the basis of sputum smears positive

for acid fast bacilli. Following this, the fever resolved and the patient noted a subjective sense of well-being. After 6 weeks of antitubercular therapy, however, he was symptomatic again with a sharp retrosternal pain, which was aggravated on lying supine and was unrelated to exertion. He had been re-evaluated by his physician, was detected to have a large pericardial effusion and was therefore referred to us for further management. Till the time of presentation to us, the patient claimed to be compliant on therapy. There was no history of substance abuse, administration of steroids or other immunosuppressant drugs in the past. He also denied any episodes of unprotected sexual exposure.

General physical examination revealed regular tachycardia; blood pressure and jugular venous pressure were normal. There was no significant lymphadenopathy or pedal oedema. A pericardial rub was audible over the precordium.

Figure 1 Chest radiogram showing mediastinal abscess with air-fluid level (thick black arrow) at presentation (A). Postpercutaneous drainage, catheter seen insitu (thin, black arrow, B). At discharge, chest radiogram shows complete recovery (C). Note cardiomegaly and pencilling of cardiac silhouette (white arrow, A), suggestive of pericardial effusion.

Figure 2 CT thorax showing mediastinal collection with air-fluid level (black arrows, A–C), and pericardial effusion (white arrows, A–C)

INVESTIGATIONS

Preliminary investigations revealed neutrophilic leucocytosis (total leucocyte count: 16 500, 80% neutrophils), and elevated erythrocyte sedimentation rate (72 mm/h). A Mantoux tuberculin test was positive (14 mm). Thoracic radiogram (figure 1A), showed an enlarged cardiac shadow with pencilled margins, consistent with a pericardial effusion. In addition, it revealed an air-fluid level overlying the cardiac shadow suggestive of a mediastinal abscess. Echocardiography also confirmed the presence of a pericardial effusion with fibrous stranding, but ruled out any tamponade. Emergent thoracic CT imaging was performed next. A large well-defined peripherally enhancing anterior mediastinal abscess with a large internal air-fluid level was seen abutting the anterior pericardium (figure 2). A moderate pericardial effusion was also noted (maximum thickness of 1.9 cm) along with minimal parietal pericardial thickening (3.5 mm). A percutaneous catheter was inserted under CT guidance (figure 1B) and the abscess was drained continuously. Biochemical analysis of the fluid revealed extreme elevation in adenosine deaminase (670 U/l), strongly supporting a possibility of tuberculosis as the aetiology. Smear preparations showed predominantly neutrophils against a necrotic background and proteinaceous material, but no bacteria. Accurate estimation of cell count was not possible owing to the thick consistency of the aspirate. Ziehl–Neelsen staining for acid fast bacilli was also negative. Conventional aerobic and anaerobic cultures as well as cultures for *Mycobacterium tuberculosis* remained sterile. The patient also tested negative for HIV infection by ELISA technique. Diabetes mellitus was ruled out by normal fasting and postprandial blood sugars (93 mg/dl, 128 mg/dl, respectively).

DIFFERENTIAL DIAGNOSIS

- Tuberculous mediastinal abscess secondary to mediastinal lymphadenitis, due to primary progression of disease.
- Pyogenic mediastinal abscess, possibly due to secondary bacterial infection of pre-existing tuberculous mediastinal lymphadenopathy.
- Paradoxical reaction of tuberculosis to antitubercular therapy manifesting as mediastinal abscess formation.
- Sympathetic pericardial effusion secondary to adjacent inflammation.

TREATMENT

Pending microbiological reports: the patient was empirically treated with parenteral ciprofloxacin (200 mg intravenously q12h) and metronidazole (500 mg intravenously q8h). Antitubercular therapy was continued as before. In the absence of evidence of a secondary bacterial infection, the percutaneous catheter was removed after complete drainage of the abscess. Empirical antibiotic therapy was also stopped after completion of a 10 day course.

OUTCOME AND FOLLOW-UP

Serial thoracic radiograms showed full resolution of the mediastinal shadow (figure 1C), as well as steady reduction in the size of pericardial effusion. The patient was therefore discharged on the same dose of antitubercular drugs. On follow-up, he reported significant subjective improvement, and subsequent echocardiograms ruled out recurrence of the pericardial effusion.

DISCUSSION

Paradoxical reactions are seen in up to 25% of patients¹ with tuberculosis after the initiation of antitubercular therapy, and are characterised by clinical deterioration or radiological worsening of pre-existing tuberculosis, or the development of new lesions.² Typically these reactions occur following an initial phase of response to therapy. While more frequent in HIV-positive individuals on antiretroviral therapy, paradoxical reactions, also termed as immune reconstitution inflammatory syndrome (IRIS), can also be encountered in immunocompetent individuals. Common manifestations of IRIS in tuberculosis include exacerbation of central nervous system disease, and the appearance of de novo pleural effusions, skin lesions and lymphadenopathy.

Mediastinal abscesses can arise by a variety of pathogenetic mechanisms, including extension from cervical suppurative disease such as Ludwig's angina and parapharyngeal and retropharyngeal abscesses, and as a late sequela of acute mediastinitis. Mediastinitis itself arises most frequently as a result of oesophageal rupture or as a complication of sternotomy. Tuberculous mediastinal abscesses generally develop from mediastinal lymphadenitis, although direct extension from cervical cold abscess has also been reported.³

Mediastinal lymphadenitis can be seen as a primary manifestation of tuberculous infection, or as a paradoxical reaction.^{4 5} However, progression of such lymphadenitis to abscess formation as a paradoxical reaction is unprecedented and has never been reported previously to the best of the authors' knowledge.

Before labelling clinical deterioration or a suboptimal response to therapy as a paradoxical response, it is of paramount importance to rule out commoner and reversible causes for treatment failure including non-compliance to therapy, incorrect dosing of drugs, erroneous diagnosis of tuberculosis as the aetiological agent and the development of drug resistance. In our case, all these possibilities were considered and conclusively excluded, with the exception of drug resistance, which could not be tested, as we were unable to isolate *M tuberculosis* organisms in culture. However, the fact that our patient made a complete recovery on the same regimen of antitubercular drugs, argues against the possibility of resistance.

Having thus reviewed the case, we were therefore convinced that this was indeed a case of paradoxical reaction.

Although steroidal therapy has been widely employed to treat IRIS,⁶ it was not used in our patient. The principal reason behind this was his rapid response to drainage of the abscess, rendering it unnecessary to resort to steroids. It would be pertinent to note that requirement for such therapy by itself does not constitute a prerequisite for diagnosing IRIS.

Learning points

- ▶ Paradoxical reactions in tuberculosis can be seen even in immunocompetent individuals and should be kept in the differential diagnosis of individuals with clinical deterioration following initiation of antitubercular therapy.
- ▶ Tuberculous mediastinal abscess can occur as a paradoxical reaction, although admittedly it is rare.
- ▶ Treatment with steroid therapy is not essential in all cases of paradoxical reaction in tuberculosis.
- ▶ Absence of requirement for steroid therapy does not rule out paradoxical reaction.

Competing interests None.

Patient consent Obtained.

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