HYDATID DISEASE OF THE INNOMINATE BONE

With a Report of a Case Successfully Treated by Irrigation with Supersaturated Salt Solution

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Hydatid disease of bone is comparatively rare. Dew (1928) stated that 1 per cent of all hydatid disease was found in bone. The bones commonly affected are the humerus, femur, vertebrae, tibia and innominate bone. The structure of bone determines the form assumed by the parasite. Uniform spherical growth is impossible because of the small size of the bony canals and the resistant nature of their walls. The parasite grows along the lines of least resistance. Its prolongations extend centrifugally in all directions along bony canals causing some pressure absorption and widening of the canals and producing a cyst with many diverticula.

HYDATIDOSIS OF THE INNOMINATE BONE

Hydatid disease of the pelvic girdle has always presented great problems in treatment and its prognosis has been extremely gloomy. Rendle (1913) reported a case with a fatal termination. There was a tumour arising from the ilium which over four years grew to a large size. Corlette (1920) reported a case of affection of the right side of the pelvis with an eight years' history and again with a fatal termination. The patient first came with a large tumour in the inguinal region. Coley (1932) reported two fatal cases of affection of the pubis. In both cases an initial diagnosis of neoplasm was made. In one, treatment by radium pack was used; in the other, deep x-ray. In neither case was the spread of infection arrested.

Treatment of hydatidosis of the innominate bone—Dew (1928) stated that unless the diagnosis was established early and the affected part could be completely excised—as in affection of the iliac crest (Finochietto 1921 and Landivar 1922)—surgical treatment was only palliative. Incision and evacuation of the cyst confers only temporary benefit and recurrence is inevitable. With such procedures there is also a risk of introducing sepsis: before the introduction of antibiotics this usually caused the patient's death.

There is much to be said for the complete removal of the diseased area afforded by hindquarter amputation. Dew (1928) did not think that the results of operation justified the risk, but since that time the techniques of operation and of blood replacement have very greatly improved. Successful cases have been recorded by Oulé (1947) and also by Nisbet (1963), who gave us the details of a patient so treated some years ago. However, even Gordon-Taylor (1959) refused operation to a patient with advanced disease and debilitated by sepsis. Hindquarter amputation remains a mutilating operation that carries a high mortality even in the most expert hands. Again, if there has been any spread to the soft tissues of the pelvis or if daughter cysts are split during operation there is a grave risk of contamination and of later formation of secondary cysts.

Bourgeon, Catalano and Guntz (1960) reported the case of a patient who came with a tumour in the right iliac fossa. The diagnosis of hydatidosis was made by laparotomy. There was intrapelvic spread and radiographs showed extensive involvement of the acetabulum and surrounding parts of the innominate bone and also of the head and neck of the femur. The affected areas were removed by wide excision and the bony defect made good by grafting. The period of observation after operation was rather short, but the possibility of this method of treatment as an alternative to hindquarter amputation is obvious.

Other methods have been tried in order to check the spread of the disease. Dévé et al. (1924) and others tried radiotherapy and found that it had no effect. Dew (1928) gave antimony
tartrate intravenously with no result. He wrote: "It is possible that in the future biochemical research will provide us with a drug against the parasite which will find in vertebral and other osseous hydatid disease a sphere of great usefulness." Perez Fontana (1959) condemned the use of formalin. He considered that many of the complications after operation were not anaphylactic but toxic, and caused by formalin.

A supersaturated saline solution sterilises the germinal elements of the parasite, the scolices, by osmotic action. It seems that this may be the "biochemical drug" which Dew was seeking. Fontana reported successful results in cases of hydatid disease of the spine and of other bones.

Woodward (1962) reported a case of involvement of the left ilium. He had been in contact with one of us (D. P.) and knew of the case reported in this paper and also of the effect of supersaturated saline solution. The lesion was twice curetted and the brine solution was used after operation. Two years later the disease appears radiologically to be arrested.

In the case now reported supersaturated saline solution was used as an adjunct to operation.

![Radiograph of pelvis in March 1959, showing extent of involvement of bone at the time of the beginning of treatment. Note the destruction of the superior ramus of the pubis.](image)

**Fig. 1**

**CASE REPORT**

In February 1959 a man of thirty-nine attended with pain in the right hip and knee on straining, and with a swelling on the inner aspect of the right groin below the inguinal ligament and medial to the femoral artery. The lump was firm, discrete and smooth and about the size of a small hen’s egg. Radiographs showed circumscribed areas of rarefaction in the pubis deep to this swelling (Fig. 1). The patient, a factory foreman, had been raised on a sheep property. He had had tuberculosis in 1948 and in 1956 had undergone thoracotomy for hydatidosis of the right lung. His brother also had suffered from hydatid disease. A diagnosis of hydatid was considered, but because of its extreme rarity in this situation, it was thought more likely that the lesion was a neoplasm. Exploration and biopsy was considered necessary.

At operation in March 1959 the lesion was found to be a hydatid cyst which ruptured before the exact nature could be established. The soft tissues were soiled with hydatid fluid and daughter cysts. The cyst was evacuated and was found to originate in the part of the pubis...
shown radiologically to be involved. Because of the danger to the tissues surrounding the
great vessels (which were very close to the field of operation) formalin was not used to sterilise
the soft tissues. A good deal of thought was given to removal of this area, but local excision
of the bone with adequate sterilisation did not seem possible, and the only way of getting
clear of the tissue contaminated by the cyst contents seemed to be hindquarter amputation.
However, the patient refused to undergo the latter.

In May 1959, because of abdominal symptoms, a laparotomy was performed and the
liver was found to contain a dead secondarily infected hydatid cyst. This was opened and
evacuated. In June 1959 the patient came with a lump in the right groin adjacent to the previous
operation scar. Only pus was obtained when this was incised. One month later he was
readmitted with a history of hydatid elements having been extruded through the sinus in
the groin. Drainage of pus and hydatid cysts continued intermittently over the next three

months. Radiographs at this time showed slight further destruction of the ilium surrounding
the acetabulum.

In March 1960 the disease was found to have eroded through to the acetabulum (Fig. 2). On
rectal examination a rounded mass seemed to be palpable on the right wall of the pelvis.
Hindquarter amputation was again considered but as the patient still refused to undergo this
procedure, a modified operation was contemplated. At this time one of us (D. P.) became
aware of Fontana’s use of 30 per cent saline solution to kill the cyst wall and daughter cysts.
In the meantime there had been a fairly active and rapid progression of the hydatid in the
innominate bone. It now involved the superior surface of the hip joint, extended to the ilium
and down the ischium towards the ischial tuberosity. Rectal examination and barium enema
showed the cavity of the pelvis to be free of any mass. The decision was made to evacuate
the cyst, to pack the affected area with gauze soaked in brine and then to irrigate locally with
brine. The case was discussed with the Senior Surgical Consultant to the Repatriation Hospital,
and it was decided that a combined operation should be undertaken because it was quite possible that soft tissue spread might be encountered in the pelvis.

*Plan of operation*—The incision had to give access to the inner side of the pelvis and to the hip joint and to permit exposure of the affected part of the innominate bone. It was decided that the only way of dealing adequately with the hip joint would be by dislocating the head of the femur from the acetabulum. Because part of the hip socket was involved it was clear that there was no possibility of restoring adequate function of the hip joint. It was also decided to remove the head of the femur to give access and to allow for subsequent arthroplasty.

*Operation*—The operation was performed in June 1960. One incision was made across the lateral aspect of the right thigh, and another below the right inguinal ligament. The abdomen was opened above the right inguinal ligament, and an excellent exposure of the inner side of the pelvis was obtained. Fortunately, there was no spread to soft tissues in the pelvis. The hip joint was then exposed through the lateral incision and the head of the femur was dislocated from the acetabulum. This gave good access to the diseased area.

As the affected bone was curetted away it was found to contain numerous daughter cysts and to be very fragile. The affected area appeared to be a spongy bag of soft bone containing innumerable very small daughter cysts (Fig. 3). The wound was only partly sutured and was mainly packed lightly with gauze and left to granulate. Two catheters were inserted deeply and sewn into place so that the wound could be irrigated daily with salt solution.

Convalescence after operation was surprisingly uneventful, though the wounds became infected with staphylococcus aureus and bacillus proteus. The daily instillations of brine caused much pain. At first, injections of morphia or pethidine were used to control pain but later, general anaesthesia by intravenous injection of about 14 millilitres of 2 1/2 per cent thiopentone was given. This kept the patient unconscious for about four minutes. Over the next four months there was an intermittent discharge of pus and, occasionally, of live and

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**Figure 3**—Radiograph taken one month after the major operation showing the extent of removal of bone. **Figure 4**—The condition in October 1963. Note the sclerosis and regeneration of bone and the well-defined pseudarthrosis.
desiccated cysts through the anterior sinus. Each time the brine solution was instilled desiccated cysts were extruded.

In October 1960 radiographs showed an increase of bone sclerosis, without evidence of extension of the hydatid disease. The femoral neck seemed to be forming a pseudarthrosis with the lateral aspect of the ilium. At this time a lump was noticed adjacent to the anterior sinus in the right groin. This was explored and was found to be formed by a large hydatid cyst extending beneath and medial to the femoral vessels, to lie deep in the adductor magnus and extend posteriorly around the femoral shaft. It could not be completely removed. The cyst was punctured with a trochar and cannula and 20 millilitres of 10 per cent phenol in glycerine were introduced. This solution was retained for five minutes and then the cyst was opened. About 500 daughter cysts were extruded. The cyst and wound area were then saturated with the brine solution. This cyst undoubtedly arose because of spill at the time of the original exploratory operation.

Over the next four months large amounts of pus drained from the hip sinuses, and on separate occasions a desiccated cyst, two live cysts and a small piece of dead bone were extruded. Two months later the patient was found to have gained eight pounds in weight. However, five desiccated cysts had been extruded through the anterior sinus during that period. By July 1961 weight had increased by a stone; the patient was putting weight on the affected limb with the help of a raised shoe and had returned to work. The sinuses discharged intermittently and an occasional cyst was extruded. Though there was some pelvic tilt, flexion of the affected hip was satisfactory and there was a reasonable degree of lateral and medial rotation. Radiographs showed sclerosis of bone without evidence of extension of hydatid disease. The pseudarthrosis was well formed. Progress was satisfactory up to the end of 1961, though a few desiccated cysts were extruded through the anterior and lateral sinuses.

The intermittent discharge of pus and cysts continued until April 1962, when the anterior sinus was opened under general anaesthesia and the wound was for a time irrigated daily with supersaturated saline. During the phases of exacerbation of infection the patient was given chloramphenicol parenterally.

Over the fourteen months up to June 1963 no cysts were extruded and there was only a slight purulent discharge from two sinuses. The patient was last seen in April 1964. At that time there were two small sinuses with slight purulent discharge, but there had been no further discharge of hydatid cysts. Gait had improved and the patient was able actively to control movements at the pseudarthrosis and to walk well with one stick. He was employed as a plant engineer. Radiographs showed further regeneration of bone and no sign of any progression of the disease (Fig. 4).

DISCUSSION

It is pleasing to be able to report the apparent arrest of progress of disease in this case of hydatidosis of the innominate bone—a disease which formerly carried a very grave prognosis. Before treatment was started the disease was progressing rapidly. Local resection combined with irrigation with brine was chosen instead of hindquarter amputation because the patient refused to undergo the latter operation. The result has justified the choice of method.

It is interesting that in the sites that were so readily accessible at operation that complete removal was possible, there was immediate arrest of the disease. The discharge of the daughter cysts continued through the anterior sinus which communicated with the pubis. This area and the ischium were on the periphery of the wound and curettage was carried out blindly at the major operation. It is evident that operation should be so planned as to give adequate exposure of the affected bony parts. In this instance this was extremely difficult. However, after enlargement of the sinus at a later operation and irrigation of the area with brine there has for two years been no discharge of hydatid material. This is in line with the experience of Perez Fontana (1961) who advocated local instillation of brine should there be any further discharge of daughter cysts.

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The use of the brine is a major advance in the treatment of hydatid disease of bone. Not the least of the benefits conferred by it is the sterilisation of the soft tissues which are contaminated at the time of operation. It is interesting that soft tissue contamination occurred after the initial operation, which was undertaken to establish the diagnosis. Quite a large hydatid cyst grew in the soft tissues of the groin but since brine was used no new cysts have developed in the soft tissues. The pain associated with the instillation of the brine—literally rubbing salt in the wound—was most distressing and in this case had in the end to be controlled by general anaesthesia. Another feature of interest is the successful result of the arthroplasty: the patient has an excellent painless stable hip which has permitted him to go back to his work as a plant engineer.

SUMMARY

1. A case of hydatidosis of the innominate bone is described.
2. The disease was treated by local resection combined with instillation of supersaturated salt solution.
3. The disease appears to have been arrested and the functional result is good.
4. The lethal effect of supersaturated salt solution on the parasite is stressed.
5. The experience of other workers in the field of hydatid disease is described.

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REFERENCES


