

Byford (W. H.)

Dermoid Ovarian  
Tumors

BY

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## DERMOID TUMORS OF THE OVARY.

BY WILLIAM H. BYFORD, M. D.,

*Chicago, Ill.*

FOUR cases of ovarian tumors have recently come under my observation, presenting features in some respects widely different, and yet having sufficient similarity to necessitate their classification under the division known as dermoid tumors. They have awakened an interest that induces me to give a concise account of them, feeling assured that their diversity in appearance, from simplicity to great complexity of structure, would scarcely fail to attract the attention and excite the reflection of others as well as of myself.

I shall purposely abstain from giving the clinical history of each case in such detail as might make the reading of them tedious, and shall briefly allude to the salient points as an introduction to a description of the tumors themselves. I shall not take up the cases in chronological order, but with reference to the simplicity and complexity of their structure.

I would apologize to the society for consuming time on a subject of so little practical importance if I did not believe that they were sufficiently curious to compensate to some extent for the time thus occupied.

CASE I. — In the spring of 1874, the patient, a girl eighteen years of age, noticed an enlargement in the left iliac region, which finally became so great that in October, 1875, she was distressed from the distention. At this time she was tapped and about ten quarts of fluid evacuated. The physical nature of the fluid was somewhat tenacious, of a clear, slightly bluish tinge, and contained the ovarian cell. The outline of the tumor could be traced quite

easily after the tapping. It occupied the whole width of the abdomen between the two iliac fossæ and extended upwards to within two inches of the umbilicus. It was globular and of soft consistence.

After this operation the tumor filled quite rapidly, and on January 1, 1876, the patient was as large as before the fluid was evacuated.

On January 4, ovariectomy was performed. There were no adhesions or other source of embarrassment to the removal of the tumor, and the patient made a good recovery.

The sac was thin but firm, and presented the peculiarly pearly aspect of the ordinary ovarian tumor. When the large Wells' trocar was introduced nothing but serum flowed through the tube. Upon being opened the tumor was found to contain about half a pound of sebaceous fat. The inner surface was smooth, except a small part about the size of the palm of the hand situated at the bottom near the pedicle. Here the surface was depressed at least an inch below the level of the inner surface, and, although not sacculated, had a well defined and pearly margin. The bottom of this depression was covered with dermic tissue and upon it grew an abundant crop of dark brown hair about an inch long. It was very fine, and firmly attached. Doubtless the dermic patch was the source of the fatty material found floating in the cyst which on cooling assumed the consistence and appearance of yellow butter. Upon closer inspection of the smooth lining of the larger part of the tumor it was found to be studded with very minute papillæ such as we sometimes see in oligocystic ovarian tumors.

This specimen I regard as not a true dermoid cyst, but as a complex dermo-ovarian tumor, a tumor originating in a Graaffian follicle in which a tegumentary element had been inclosed. It contained no bone or teeth such as are often found in the true dermoid tumor, but did contain undoubted colloid fluid, diluted with the watery product from the sweat glands of the dermic membrane upon which the hair was implanted.

CASE II. — Mrs. P., aged forty-three years, the mother of one child eighteen years old, became aware of an enlargement of the abdomen about ten months before the operation, which was per-

formed June 28, 1876. During that time she grew to the size of pregnancy at full term. The tumor filled the abdominal cavity and extended to the ensiform cartilage. There was no difficulty in deciding that it was monocystic and contained a thin fluid. The operation was not attended with difficulty in any respect. There were no adhesions, and after evacuation the sac passed through an incision only three inches long. The patient experienced considerable depression from the shock of the operation. This however lasted but a few hours, no other disagreeable symptoms supervening. The recovery was rapid. The care of the case after the operation was undertaken by Dr. S. W. Green of Marengo, Illinois.

The cyst was single, thin, and uniform, except at the part opposite the pedicle, where its wall was about half an inch thick and contained a thick layer of adipose tissue. Upon the inner surface of this part was a thick tegumentary covering, upon which was implanted a dense mass of blonde hair, matted together, and nearly the size of an orange. The whole of the inner surface of the sac elsewhere was smooth and of a buff color. The external surface was of a pearly hue and smooth. There was no evidence of bony or dental tissue. The fluid was quite thin, of a slightly blue tinge, and floating in it in considerable masses were ten to twelve ounces of yellow sebaceous fat. The hairs when straightened out measured from six to fifteen inches in length.

This example I regard as a simple dermoid cyst of the ovary, there being no signs of follicular papillæ upon the inner surface, and the fluid not being in the least tenacious or colloid in appearance; moreover I was unable to find in it the ovarian cell. I think the fluid was the product of the sweat glands in the dermic structure at the bottom of the cyst.

CASE III. — Mrs. P., a small Jewess, thirty-one years of age, the mother of four children, the youngest being three years old, noticed about nine months before the operation — which was performed April 7, 1875 — that the abdomen had commenced enlarging. The tumor was found to be monocystic and so completely filling the abdomen that the patient had great inconvenience from distention.

The removal of this tumor, which originated in the left ovary, was easy, as no adhesions or other obstacles were encountered. The patient recovered without experiencing any untoward symptoms.

The tumor was composed of a single cyst, of which the wall was thin over about three fourths of its circumference and easily ruptured. At the bottom or pedicular portion, involving about one fourth of the inner surface, was a dense mass of areolar tissue literally filled with pieces of bone. The greater number of these pieces were cylindrical, from half an inch to two inches in length, and varying from an eighth to a quarter of an inch in thickness. They seemed to be imbedded in loose cellular tissue, were not attached to each other, and were easily removed by the finger. Other masses of bone, made up of alveolæ, were not unlike the maxillary processes, and varied in length from one to two inches, and in width from one third to one half inch. They resembled honey-comb, and were quite firmly attached to the cyst wall. The microscope showed their structure to be that of true bony tissue. This mass was covered by a tegumentary membrane to which was attached more than a hundred imperfect incisor teeth, distributed over the whole surface, their adhesions being so slight that they could easily be scraped from the surface with the finger. These dental bodies were all about the same size and consisted merely of the crown; but the enamel and dentine seemed perfect. They had no connection whatever with the bony tissue. Interspersed among these teeth was a dense crop of blonde hair, averaging an inch in length.

The fluid, of which there was about ten quarts, *sp. gr.* 1008, was clear, with a slight bluish tinge, and entirely devoid of tenacity or other colloid properties. I believed it to be perspiratory serum. There were also several ounces of yellow sebaceous fatty matter within the cyst.

I should class this tumor among the true dermoid cysts of the ovary, and believe that it possessed none of the properties of the ordinary ovarian tumor. Its structure was much more complex than that of the two preceding tumors, but much less so than that to which I shall now call attention.

CASE IV. — Mrs. B., thirty-five years of age, the mother of four children, the last twenty months old, first noticed a tumor in the right iliac region nine years before the operation. It was then about the size of her fist. It had grown steadily but slowly until June 19, 1878, when it was extirpated. The growth did not seem

to be influenced by pregnancy. She had borne three children from the time when the tumor was discovered to the time of its removal. Her health had been feeble for several years, but from the birth of her last child she had been confined to bed half of each day, and, for several weeks, all the time. The main inconvenience was from the weight and mobility of the tumor. When she was in the erect posture it caused dysuria and rectal tenesmus; when lying on either side it pressed upon the subjacent viscera and also dragged upon the upper side; the only comfortable position was the dorsal. The pulse and temperature were decidedly and continuously above the normal standard. She was sleepless, had a very poor appetite, and was rapidly becoming emaciated. The above very brief history was given me by the attending physician, Dr. J. H. Low of Brimfield, Illinois.

The appearance of the abdomen was very singular. It was considerably distended; from its centre, including in fact the whole umbilical region, arose a round projection exactly resembling a ventral hernia, the umbilicus occupying its apex. It measured five inches in diameter and protruded three and a half inches above the common level. It was fluctuating and dull upon percussion. On each side, I could easily distinguish two other, apparently larger, cysts not projecting above the surface. Percussion over these elicited no resonance, but it was easy to detect fluctuation. The tumor could be moved pretty freely in all directions without traction upon any part of the abdominal walls. By external and internal manipulation I could trace the attachment of the mass to the right side of the pelvis and assure myself that it was not of uterine origin. It was clear that I had to deal with a tumor made up, principally at least, of three cysts, and quite certainly originating in the right ovary, but it presented so many unusual symptoms and appearances that further diagnostic measures were necessary before I would venture to remove it. After making preparations for its extirpation, the patient being fully etherized, I introduced a small trocar into the prominent cyst. A little sebaceous fat flowed through the canula and at once made the diagnosis complete. The usual small incision exposed the pearly cyst and allowed me to evacuate the prominent sac of one quart of thin, yellow fat. The other two cysts were drawn to the opening and their contents, of a similar character, evacuated. By this time the rubber blanket was smeared with a sticky grease, the instruments had become

slippery, and my fingers were encumbered with a mass of fat which had to be removed before I could proceed with the operation. The cysts were drawn through an incision about three inches long, and a short slender pedicle — consisting of the right ovarian ligament, part of the broad ligament and Fallopian tube — was brought up into the wounds, ligated, cut and dropped into the pelvic cavity. The left ovary was healthy. As nothing had been allowed to pass into the peritoneal cavity the incision was then closed. It will have been seen by this description that no adhesions or other impediment hindered or complicated the operation. It was remarkable how extremely greasy everything employed in the operation became, and I had more trouble in cleansing the instruments from the grease than is usually experienced in getting rid of the blood and mucoid fluid of the common ovarian tumor. The patient had no untoward symptoms, seeming to me more like one recovering from the exhaustion and irritation in which I had found her than from the hazardous operation for the removal of an ovarian tumor.

Before describing the tumor I wish to call attention to the fact that there was no serum evacuated during the operation; no fluid but the soft fat was observed. The tumor proved to be a remarkable specimen of the true dermoid variety, nothing in its contents seeming to be of ovarian origin. The cyst wall was thin, but of firm structure, and divided into three compartments of about equal dimensions. The septa were complete and of the same consistence and density as the external wall. At the base of the tumor the sac was more dense and firm than elsewhere. The peculiar formations contained in each cyst were so nearly alike that a description of the contents of one will suffice for each of the other two.

On opening the cysts each was found to contain a mass of matted hair, the size of a lemon, thoroughly supplied with the same fatty substance that had been evacuated from the tumor. One of these rolls of hair was red, another blonde, and the other gray. The patient's hair was dark brown. Some of this hair was twenty inches long, and it was all attached to tegumentary substance closely resembling the scalp. The dermic structure, which was about four inches across, rested upon a very uneven layer of adipose tissue an inch thick. By the side of the dermic patch and not covered by it was a loose layer of areolar tissue, an inch and a half thick, containing bones in a great variety of

shapes, — scales, round bones an inch or more in length, alveolar nodules, etc. Upon the surface of this part of the tumor in each cyst was a half-arch of teeth the shape of one half the superior maxilla. In one cyst the crowns of the teeth projected above the surface, while in the other two they were thinly covered by tissue so soft that it could be pinched off by the thumb and finger. The teeth were not attached to the subjacent bones, but were simply imbedded in the loose mass. The teeth in each segment very perfectly represented, respectively, an incisor and three molars, each having three well-marked fangs. One of the molars in each row strongly resembled the wisdom tooth. The perfection of their formation will be recognised in the specimens which I submit for your examination. The crown with the enamel and eminences, the main body, and roots are as distinctly marked as if they had been removed from alveolar cavities.

Before leaving the description of the tumors and their removal, I would call your attention to the great simplicity of the operation and the fortunate recovery of all the patients, no adhesions or other complications having existed.

Now what is a dermoid tumor? This name is given to a cyst formed anywhere in the body, the internal or lining membrane of which is in part or wholly tegumentary in structure. As now understood, the presence of this condition alone would justify this nomenclature. The formation seems to be no less an error of structure than location. Lebert, Paget, Virchow, and most other modern pathologists agree that the dermic tissue thus located is essentially the same in structure as true skin. The products are all the same, hair, sebaceous fat, and perspiratory fluid. In many of these tumors we find subcutaneous adipose tissue very perfectly formed. Less constantly, teeth, bone, muscular, nervous, and even brain tissues. These latter, except the teeth in some instances, are found either beneath the dermic membrane, or beneath the portion of the internal surface not lined by this cutaneous substance.

My experience shows that the dermic tissue and its products characterize one variety of these formations, as in Cases II. and III. These constituents are sometimes found alone, and may then be regarded as indicative of a more

simple formation, while the addition of bone, muscle, etc., constitute a more complex order of tumor represented by Case IV. The bone and muscle, however, are never found in a tumor of this kind without the dermic membrane, its essential glands, and their products. Another thing quite apparent is that the skin and its appendages are not only constantly present, but comparatively perfect in their organization. The teeth, which are very closely associated in embryonic metamorphosis with the formation of the skin, stand next; many being quite perfect in their structure. The bony, muscular, and nervous structures, although complete in their texture and formation, are never developed into complete organs. I am aware that cases have been recorded,—as for instance by Blumbach and Rokitsansky, that would seem to be at variance with this assertion, but the bones in these cases lacked the completeness in structure necessary to entitle them to be classified with any of the bones in the human skeleton. When some or all of these structures, together with the products of the dermic tissue, constitute all the contents of the cyst, the specimen should be regarded as a simple dermic tumor, even when formed in the ovary, the fact of its having found a lodgment in that organ being an accidental rather than a necessary condition. When, however, it exists in the ovary, and with these substances there is found the colloid or mucoid fluid characteristic of the ordinary ovarian tumor, it is not merely a dermoid, but an ovarian dermoid tumor. It is a mixed neoplasm, a morbid development of the ovarian follicles in connection with the congenital dermoid. In my first case this was the character of the tumor, and instances of this kind are recorded in the well known books of Drs. Atlee, Peaslee, and Mr. Wells. The first variety then, although often found in the ovary, differs in no essential particular from those found elsewhere, except in magnitude and perhaps greater perfection of organized development. Possibly this last difference does not exist.

When found in the ovary, either in the single or mixed form, the investing membrane seems to be the same in ap

pearance and structure as in ordinary ovarian tumors ; and, when first exposed, it is often not easy, if at all possible, to distinguish between them until some of their contents are evacuated.

To the more fluid products of the first variety of simple dermoid cysts, especially the secretion from the dermic tissue, such as the serous or perspiratory fluid, we must attribute the difference in the size of this form of tumor. The sebaceous product is also sometimes quite bulky, as seen in Case IV. ; but when the sudoriparous glands are numerous and active the amount of watery fluid is sometimes enormous, and consequently the tumor grows to be very large, as may be specially noted in the second case. In such instances, from causes which are not appreciated, the sudoriparous glands seem suddenly to acquire great functional activity, and by pouring into the tumor a large supply of fluid make it grow with great rapidity.

As there was no appreciable amount of serum in Case IV., the sac being filled with the sebaceous matter, it is easily understood why the tumor was a long time in attaining the dimensions it finally acquired. The solid contents of these tumors, as far as I can learn, do not grow to a sufficient extent to give them any great bulk, and consequently when situated in the ovary, such a tumor, apart from its fluid contents, would hardly require extirpation.

The compound variety, or ovarian dermoid, would be likely to grow to a great size in consequence of the accumulation of the colloid secretion, just as they would if the dermoid element did not exist. By consulting the literature of the subject, I am led to the conclusion that the dermoid and colloid contents of these compound cysts are usually contained in different compartments of the tumor. This was notably the case in some of Mr. Wells' specimens.

There are one or two facts which may have some bearing upon the production and development of these tumors : The dermic membrane is always superficial with reference to the inner surface of the tumor ; the hair always, and the

teeth often, grow from its surface ; while the bone and other tissues are situated below it, but not always immediately under it. In my fourth specimen the bone was imbedded in a mass of cellular substance by the side of the cutaneous layer, giving me the idea that it belonged to a blastodermic formation deeper than the tegumentary portion of the surface.

The question here naturally presents itself, whether the simpler forms of these dermoid cysts, in which the dermoid structure, with hair, fat, and serum are found without any of the deeper tissues, are tumors in the process of development into the more complicated variety. I think not, and believe that each tumor receives during its embryonic state all the elements of formation it is capable of producing ; that the trophic qualities imparted to it then definitely limit its possibilities. If so it necessarily follows that the tumor, containing all the variety of structure ever found in them, should manifest these qualities and structures without gradation of growth, and possess from the beginning the complex qualities found in advanced periods of life.

#### THEORIES OF THEIR ORIGIN.

The theories devised to explain the origin and development of ovarian dermoid tumors represent with some degree of exactness the physiology of the times in which they originated. In the earlier ages of medicine physiology was the creature of imagination. Definite knowledge of the internal organs was wholly wanting ; if possible, even less was known of their functions. Pathology also rested upon the same unsubstantial basis. As a consequence the theories of the origin and development of these curious growths were all vague and imaginary. In the latest and most plausible explanation yet offered we have the results of the present highly cultivated science of physiology ; and if not absolutely true there can be fewer rational and scientific objections opposed to it than to any of its predecessors.

It is not my present purpose to do more than give a very cursory view of some of the most prominent theories which

have at different ages been presented to, and accepted by, a large portion of the profession at the time they were promulgated. I will classify the theories under three divisions. I. Those originating in the imagination alone without any scientific foundation. II. Those which have for their basis the superstitions of the times in which they originated, and of the people by whom they were entertained. III. The scientific theories.

I. The most ancient of the imaginative theories is, I believe, attributed to Aristotle. It taught that the dermoid products of these tumors, — as the hair, teeth, etc., had been swallowed and transmitted in some unknown manner to the localities occupied by them. This idea is a good match for many of the ingenious vagaries of that wise man.

Belief in virginal pregnancy supplied the basis of another and extensively prevalent theory. It assumed several forms. One was the abstract possibility of a virgin becoming impregnated without sexual intercourse, or true parthogenesis. Another was that the ovaries possessed properties that enabled them to produce to a limited extent the organized bodies resembling the parts of a fetus; or again that certain unsatisfied sexual longings of an isolated woman might stimulate the ovaries to imperfect generative processes.

Still another was that *certain individuals* possessed a sort of ovario-cystic diathesis which took this direction.

It is easy to see that these vagaries — for they ought not to be dignified by the term theories — had no physiological basis and could be the products of imagination alone.

II. The superstition of medieval times gave rise to the theory that these tumors were visitations of Providence upon the subjects of them, on account of particular sins. The infliction of this punishment upon males as well as females showed Providence to be no respecter of persons. One man had a pregnancy in the thigh because he laughed at his wife in her suffering during labor. It is said that the products of these tumors were sometimes baptized in the hope of avoiding the perdition in which they would be involved without such a ceremony. Hence, it seemed that the priests

believed in their own invention, and that the theory was not a mere trick with which they tried to practise upon the credulity and ignorance of the people.

III. As the knowledge of physiology advanced somewhat among the profession the theories became more rational, and the possibility of natural causes was employed to explain the occurrence of these singular tumors.

They were regarded by many as ovarian pregnancy in which the formation of the fetus was imperfect, or after having undergone development the fetus had become disintegrated and, the skin, bones, and teeth being more difficult of destruction, had withstood decomposition and remained in the sac. Another theory accounted for their peculiarities by supposing that the ovum had become blighted after having been developed to a certain extent.

Some one else has propagated the doctrine of inclusion, or of a *fetus in fetu*; believing that somehow one ovum had become engulfed in the organization of the other and on account of the nature of its nidus could not attain to complete organization or development.

Still later plastic heterology and heterotopy were supposed to afford a more rational explanation of their production. According to this theory the origin of these tumors in any part of the body is no more wonderful than the growth of other forms of heterologous tumors in the same localities.

In the light of the patient physiological research of our own day, and especially from the revelations of the microscope, a theory of these curious tumors has been developed which I regard by far the most satisfactory and scientific.

This theory is based upon a supposition which is at least physiologically plausible. It may be stated thus:—

In the early period of ovulation or embryonic development, by some accident or imperfection of formation, an indentation of the blastoderm is produced. In the wonderful trophic energy of that period the minute depression is inclosed by the approximation of its blastodermic margin and becomes an isolated cavity, and the growth and perfection of the embryo are accomplished notwithstanding

this early accident to the integrity of its envelope. The depression thus formed involves, perhaps, all the layers of the blastodermic membrane, but the external layer becomes the lining membrane of the cavity and is completely cut off from the rest of the blastodermic surface and invaginated with all its essential structures and processes of organization; all its products therefore, must be retained in the cavity. The contents of this cavity correspond in miniature with what the formation might have been if the displacement had not occurred. In the further development of the embryo the portion of the blastoderm covering this adventitious cavity develops its tissues and organs in the ordinary way, and thus incloses it in the body by the structures usually found to cover it. The internal layer of the blastoderm is doubtless also displaced, but it is not isolated, and consequently its products are never found inside the tumor. Therefore, in instances where the dermoid patch occupies any of the mucous cavities, the neoplasm will always be found external to the mucous membrane. This theory serves to explain why these hairy tumors are found in the fetus, child, virgin, matron, or male, and with equal plausibility why they may exist in any part of the body.

Dr. Pauly, in an excellent paper in the "American Journal of Obstetrics," expresses a doubt whether they exist more frequently in the ovary than elsewhere, notwithstanding the generally received opinion that this is the case, and at present it cannot be asserted that they are not as common in the male as in the female. This theory would certainly not furnish us with reasons for their occurrence more frequently in woman than in man.

If nothing unusual happens the adventitious sac grows with the individual in whom it is situated, and perhaps attains maturity as the same character of organs mature elsewhere. The sac itself continues to increase in size because of the constant secretion of the glands of the dermic structure. Growth from this cause would probably be slow if the activity of the tegumentary glands were not preternaturally quickened by morbid causes. When situated in the ovary,

however, the conditions naturally calculated to impart an impetus, exclusive of what is termed pathological states, exist. Hence in them they grow more rapidly and larger than in other places or organs. The fluctuation of nerve force, circulatory supply, and nutritional conditions which take place in the ovaries in consequence of the processes of menstruation, sexual excitement, and the varied states of generation, disturb the states of these otherwise nearly stationary neoplasms.

These reasons would lead us to expect the dermoids situated in the ovaries to become large and to grow more rapidly than in any other organ or locality. When situated in these bodies their progress is usually tardy until the age of puberty is reached. At this time the tumor is likely to be influenced by the increased nervous and vascular activity assumed by the ovary, and thenceforward they manifestly possess all the conditions necessary to cause copious dermic secretions. In the ovaries also, their growth is more likely to be influenced by the *morbid* impressions to which these organs are more frequently subjected than almost any other part or organ of the body. They are also doubtless especially stimulated by the occurrence of the conditions which give rise to the colloid tumors. For in connection with this form of tumor they are generally found to have assumed great proportions.

The condition imparted to dermoid tumors by the ovaries would almost necessarily lead to their discovery during the lifetime of the patient, and thus favor the idea that they are more frequently located in these organs. Situated in organs of more unvarying functions they would be likely to remain dormant and never attain dimensions that would cause them to be discovered; consequently they are overlooked in the general statistics on the subject.





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