SURGICAL MANAGEMENT OF HYDATID CYSTS OF THE LUNG

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Because the risk of complications is much greater than that of operation, every hydatid cyst of the lung, whatever its stage of evolution, should be removed as soon as it is recognized. If the pathological process is still confined within the adventitial sac, local evacuation of the adventitial contents is all that is required. Immediate problems associated with this operation are the risks of sudden haemorrhage, and flooding of the bronchial tree with fluid as soon as the tension is taken off the cyst in the process of evacuation, and of anaphylaxis. Bird¹ was very fearful of this haemorrhage, and before the days of effective endotracheal anaesthesia, flooding of the bronchial tree was a real hazard. With modern anaesthesia and a sufficient opening in the chest wall for control of the pedicle in the face of severe bleeding, these risks need not be feared. Anaphylaxis must still be a real possibility, but fortunately it appears to be unusual.

Spilling of scolices and the risk of anaphylaxis can be completely avoided if the intact vesicle is extruded from its bed by the method originally devised by Posadas² for some abdominal cysts, and recently popularized by Barrett.³ It is probable that this method of removing the cyst was thought of by a number of surgeons. To my knowledge it was used for pulmonary cysts by Mr. Balcombe Quick in Melbourne 25 years ago, and it was recommended by V. Armand Ugon⁴ in a paper presented to the Society of Surgery of Uruguay on April 23, 1947. In skilled hands this technique is ideal, but great care must be taken lest sudden rupture during the course of enucleation should result in gross soiling of the field. We have attempted extrusion in seven patients and in two the cysts ruptured during delivery. Even when this happens, if the patient is postured so that the wound is below the cyst, as advised by Holmes-Sellers, and well protected with packs, serious contamination need not occur. It is in large cysts with thick, fibrous adventitiae that extrusion is difficult, and for these it is probably wiser to evacuate the fluid through a very fine needle, and

then when the adventitia is quite flaccid, it may be picked up with Allis forceps and an opening made to insert a sucker to remove the remaining fluid. Finally, a sucker with a bore of 1 in. made of glass tubing with wide bore rubber connections is inserted and the membrane may be sucked into this and removed without any spilling. Alternatively, the membrane may be lifted out with sponge forceps and, if the packs are carefully placed, little or no soiling will occur. Fitzpatrick⁵ points out that scolices are heavy and sink and, if the partially emptied membranous sac is carefully lifted out, they will not be spilt, even if a little fluid escapes from the top.

The immediate post-operative risk is leakage of air into the pleural cavity with the development of a tension pneumothorax and collapse of the lung. This can be avoided by air-tight drainage of the adventitial space, or by closure of the adventitia with water sealed drainage of the pleural cavity at a high level. Probably there is little to choose between these two methods. In nearly all our cases, air-tight drainage of the adventitia has been used. A Depezzzer catheter is sewn into the cavity and then, if possible, the adventitia is sewn into the deep layers of the wound, but where this has not been possible because of the site of the adventitial opening, no leakage has followed. Leakage of air into the pleural cavity has occurred once in our series. Barrett⁶ and Susman⁷ prefer to close the adventitia and drain the pleura, and we have used this method with satisfaction in a few patients.

A small number of patients will develop post-hydatid cavities resulting in haemoptyses and/or suppuration, even years after simple evacuation of the cyst, and, impressed by the frequency of this complication, Fontana⁸ has advised the Uruguayan operation in which, after removal of the cyst, the adventitia is dissected out of the lung with ligation of vessels and closure of bronchial openings as they are encountered. We have used this technique in five patients, in two of whom we first extruded the intact vesicle. We had no difficulty

with the procedure and convalescence was rapid, but, in two patients with large cysts, a haematoma formed in the cyst bed, and in post-operative films the cyst appeared to be still present. One of these haematomata was finally discharged into a bronchus, and for some weeks the patient continued to spit up old blood. The other was quietly absorbed. Perhaps this method may be indicated in some suppurating cysts or those with very thick, fibrous adventitial capsules, where the development of a troublesome post-hydatid cavity is more likely. Barrett⁹ has taken the logical step of shelling out the adventitia containing the intact vesicle. These methods are more severe than simple removal and drainage and the results of the simple operation are so good that I see no reason to use the more complex methods as a routine.

Secondary Changes in the Lung

Suppuration within a ruptured hydatid cyst usually remains limited to the adventitial cavity, and evacuation and drainage is adequate treatment, but, in a few cases, secondary changes develop in the surrounding lung tissue and the patient presents a picture of chronic pulmonary suppuration. In these patients resection of the lobe or segments involved is indicated.

Pleural Complications

Rupture of a cyst into the pleura is always an indication for operation. The pleural cavity should be opened and all hydatid elements cleaned out. The mother cyst may still be in its adventitial cavity and should be removed and the cavity then treated as if a simple cyst had been removed. If rupture is recent, the lung will expand at once, but, if operation has been delayed, decortication may be required and secondary pleural cysts may have to be removed.

If a liver cyst has ruptured into the pleura, the opening through the diaphragm should be enlarged, and the liver sac, which will often be calcified, and may be draining bile, should be cleaned out. If there is no leak of bile and no suppuration, the cavity in the liver may then be closed and left to take care of itself, but, if either of these complications is present, drainage of the cyst bed is essential and should be by the shortest route. In any case the lung must be fully expanded and the pleura drained.

Indications for Resection

Resection is indicated where secondary changes in the parenchyma or bronchi of the lobe have resulted in atelectasis, bronchiectasis or chronic pulmonary suppuration, and in this series ten lobectomies and three segmental resections were done for this indication.

Post-hydatid cavities and bronchiectasis-causing symptoms can only be treated by resection and eight of our patients with these conditions had lobectomy and one had a resection of the lingula.

Very large cysts can usually be treated by simple removal but convalescence is likely to be troublesome, and in cysts over 5 to 6 in. in diameter resection should sometimes be considered. Large cysts in the middle lobe are particularly suited for resection. In four of our patients with very large simple cysts lobectomy was done and in one patient with an immense cyst in the upper lobe and another equally large in the lower lobe pneumonectomy was required.

Complications of Operation

Suppuration in the Adventitial Space

In five patients from whom very large, simple cysts had been removed, pus collected in the adventitial space after removal of the tube and required its re-insertion. All subsided after about two weeks' drainage.

Empyema

Empyema developed in three patients treated before the introduction of chemotherapy.

Anaphylaxis

Anaphylaxis has not been a problem in this series. Two patients who had simple cysts removed had queer, unexplained circulatory collapses some hours after operation, and were looked on as odd manifestations of anaphylaxis. Both patients recovered. Perhaps this experience has been fortunate, as I have been told of five sudden deaths from this cause that have occurred in the last few years. Two of them followed spontaneous rupture and three during operation for the removal of simple cysts.

Recurrent Pleural Cysts

Four of our patients are known to have developed recurrent cysts in the pleura. In one of these, cysts were removed at another hospital and the other three are included in this series. The patient with secondary pleural echinococcosis still has some pleural cysts despite two operations, but this cannot be looked on as a post-operative recurrence. In two other patients, originally operated on elsewhere, I have removed recurrent pleural cysts and, because in one of these daughter cysts were present at the original operation, it is thought that his recurrent cysts may have developed from the spilling of daughter cysts. Because all our patients have not been completely followed up, it is impossible to estimate the true incidence of recurrent cysts, but it seems unlikely to be high. Ten patients were operated on be-

cause of intra-pleural rupture of cysts of the lung or liver, and at least four others, whose cysts were collapsed when I removed them, gave a history of hydatid pneumothorax with re-expansion of the lung. Secondary cysts had developed in only three of these 14 patients. Many Australian surgeons, who did pioneer work in this field before the days of adequate anaesthesia, spilt scolices recklessly for the sake of speed and to avoid flooding the bronchial tree with fluid, and, despite this, none of us sees many cases of recurrent pleural cysts, and I know of none that have been found by Mass Survey examinations.

Post-Hydatid Cavities and Bronchiectasis

Three of our patients reported with haemoptyses some years after operation and required resection for post-hydatid cavities and bronchiectasis. We prefer to do a simple routine operation and to accept the need for a second operation in this small group rather than to subject every patient to a more severe operation. The other six patients, who had resection for post-hydatid cavities, had coughed up their cysts spontaneously after a period of prolonged suppuration, or had had suppurating cysts removed at a previous operation in some other place.

Local anaesthesia and two-stage operations have no place in the modern management of pulmonary hydatid cysts. Anaesthesia should be administered by an endobronchial tube. We prefer to use Pentothal and Curare with a supplement of Nitrous Oxide and Oxygen with controlled respiration. An adequate incision should be made, and at least 6 to 7 in. of a suitably placed rib resected. Liver cysts may be removed at the same time as the lung cyst, either through a combined incision or through a second abdominal incision.

Summary

1. One hundred and eighty-three cysts of the lungs and pleura in various stages of evolution in 152 patients have been removed with no deaths; seven liver cysts were removed from the same patients.
2. Three patients developed post-operative empyemata; two had mild anaphylactic reactions; four developed recurrent pleural cysts.
3. All cysts at any stage should be treated surgically when recognized.
4. Treatment depends on the stage of evolution:
 - (a) If the pathological process is confined within the adventitial cavity, treatment should be by evacuation and drainage of the adventitial cavity.
 - (b) Where the pathological changes have extended beyond the adventitial cavity into the bronchi and the lung parenchyma, resection is required.
 - (c) Pleural complications must be treated by evacuation of the pleura and the cyst bed, and re-expansion of the lung. Decortication may be required.
5. Resection is indicated for:
 - (a) Secondary suppurative changes in the lung.
 - (b) Post-hydatid cavities.
 - (c) Sometimes in simple cysts of more than 6 in. in diameter.
 - (d) Large cysts of the middle lobe at any stage of evolution.

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