The first reported sudden fatality from pulmonary artery compression by a thymic cyst

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INTRODUCTION

Benign mediastinal thymic cysts have almost always been described as asymptomatic. A mediastinal cyst of thymic origin with an acute fatal presentation has not previously been documented. This article describes the unique clinical presentation of a 21-year-old woman with acute severe central chest pain and dyspnoea which rapidly progressed to a fatal cardiac arrest as a result of electromechanical dissociation. Post-mortem revealed a tense, thin-walled, non-communicating cyst, 8 cm in diameter, compressing the pulmonary artery (*Figure 1*).

Cysts account for less than 15% of radiologically detectable mediastinal lesions (Kirwan et al, 1973). Less than 2% of these are of thymic origin (Wychulis et al, 1971). These are usually detected in asymptomatic adults between the ages of 20 and 50 years (Krech et al, 1954). Unilocular thymic cysts are thought to be congenital (Zanca et al, 1965) and can occasionally extend to the pericardium (McCafferty and Bahnson, 1982). An acute fatal presentation of a para-cardiac thymic cyst has not been described previously.

CASE REPORT

A 21-year-old previously well female student presented to accident and emergency having woken in the early hours of the morning with severe chest pain. On arrival she appeared, very unwell and breathless. For 1 week she had complained of a severe upper respiratory tract infection associated with chest pain which had been attributed to pleurisy. There was a strong family history of coronary heart disease but no risk factors for venous thrombosis or history of drug abuse. Over the next few minutes she began to look moribund with breathlessness and confusion. During physical examination, which was normal apart from tachypnoea and tachycardia, she had a cardiac arrest.

Advanced cardiopulmonary resuscitation for electromechanical dissociation was commenced and after two cycles the rhythm changed to ventricular fibrillation. Tension pneumothorax was excluded by intercostal fine needle aspiration and an endotracheal tube inserted. After 20 minutes of resuscitation, sinus rhythm was restored with a blood pressure of 100/50 mmHg. Physical examination revealed no rash, normal abdominal examination and no abnormal respiratory signs. She regained consciousness and sat up in an agitated state for about 30 seconds. An arterial blood gas showed pO_2 10 KPa, pCO_2 4 KPa, pH 6.97, bicarbonate 7.3 mmol/litre. Haemoglobin was 12g/dl, total white cell count 18.2 (neutrophils 5, lymphocytes 10). Electrolytes were normal.

A chest radiograph and electrocardiogram were about to be taken when cardiac output was lost during another electromechanical dissociation arrest. Resuscitation was restarted having established central venous access, which showed a central venous pressure of about +10 cmH_20. Over the next 30 minutes cardiac output could not be re-established and nearly an hour after the initial cardiac arrest the patient was pronounced dead.

Post-mortem revealed an 8.0 cm diameter non-communicating cyst in the mediastinum. This was adherent to the left atrium anteroinferiorly and there was external compression of the pulmonary artery anterosuperiorly. It was unilocular, tense, thin-walled and collapsed when punctured revealing a cloudy white serous fluid.

The trachea contained thick secretions consistent with resolving pneumonia and there were multiple pulmonary foci of consolidation. There were bilateral pleural effusions each measuring 300 ml and pulmonary oedema, but no evidence of pulmonary emboli. Otherwise, the heart, pericardium and cardiovascular system were normal apart from a small blood-stained pericardial effusion.

Histological examination showed that the cyst had a thin fibrous wall and was lined by cuboidal cells. Immunohistochemistry showed that these cells were positive for the specific cellular antibodies CAM 5.2 and AUA 1 indicating an epithelial rather than mesothelial origin. These findings are consistent with tissue of thymic origin.

DISCUSSION

Benign mediastinal thymic cysts have almost always been described as asymptomatic (Krech et al, 1954; Kirwan et al, 1973). Circulatory failure consequent to electromechanical dissociation was fatal in this patient as a result of external compression of the pulmonary artery and possibly the left atrium, although cardiorespiratory reserve would have been compromised by intercurrent pneumonia.

An acute fatal presentation of a benign thymic mediastinal cyst has not previously been described although one case with pericarditis and pericardial tamponade has been recognized (Allee et al, 1973). In contrast to the present case, however, the pericardial tamponade presented with 3 months of progressive exertional dyspnoea without acute deterioration. Displacement of vital mediastinal structures by thymic cysts has been recognized on computed tomography (Hendrickson et al, 1998).

Unilocular mediastinal thymic cysts are usually small but a diameter of 18 cm has been described (Bieger and

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McAdams, 1966). Diagnosis has often only been made during surgical excision; 12 out of 14 cases were misdiagnosed preoperatively in one study (Allee et al, 1973). In larger cysts only a thin layer of cuboidal epithelium remains, as in this case. In the majority of adults, treatment is excision. HM

Allee G, Bruce L, Mansour K (1973) Thymic cyst simulating multiple cardiovascular abnormalities and presenting with pericarditis and pericardial tamponade. *Am J Cardiol* **31:** 377

Bieger RC, McAdams AJ (1966) Thymic cysts. *Arch Pathol* **82:** 535–41

Hendrickson M, Azarow K, Ein S, Shandling B, Thormer P, Daneman A (1998) Congenital thymic cysts in children – mostly misdiagnosed. *J Paed Surg* **33:** 821–5

Kirwan WO, Walbaum PR, McCormack RM (1973) Cystic intrathoracic derivatives of the foregut and their complications. *Thorax* **28:** 424–8

Krech WG, Storey CF, Umiker WC (1954) Thymic cysts: a review of the literature and report of two cases. *J Thorac Cardiovasc Surg* **27:** 477–93

McCafferty MH, Bahnson HT (1982) Thymic cyst extending into the pericardium: a case report and review of thymic cysts. *Ann Thorac Surg* **33:** 503–6

Wychulis AR, Payne WS, Clagett OT, Woolner LB (1971) Surgical treatment of mediastinal tumors. *J Thorac Cardiovasc Surg* **62:** 379

Zanca P, Chuang TH, De Avila R, Galindo DL (1965) True congenital mediastinal thymic cyst. *Paediatrics* **36:** 615–9

Figure 1. White thymic cyst (centre) with anterosuperior pulmonary artery.

In the Public's View...

In a New York minute

I have a video that I will never be able to make again. In June, my wife and I stood on the viewing deck at the top of the World Trade Center. It was a perfect day: the view south over the water to the Statue of Liberty and the Verrazano Narrows Bridge, north uptown to the Empire State Building and beyond. Three month later, sitting on a train to London, a fellow passenger told me with disbelief that his son had just phoned: a plane had crashed into the World Trade Center. His son kept phoning. By the time we arrived at Paddington, the world was a different place.

This column is 'In the public's view...'. Mostly I write about perceptions of medicine. That day, there was nothing else in the public's view.

There are few events that almost everyone on earth will watch and that could have direct consequences for everyone watching. I was 3000 miles away when it happened. I could not get to sleep that night for the recurring image of a passenger jet being flown at full speed into a skyscraper, at such an angle that it looked like a knife about to pare off a lump of cheese. And it stopped. The passenger jet was travelling at 400 miles/hour, maybe at 500 miles/hour. It stopped within its own length — just a few burning lumps flew out the other side.

Never mind the fuel, kinetic energy is proportional to the square of the speed. That energy was absorbed by each of the twin towers. The marvel is that the top of each was not cut off and carried, with its doomed human cargo, onto surrounding buildings. After the fireballs, it was almost as if the towers tried to stay standing, but were just too tired; they thought they'd better sit down. And so they did, sliding down almost gracefully. The radio mast, which we'd gazed across 3 months previously, vanished into the billowing dust, perfectly vertical until it was lost from sight, an obscene mirror image of an Apollo mission launch.

I looked for the restart button: maybe I'd have another go — see if I could do what I'd meant to do and fly the plane between the towers. The Microsoft Flight Simulator allows you to do that. Real life doesn't.

Just eighteen men, not just prepared to die but prepared for certain death, not with nuclear weapons or even with guns, but with knives. Yes, it needs organization and it needs money, but the most potent weapon is the person who has no regard for their own life. There are many who have done dangerous things which they were unlikely to survive, but crashing a passenger jet into a skyscraper is beyond that.

So back to the mundane problems of the NHS: the dishonesty of the private finance initiative, the impotence of clinical governance, the reality of unfilled posts and overflowing medical emergency wards.

Welcome to the 21st century. HM

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