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The Author.*

Peritonitis Due to Rupture of an Ovarian Hæmatoma;
Laparotomy; Recovery.

BY

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MRS. EMMA LEHMAN came to my clinic January 4th, 1890. She was 31 years of age, had been married ten years, and nine years ago was delivered of a 7 months' foetus after a long labor. Since that time she had suffered with abdominal trouble, and more recently with intense backache. The seat of the most severe pain was in the left ovarian region. There was also complaint of constipation and very severe dysmenorrhœa. Examination of the patient gave the following result: Perinæum intact; vagina capacious; laceration of the cervix; ante flexion of the uterus, right ovary and tube in normal posi-

tion, but somewhat indurated and sensitive to touch; left ovary and tube decidedly enlarged, and so painful to the touch that a careful bi-manual examination was impossible without anæsthesia.

On January the 8th I was informed that on the previous day the patient was suddenly seized with violent pain in the left ovarian region, and quickly lost consciousness. The pain was subsequently diffused over the entire abdomen, and there were frequent spells of vomiting. When received into the hospital, it was found that the patient was suffering from peritonitis; her temperature varied between 39.2° and 39.8° C. in the axilla; and her pulse varied between 120 and

¹ Read before the International Medical Congress in Berlin, and translated from the German by A. F. C.



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130 per minute, and was quite feeble. No definite condition could be made out by vaginal examination, with the exception of an obscure fullness in Douglas' cul-de-sac. The pain was believed to be due to a moderate discharge of pus from the enlarged left tube. The treatment consisted in the application of an ice bag to the abdomen and the administration of a saline cathartic, with morphine for the relief of the pain. No improvement followed. The belly continued to be tympanitic, the pulse frequent (140) and weak, and the axillary temperature 39.6° . A surgical operation seemed imperative, and was performed January 10th. As the belly was opened a considerable quantity of bloody serum gushed out. From Douglas' space about 200 grams of blood and coagula were removed. The adnexa on the left side were adherent; on the right side their removal was not indicated. The abdominal cavity was then irrigated with a large quantity of hot water, the loops of intestine being disturbed as little as possible. The abdominal cavity was not sponged out. The wound was then closed. No narcotics were used in the after treatment. The temperature and pulse immediately fell, and both became normal after the first twenty-four hours. Convalescence was uninterrupted. The excised left ovary presented a remarkable appearance to the naked eye. (See Fig 1.)

On the superior surface of the slightly enlarged organ, the contour of which was very irregular, was a dark-brown swelling as large as a cherry. For about a third of its circumference it was firmly embedded in the ovary, the remaining two-thirds be-

ing free in the abdominal cavity. Over the surface of this swelling was a collection of small ball-like structures. At the uppermost part of the periphery of the swelling was a rent six millimetres long and one and a half broad, with irregular borders partly filled with blood and clot. The consistency of the swelling was about like that of the normal ovary. The naked-eye appearances showed the presence of a spontaneously ruptured hæmatoma, the origin of which was a matter for investigation, and a question which could only be solved with the aid of the microscope.



FIG. 1.
Ruptured Hæmatoma of the Left Ovary. Natural size.
E, Ovary; H, Hæmatoma with a rent; T, Tube.

To make the result of the microscopic investigation intelligible, the following historical data must be premised: After four years' study of ovaries, obtained from about forty laparotomies, Dr. M. Jones, of Brooklyn, was enabled to conclude that hæmatomata of the ovary were composed of endothelial formations in which there has been an extensive metamorphosis of cavernous blood vessels with a simultaneous discharge of blood. These conclusions, which followed studies in the laboratory of Dr. C. Heitzmann, of New York, were published in the *New York Medical Journal* in September, 1889.

Further investigations have shown that the endotheliomata proceed from the so-called structureless wall, of Graafian follicles ruptured during menstruation. The follicular wall is gradually extended in consequence of a plastic or formative inflammatory process, in connection with which, however, it retains its healthy appearance. In many cases almost the entire ovary, cortex as well as medulla, is converted

The walls of the gyromata are converted into a medullary condition, and then the rarer endotheliomata develop, these without exception being caused by new formations of blood-vessels and red blood corpuscles, and subsequently being changed into angiomata and hæmatomata.

My own case is a typical one of endothelioma with evolution into angioma and hæmatoma. All that the

FIG. 2.

Endothelioma of the Ovary Transforming into Angioma and Hæmatoma. $\times 50$.

K, connective tissue capsules; V, newly-formed vein; A, artery in cross section; E, E, Endothelioma; H, Processes of angioma leading to a central hæmatoma.

into this abnormal condition. On account of the manifold inequalities in the outline of these formations, the name *gyroma* was given to them. Since the result of these investigations referred to has only recently been published, I must limit my remarks on the subject to what has already been said. I venture to add that gyromata are not infrequent as to their occurrence, I possessing quite a number of them in my collection.

microscope has revealed to me in my case confirms the statements of Jones. The interest in the case is increased by the fact that the hæmatoma had burst, and had led to a condition in the peritoneal cavity which jeopardized life.

A cross section through the hæmatoma in my case showed a dark, reddish brown centre with numerous projecting processes toward a clear cortical layer which averaged one

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millimeter in diameter; it became thinner at the seat of rupture, and in places was entirely wanting. Vertical sections when examined with a low power of the microscope, gave the following result. (See Fig. 2.)

The surface of the tumor consists of a capsule resembling connective tissue, with delicate papillary elevations diffused over it, and at the place of rupture appeared to be very thin. In the substance of the capsule there were numerous elongated extravasations of blood, evidently caused by the pressure of the blood within the hæmatoma. The endothelial formation began deeply below the capsule, and formed the entire cortical layer of the hæmatoma. The processes of endothelia ran parallel with the surface near the capsule, while toward the centre of the hæmatoma they showed a radiating arrangement, the elements being for the most part cubical in shape but in some parts tending to a linear formation. Within the endothelioma there were large arteries and veins, the latter being filled with blood. Numerous bloodvessels, some of them in process of development, ran through the endothelial tissue, especially in the radiating processes, where there was also a notable new formation of red blood corpuscles. All the angiomatous processes ran toward the central hæmatoma, which was composed of blood which was apparently newly formed. In many places the blood layer was limited toward the endothelioma by small bundles of connective tissue. In the entire endothelial cortex there was a new formation of bloodvessels and red blood corpuscles.

Let us next study these processes

of endothelium which are in the process of development into angioma, without marked formation of blood. (Sse Fig. 3.)

We observe endothelium which is of considerable size partly cubical and partly columnar, provided in almost all cases with round or oblong nuclei, in which are frequently demonstrable irregular karyokinetic figures. The protoplasm of the endothelial elements is finely granular. The boundary between individual elements is supplied by particles of cement substance in which are thorn-like (stachel förmige) formations of varying size and demonstrability. In the most evident development of these thorns they take the appearance of a series of brilliant columnar-shaped particles.

The new formation of bloodvessels follows from the vacuolation of individual endothelia, in which the protoplasm becomes pale, and undergoes a kind of dropsical process. All the spaces which are developed in this way contain variable quantities of granular matter, the residue of the pre-existent protoplasm. The spaces are directly limited by the unchanged endothelia in such a way that between two vessel-spaces there is always an unchanged endothelial cell. Hand in hand with the vascular new formation, there is a new formation of red blood corpuscles from enlarged granules of the living matter in the protoplasm. From the disorganized karyokinetic matter of the nuclei, and from the particles of the enlarged thorn-like bodies referred to in the cement substance between contiguous endothelia, the same process occurs. There is no doubt that the

endothelia are the original elements from which are developed, by a drop-sical process of the protoplasm, subsequent endothelia, bloodvessels, and by the growth of the living material of the protoplasm, red blood corpuscles. As early as 1872 it was shown by C. Heitzmann that there may be a new formation of bloodvessels and red corpuscles in the same way as I have described in this paper. It was then

gradual development of the hæmatoblasts into red corpuscles may be followed with great precision.

I have already shown that angioma-tous processes pass within the endothelioma toward the central hæmatoma. In these processes, the development of the cavernous angioma may now be intelligibly studied. (See Fig. 4.)

FIG. 3.



Endothelioma showing Vessel Formation Without Decided Blood Formation.

E, cubical endothelia; E', elongated endothelia; V, transition endothelium with an hæmatoblast; V', transition endothelium with remains of nuclei; V'', transition endothelium associated with a bloodvessel; K, Hæmatoblasts—formation in the cement substance.

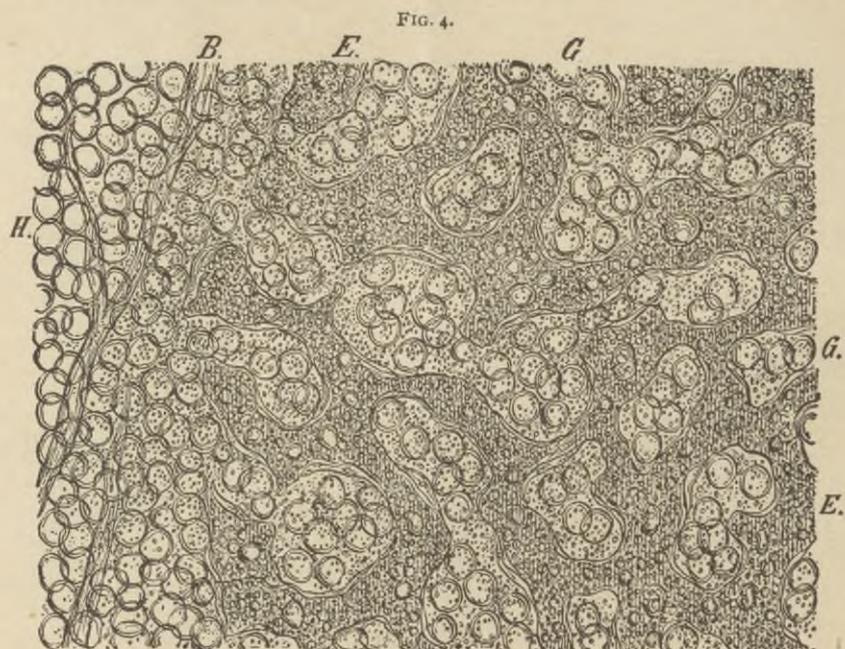
that he gave to the masses of living matter which in consequence of absorption of hæmoglo-bin have a distinctly yellow color and very bright appearance, the name of hæmatoblasts. This term was used by Hayem in 1876 to designate the elemental forms of red blood corpuscles suspended in the blood. Both investigators have apparently chosen identical terms for the same forma-

We recognize as relics of endothelia solid trabeculæ distinguished by a yellowish-red color, which surround large blood spaces with frequent anastomoses. The limitation of the blood spaces is determined in many cases by vessel-endothelia, which in cross section show the well-known spindle shape, and are to be differentiated from the large endothelial processes. The endothelial pro-

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cesses are coarsely granular and may be demonstrated with some difficulty within their nucleus-like formations and within the cement substance formations. It is clear that the living matter of the protoplasm of most of the endothelia in these processes is developed into hæmatoblasts. Not only does the living matter of the protoplasm participate in the hæmatoblast formation, but also that of the nuclei,

raneous developments. The latter are associated with large numbers of granules which are apparently the relics of the pre-existing protoplasm. If the entire protoplasm of the endothelia has been devoted to the new formation of blood corpuscles and bloodvessels, then the outlying endothelial processes will be entirely wanting, and we shall have before us nothing but a collection of red cor-



An Angioma and Hæmatoma developed from an Endothelioma. $\times 800$.

E, E, Endothelioma filled with hæmatoblasts; G, G, cavernous vascular spaces; H, hæmatoma; B, connective tissue processes.

as well as that portion of the thorn-like bodies (stacheln) passing through the cement substance. This is the reason why neither nuclei nor cement substance appear to be especially diffused. From the hæmatoblasts of different sizes at length arise the red corpuscles simultaneously with the swelling up and disintegration of the protoplasm. Bloodvessels and blood corpuscles are therefore contempo-

puscles; in other words, a hæmatoma without granular relics of the pre-existing protoplasm. Then we have an accumulation of blood before us, as to the origin of which the study of the surrounding endothelial formation leads to indubitable conclusions. In order to appreciate the fact that a hæmorrhage so extensive as the one in the case under consideration may take place from the rupture of a hæ-

matoma, we must realize that the newly-formed cavernous vessel-spaces are associated with the dilated veins of the ovary. That such a communication actually exists I was not able to demonstrate in my case; but I know from the study of preparations from other endotheliomata that the veins in their vicinity are much enlarged, and are filled with blood, while the arteries have become quite impervious on account of *endarteritis obliterans* or have suffered much contraction of their lumen. In conclusion, I would remark that the few cases described as endotheliomata by Dr. J. Pomorski, in the *Zeitschrift für Geburtshülfe und Gynäkologie*, 1890, Band XVIII, Heft I., are in reality large tumors of the ovary.

The endotheliomata which, accord-

ing to Dr. Mary Dixon Jones, are converted into angiomata and hæmatomata, on the other hand, are not tumors, but products of a formative inflammation which does not lead to a notable enlargement of the ovary. Hæmatomata are either embedded in the ovarian stroma or develop more or less at the surface. They can always be sharply distinguished from the ovarian tissue, and are usually united with the same only by delicate connective tissue. A condition of this kind may not infrequently be surmised from existing symptoms and as the result of a bimanual examination, although it would be very injudicious to suppose that one could make, with certainty, a diagnosis from clinical data.



