months. He states that the experimental incubation period seems to vary with the dose of organisms, the depth of inoculation, and the susceptibility of the individual. There seems no reason to doubt that these factors might operate to produce exceptionally prolonged incubation periods in the naturally occurring disease, and it may be that residence in a temperate climate is also relevant.

We are indebted to Dr. C. A. Hoare, F.R.S., for drawing our attention to the Russian work quoted, and for providing a translation of it; and to Professor P. C. C. Garnham for confirming the diagnosis in our case.

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Operative Procedure for Hydatid Disease of Liver

Although the occurrence of hydatid disease of the liver is comparatively rare in most parts of the world, there are certain areas where it is so common that it is a major cause of death in the community. In the Eastern District of Equatoria Province, Southern Sudan, the main town of Kapoeta is the centre of a large area where hydatid disease is endemic, affecting upwards of 50% of the population at all ages; tiny tots of 4 years and old men and women suffer equally from "large abdomens." A smooth swelling in the upper abdomen and an address in the Kapoeta area are almost synonymous with a diagnosis of hydatid cyst. The Toposa, Didinga, and Boya tribes who inhabit this area live mainly by breeding cattle, sheep, and goats, and live in *tukls*, or huts made of mud and thatch. Their dogs share their houses and food, often eating from the same plates, and little or no care is taken to ensure that the food is not contaminated by the dogs' excreta. A staple part of the diet is meat, either raw or briefly flamed for a minute or two, washed down by milk or fresh cow's blood.

In view of the admission at times to hospital of large numbers of patients suffering with this disease, a simple, safe, and rapid method of treatment is necessary, and the following operative procedure has been found to be of value.

METHOD

Pre-operative chest x-ray and blood films are taken routinely. Under spinal anaesthesia for adults, and hexobarbitone for younger patients, the abdomen is palpated to find the most prominent part of the cyst. With practice, the cyst wall can easily be distinguished from overlying liver substance, which, if incised, will add considerably to the difficulties of operation by causing unnecessary haemorrhage. When the accessibility of the cyst has been determined, a small incision is made at the chosen point. In most cases this will be a vertical midline one, but, if liver substance is consistently felt, then it is likely that the adventitia will best be reached under the costal margin; in this case a transverse incision will be required, with gentle retraction of the rib cage upwards.

A Potain aspirating trocar and cannula, connected by its side tube to a powerful suction apparatus, is thrust into the thick pink-white adventitia of the cyst, the trocar is withdrawn to its full extent, and 200-300 ml. of fluid evacuated. The suction tube is disconnected from the cannula, the trocar having first been pushed down again; a 10-ml. syringe full of strong formalin is attached to the side-tube, and the formalin is injected, the trocar having been withdrawn temporarily. The syringe is now removed.

With an assistant holding the cannula firmly, two catgut stay sutures are inserted, one on each side of it, about half an inch (1.3 cm.) away. If these sutures are put in before partial evacuation of the cyst, the tension will produce persistent leakage of unformalized and potentially dangerous fluid. After three to four minutes the suction tube is reconnected and the cyst is evacuated as completely as possible. By this time it should be completely flaccid and can be drawn up to, or even outside, the abdominal wall. For this reason one finds it very rarely necessary to extend the incision across the costal margin. After packing off any portion of the abdominal cavity which may occasionally be visible, the trocar and cannula are withdrawn and discarded, their place being taken by a perforated metal sucker tube. The cyst wall being held by an assistant by means of the stay sutures, the puncture hole is carefully enlarged with scissors to a diameter of about 1½ in. (3.8 cm.). The cyst is now sucked as dry as possible, a head mirror being useful at this point to confirm that no fluid is left.

Two pairs of ovum forceps or swab-holders are now used to withdraw, as gently as possible, the milk-white and extremely friable germinal membrane lying collapsed in the depths of the cyst. A final wipe round with a swab moistened with formalin, and the abdomen is ready for closure.

In the case of a vertical incision, the upper corner of the peritoneal opening and the edges of the peritoneum adjacent to it are sutured to the margins of the cyst by a continuous locking suture of catgut, leaving the cavity wide open; the rest of the peritoneum is closed in the usual way. The sheath is closed from below upwards with continuous braided stainless-steel wire, the final bite including the cyst wall. The skin is also closed from below upwards, stopping short at the lower end of the cyst wall. The cyst cavity is thus left in communication with the outside. No drainage is used.

The above procedure can be adopted for any size of single cyst and will normally take about half an hour. Thus about six cases can be dealt with comfortably during a morning session.

COMMENT

The average patient can be expected to be free of post-operative pyrexia on the second day, and will be fit for discharge about the eighth to tenth day after operation, with the site of marsupialization completely closed and dry. Early in the series of cases, every patient suffered a sharp rise of temperature immediately after operation, owing to malaria, probably made manifest by the loss of tension in the cyst. Prophylactic mepacrine, and latterly camoquin, prevents this pyrexia, while a course of procaine penicillin, 400,000 units twice daily for five days post-operatively, will serve to reduce infection during the healing process.

Occasionally large cysts are encountered in which, on inserting the trocar and cannula, no fluid can be sucked out. These prove to be filled with hundreds, or even thousands, of daughter cysts, and must be dealt with somewhat differently. The trocar is unscrewed and a long, thin lead probe is pushed down the cannula. By pushing the probe against the cyst wall inside, a bend is produced which will serve to burst the small cysts when the probe is twisted. After its withdrawal and replacement of the trocar, formalin is injected and suction started again. After incision of the cyst wall a careful removal of each and every cyst is done, using a tablespoon with an extension handle welded on to produce an instrument at least 18 in. (46 cm.) long. With this every part of the interior can be cleared down to an occasional depth of 15 in. (38 cm.). After careful inspection of the depths of the cyst, and repeated swabbing to catch any missed cysts or debris, marsupialization and closure are performed as for a single cyst.

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