Online Case Report

Hydatid disease of the heart

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A 27-year-old physical education teacher, from a rural sheep farming area of South Africa, was referred following an isolated episode of collapse. Transthoracic echocardiography and MRI showed a cystic lesion under the septal leaflet of the tricuspid valve attached to the right ventricular wall. A provisional diagnosis of hydatid cyst was made. Hydatid serology was negative and there was no evidence of hydatidosis elsewhere. Preoperatively, the patient was treated with praziquantel and albendazole. Surgery was performed using cardiopulmonary bypass. Cyst was excised without any spillage. The patient was weaned off bypass without any support and made an uneventful recovery. Cytology and microbiology of the specimen confirmed hydatid pathology. This case describes excision of a right ventricular hydatid with techniques used to avoid spillage. It also describes an up-to-date antihelminthic therapy used in the management of hydatid cysts.

Key words: Hydatid cyst – Cardiac – Echocardiography – Surgery – Multidisciplinary

Hydatid disease is a parasitic infection with the metacystode stage of the tapeworm *Echinococcus*. *Echinococcus granulosus* is the commonest species infecting humans and is characterised by cyst formation. Hydatid cysts have been documented in almost all the organs. Cardiac involvement however is very rare, ranging between 0.5% and 3%.¹ Right ventricular hydatid cysts are even more rare; in this report, we review the management of one such case, recently operated in our unit.

Case report

A previously fit, 27-year-old male physical education teacher was referred for investigation following an episode of syncope. He had no relevant family or past medical history. The only remarkable finding on physical examination was a soft ejection systolic murmur in the aortic area. Apart from the ECG, which showed

incomplete right bundle branch block, all other routine investigations were normal.

A 24-h Holter monitor revealed no abnormality. Transthoracic echocardiogram, however, showed a large septated cystic structure in the mid free wall of the right ventricle (RV). The appearances were compatible with a hydatid cyst. Further questioning revealed that he had grown up in rural South Africa, and during his childhood had come into contact with sheep and dogs. Findings of echocardiography were confirmed on the MR scan (Fig. 1A–C). The non-enhancing mass seen was not associated with any inflow or outflow tract obstruction. CT scanning of brain, abdomen and thorax failed to show involvement of any other organ. Coronary angiogram was normal. Hydatid serology was negative.

Combination anti-helminthic chemotherapy, to be followed by surgical excision of the cyst, was planned. The patient was admitted to hospital 1 week before his

A

B

C

Figure 1 Cardiovascular magnetic resonance images of the mass in the right ventricle (RV). (A,B) Four chamber view obtained using a gradient echo sequence. (A) A septated cyst is present attached to the RV free wall, which is fluid filled (bright signal, arrowed). LV, left ventricle. (B) The same view early after intravenous gadolinium showing low signal intensity comparable with a cyst of low vascularity. (C) Short-axis view of the hydatid cyst.

surgery and commenced on praziquantel and then, two days prior to surgery on albendazole. Surgery was performed via median sternotomy using cardiopulmonary bypass by cannulating the ascending aorta and both cavae. There was no obvious mass seen on the surface of RV. Intra-operative transoesophageal echocardiography assisted in localising the mass to the inferior aspect of the RV just underneath the posterior descending artery and it appeared well embedded in the myocardium. The aorta was cross-clamped and the heart was arrested with antegrade cold blood-based cardioplegia. A further cross clamp was applied to the main pulmonary artery, to avoid accidental spillage. On opening the right atrium, a tense mass, 3 x 3 cm, under the tricuspid valve was noted. This had a white,

thickened wall and was embedded in the RV trabeculae (Fig. 2). Aspiration of the cyst revealed straw-coloured fluid, consistent with a hydatid cyst. The cyst was then injected with 5 ml of betadine, which was left inside for 3 min and then aspirated. The trabeculae over the cyst were incised and retracted and an incision was made into the cavity. The contents were emptied without spillage and the capsule was excised completely. The resultant cavity was closed with interrupted prolene sutures. The atriotomy was closed, the heart was de-aired and the patient was weaned off bypass with no support. He made an uneventful recovery. Cytology of the aspirated cyst fluid, and histology of the cyst wall confirmed the diagnosis of hydatid cyst.

The patient is well at 1-year follow-up.

Discussion

Echinococcal involvement of the cardiac chambers is very rare, with a reported incidence between only 0.5% and 3%.¹ Most frequently involved sites are the left ventricle, followed by the interventricular septum, RV, atria and the pericardium.²⁻⁴

The surgical approach used in this case is of relevance. Intra-operative transoesophageal echocardiography aided in the localisation of cyst and planning of the surgical approach. Covering the area with betadine-soaked swabs and applying a cross-clamp to the pulmonary artery avoided contamination of the surrounding structures. The latter step was taken because

Figure 2 Intra-operative findings. (A) External appearance of right ventricle showing the hydatid cyst bulging outwards. (B) View within right ventricle showing cystic structure embedded in trabeculae. (C) Excised hydatid cyst stained with betadine iodine used to sterilise the contents.

of the risk of intra-operative rupture and embolisation to the pulmonary artery, associated with RV hydatids.⁵ Before removal, the cyst was injected with betadine to kill any remaining larvae. Various other agents (e.g. hypertonic saline, formalin, silver nitrate⁶) have also been used as scolicide by others. Aspiration of the cyst contents facilitated surgical excision. If total excision of the cyst wall is not feasible, Miralles and colleagues have recommended that the remaining cavity should be closed to avoid recurrence.¹ In the case described here, the cyst wall was excised completely and the surrounding defect in the RV was closed.

The majority of cardiac hydatids have been resected using cardiopulmonary bypass. However, there are reports, wherein excision has been carried out using off-pump technique.⁷

It is conceivable that the right bundle branch block, seen in this case, was the result of its interference with normal conduction. At surgery, the cyst was found to extend to the interventricular septum, and conduction abnormalities have been reported with cysts in this position.⁸

In this case, serological tests were negative, as they often are in cases of single extrahepatic organ involvement. Albendazole is active against the germinal membrane of the cyst wall but its concentrations in cyst fluid may be suboptimal. In contrast, praziquantel reaches adequate levels in cyst fluid but is not active against the germinal membrane at usual dosages.⁹ Some evidence suggests pre-operative combination chemotherapy with both agents is more effective than albendazole alone.¹⁰ However, because of its activity against the germinal membrane, albendazole may cause cysts to leak or rupture. Therefore, in this case we elected not to pretreat with albendazole for a prolonged period.

Conclusions

In appropriate clinical settings, hydatid cyst should be considered in the differential diagnosis of a mass-lesion

within cardiac chambers. Echocardiography and MRI scans helped us to delineate the anatomy and aided in planning of surgical strategy. This case illustrates the importance of a multidisciplinary approach, using a combination of appropriately timed anti-helminthic and surgical treatment, for the management of such patients.

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