A case of cardiac hydatidosis

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Summary

We present the case of a female patient with a diagnosis of hydatidosis located in the heart. Although echinococcosis is endemic to our country, very few cases of cardiac hydatidosis are normally reported. In our patient, the hydatid cyst was located in the septum and in the right ventricular cavity; it presented other unusual features, such as the fact that it was located exclusively in the heart, that it first manifested as anaphylactic shock of unknown origin and that it required immediate surgical treatment because of severe haemodynamic compromise. (Br. J. Anaesth. 1997; 79: 671–673).

Key words

Echinococcosis is a disease produced by the encysted larvae of echinococcal worms. There are four species pathogenic to human: *E. granulosus*, *E. multilocularis*, *E. oligarthrus* and *E. vogeli*. The most frequent is *E. granulosus* which is endemic in areas of the Mediterranean coast, Middle East, Australia, New Zealand and South America, although it is spreading to other non-endemic countries as a result of immigration.

*Echinococcus multilocularis*, the causative agent of human alveolar echinococcosis, is found usually in countries of the Northern Hemisphere, *E. oligarthrus* and *E. vogeli* are endemic to Central and South America.

It is agreed that cardiac involvement of echinococcosis occurs in approximately 0.5–2% of all cases, although these values are taken from a study performed in 1958, and are therefore debatable. The occurrence of severe complications, such as sudden death and cyst rupture, in cardiac cavities or in the pericardium makes cyst extirpation the most appropriate treatment.

This report describes a case of cardiac hydatidosis and discusses its clinical manifestations, diagnosis, treatment and anaesthetic implications.

Case report

A 49-yr-old female patient with a history of tonsillectomy and brucellosis was admitted suffering an anaphylactic shock which had manifested without previous trauma or strain. After treatment at home with adrenaline, dexchlorpheniramine and prednisolone s.c., she was transferred to hospital.

On examination the patient showed signs of low cardiac output and ventricular tachycardia, which was controlled with lignocaine i.v. An ECG performed after remission of symptoms showed ST-segment elevation in leads V1–V3. Chest radiography revealed a small overgrowth of the left ventricular cavity.

Three days after admission, the patient presented with instability, cyanosis, hypotension and a body temperature of 38°C. The EEG showed subepicardial ischaemia on the anterolateral wall. Echocardiography demonstrated a cystic mass in the interventricular septum with right ventricular cavity collapse. A thoracic computed axial tomography (CAT) scan confirmed the existence of a cystic mass as described by echocardiography and excluded any lung involvement. Abdominal CAT excluded the presence of other cystic masses.

With a diagnosis of cardiac hydatidosis and haemodynamic decompensation, the patient was transferred to a hospital with cardiac surgical facilities. On admission, she was stabilized haemodynamically and she exhibited moderate dyspnoea. Prednisolone 1 g i.v., dexamethasone 5 mg i.v., ranitidine 50 mg i.v. and midazolam 1.5 mg i.v. were administered 1 h before surgery.

During surgery, we monitored ECG, invasive arterial pressure, central venous pressure and peripheral oxygen saturation. Anaesthesia was induced with midazolam 2 mg, fentanyl 0.2 mg, etomidate 16 mg and vecuronium 6 mg. High-dose vecuronium and fentanyl were given by continuous infusion to maintain anaesthesia, and the lungs were ventilated with 100% oxygen. Surgery was performed under extracorporeal circulation with a 35-min perfusion time and an ischaemia time of 25 min.

The incision exposed an intramyocardial hydatid cyst, 10 × 7.5 cm, located on the right ventricular
wall and apical septum with leftwards displacement of the anterior interventricular artery. The cyst had ruptured at the apex of the right ventricular chamber with an orifice of 1 cm in diameter. The surgical field was isolated with a protective layer soaked in hypertonic saline solution 20% which was used as a sclerosidal agent. On discontinuing cardiopulmonary bypass, the patient required inotropic support (dopamine 5 \( \mu \)g kg\(^{-1} \) min\(^{-1} \)).

The only postoperative complication was paroxysmal supraventricular tachycardia, detected 7 h after surgery. It caused no haemodynamic problems and was treated with amiodarone i.v. ECG revealed complete block of the left branch of His bundle. As soon as oral feeding was restarted, albendazole 400 \( \mu \)g/12 h for 28 days was given. The patient was discharged 9 days after surgery.

### Discussion

**Echinococcus** enters the heart via the coronary circulation, either via a permeable foramen ovale or the pulmonary circulation.\(^5\)\(^6\) The embryo reaches full growth at 1–5 yr after being lodged in the heart. The myocardial reaction to the cyst creates an adventitial pericyst layer.\(^3\)\(^5\)\(^6\)

Although any part of the heart may be affected, the most common location of the cardiac hydatid cyst is the free wall of the left ventricle (50–77%) or the interventricular septal wall. Damage to the pericardium occurs in 50% of cases. Most patients (55–85%) also manifest multivisceral failure involving the liver or lungs, or both, in addition to other organs.\(^2\)\(^4\) The disease can remain asymptomatic (90%) but may incidentally result in sudden death.\(^2\)\(^4\)\(^7\)

Electrocardiographic alterations are not always characteristic of hydatid cysts. However, non-specific disturbances of repolarization, block of the right branch of the bundle of His or atroventricular node block can occur when the cyst affects the interventricular septum. Septal location of the cyst may cause paroxysmal tachycardia. Cysts lodged in the septum or in the ventricular cavities also cause ventricular arrhythmias. Cysts in the right ventricular cavity may cause right ventricular hypertrophy, whereas those located in the left ventricle usually produce myocardial ischaemia (table 1).

<table>
<thead>
<tr>
<th>Table 1 Clinical manifestations of cardiac hydatidosis</th>
<th>Most frequent clinical manifestations.</th>
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<td>Precordial chest pain*</td>
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<td>Cough*</td>
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<td>Fever</td>
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<td>Haemoptysis</td>
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<td>Dyspnoea</td>
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<td>Anaphylactic shock</td>
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<td>Syncope</td>
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<td>Arrhythmias and conduction disorders</td>
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<tr>
<td>Acute myocardial infarction</td>
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<td>Pericarditis</td>
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<td>Valvular dysfunction</td>
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<td>Sudden death</td>
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Myocardial infarction may occur when the cyst compresses the coronary arteries. Normal electrocardiographic patterns exclude left ventricular wall location.\(^2\)\(^3\)\(^6\)

Echocardiography is the most efficient method of diagnosing hydatid cysts in the heart.\(^2\)\(^7\) Chest radiography can demonstrate signs such as pulmonary cyst, altered cardiac silhouette or traces of calcification that suggest a diagnosis of hydatid cyst. Other diagnostic steps to be taken subsequently include CAT and nuclear magnetic resonance. Further complementary examination may include seeking cysts in other locations using computer image techniques and serological tests.\(^3\)

Before operation, cardiac function should be evaluated using cardiac and coronary angiography as preparation for surgical intervention or in case some form of co-existent valvular or ischaemic lesion is present.\(^5\)\(^6\)

Surgery requires cardiopulmonary bypass and moderate hypothermia with aortic cross-clamping. One of the difficulties in the removal of the cyst is its location and extreme fragility. If the cyst is ruptured and there is leakage of content into the systemic circulation, an immunological reaction (type 1 Coombs–Gell response) or an alternative pathway of complement activation may occur, with subsequent liberation of substances which can occasionally cause anaphylactic shock.\(^8\)\(^9\) The occurrence of this potentially fatal complication may take place during surgery or early in the postoperative course.\(^10\)

Another risk of a ruptured cyst is dissemination. For this reason, surgery should be extremely cautious and the cyst must be isolated from the surgical field and sterilized with saline solution\(^1\)\(^1\)\(^1\) or other substances such as 2% formalin, 5% silver nitrate solution, 1% iodine solution, 5% cetrimide solution, hydrogen peroxide or 20–30% hypertonic saline solution.\(^3\)

Fatal cases of cerebral air embolism caused by liberation of gas into the circulation have been reported after sterilization with hydrogen peroxide.\(^12\)

Hypertonic saline solution is the least toxic, although it is not free of adverse effects as it may cause hypernatraemia and a case of hyperosmolar coma has been reported.\(^13\)

The combination of corticosteroids with H\(_1\) and H\(_2\) blocking agents, and administration of benzodiazepines are thought to be beneficial in preventing the effects of histamine release.\(^14\) The anaesthetic technique should use drugs with minimal histamine-releasing activity. An anaesthetic regimen combining etomidate, vecuronium and fentanyl has proved highly effective.

With pulmonary cysts, high pressure ventilation must be avoided because of the serious risk of cyst rupture; some authors recommend intubation with double-lumen tubes as the most effective method of isolating the affected lung in case of rupture.\(^13\)

Pulmonary artery catheterization is contra-indicated in these patients, although no cases of cyst rupture caused by such catheters have been reported. We believe direct insertion of a catheter by the surgeon to monitor left atrial pressure is preferable.
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Supraventricular and ventricular arrhythmias may occur frequently as a result of either the cyst itself or surgical excision, before, during or after operation. Patients in whom anaphylactic shock is suspected as a result of cyst rupture require careful preventive treatment with albendazole or mebendazole to prevent dissemination. Follow-up should include periodic check-ups accompanied by serological and imaging tests. Patients with contraindications to surgery should be treated with mebendazole or albendazole, although their efficiency is uncertain.

References