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# REPORT OF A CASE OF A LARGE ABDOMINAL ECHINOCOCCUS CYST: WITH REMARKS.

BY

M. STAMM, M.D.,

PROFESSOR OF OPERATIVE AND CLINICAL SURGERY IN WOOSTER UNIVERSITY, CLEVELAND, OHIO.



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# REPORT OF A CASE OF A LARGE ABDOMINAL ECHINOCOCCUS CYST: WITH REMARKS.[1]

BY M. STAMM, M.D.,
PROFESSOR OF OPERATIVE AND CLINICAL SURGERY IN WOOSTER UNIVERSITY, CLEVELAND, OHIO.

MRS. A. H., forty-nine years old, a native of Germany and a resident of this country for four years, has borne seven children, the last twelve years ago. Menstruation has always been regular. The general health was good until eight years ago, when, after having engaged in laborious work and perspiring profusely, she experienced severe pain in the right inguinal region; the abdomen became enormously enlarged and painful and the legs edematous. A surgeon who examined her at this time stated that there was a tumor, and proposed an operation, to which patient would not consent.

She was afterwards treated by a midwife, with external applications and internal remedies, which, according to patient's statement, acted on her bowels and increased the flow of urine very materially; and after a period of fourteen weeks led to her recovery. Her abdomen became somewhat reduced in size, but never to the normal. Her health was afterward tolerably good up to September 9, 1892, when, while perspiring, she exposed herself to the chill air.

I saw her September 14, when she complained of a pain in the umbilical region; she had slight chills

[1] Read before the Northwestern Ohio Medical Association, December 15, 1892, at Lima, Ohio.

and vomiting; her temperature varied between 99° and 100°; her pulse was about 110 per minute. On examination I found a spherical tumor originating from the pelvis and reaching about two inches above the umbilicus. It was not very tense, but fluctuating, somewhat like a unilocular cyst.

On percussion there was an absence of tympanitic sound in either iliac region, and even after turning the patient from side to side the dulness was not diminished. The tumor thus appeared to be immovable. On the right side especially I could feel a soft mass resembling omentum. On vaginal examination the neck of the uterus was found imbedded in a cystic mass which reached low down into Douglas's pouch. Traction would not bring the uterus down much. The organ, therefore, could not be outlined and did not seem to be very movable.

Bimanual as well as rectal examination threw no further light upon the question of diagnosis. Of course, the thought of the cyst being ovarian was uppermost in my mind; still, the long history and the peculiar course led me to suspend my diagnosis. All the different conditions met with in abdominal surgery were more than once passed in review. Even the thought of an hydatid cyst entered my mind for a moment and prompted me to ask the patient whether she had ever been in close contact with dogs; but, on her answering in the negative, the thought was pushed into the background again.

I had never before seen a case of hydatid cyst, and, though the undulations on percussion of the tumor were quite distinct, I did not at that time consider myself competent to compare them with the characteristic hydatid tremor; nor was I able to judge if the phenomenon were more aptly expressed by the English word "tremor," or the German "Hydatidenschwirren" or the French "froissement hydatique." Viewed in the light of experi-

ence, however, I should think that the word "tremor" is the most expressive. As a matter of fact, some German authors also use the word "Hydatidenzittern," which corresponds with the English "tremor."

After a few days' observation I proposed an operation; but, strengthened by her former experience, the patient did not accept my proposition. She was subsequently seen by several physicians who, I am informed, also advised operation. To counterbalance our opinions a midwife, from some distance, was called in, who frankly admitted that the condition was beyond her extensive obstetric experience.

On October 21, I was called again, and found the woman much emaciated, with a rapid and feeble pulse. Her abdomen was enormously distended and her legs edematous. She could not retain much food, and dyspnea was present. On the left side, in the iliac region, I could trace the sigmoid flexure extending toward the median line, but from here it was lost in the pelvis. The dyspnea and other symptoms finally became so aggravated that she herself urged an operation. I prepared myself to deal with more than a simple ovarian cyst, and was assisted by Drs. Caldwell, Kinsey, and Thomas. The delay in operation had one good effect; the cyst was firmly adherent to the peritoneum, so that I punctured it with the knife before I was aware of it. Some purulent fluid escaped through the small opening, and I immediately enlarged the incision to about 2½ inches.

Probably the first quart of fluid was mixed with pus and a number of small hydatid cysts of from about the size of a California grape up to a large plum. The rest of the fluid was clear; it nearly filled a tobacco pail, and contained 300 daughter-cysts, filled with clear fluid, and, besides, two large

echinococcus membranes. The cavity was irrigated with a solution of corrosive sublimate.

Introducing my fingers into the sac, I found it universally adherent. The adhesions seemed to be firmest in the right iliac fossa and along the spinal column. An attempt to enucleate part of the sac was followed by free hemorrhage, so that on account of the patient's feeble condition I desisted. The sac was, therefore, stitched to the wound and drained by means of a glass tube and iodoform-gauze strips. Four hours after the operation the patient's temperature was 102°, the pulse 120°. After that the temperature varied between 99° and 100°, except on the fourth day, when, at about noon, the patient had a slight chill, and the temperature rose to 103°. I attributed this rigor to a gastric derangement, especially as she vomited once, and a dose of calomel relieved all the symptoms, and she made rapid progress towards recovery, although with a slight elevation of temperature for ten days. After a day or two the sac occupied the right iliac region and pointed to the iliac fossa as its starting-point.

As hydatid disease is quite a rare affection in this country, it may not be out of place to dwell at some length upon the most important practical features of the subject, the more so as we find comparatively meager reports of it in American literature as far as I have had access to it.

*Etiology.* Echinococcus disease seems to be almost endemic in Iceland and in Victoria (Southern Australia). In Iceland we find one case to from every 61 to 82 inhabitants; in Victoria the annual mortality from echinococcus disease is 3 07 per cent. To a less degree we find it in the northern part of Germany; in Mecklenburg there is one case

to every 12,879 inhabitants; in Pomerania probably the proportion is lower still. Osler collected eighty-five cases in this country up to July, 1891.

The disease is caused by the eggs of the tenia echinococcus, of which the dog seems to be the usual carrier; parts of the tenia may gain entrance to the intestinal canal with drinking-water or uncooked fruits and vegetables, as lettuce, etc., which may not have been thoroughly cleaned and to which the fecal matter of the dog may readily adhere. On questioning my patient, after the operation, she stated that she obtained her drinking-water from neighboring creeks and very often drank some from surface-holes on peat-land, to which shepherd dogs had access; besides drinking they would bathe in the water and deposit their feces in it. She stated further that a shepherd had died with an enlarged abdomen some time after she had become sick, and that quite a number of persons in her neighborhood had died with dropsical affections, which, in the light of her illness, might be suspected as having been echinococcus disease. The countries in which echinococcus disease is common raise many sheep and cattle, which, it is known, are even more prone to the affection than man.

The woman stated further that a large number of sheep about her die of a disease called "Filsch," which is probably echinococcus of the brain (Drehkrankheit), and that their behavior was remarkable. This statement accords with that of Richardson: "It does not require much imagination to follow the course of these embryonic tape-worms eaten by the shepherd dog. They are matured in the dog,

passed as tape-worms over the pasturage of other sheep; the ova are again taken into the stomach and system of the sheep, and circles of propagation are established." After some parts of the tenia echinococcus have reached the intestinal canal the eggs perforate its walls and find a nidus in the liver, by way of the portal system or biliary passages, or in the spleen, or, as in my case, somewhere in the pelvis. The echinococcus cyst is there formed by the embryo, and seems to consist of two distinct layers. The inner layer, composed of granular matter and cells, consists of muscular fibers and vessels, and is called the parenchymatous layer. The outer layer is called the cuticle; it is very elastic and shows very fine parallel layers. Its growth is slow; at the end of four or five months it may only attain the size of a small walnut; at this time the brood-capsules, of the size of a pin-head, are developed from the parenchymatous layer. From these brood-capsules the heads or scolices are formed, and they seem to take their origin from the sacculated out-growths that project into the interior of the cysts. After these heads are formed they retract within the cyst; they have four sucking disks and one hooklet. A single brood-capsule may, with increasing age, contain a dozen or more scolices, and in consequence we may find an immense quantity in a large echinococcus sac, but we also find sterile cysts. Like any foreign body these cysts set up an irritation in the surrounding tissue, and in this way become enveloped in a layer of connective tissue, from 5 to 10 millimeters thick and of extreme tenacity.

The *diagnosis* of echinococcus cysts is generally very difficult, and cannot be made from one single group of symptoms. We should closely inquire into the mode of living and the surroundings of the patient. The knowledge that a patient has been in intimate contact with dogs is not sufficient. The slow growth of the tumor would almost exclude an ovarian cyst and weigh heavily in the balance of an echinococcus. It seems to me that the undulations were more distinct than are generally found in a unilocular ovarian cyst. The tumor also did not seem quite as tense and spherical as does an ovarian cyst. Hydatid tremor, caused by the presence of a large number of daughter-cysts, when present, is, no doubt, a very valuable diagnostic factor; but it is more likely to be absent than present. Vaginal examination in females, of course, should never be omitted. In my case the cyst descended between the vagina and rectum to a lower level than the neck of the uterus; it also yielded a sense of greater laxity than an ovarian cyst; it had greater semblance to ascites, and, in fact, there may also have been ascites, as shortly after the operation I was still able to detect a soft, doughy condition.

If the tumor occupies the upper region of the abdomen we should see whether or not it moves with the respiration. Aspiration of the fluid contents of the tumor will no doubt give the best information, and this is recommended by some surgeons as a procedure devoid of danger. From the reports of some cases it would seem, however, that this procedure is not entirely harmless, as some of the contents might escape into the abdominal cavity and give rise to a

new colony of echinococci. A case operated upon and reported by Krause has the significance of an experiment, as a puncture of a cyst was followed in six months by the development of multiple echinococcus cysts.

The pressure within the cyst is often so great that the fluid is ejected through the puncture-opening in a fine stream. In a number of cases urticaria, headache, vomiting, dizziness, and abdominal pain, and even peritonitis, have followed puncture, undoubtedly as a result of the taking up of some chemical poison (ptomaïnes, according to Schlagdenhaufen).

The situation is much aggravated if the fluid be purulent, unless adhesions be formed. The fluid is usually clear, free from albumin, but contains some sodium chlorid, sodium succinate, grape-sugar and inosite, and has a specific gravity of from 1008 to 1010. Microscopically we may find scolices, hooklets and shreds of the chitinous capsule. At times, however, the contents of the large mother-sac may become turbid, pulpy, greasy, yellow, or may even resemble tuberculous pus, though there may be still present a large number of viable daughter-cysts filled with clear crystal fluid. In isolated cases suppuration may take place in the contents of the sac. In such an event we naturally find albumin, and we can only then make a diagnosis by the presence of hooklets or pieces of the characteristic membrane.

If we find a yellow, soft, cheesy substance interspersed with the intact daughter-cysts and other contents, we should not be too hasty in pronouncing the condition tuberculous before the matters have

been examined under the microscope. Volkmann received into his clinic a case in which the diagnosis of coxitis was made. There was some indistinct fluctuation, and a tablespoonful of a yellow, pulpy mass, resembling tuberculous matter, was withdrawn by means of the aspirator. A resection was made, and the upper extremity of the femur, the joint, and the pelvis were found filled with a large number of echinococcus daughter-cysts, together with a grumous mass, having the appearance of scrofulous pus. Microscopic examination in this case would probably have cleared up the diagnosis.

The *treatment* can only be prophylactic or operative. The attention of the public ought to be drawn to the danger of drinking water from shallow wells or surface holes. The practice of fondling or kissing dogs should be interdicted. Dogs should not be allowed to eat or drink from the vessels used by human beings. Special care should be taken in slaughter-houses and other places to dispose immediately and safely of refuse matter. If dogs show symptoms of tape-worm they should receive appropriate treatment. The fox has also been spoken of as being a source of infection; but I doubt if hydatid disease has ever been directly communicated by this animal.

Respecting the operative treatment, I shall limit my remarks simply to hydatids of the abdominal organs. The use of caustics as employed before the antiseptic period; of electrolysis, introduced by Althaus; of double puncture, practised by Simon and his contemporaries, with a mortality of 33 per cent., has to-day merely historic interest. Simple aspiration or tapping has also been advocated by

some authorities as a curative measure. But I need simply refer to what I have said under the head of diagnosis to point out its dangers. Should we really wish to resort to tapping, the only safe method would be to make a large incision, so that we can examine the tumor and its connections, and thereby find the most suitable point for puncture.

Chaintre [1] reports a case of echinococcus of the spleen which was operated upon by Ollier. The original intention was to make a large incision into the tumor and empty it at once, but on more careful examination it was found that to do this it would be necessary to go through some tissue of the spleen, which might be followed by profuse hemorrhage. Silver sutures were therefore passed through the abdominal walls, uniting the peritoneum to the skin, and then, by a few more sutures, the tumor was fixed to the wound. To the trocar, through which a portion of the contents of the sac had already been emptied, he attached a rubber tube, passed through an antiseptic dressing, and kept closed by means of hemostatic forceps, but opened six or seven times a day to permit some of the fluid to escape through the tube. About five days later the trocar was removed and the opening dilated with laminaria tents, and then a drainage-tube of the size of six millimeters was introduced.

The principal methods that surgeons now employ are operations concluded either at one sitting or at two or more sittings, and total extirpation of the sac. Opinions are still divided as to operating at one or

[1] Revue de Chirurgie, Oct., 1890.

more sittings. Volkmann was the first to recommend the performance of the operation in two sittings, and his results, together with those of his followers (31 cases without a death), add weight to his recommendation. Koenig, who at first also operated after Volkmann's method, in two sittings, now advocates the performance of the operation in one sitting, and apparently with equal success. The statistics, however, speak in favor of the operation in two sittings, and this seems to me the best when profuse hemorrhage is to be anticipated or when the sac communicates with the bowel or the bronchial tubes. Of course, the condition of the patient may sometimes call for immediate relief, and in such a case, with proper care, we may risk an operation in one sitting. The latter method, I think, can nearly always be adopted in cysts of the pelvis; owing to the difficulties in diagnosis, the sac is generally opened before the operator is fully aware of the nature of its contents.

I shall now give the different steps of Volkmann's method. It is scarcely necessary to say that the patient and everything that comes in contact with him should be in a perfectly aseptic condition. The operation may be performed under an anesthetic, preceded by an injection of morphine, or, if vomiting is feared, a hypodermatic injection of cocaine may secure sufficient local anesthesia. The incision should be about four inches long in the direction of the long diameter of the tumor and in a situation where fluctuation is most distinct.

Hemorrhage should be fully checked before the peritoneal cavity is opened. Should the omentum

be present, it can be pushed aside or divided with the scissors between two ligatures. After the tumor is exposed the wound should be packed with iodoform-gauze, over which is placed a thick layer of absorbent cotton, wood-wool, or moss. These are fixed by means of muslin bandages. The patient should be supported by pillows placed beneath the spine; the pelvis should be slightly raised, and two nurses should at the same time make slight traction on the extremities and shoulders. Over the dressing a dry, wide flannel bandage is tightly applied, and over this a gauze bandage. The dressing can be left undisturbed for eight or ten days. It is well to give the patient injections of morphine for the first few evenings, to keep him perfectly quiet.

After eight or ten days the sac can be opened. Should the adhesions prove not to be firm enough, a few sutures may be added. Koenig advises that a few sutures be placed between the wound and the sac at the first sitting, to protect the tumor from injury through respiratory movements. We may then introduce a small aspirator, to determine the thickness of the cyst-wall; if this be not very great, we can use the knife; but if the tumor has a cyanotic and congested appearance, it were better to use the thermo-cautery, and make the opening as large as possible. The fluid and the daughter-cysts will escape in a powerful jet, which can be interrupted or retarded by pressure with a sponge or gauze, and the flow may, toward the end, be assisted by irrigation with a solution of boric or salicylic acid.

The cyst is at times very brittle, but generally, with some caution, it can be removed with the finger or forceps in part or in toto. After its removal we again wash out the sac and introduce a good-sized drainage-tube, over which we place a thick, absorbent dressing, and have it changed in accordance with the amount of discharge.

The sac shrinks considerably after the operation, and it may disappear entirely in the course of seven or eight weeks, but in exceptional cases the process may take a full year. Tumors of the convex surface of the liver may have to be opened through the pleural cavity.

James Israel, of Berlin, in 1879, reported a case in which he operated in three sittings. He first removed about one inch of the sixth rib in the axillary line and opened the pleura. The cyst pushed the diaphragm immediately into the wound. A gauze tampon and a Lister dressing were applied over it. After seven days the diaphragm and its underlying peritoneum were opened and again tamponed. Nine days later the liver-tissue, about two lines in thickness, and the cyst-wall were incised. After having evacuated the fluid and daughter-vesicles the sac was drained through the pleural wound. The discharge was profuse, periodically mixed with bile after the third day, and the patient was completely cured after nine and a half weeks.

The operation in one sitting differs very little from Volkmann's method, except that the sac is temporarily fixed to the wound by a few sutures, and a pad of iodoform is placed around the edges to pre-

vent the entrance of fluid into the abdominal cavity. After the sac has been emptied and thoroughly irrigated it may be pulled out a little further and then stitched to the skin. It is claimed that this method has the advantage over the operation in two sittings of more speedy recovery, and that it may be possible to remove secondary cysts, as these are more readily detected after the first cyst has been emptied. This may be true to some extent. If, however, we make it a rule to examine the tumor in every direction immediately after the abdomen is opened, it ought not to be difficult to detect other cysts, and they might be emptied by puncture through the first cyst, or by incision in a more suitable situation.

In exceptional cases we have such a number of cysts distributed over the abdominal cavity that their removal may appear impossible. Very few cysts can be completely extirpated; sometimes we may excise part of the sac. Bergmann, in one case of hydatid of the spleen, extirpated the whole organ for reasons that I fail to comprehend.

In echinococcus of the liver patients are sometimes troubled after operation with a profuse discharge of bile through the wound. A slight discharge, though it continue for some time, has no bad effect; but the cases that in this connection occasion concern are those in which all of the bile finds its way out through the wound. In patients already feeble from the effects of the tumor, nutrition may become seriously disturbed by the total absence of the bile from the intestinal tract. The latter condition may be caused by an obstruction

(coagulum), by kinking, or by opening of the common duct into the sac, as a result of an erosion. We have no operative means to relieve these conditions. If the patient's strength holds out, time will finally bring the remedy.