

times, also, several larger granules of high refracting power. They appear to be identical with the *pyoid bodies* of Lebert, or the *exudative cells* of Henle. *Cholesterine crystals* are found in great quantities. *Pigment*, dark-brown, reddish-black, or black, in granules of different sizes, is found.

The following propositions present a fair general guide to diagnosis in so far as indications can be drawn from an examination of the fluid contents of abdominal tumors:—

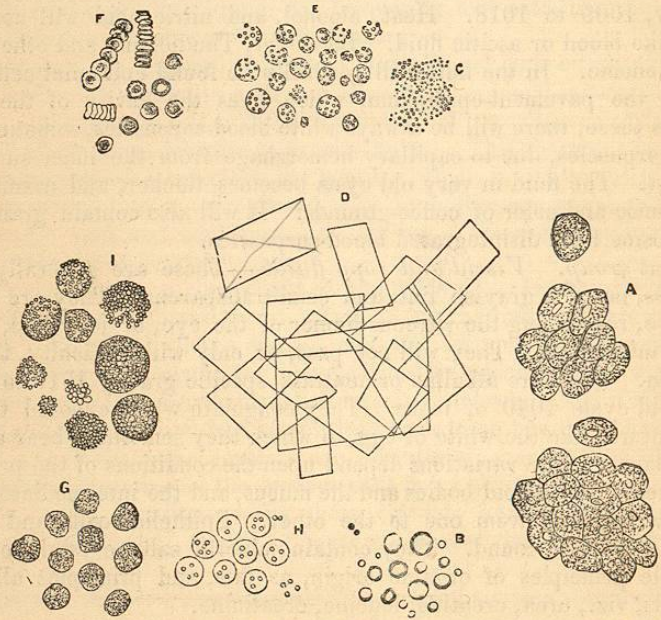
1. Hair, teeth, oil or fat or a gruel-like fluid, give evidence of a dermoid cyst. Pus may come from an ordinary cystic ovary, but it is more likely to come from a dermoid cyst.

2. Bile-matter, or a more or less deep yellow or green fluid, indicates hepatic origin. In one case an operation that terminated fatally would have been avoided had the fluid been first examined. Echinococci also point to origin in the liver or kidney.

3. Fluids containing urea probably come from a renal cyst.

4. Fluids nearly free from albumen and of low specific gravity point to cysts in the broad ligament.

Fig. 91.



Microscopic characters of ovarian fluids—(after Thomas M. Drysdale, Philadelphia, 1873). *a.* epithelial cells, *b.* oil globules, *c.* granular matter, *d.* cholesterine, *e.* granular cells, *f.* blood corpuscles, *g.* Gluge's inflammatory globules, *h.* pus cells and blood.

5. If a clear bright or pale-yellow fluid, which is not viscid, forms a dense white or whitish-yellow coagulum on heating, which is often somewhat yellowed, but not dissolved by boiling in strong acetic acid, it is probably ascitic.

6. If a fluid clear like water, or slightly opalescent, of low specific gravity, forms little or no coagulum on heating, but often becomes markedly turbid if a few drops of acetic acid are first added, and then quite clear again with more acetic acid and more boiling, it is probably from a broad ligament cyst.

7. The specific gravity of ovarian fluids varies from 1015 upwards. In extra-ovarian fluids we rarely find any microscopic elements, and the fluid is of low specific gravity—1003 to 1010 at the most. Hydatid cysts, hepatic or renal, also yield fluid of low specific gravity, rarely so high as 1010. Hence a specific gravity below 1010 tells against an ovarian tumor.

8. Fluids of colloid or syrupy consistence, fluids of specific gravity exceeding 1012, containing epithelial cells possessing the character represented (Fig. 77, p. 291, and Fig. 91), point to ovarian tumors.

## CHAPTER XVI.

TREATMENT OF OVARIAN CYSTIC DISEASE: HISTORICAL NOTE; MEDICINAL, LOCAL MEDICATION, SURGICAL. TAPPING BY VAGINA; BY ABDOMEN; TAPPING COMBINED WITH IODIC INJECTIONS; INCISIONS IN CYST; ELECTROLYSIS; OVARICTOMY.

The scope of this work precludes all attempt at history. The steps by which the present skill in abdominal surgery has been acquired are, however, deeply interesting and instructive. I refer to Peaslee for the most able and impartial historical review. I will do no more in this place than to recall attention to the work and arguments of Dr. Blundell in dispelling the dread of abdominal surgery which so long barred the way to surgical relief of abdominal tumors. Radford, imbued with the teachings of this master, encouraged Clay at the commencement of that career which may be said to have placed ovariectomy upon a secure foundation. Southam, also, of Manchester, in 1843-5, recorded cases (*Medico-Chirurgical Transactions*), and spoke with unreserved confidence of the future of ovariectomy. Walne and Samuel Lane had before this date been operating with fair success, and never wavered in their confidence of the merits of the operation.

The operation was suggested by William Hunter; its practicability and the mode of performing it were taught by John Bell; it was first practised, and that successfully, by an American, Mc Dowell, a pupil of John Bell. The more recent successes of Atlee, Peaslee, Spencer Wells, Keith, Koeberle, and others, ought not to be allowed to obliterate the

claims of Walne, Samuel Lane, Bird, and Baker Brown, which although not unchallenged in some respects, yet deserve the honor that is due to enterprise and priority.

The experience of a century has confirmed the conclusions arrived at by William Hunter, that ovarian dropsy was an incurable disease; and that the only palliative was tapping.

The methods by which nature or accident effects a cure are uncertain, so unforeseen, that the expectation of relief by them cannot influence the conduct of the surgeon. Rupture, perforation, or twisting of the tumor may indeed effect a cure, but they are far more likely to cause death.

It may with confidence be affirmed that if a woman is to be rescued from the danger of an ovarian tumor, the only reasonable prospect lies in extirpation.

The following proceedings may be recorded, chiefly as examples of failure:—

1. *Medicinal.*—The Pharmacopœia has been ransacked in vain. There is no trustworthy evidence that any internal remedy has the slightest influence in arresting the growth of an ovarian cyst. If in a few instances a cyst has seemed to disappear or to diminish under the use of bromides, iodides, chlorates, or other medicines, further trials have resulted in signal failure, suggesting that the cases of presumed cure were but examples of error in diagnosis.

2. *Local Medication.*—Peaslee says, "In several instances the growth of ovarian cysts in the early stage had been apparently arrested by the application, *per vaginam*, of iodide of lead. But," he adds, "further trials must demonstrate how permanent is to be the benefit thus obtained." Firm pressure upon the tumor, at one time much vaunted, has passed into the domain of history.

3. *Surgical Proceedings.*—Although all surgical proceedings, short of extirpation, which have been tried for the relief or cure of ovarian cystic tumors, have yielded for the most part unsatisfactory results, a brief review even of those which have most unequivocally failed is useful. This review may save us from repeating operations which experience has condemned. These proceedings may be regarded as experiments illustrating the constitution and behavior of cystic tumors. And some of them, although they have lost claim to be regarded as generally applicable, may still prove valuable in exceptional cases.

*Tapping and iodic injections* have to some extent been discussed under "Diagnosis." Many simple cysts may be cured by simple tapping, or by tapping and injection of iodine. This especially applies to cysts of the broad ligament. Should examination of the fluid drawn by aspiration indicate a cyst of this kind, iodic injection may be resorted to with some confidence. But the case of true ovarian cysts is very different. Sometimes tapping itself proves fatal. It is not always less hazardous than ovariectomy. In the great majority of cases the cyst will quickly fill again; and the operation must be repeated. Sometimes tapping is followed by inflammation and suppuration of the tumor. And although tapping will commonly give immediate comparative relief, it has been thought that the disease is often accelerated by it. Tapping finds an

especially valuable application in some cases where the diagnosis of ovarian cystic tumor is not sufficiently clear to justify laparotomy.

*Tapping by the vagina.*—The argument for this proceeding rests upon the anatomical fact that the ovary always occupies the lowest position in the pelvis. It is in direct relation with the roof of the vagina, and below the intestines. A fair amount of success has attended the operation; but there is not sufficient reason to conclude that it is more favorable than tapping by the abdomen.

There are two forms of tapping: the one is *simple tapping*; in the other the tapping is supplemented by other proceedings, as *keeping the cyst open*, and *throwing irritant or other fluids into the cyst*.

Simple tapping consists in puncturing the cyst, draining off the fluid contents, and then letting the opening close. This proceeding may be adopted as a palliative, with a view to cure; or as tentative with a view to obtaining information to guide further treatment. It is useful only in a limited order of cases. Our first care then is selection. The favorable conditions are: a small cyst which descends fairly behind the uterus, bulging out the posterior wall and roof of the vagina; distinct fluctuation; absence of solid masses at the most prominent point where puncture must be made.

The cases in which vaginal tapping is most likely to be useful are the monocystic. But this condition can hardly be determined before tapping; and thus tapping comes to be experimental as regards treatment, and exploratory as aiding diagnosis. I would therefore strongly advise that the first or diagnostic tapping be made by the aspirator-trocar. Comparatively little risk attends this method, but it is not absolutely free from danger.

*The Operation.*—The first point is to select the place for puncture. This should be determined with precision. The cyst, it is assumed, occupies by its most dependent part the peritoneal sac between the uterus and rectum. Occupying this space, it causes the uterus and rectum to diverge, the uterus is pushed forwards and a little to one side, the rectum is compressed or flattened backwards. The perforating instrument must therefore strike between these two organs. First, pass a catheter into the bladder, to empty this organ, to insure its safety, to remove it from all interference. Secondly, feel for the position of the uterus by touch and by the sound. In front of the os uteri through the anterior vaginal wall, we may feel the body of the uterus; by passing the sound, the position and relations of the uterus are made still more clear. This is one great landmark. We must keep behind this. Thirdly, pass the forefinger into the rectum, the sound being still in the uterus. You will then ascertain the position and relations of the rectum at the level of the tumor and os uteri. There will probably be a space of one or two inches or more between the os uteri and the anterior wall of the rectum. It is within this space that the puncture must be made. The anterior wall of the rectum is the other great landmark. Fourthly, your finger quits the rectum and returns to the roof of the vagina behind the cervix uteri; then, feeling the cyst here, press firmly down towards it the cyst from above by your other hand on the abdominal wall above the pubes. You thus get evidence of a fluctuating point. Tapping being resolved upon,

you place the patient in position. It is scarcely desirable to give chloroform. The lithotomy-position is convenient; but it is often quite as easy to operate, the patient lying in bed on her left side, the nates drawn well to the edge. An assistant presses the tumor firmly down into the pelvis; the forefinger resting on the tumor an inch or so behind the cervix uteri guides the trocar, which is thrust in perpendicularly to the surface, and carried in the direction of the axis of the pelvis for about an inch, parallel to the course of the uterus indicated by the sound, or until the sense of resistance is suddenly lost. Then, the fluid ought to flow either spontaneously, or under the vacuum produced by the pump. The exhausting pressure should be kept up as long as fluid flows. Then explore to ascertain what remains of the tumor. Withdraw the trocar. Enough has been done for the occasion. Time must be allowed to observe the subsequent course of events, before the diagnosis can be absolute, and before determining on further operations.

As yet we cannot be certain that the cyst is not formed by a tubal gestation, or by dropsy of the Fallopian tube. In either of these cases it would not be desirable to enlarge the opening or to inject fluid into the cyst. Simple exhaustion of the fluid contents may be sufficient for cure of either of these affections, and also of a simple cyst of the ovary or of the broad ligament. It is obviously, then, sound practice to take the benefit of this possibility of cure.

If the cyst be ovarian it will probably fill again. By repeated tapping by vacuum, a small ovarian cyst may gradually become smaller, shrivel up, and be obliterated. This process may be accelerated by iodine injection, or by drainage. The most convenient drain is a silver coil tube.

Firm pressure by compress and binder should be applied immediately after operation, and sustained for some days. The double use of this is to obviate the vacuum that might otherwise form favoring suction of air into the cyst; and to promote the reduction of the cyst by maintaining its walls in contact.

Rest in bed for a week, salines and sedatives are to be recommended as after-treatment.

If, aided by this preliminary tapping, the tumor be found to be ovarian, and be of the size of a foetal head, or somewhat larger, we may then consider the expediency of tapping by the vagina, and keeping the cyst open, so as to allow continuous drainage to go on. The preparatory steps are the same as those already described. It is best to use the long tube, carrying a knife designed by me for similar operations, which can be connected with the aspirator, and will serve to introduce a coil drainage-tube. By this the wound is enlarged, to allow the forefinger to pass into the collapsing sac, to ascertain the condition of the internal surface. On the second or third day, symptoms of inflammation of the cyst, with severe reaction, commonly set in. A discharge of ichorous fluid takes place, and there is great pain in the pelvic region. In favorable cases, says Kiwisch, these symptoms gradually gave way to a purulent discharge, which ceased in from five to seven weeks, and then shrivelling and perfect obliteration of the cyst took place. As long as any secretion goes on it is desirable to inject carbolized water through the tube daily.

Scanzoni<sup>1</sup> is an advocate for the vaginal tapping, in preference to abdominal tapping, generally, when the cyst can be reached by the vagina, amongst other reasons, because it secures more perfect draining of the cyst. If this could be always performed, he says, abdominal tapping would disappear from the rank of recognized operations. Our experience of this method is, perhaps, insufficient. But it is certain that the advantages of it are not without a drawback of danger and of failure. There is always an element of uncertainty, owing to the varying character of these tumors, complications, and the idiosyncrasy of the patient. The operation is, therefore, of an experimental kind. The inflammation, the suppuration, may extend beyond the wished-for limits. Then there is an objection which especially applies to tapping through the vagina. The wound is necessarily made at the base of the tumor, where solid elements are most commonly found, and where the bloodvessels which feed the tumor are largest and most abundant. Kiwisch himself, the chief advocate for the measure, says it is only of use in moderately-large simple cysts, because in very large cysts the extensive decomposition must be very exhausting to the system, and compound cysts do not allow of a full shrivelling-up of the sac. Now here is the difficulty; we can rarely be certain that the cyst is not compound.

Some cases are related by Mr. Wells. His conclusion is, that "simple tapping is more hazardous than tapping followed by drainage, and that drainage should be so complete, that no reaccumulation of fluid can take place, the cavity being kept open until the walls collapse and unite, so that it is completely obliterated."

I am disposed to qualify this view. Assuming that only those cases are suitable for vaginal tapping, in which there is strong presumption that the cyst is single, I would first practise a simple tapping; and if the cyst refilled I would combine the second tapping with drainage.

Tavignot proposed *tapping by the rectum*. Where the tumor protrudes more within reach by this canal, it may be preferable to tapping by the vagina. But whilst open to all the objections urged against tapping by the vagina, it is far less convenient for drainage. And dysenteric tenesmus has been caused by the irritation produced.

#### THE OPERATION OF TAPPING BY THE ABDOMEN.

*Tapping by the abdomen* is an operation often of necessity to relieve urgent distress of breathing. It scarcely merits the rank of an operation of election; since, except in rare and unforeseen cases, it is at best a palliative only. But as a palliative it is exceedingly valuable. It is applicable to a large class of cases, and especially to those large tumors which are admittedly unfit for vaginal tapping. It is a legitimate resource in most cases where, for any reason, extirpation of the tumor is excluded. It possesses the great advantages over the vaginal operation, that it is easier of performance, that it is done at a distance from the base of the tumor, so that we are more likely to avoid wounding solid and vascular

<sup>1</sup> *Maladies des Organes Sexuels de la Femme*. French ed., 1858.

parts; that there is, further, a considerable area of space within which we can select the point for puncture.

The following dangers attend tapping by the abdomen:—

1. It is possible to wound a vessel in the abdominal wall large enough to cause serious bleeding. This is no real bar, because all serious bleeding may be avoided by selecting the linea alba for puncture, and by dividing the skin by a scalpel, by which precaution we can secure any injured vessel before plunging in the trocar.

2. The risk of wounding some large vessel in the wall of the sac is more serious, and can hardly be secured against. This risk is, however, small in cysts presumed to be single, and in which free fluctuation indicates that the walls are thin. In the case of tumors partly solid, and whose walls, even at the fluctuating parts are thick, the risk is very great, so great in fact, that if things generally are not adverse, the major operation of extirpation should be at once preferred. The hemorrhage is dangerous in two ways: blood may be slowly poured out into the peritoneum, setting up peritonitis: or it may pour into the cyst to such an extent as to cause anæmia, as well as inflammation of the cyst. If, after tapping a thick-walled cyst, symptoms of internal hemorrhage arise, the operation for extirpation should be immediately undertaken. By this means, and only by this means, can the bleeding be arrested by tying the pedicle, and the effused blood be removed.

3. The rapid emptying of the cyst may be followed by collapse, just as prostration sometimes follows too rapid delivery. This is our reason for compressing the abdomen by bandages as the fluid escapes.

4. Some of the contents of the cyst may run into the peritoneal cavity and set up inflammation, which may prove fatal. This accident may be avoided by using a sharp well-made trocar, by dividing the skin of the abdomen first by a scalpel, oiling the trocar, and piercing the remains of the abdominal wall and the cyst-wall with a decided stab, so as to carry the canula a good inch or more through into the cavity of the cyst, before withdrawing the trocar.

5. Air may be sucked into the sac. When this accident happens, decomposition and suppuration are very likely to ensue. Irritative fever will set in, and the result may be fatal. This risk should be guarded against by using a trocar so constructed as only to permit flow from the cyst outwards, by keeping the delivery end of the drainage tube under water, and by steadily following down the emptying sac by pressure.

6. In the case of compound cysts, especially if malignant, mere tapping, where precaution against letting-in air has been successful, may be still followed by suppuration and fatal septicæmia. Indeed, in most cases, it is observed that after several tapplings the nature of the fluid changes, becoming turbid, more viscid, or puriform. Where evidence of suppuration in the cyst is obtained, the feasibility of extirpating the tumor should be considered.

7. By repeated tapping the system is exhausted by the drain caused by the diversion of material to the cyst. This is probably often increased by tapping, which takes off the pressure that restrained exhalation.

Even where no untoward accidents follow tapping, the relief obtained is often very transient. Fluid rapidly collects again, and the operation

must be very soon repeated. It has been supposed that tapping accelerates the progress of the disease—that it is, in fact, the beginning of the end; that, once performed, the necessity for having recourse to it again and again recurs at a constantly accelerated ratio. There appears to me to be a fallacy lurking under this belief. Tapping is rarely performed until the symptoms are so urgent that relief is imperative. This implies that the disease is in high activity, and that things have reached a climax. From this time it is not surprising that the course should be down-hill, whether tapping be performed or not. And it can scarcely be doubted that in most cases, tapping does afford a respite more or less prolonged. It certainly, in some cases, averts apparently imminent death. In some cases, unforeseen, it must be admitted, it is followed by complete cure.

I think the question may be summed up as follows:—

Tapping has its own immediate dangers, but these are limited to a small proportion of cases; tapping postpones death from the secondary effects, such as pressure of the tumor upon the viscera and bloodvessels, and allows the sufferer to sink under the proper effects of the progressive disease.

Dr. Fock published a memoir in 1856, in which it is stated that out of 132 cases of ovarian disease tapped for the first time, twenty-five died within some hours or a few days. Kiwisch lost nine patients out of sixty-four within twenty-four hours after the first tapping. Mr. Southam, of Manchester, collected twenty cases of tapping from various sources; of these four died within a few hours.

I think, however, these figures give an exaggerated idea of the danger of tapping, if the operation be performed with proper circumspection.

*The Operation.*—A trocar modified from that of Mr. Charles Thompson, designed for paracentesis thoracis, secures against most of the accidents liable to attend the use of ordinary trocars. The edges of the canula should not be thin, but perfectly smooth and well rounded off. This best obviates the risk of injury to large veins on the inner surface of the cyst; and the maker should be careful, when sharpening the cutting part of the hollow trocar, to leave one-half of the lips quite blunt. If sharpened all round it would act as a punch, and cut out a circular hole in the skin. If the instrument is properly finished, only a semilunar cut is made in the skin and cyst, which closes much more readily than the triangular puncture made by the old trocar. The best position is the semirecumbent in bed. Empty the bladder by catheter, as it is important to puncture below the umbilicus. A firm linen binder having a long slit in the middle is applied round the belly, so that the slit corresponds with the linea alba; the two ends are then crossed behind the back and brought out in front, one on each side. A small incision is then made *through the skin only* in the selected spot between umbilicus and symphysis pubis. The trocar is then plunged in. Withdrawing the trocar from the canula exerts a suction-power, and this sets going the syphon-action of the canula and elastic tube. The delivery end of the tube is kept under the surface of the fluid in the receiving-bucket. This is especially desirable towards the end, when the cyst is nearly empty. As the fluid runs and the cyst collapses, the ends of the binder are drawn tighter in to keep up steady compression. If the canula gets choked, it may be cleared by hooking out