

anxiously seek for assistance, this method has led to disappointment or error. This happened on one occasion to myself. I submitted some fluid to a gentleman justly considered an authority on this special point. Acting on his report I opened the abdomen expecting to find an ovarian cyst; the actual thing was an encysted peritoneal dropsy. Dr. Fordyce Barker informs me that the "characteristic ovarian cell" was found in the sac of an extra-uterine gestation recently operated upon in New York! Strong testimony is borne by Thomas, Byford, and Atlee to the general accuracy of Drysdale's test when applied by himself. Fig. 91, from Drysdale, shows the microscopical characters of ovarian fluids.

Beginning with the normal Graafian vesicle, we find it to contain a minute quantity of a slightly viscid, whitish-yellow albuminous fluid, resembling the serum of blood. It is alkaline and transparent, limpid, readily separating into minute drops. It contains a small quantity of a substance which will coagulate with alcohol, or when heated. It holds in suspension spheroidal, nucleated epithelial cells, and shreds of epithelium from the membrana granulosa of the ovisac.

Under pathological conditions the fluids of the Graafian follicles are changed. They may be arranged in three groups; 1, fluids resembling the normal fluid of the ovisac; 2, ropy or viscid; 3, resembling mucus. The fluids of the two last groups are frequently met with in multilocular cysts, and in the alveolar and colloid tumors.

The simple cysts commonly contain a clear, limpid, pale-citron or straw-colored fluid, which flows in a stream as rapidly as blood-serum, or even more so. Scherer demonstrated the presence of *paralbumen* and metalbumen as albuminates peculiar to ovarian fluids. This character is shown by the formation of a coagulum on heating, which is either entirely dissolved or turned into a transparent jelly by adding an equal volume of strong acetic acid and continuing the boiling. When this is found the fluid is probably of ovarian origin.

*Fibrinogen* is also a constituent of simple cysts. It may be demonstrated by Dr. A. Schmidt's test, which is the addition of a few drops of blood to the fluid, when a distinct clot will form in from twenty-five to ninety minutes, involving the blood-corpuscles which had been added. The clot is generally so firm that it can be raised unbroken, and if squeezed in the hand a quantity of fluid issues, leaving a loose bundle of fibrillated substance. *Cholesterine crystals* are sometimes seen in the fluid of simple cysts, glistening in the stream as it flows through the canula on tapping. After standing awhile these crystals form a pellicle on the surface of the fluid. Scales of *epithelium* are almost always found floating in it.

It must not, however, be assumed that even in simple cysts the fluid is always clear. Pus or blood is occasionally found; and pus is occasionally apt to be found on a second or subsequent tapping, although the fluid drawn by the first tapping was perfectly clear. Admixture of pus and blood will affect the color variously, according to the period and quantity of the effusion. Thus it may be yellow, green, brownish, or red. The turbidity of the fluid generally depends upon the admixture of these secondary matters. In compound cysts every variety of contents may be found.

The chemical and microscopical characters of ovarian fluids have been elaborately described by Eichwald.<sup>1</sup> *The first group of abnormal fluids, very liquid*, are generally found in molecular cysts with a smooth internal surface invested with a layer of pavement-epithelium. Their specific gravity ranges from 1003 to 1006. They have no odor, and are either neutral or slightly alkaline. The following analysis represents the average composition: Water, 982.5; mineral salts (sulphates, chlorates, phosphates), 12.0; organic salts (lactates), 4.0; cholesterine, occasionally traces; albuminose, 1.5 = 1000.0.

These fluids are devoid of fat and albumen.

In the clear slightly ropy fluid of some of the small cysts in the broad ligament, minute flakes are occasionally found. They are granular, with a minute round or irregular cumulus of fatty granules in the centre.

*The second group of liquid but ropy ovarian fluids.*—They are of the consistence of oil or syrup, and frothing when shaken. They are clear amber or lemon-colored, or pinkish like the peritoneal fluid. The reddish fluids, after standing, deposit the red blood-corpuscles to which they owe their color. These fluids may become turbid, and of grayish, yellowish-green or whitish color from the presence of cells and oil globules, which they hold in suspension. Their reaction is alkaline; specific gravity, 1009 to 1018. Heat, alcohol, and nitric acid will coagulate them like blood or ascitic fluid. Baedeker, Thudichum, and others have found leucine. In the fluid will generally be found epithelial cells, principally the pavement-epithelium, which lines the cavity of the cysts. Besides these, there will be always white blood-corpuscles, sometimes red blood-corpuscles, due to capillary hemorrhage from the inner surface of the cyst. The fluid in very old cysts becomes thicker, and assumes the consistence and color of coffee-grounds. It will also contain granules of hæmotosine from disintegrated blood-corpuscles.

*Third group. Viscid and ropy fluids.*—These are generally clear, colorless, or of a grayish tint, and semi-transparent. They are viscid, adhesive, resembling the vitreous humor of the eye, or jelly-like, breaking up into lumps. They will not pass, or only with difficulty, through a canula. They are alkaline or neutral; specific gravity 1010 to 1015; in colloid cysts 1040 or more. They coagulate when exposed to high temperature, like the white of egg, to which they sometimes bear a great resemblance. The variations depend upon the conditions of the principal components, the colloid bodies and the mucus, and the intermediate stages of metamorphosis from one to the other. Epithelial cells and blood-globules are also found. They contain mineral salts, crystals, or crystallizable principles of organic origin, as fats, and principles allied to alkaloids, viz., urea, creatine, leucine, creatinine.

The microscopical analysis shows fat-granules and globules, large colorless colloid globules, with delicate margins and a large transparent centre, either perfectly homogeneous, or dotted with fine black spots. Some colloid globules inclose one or more granulated aggregations. There may also be found a large quantity of *small circular corpuscles*, clear, with a dark margin, containing a varying number of fine dark molecules, and some-

<sup>1</sup> Würzburg, Medizinische Zeitschrift, 1864.

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:—

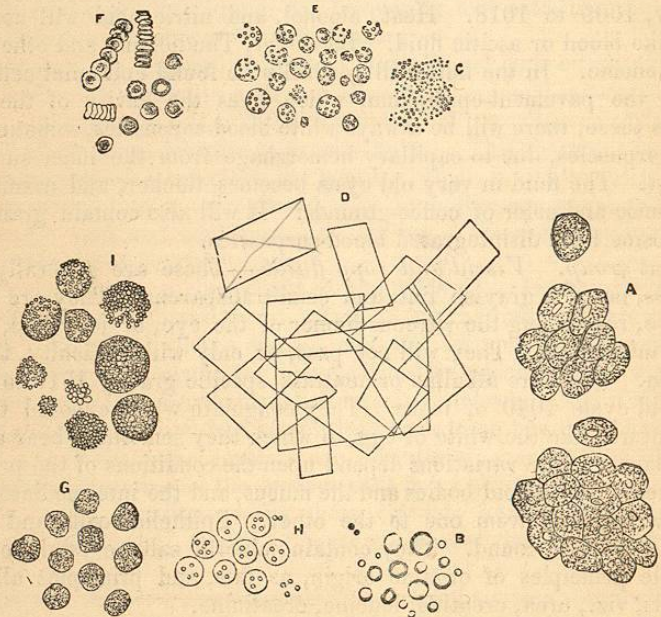
1. Hair, teeth, oil or fat or a gruel-like fluid, give evidence of a dermoid cyst. Pus may come from an ordinary cystic ovary, but it is more likely to come from a dermoid cyst.

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