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GRANULAR CELL FOUND IN OVARIAN FLUID.

BY

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ON THE GRANULAR CELL FOUND IN OVARIAN FLUID.

TWENTY years ago it was customary to decry ovariotomy, not only for its fatality, but for the difficulties which were experienced in the diagnosis of ovarian tumors. That these difficulties were not exaggerated may be inferred from the fact that it was not unusual, at that time, to hear of cases of abdominal section where no tumor was found, or where an irremovable fibroid was present, or the patient even pregnant.

Hoping to throw some light upon the diagnosis of abdominal tumors, more especially those arising from the ovary, I commenced at the above date to investigate the fluids removed from the abdomen by tapping, which were kindly furnished me by Dr. Washington L. Atlee. From that time to the present I have examined chemically, and with the microscope, several hundred specimens of these fluids. That these researches have not been unproductive of good, but have added an important aid to our means of diagnosis, has been proven in another place.

In this paper I shall confine myself to the microscopic appearance of the fluids obtained from ovarian tumors. My principal reason for doing this is to bring to your notice a cell which I have discovered to be almost invariably present in these fluids, and which I have named the ovarian granular cell, to distinguish it from all other cells found in abdominal dropsical fluids; not meaning to assert that a cell having a similar appearance may not be found in cysts met with in other parts of the body. This cell, when found in this location, I believe to be pathognomonic of ovarian disease, and, as such, its diagnostic value cannot be over-estimated.

On placing a drop of the fluid removed from an ovarian cyst under the microscope, we usually find a number of granular cells, E, some free granular matter, C, and small oil globules, B; and frequently, in addition to these, epithelial cells of various forms, A, and crystals of cholesterine, D. These, together with blood-corpuscles, F, the inflammatory globules of Gluge, I, the pus cell, G H, and disintegrated blood and other cells, may all be sometimes seen floating in either a clear or a turbid fluid.

To find them all present in one specimen, however, is rare; more commonly we can discover but three or four of them in the fluid. *But no matter what other cells may be present or absent, the cell which is almost invariably found in these fluids is the granular cell.*

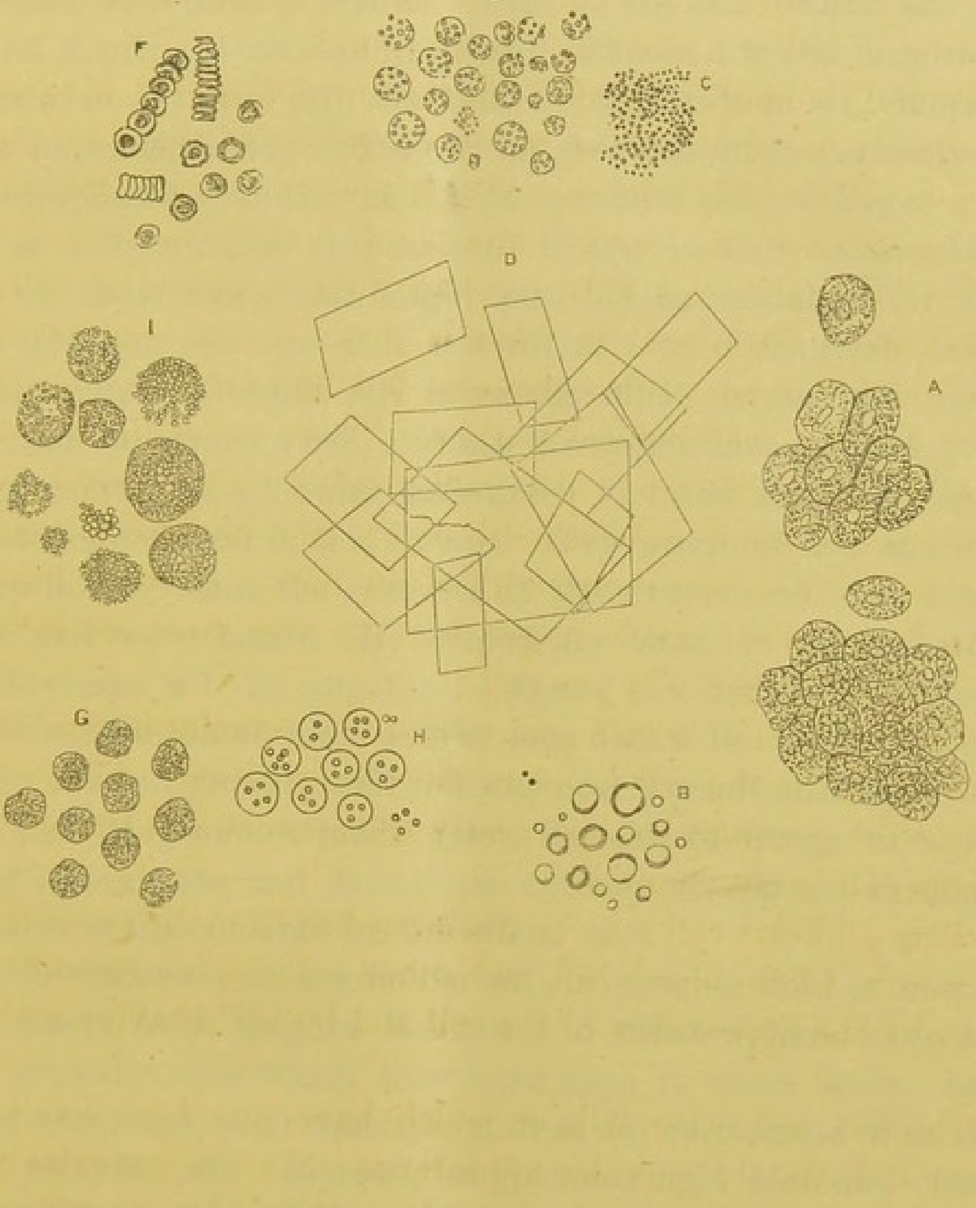
This granular cell, E, in ovarian fluid, is generally round, but sometimes a little oval in form, is very delicate, transparent, and contains a number of fine granules, but no nucleus. The granules have a clear, well-defined outline. These cells differ greatly in size, but the structure is always the same. They may be seen as small as the one five-thousandth of an inch in diameter, and from this to the one two-thousandth of an inch. In some instances I have found them much larger, but the size most commonly met with is about that of a pus cell.[1]

The addition of acetic acid causes the granules to become more distinct, while the cell becomes more transparent. When ether is added the granules become nearly transparent, but the appearance of the cell is not changed.

This granular cell may be distinguished from the pus cell, lymph corpuscle, white blood cell, and other cells which resemble them, both by the appearance of the cell and by its behavior with acetic acid.

The pus and other cells, G, which have just been named, have often a distinctly granular appearance; but the granules are not so clearly defined as in the granular cell found in ovarian disease, owing to the partial opacity of these cells; and, when the granular cell of ovarian disease and the pus cell are placed together under the microscope, this difference is very apparent. In addition to the opacity of these cells, we frequently find their cell wall appear-

[1] By comparing the drawing of the ovarian cell which accompanies this paper with one given in Dr. Atlee's work on Ovarian Tumors, it will be seen that I have omitted the three large, dark cells which form the left of the group representing the ovarian cell in that drawing, and which are inaccurate.


F
E
C
D
I
A
G
H
B

ing wrinkled rather than granular; and further, in the fresh state, they are often seen to contain a body resembling a nucleus.

But, if there is doubt as to the nature of the cell, the addition of acetic acid dispels it; for, if it is a pus cell, or any of the cells named above, it will, on adding this acid, be seen to increase in size, become very transparent, and nuclei, varying in number from one to four, will become visible. (See G, pus cell before adding acid; and H, pus cell after adding acid.) Should the cell, however, be an ovarian granular cell, the addition of this acid will merely increase its transparency and show the granules more distinctly.

The compound granular cell, I, the granule cell of Paget and others, or inflammation corpuscle of Gluge, is also occasionally present in these fluids, and might possibly be mistaken for the ovarian granular cell; but it is not difficult to distinguish them from each other. Gluge's cell is usually much larger and more opaque than the ovarian cell, and has the appearance of an aggregation of minute oil globules, sometimes inclosed in a cell wall, and at others deficient in this respect. The granules are coarser, and vary in size, while the granules of the ovarian cell are more uniform and very small. By comparing them in the drawing these differences will be apparent. Again, the behavior of these cells on the addition of ether will at once decide the question; for, while the ovarian granular cell remains nearly unaffected by it, or, at most, has its granules made paler, the cell of Gluge loses its granular appearance, and sometimes entirely disappears through the solution of its contents by the ether.

That the discovery of a granular cell in ovarian fluid is new, I do not assert, as J. Hughes Bennett and other writers have described granular cells which they have seen in these fluids; but, with one exception, their description does not correspond with the *ovarian granular cell.* Bennett, for instance (*Ed. Med. and Surg. Journ.*, vol. lxv. p. 280, 1846), states that the granular cell which he saw exhibited a distinct nucleus on the addition of acetic acid, which is not the case with this. Other writers have described the cells which they found as pus and pyoid cells; and yet others confound them with the compound granular cell, or inflammation globules. The exception referred to above is found in Beale's description of the microscopic appearance of ovarian fluid.[1] He observes:—

[1] The Microscope in its Application to Practical Medicine. By Lionel S. Beale, M.B., F.R.S., etc. 3d edit. p. 179.

"The cells are composed of at least two distinct forms: 1. Small, delicate, transparent, and faintly granular cells, without the slightest appearance of a nucleus, some being somewhat larger, and others smaller, than a pus corpuscle. 2. Large cells, often as much as the thousandth of an inch in diameter, but varying in size, of a dark color by transmitted, and white by reflected light. These, which have been termed 'granular corpuscles,' 'compound granular cells,' 'inflammation globules,' etc., are aggregations of minute oil globules in a cell form."

It will be seen by this extract that Beale distinguishes these "small, delicate, transparent, and faintly granular cells" from the compound granule cells or corpuscles of Gluge. The description which he gives of the first cell, with the exception of the cell being *faintly* granular, corresponds very closely with that of the ovarian cell, but it is incomplete, and no test is given to distinguish this from other granular cells.

A full and accurate description of this ovarian granular cell has therefore never been published, to my knowledge, except by me, nor any tests given by which to distinguish it from others, such as the pus cell, white blood corpuscle, and the compound granule cell, which often closely resemble it. This renders all descriptions of granular cells seen in ovarian fluids, heretofore given, of little value, as these last-named cells are frequently found in fluids removed from the abdomen, which might, on that account, be considered ovarian.

I claim, then, that a granular cell has been discovered by me in ovarian fluid, which differs in its behavior with acetic acid and ether from any other known granular cell found in the abdominal cavity, and which, by means of these reagents, can be readily recognized as the cell which has been described; and further, that by the use of the microscope, assisted by these tests, we may distinguish the fluid removed from ovarian cysts from all other abdominal dropsical fluids.

I have been thus particular in asserting my right to priority of discovery in this matter, to answer a reviewer of Dr. Atlee's work on Ovarian Tumors, who has said, "no distinct claim is made by him, or by Dr. Drysdale, that they are the discoverers of this cell, yet enough is said to convey doubts upon the point, and to lead the reader to infer that others have had something to do with the matter," an opinion which appears to be based upon a paragraph in Dr. Atlee's book, in which Dr. A. says: "It recalls to mind a statement made to me some years ago by Dr. Waldo J. Burnett, the author of the Prize Essay on 'The Cell,' that he could distinguish ovarian fluid from every other by the character of the cell." Now, Dr. Burnett did not mention a *granular* cell; but, as will be seen by referring to his essay,[1] considered the *epithelial cell* as diagnostic of ovarian disease.

That I have not laid too much stress upon the value of this discovery will be admitted by any one acquainted with the difficulties met with, even at the present day, in diagnosing some cases of abdominal tumors, difficulties which caused one skilled in ovariotomy to say, "I do not think that a perfectly satisfactory differential diagnosis of an abdominal tumor can ever be made during life, save by section, no matter how skilful in such questions the attendant."

For examples of the practical use to which it has been already put, I may refer to the work of Dr. Atlee, *On the Diagnosis of Ovarian Tumors.* Many instances could be given, in addition to those recorded in that book, where the finding of the ovarian cell in the fluid removed by tapping, has been the only means of solving doubts in obscure cases; I will, however, recite but one, the history of which is given in a letter received from a distinguished ovariotomist, Dr. Jno. L. Atlee, Sen., of Lancaster, Pa. He says: "I operated upon Mrs. M., aged over fifty years, in October, 1870. She had labored under abdominal enlargement from the presence of a fluid for several years, and had been tapped about twenty-seven times, filling rapidly after each operation. After the last two or three tappings a small tumor remained in the right iliac and pelvic regions; but at no time could albumen be detected in the fluid by the ordinary tests of heat and nitric acid; hence I diagnosed the case to be one of serous cyst attached to the broad ligament. The presence of the tumor, as large as a turkey's egg, in the right iliac region, an unusual thing in serous cysts, cast a doubt as to its true character; but the inability to detect albumen by the above tests decided me against the operation, and the patient was sent home. Under these circumstances, a portion of the fluid obtained from the last tapping was sent to Dr. Drysdale, who gave a very decided opinion that the fluid was from an ovarian cyst. Upon the strength of this opinion I told the friends of the patient that I would operate if she filled again.

[1] The Cell: its Physiology, Pathology, Philosophy, etc., Transactions Am. Med. Assoc., vol. vi. p. 801, 1853.

"Accordingly, on the 14th of October, 1870, I removed a cyst weighing, with the contained fluid, fifteen pounds, and of an unusual character. The upper half of the cyst was very thin and of a serous nature. Below the umbilicus the cyst was much thicker and, descending to the pelvis, proved to be the right ovarium, having one large cyst filling the abdomen above, with an aggregation of very small cysts constituting the iliac and pelvic tumor.

"The peculiarity of this case consisted in the rupture, probably at an early period of the disease, and before I saw her, of the tunica propria, or albugineous coat of the ovary, leaving the peritoneal covering intact, and of sufficient strength to retain, not only the small portion of the ovarian secretion, but of the serum secreted by the peritoneal coat. This also accounted, in some measure, for the very rapid filling after each tapping.

"The ovary had a very large pedicle, was separated after the application of the clamp, and the patient had a rapid and highly favorable recovery. She has remained in good health since.

"In conclusion let me add, my dear doctor, that it was your opinion that decided me to operate, and the result showed the value of your diagnosis."