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Dermoid Cysts of the Ovary.

by

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The great interest which has long been attached to the subject of dermoid cysts of the ovary is principally due to the very exceptional position which these growths occupy among pathological formations. It is not surprising that their occurrence should have excited the wonder of past generations, for even now it cannot be said that the conditions under which these extraordinary growths originate have been clearly ascertained. But independently of the apparent mystery which surrounds their origin, and viewing the subject only in its practical bearings, it is one which merits some attention. Though of comparatively rare occurrence, so rare, indeed, that probably the majority of medical men have not met with a single case of it during their practice, still the existence of a dermoid cyst of the ovary is a condition which one may encounter at any time and with which he may be called upon to interfere without delay. So it was in the case which first

directed my attention to the subject. It occurred in my practice some years ago, and, by reason of its great chronicity and numerous complications it has caused me to devote a good deal of time and attention to the subject.

The case referred to was that of Mrs P. aged 32. She belongs to a healthy family, and she herself always enjoyed robust health up to the time of her first confinement. It was then that she came under my care and the condition afterwards described was discovered. She began to menstruate at the age of sixteen and continued to do so regularly till she became pregnant. She had been married for four years before this occurred.

On the morning of Sunday, 27th December, 1880, I was summoned to attend her, she having been in occasional pain for the greater part of the preceding night. On examination per vaginam, I found the upper part of the fetus occupied by a large

tumour which bulged forward (as was ascertained by introducing a finger into the rectum) from the recto-vaginal space. The tumour reached as low as the middle of the sacrum and extended as high as the finger could reach for rectum. Anteriorly, it pressed forward to within an inch of the symphysis pubis. Felt from the vagina, it seemed to be elongated transversely, this evidently being caused by the pressure downwards and backwards of the gravid uterus. It was rounded from above downwards and to a less extent from side to side, its shape being therefore that of an elongated oval with its long diameter lying transversely. The point of greatest prominence anteriorly seemed to be about the middle line. To touch, the tumour was firm with the merest suspicion of elasticity, and its surface was smooth and regular. It was not appreciably movable in any direction. The os uteri was felt in a position above the space between the symphysis pubis and the

tumour, it being evidently displaced forward by the latter. It had begun to dilate, and the presentation was ascertained to be cranial.

After consultation with my partner, Dr. Robertson, it was determined to puncture the tumour, and this was accordingly done by means of Dieulafoy's aspirator. The largest size of trocar and canula was used, but nevertheless it required very considerable suction force to evacuate the semi-fluid matter contained in the tumour. As this matter flowed from the tumour it had the consistence of custard, but it solidified immediately on cooling, forming a substance resembling dripping in consistence and appearance. It had a greasy feeling to the fingers, blazed when put into the fire, and, under the microscope, was found to consist of fat, with epithelial scales and crystals of cholesterin. We removed about ten ounces of this matter. Towards the end

of the operation there was a little blood mixed with the fluid, the bleeding being probably caused by the great suction power required.

Although the tumour, after the operation, was much reduced in size and its walls had lost their former tenseness, it still formed no inconsiderable obstruction to the passage of the child. After waiting some hours, the os completely dilated, but with this, notwithstanding very active pains, all appreciable progress ceased. We therefore applied forceps and after an hour's strong traction, we succeeded in effecting delivery. The child, which was above the average size, was alive at birth, but died some hours afterwards.

For about three weeks after her confinement the patient seemed to be making a satisfactory recovery. She then, without any apparent cause, had some severe rigors followed by high fever, without however, any symptoms referable to the region of the cyst. After

a few days the temperature became normal, and she continued for a time to be in fair health. At the end of March, however, there was a return of the shiverings and their concomitant symptoms, the temperature remaining at 104° for some days. On this occasion, these symptoms were accompanied by a rapid increase in the size of the tumour, which, for the first time, could be felt on palpation of the abdomen. It reached nearly as high as the umbilicus, and was observably more to the right of the middle line than to the left. Though tender to touch otherwise there was not much pain in the cyst or its neighbourhood. Fluctuation could easily be detected. It being evident that the cyst had suppurated we decided to open it. After a preliminary aspiration, an incision was made with a bistoury into the cyst where it bulged most prominently into the vagina. This was in the posterior cul-de-sac, and a little to the right of

the middle line. A large quantity of very offensive pus flowed away. An ordinary india-rubber drainage-tube was introduced, and the cavity was washed out with carbolized water. The tube was left in the incision, but it caused so much pain that it had to be withdrawn the same evening. The pus, however, continued to drain away freely, and the constitutional symptoms gradually subsided. Frequent syringing with carbolized water was practised, and this lessened the offensive character of the discharge. A few days after incising it I removed from the cavity with a pair of dressing forceps a large quantity of hair. It was yellow in colour, and some of it was over a foot in length. I continued extracting it at intervals for some weeks, and believing then that all the contents of the cyst had been removed I endeavoured to promote the obliteration of the cavity by injecting lotions of sulphate of zinc. The presence of a drainage tube could

now be borne without pain. The incision contracted periodically to such an extent that it grasped the tube so firmly as to cause its occlusion, and it was therefore necessary to dilate the opening at times. This I did at first by means of a bistoury, but on one occasion there was such alarming haemorrhage in consequence that I thereafter did so by means of a tangle tent, which answered the purpose admirably. Excepting this occasional dilatation, daily syringing, and the use of stimulating lotions, nothing further was done for some months. During this time the patient improved very much in health, and but for the inconvenience arising from the use of the drainage tube (now a piece of gum-elastic catheter), she felt no discomfort and was able to move about as usual. The cyst, however, though much less in size, continued to discharge pus, and on exploring the cavity I found that hair was still growing

in it. It was evident that it was a new production, for it was not over an inch in length, required some force to extract it from its attachment, and shewed the bulb at the extremity seen in hair which has been pulled out by the root. Its extraction caused a twinge of pain. It did not seem to grow from the whole of the lining membrane, but only from a limited area. I removed as much of it as was practicable; and after waiting some months and finding that hair was again being reproduced, I once more removed it and several times injected tincture of iodine (of the Edinburgh Pharmacopoeia) into the cyst. This also proved to be ineffectual in destroying the formative tissue, for hair still continued to grow and the suppuration still went on. So matters continued till the New Year of 1882 when the patient was suddenly seized with a very acute pain in the region of the liver resembling that of gall-stone in its position and severity. No enlargement

of the liver or gall-bladder could be detected, nor were any gall-stones found though searched for in the dejections. This pain only lasted a day or two, but a few days afterwards pain began in the right iliac region, pain which was much increased on pressure and evidently of an inflammatory nature. Though in the region of the cæcum, there was neither the constipation nor the swelling present in cases of perityphlitis. The pain seemed to be due to a limited peritonitis. It lasted only for a few days, but the constitutional symptoms, which were severe from its onset, lasted for three weeks. The temperature ranged from 102° to 104°, there was constant vomiting, and from being plump and well-nourished, the patient rapidly became emaciated in a manner mostly seen in cases of continued fever. During this time the discharge from the cyst was more offensive than formerly, and more frequent syringing was

practised. At the end of three weeks the fever gradually subsided, and with it the vomiting and other unfavourable symptoms; and the patient rapidly regained her flesh and strength.

In March, 1882, Dr. Thomas Keith was consulted. He advised that beyond the continued use of the drainage tube and the removal of hair * when practicable, the case should be left to nature, as he anticipated that the continued suppuration would eventually destroy the formative tissue. After waiting a whole year and no sign of this occurring, and the patient being anxious that something else should be done, I decided on trying the effects of a stronger application than had been used formerly. In using the solution of the ethylate of soda for the cure of small nævi, as recommended by Dr. Richardson, I had observed that not only the nævus was destroyed but sometimes also a small part of the neighbouring skin which the liquid

had happened to touch, and that without causing much surrounding inflammation. I thought that the destruction of the dermoid tissue of the cyst might possibly be effected in a similar manner. I accordingly dilated the opening with a large tangle tent, introduced a large ear-speculum into the opening, and then a Fergusson's speculum into the vagina. Finally, I passed a long probe, tipped with cotton wool which had been moistened with the solution of ethylate of soda, through both specula and so into the cavity of the cyst, applying the caustic to the part from which I believed the hair to grow. The application was repeated several times at intervals of a week. Beyond causing a little pain for a day or two, it was not followed by any bad effects. No benefit, however, resulted, and since then I have not made any further attempts at destroying the lining of the cyst.

As the opening ceased to shew any disposition to contract, the drainage tube was dispensed with about a year ago. The suppuration is not now great in quantity, and the probe passes only two inches into the cyst. On exploring the cavity at intervals, I always find some short hairs which I have to pluck from their attachments. The patient remains in robust health, and is only made aware of her ailment by the inconveniences arising from the suppuration.

Though a good deal has been written on the subject of the origin and mode of development of dermoid cysts of the ovary, as yet very little exact knowledge has been attained on these points. Dermoids are seldom, if ever, found and submitted to examination till they have reached a state of growth which makes it impossible to ascertain anything positively about the history of their development; hence any explanation of their occurrence can only be conjectural. By the older writers they were looked upon as instances simply

of extra-uterine or ovarian pregnancy, and this view obtained till Dr. Baillie was led to question its truth through discovering such a cyst in a girl of twelve or thirteen. He expressed the opinion "that such productions may arise from an action of the ovarium itself without any stimulus from the application of male semen" (Philosophical Transactions). This view was soon afterwards confirmed by another case which is recorded by Dr. Baillie in his "Morbid Anatomy", and Mr. Abernethy published a similar case in the first volume of the Medico-Chirurgical Transactions. Since then numerous cases have been recorded which conclusively prove that impregnation is not a necessary factor in the production of dermoid cysts of the ovary. Beyond this, however, little that is definite has been ascertained as to their origin, though some views have been advanced which afford a reasonable explanation of the occurrence of these remarkable formations in the ovary.

While the majority of dermoid cysts

are of ovarian origin, they not unfrequently develop in other parts of the body. Lebert reported 188 cases of dermoid cyst, and of these 59 were non-ovarian. The most common seats of non-ovarian dermoids are the testicle, the outer angle of the orbit, and, more rarely, the anterior mediastinum, the interior of the skull, the lungs, &c. The question then arises — do the cysts in these different regions all owe their origin to the same cause? The balance of evidence seems to be in favour of the view that they do not, and that the conditions which give rise to them in the ovary — and probably also in the testicle — are essentially different from those which give rise to them elsewhere. The origin of many non-ovarian dermoids is undoubtedly referable, as advanced by Haeckel[2], to "developmental inclusion", either occurring at a very early period by the enclosure of epithelial cells of the corneous layer, these cells afterwards developing with more

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[1] Prager Vierteljahresschrift, 1860. [2] Ibidem.

or less regularity, or else to later enclosures of epidermal structures, thus giving rise to those cases which occur in the track of the branchial and other developmental fissures. The latter is a reasonable explanation of their occurrence at the outer angle of the orbit. There they have no connection with the external skin, for they are always found beneath the orbicularis muscle, and usually closely attached to the periosteum. Mr. Wagstaffe reported twenty such cases to the Pathological Society of London, and expressed his belief that they occurred along the line of the first branchial fissure. (Lancet, vol I. 1878.) The accuracy of Mr. Wagstaffe's observations was questioned, however, by Mr. Alban Doran, who stated that the region of the external angular process of the frontal bone — the usual seat of these cysts in the face — lies out of the line of the clefts dividing the visceral arches, and that while the arches contain the cartilaginous basis of certain bones, these

cysts lie in front of the malar and frontal bones which are formed in membrane late, while the arches are being obliterated. He suggested a rather fanciful explanation of the occurrence of dermoids in this region. Founding on observations made by Professor Kowalevsky - that in the formation of the oral cavity in the amphioxus a fusion of the epiblast and the mesoblast takes place - he thought it possible that a similar fusion of the epiblast with the deeper layers may take place abnormally at one point in the human face and so give rise to the formation of a dermoid cyst at that point. Why the outer angle of the orbit should be the chosen seat of such an aberrance no explanation was given. To my mind, the fact of the site of these cysts being slightly out of the line of the branchial clefts does not disprove the theory of the inclusion of epidermal tissue by the closure of these clefts. In the course of development and growth, one can readily understand that the part so enclosed

might lose its original relationship to neighbouring structures. In the same way we can account for the presence of dermoid cysts in the anterior mediastinum. In a case reported by Waldeyer (Archives für Gynäekologie, 1870, page 304) the cyst was found to obtain its vessels from the vasa thyroidea inferiora, and this, Waldeyer considers, sufficiently proved its origin from the neck region – the region of the embryonic clefts. And that even intracranial dermoids owe their origin to developmental inclusion we are not without evidence to prove. In a case reported by Dr. Ogle (Brit. & For. Medico-Chirurgical Rev.) a foramen existed in the mesial line of the supra-spinous part of the occiput, and this led to a depression on the inner surface of the bone caused by the presence of a dermoid cyst of the dura mater containing hair and sebaceous matter. Probably, as Dr. Ogle says, a portion of dermal tissue had, before the completion of the skull, become intimately

connected with some part of the cerebral membranes, and in the filling up of the bony deficiency it had been drawn within the cranial cavity, and the production of a dermoid cyst was the consequence. Though as a rule intra-cranial dermoids are connected with the dura mater, it is not always so. Dr. Pearson Irvine reported a case to the Pathological Society of London, (Brit. Med. Jour. Vol II, 1878) in which the cyst occupied both halves of the cerebellum. In such a case the inclusion must be referred to a more remote period, that portion of the corneal layer which formed the nervous system having probably enclosed some epithelial elements. In this way, we have, I consider, a very reasonable explanation of the presence of dermoid cysts in those situations, where, excluding the ovary and testicle, they are of most frequent occurrence.

A few other cases, the Teratomata, undoubtedly owe their origin to "foetal inclusion". Such tumours usually occur near the parts where double monsters are connected,

and sometimes contain nearly an entire skeleton.

A few other cases of dermoid cyst seem to arise from still another cause. Several cases are recorded in which dermoid cysts in the anterior chamber of the eye followed on penetrating wounds of the cornea involving the iris. Mr. Hulke believes these to be due to a sebaceous gland having been transplanted onto the iris; and he thinks that a similar theory might explain the occurrence of the rare cases of sebaceous cysts which occur on the flexor aspects of the fingers. Neither of these can be considered as being genuine dermoids, however, for although their contents resemble those of dermoids, the structure of the lining membrane is not that of true skin.

None of the theories which have been mentioned can be admitted as an explanation of the presence of dermoid cysts in the ovary. Here the contents are often of a much more complicated and diverse character than those

found elsewhere, for not only are they found to contain skin, hair, and sebum, but bone, peritoneum, brain tissue, striped muscular fibre, and teeth consisting of enamel, dentine, crusta petrosa, and tooth-pulp with nerves, all of a perfectly normal character, are sometimes found in them - Such an aggregation of structures situated in the essential generative organs of the female cannot fail to suggest that they represent an individual, though very abnormal in anatomical form, of a preceding generation; and as normal conception may be dismissed as being concerned in their development, an explanation must be sought for elsewhere. According to Cohnheim's hypothesis, dermoid ovarian cysts cannot be separated as to their origin from other tumours of whatever kind and wherever occurring, they invariably arising from the persistence of small residues of Embryonic tissue. He founds this theory principally on the frequent presence of Embryonic tissue in tumours, but probably, as said by Sir Spencer Wells (Ovarian & Uterine Tum. p. 22),

this embryonic tissue may not be the point of origin, but simply a consequence of the degenerative tendency exhibited by the tissue of morbid formations. Wells agrees with Cohnheim, however as to the identity of origin of ovarian and other tumours; and he believes that dermoids "differ in no way from the multiform morbid formations which spring up everywhere under circumstances which admit of no rational explanation" (Op: cit:, page 39). He quotes Virchows doctrine of "the continuous development of the tissues out of one another", and he believes that this is the only explanation which can be given of the growth of dermoid cysts of the ovary. Such however does not seem to be the opinion held generally by pathologists who have studied the subject. Among the foremost of these is Waldeyer of Breslau. He states his views with great clearness (Archives für Gynaekologie, 1870, page 304), and although recent investigations into the development of the ovary may possibly lead to some modification of them, the

conclusions he arrives at are not materially affected thereby - I shall very briefly state these views.

Designating all compound cystic tumors of the ovary as Cystomata, Waldeyer divides them into two classes differing from each other very materially in their structure and contents. The first, and by far the most important of the two practically, is characterized by the inner wall exhibiting the structure and properties of ordinary mucous membrane and he therefore terms it Myxoid Cystomata, while the other, having a lining membrane with the characters of an external skin, he following Lebert's nomenclature, terms Dermoid Cystomata. He is of opinion that these two groups run completely parallel courses in their mode of development, their difference consisting solely in the special characters which the newly formed epithelium assumes. As his theory of the origin of these cysts rests to some extent on his views of the development of the ovary, I shall briefly state those views, indicating at

the same time, some of the points of divergence between Waldeyer and other observers.

From the first development of the ovary two histological elements are represented in it, the vascular stroma derived from the mesoblast, and the investing germinal epithelium. This epithelium is not peritoneal or serous as was formerly supposed, for it has not only morphologically, but also genetically, the character of a genuine mucous membrane as it is developed from the same source as the epithelium of the Fallopian tubes and uterus; and it is admitted that the cells constituting it are the origin of the ova. At first, both the vascular stroma and the cells increase in quantity, and the ovary, originally a small projection from the median side of the Wolffian body consisting of a thickened germ expansion investing a small outgrowth rich in cells, becomes a roundish organ, which, in the embryo, exhibits a cavernous structure with epithelial elements

closely crowded in the meshes of the stroma. This altered relationship of stroma and cells was described by Pflüger and other German pathologists as being caused by the invasion of the stroma by columns of cells from the investing epithelium. Waldeyer describes the vascular stroma as sending out processes, the epithelial cells at the same time increasing by the continual production of new cells. The processes then penetrate between the cells and divide them into heaps of variable size. After a time, the cells cease to multiply to any appreciable extent. The stroma, however, continues to increase, the result being that the heaps are removed wider apart and are cut off from those cells still on the surface of the ovary. Some of these heaps become isolated and form round follicles, while others continue for a time to be connected to each other in the form of a chain or rosary, constituting what are known as Pflüger's tubules. He describes these as being really tubes which anastomose with each other and open with ner-

row mouths on the epithelial covering of the ovary, they being, in fact, direct tubular gland-like processes of it. The continued increase of the vascular stroma eventually separates the heaps of cells into individual follicles. Some of the cells, meanwhile, become conspicuous by their size and the size of their nuclei. These are the primordial ova, and each heap of cells generally arranges themselves round one of these and thus constitute the membrana granulosa of the Graafian follicle. Egg-cells are found in the tubules as well as in the segregated heaps. Waldeyer maintains, then, that the germinal epithelium is the origin alike of the ova and of the epithelial lining of the follicles, and that, under certain circumstances, every epithelial cell may become an egg-cell. In these opinions Waldeyer was supported by the late W. F. M. Balfour of Cambridge, though he differed from Waldeyer as to the nature of Pflüger's tubules. He held that these so-called tubules have no existence as such, but are simply trabeculae of

germinal epithelium resulting from the irregular invasion of the cells by the stroma.

On the other hand, some pathologists believe that the ova and the epithelial lining of the follicles have totally different origins. Kolliker found the latter to contain cellular bodies in the stroma, probably remnants of the Wolfian body, situated in the hilus of the foetal ovary (vide Dr. James Foulis' article in Jour. of Anat. & Phys. 1879. p. 353). Dr. Foulis (ibidem), again, maintains that the follicle cells derive their origin from the connective tissue cells of the ovarian stroma. He states that the connective tissue of the stroma, in the form of jelly-like offshoots of protoplasm, may imbed large or small groups of cells, or a single cell may be so imbedded. In the latter case, the cell so enclosed grows and forms a primordial ovum. Nuclei then appear in the stroma which surrounds it, these nuclei being the source of the epithelial lining of the Graafian follicle. He agrees with Balfour as to the nature of the so-called Pflüger's tubules.

According as to which of these views is adopted must the theory of the development of proliferous ovarian cysts be modified. Nearly all observers are agreed that it is the epithelial elements of the ovary which are to be looked upon as the foundation of these cysts. If we accept the views of Kölliker or Foulis, we must consider such a cyst as being developed from an ovum or possible ovum only, and in no case from the lining cells of the Graafian follicles; whereas, if we accept the views common to Waldeyer and Balfour, we must look upon the cyst as being descended either from the ovum, or from the epithelium of the Graafian follicle after the formation of that body, or from epithelial cells which have never developed into the one or into the other.

On making a section of a developed ovary, certain cellular bodies have been found, and these, it is generally agreed, sometimes form the source from which cysts develop. As to the nature of these cells, however, there are great differences of opinion. Waldeyer believes that they are really Pflüger's

tubules which have not followed their normal course and developed into Graafian follicles. Malassez and Sinéty (vide article in Brit. Med. Jour. 1879, vol I) found certain tubular structures, which they term "Enfoncements pathologiques", existing in a case of incipient cystic disease, and these they believe to be the origin of cysts. They consider these bodies to be germinal epithelium, which, instead of being developed into Pflüger's tubules and ultimately into Graafian follicles, have taken on a low type of development, and in consequence, ultimately develop into cysts. Their views thus, to some extent agree with those of Waldeyer; but so far as the origin of dermoids is concerned, their theory cannot be considered as in the least probable, for these growths, instead of showing a retrogression in cell-type, exhibit a very decided advance in the character of the cells constituting them. Widely different from both these views are the opinions advanced by Naegeli of New York (vide American Jour. of Obstet. 1880). He describes certain cellular bodies — probably the same as those described by Waldeyer and Malassez and Sinéty — which he believes to arise from disease of blood vessels —

First there is disease of the intima of the vessel, then loss of the endothelium and prevolation of the contents of the vessel into the intima. Migrating cells then appear in the interstices of the intima and break it up, and these, he believes, are the large granular cells found in ovarian cysts. These observations have been confirmed to some extent by Harris and Alban Doran (Jour. of Anat. and Phys. July, 1887) who believe that cystic disease of the ovary occasionally arises as a consequence of diseased bloodvessels, though they believe it to be more frequently due to changes in the Graafian follicles. If correct, Roggerath's theory can only be of limited application, for it cannot satisfactorily account for those cases which exhibit a complicated structure. It is scarcely possible to understand how a dermoid cyst could originate in such a manner, so that this theory separates them from other proliferous cysts of the ovary; and this is opposed to the opinion of those who have had most opportunities of making observations on the subject. The probabilities seem all to be in favour of the view that dermoids are of epithelial

origin. Even on Waldeyer's theory, however, the epidermoidal character which the epithelium of dermoids presents makes the development of these cysts from germinal epithelium difficult of comprehension. But if we accept Waldeyer's propositions and admit that every epithelial cell may become an egg-cell, and that every egg-cell may, through division, produce all possible cell characters; and further, if we consider that the corneal layer is the first product of furrowing, the possibility of the production of dermoids from such a source may be brought nearer our understanding. It may reasonably be assumed that the epithelial cells of the ovary, in conformity with their significance as undeveloped egg-cells, supply, in their increase through division and budding, other products widely different from themselves — in fact, such as have advanced further in the direction of an imperfect embryonic development. For such development it is not necessary to assume the intercurrence of the spermatic fluid of the male with the female bud-cells, for

the numerous instances of parthenogenetic development which have been demonstrated to take place (as in the Aphides) relieve us of the necessity of such an assumption. From this it may be inferred that Waldeyer does not refer the occurrence of dermoid cysts to actual foetal remains, neither does he consider them as due to furnished ovarian pregnancy, but rather to a pathological development of a possible embryo resulting in a hyperplastic formation of the epithelial elements of the ovary, the epithelium becoming epidermoidal in structure. As has been said, Waldeyer assumes a mode of development running completely parallel to that of myxoid cystomata. If an increase of ovarian epithelium take place in the ordinary way by which the cell-descendants assume the characters of the parent-cell, we have, in most cases, a myxoid cyst, while an increase with modified development results in a dermoid cyst. Waldeyer states that Eichwald has strengthened

the probability of the relationship between these groups by his observation of cases where the two kinds of cystomata were found close to each other in the same ovary; and he further states that although Virchow at one time denied the existence of any close connection between them, at a later period he admitted and paid great attention to the existence of such a connection. Since the publication of Waldeyer's monograph, the relationship existing between the two groups has been confirmed by other observers, and principally by Sir Spencer Wells whose opportunities of making observations on ovarian cysts are so very extensive. He says (vide "Ovarian and Uterine Tum." p. 40) that patches or nodules of dermoid structure are not unfrequently found in the walls of cysts which, from the predominance of other characteristics, are not ranked in this class; that, in fact, as a subdivision of proliferous cysts, the dermoid has no definite limits. He is of opinion that the particular form of development which is assumed is only a question of the formative power

possessed by the cells. As has been said, however, he does not look upon dermoids as differing in their causation from other tumours wherever occurring. On the other hand Waldeyer's view of their peculiarity of origin has been supported by many eminent pathologists, notably by the late Dr. Charles Ritchie, than whose opinion on questions of ovarian pathology few are entitled to greater consideration. In his words, "every dermoid cyst of the ovary is an ovum which has undergone a certain amount of development - it is a perverted attempt at parthenogenesis".

In a former part of this paper, the opinion was expressed that dermoid cysts of the testicle probably owe their formation to a cause similar to that which determines their growth in the ovary, and different from that which gives rise to them in other regions. The testicle and ovary have identical origins being formed from the same blastema, and it is only at a comparatively late period in the development of the embryo that a dis-

function can be made. The fact of this common origin, and the frequency of the occurrence of dermoids in both as compared with other organs or regions, point to a common cause as being concerned in the development of these growths in them. It may be that a portion of the blastoderm destined to form the testis, or a single cell of it, instead of undergoing those changes which its fellows undergo and which result in the formation of the organ, either retains its embryonic condition, or develops in a manner similar to that of the corresponding cells in the female and give rise to cells possessing the formative properties of the germinal epithelium of the ovary. We should thus have all the conditions necessary for parthenogenetic development, and it may possibly be to this that the formation of dermoids in the testicle are to be attributed. The probability of the similarity in origin of dermoids of the testis to those of the ovary is strengthened by the fact that the contents of the former resemble those of ovarian origin in

sometimes containing besides sebum and hair, which may be found in dermoids wherever occurring, more highly developed structures, such as teeth and fœtal bones structures which I am not aware of having been found in cysts occurring elsewhere, except in those rare cases consequent on fœtal inclusion.

Leaving the vexed question of the origin of dermoid cysts of the ovary, I shall now in as few words as possible, describe the characters of these growths. They may be single or multiple, unilocular or multilocular, sessile or pediculated. They appear to be often congenital, and as a rule, they begin to develop at an early age. Their growth is slow, and not unfrequently they become stationary after attaining a certain size. Atlee mentions the case of an old lady of ninety-nine in which the tumour was detected by his father forty-seven years before. That dermoids may develop with great rapidity, however, is proved by a case reported by Von Dumreicher (vide Lond. Med. Rec. Jan. 1878). The cyst, which was successfully

anticipated by him, grew from the right ovary of a young woman of eighteen, was the size of a child's head, and contained about a pint of yellow fluid with masses of fat and hair. Five months previously, Von Dumreicher had removed a cyst of the left ovary from the same patient, and he had then carefully examined the right ovary and found it to be normal. The cyst, therefore, must have developed within that time.

Though generally of small size as compared with mucoid cysts, dermoids sometimes develop enormously, this usually taking place, however, under the influence of suppuration. In a case recorded by Wm. Moore (Path.l Trans. vol. VIII) the abdomen was larger than at the full period of gestation; and Wm. Knowsley Thornton reports a case (Path.l Trans. 1876) in which he removed by tapping eight-six pints of fluid. In this case the tumour had been detected thirty-four years previously. The greater part of the fluid seems to have consisted of the sebaceous substance generally found in these cysts, so that the

great size attained was not altogether due to the suppuration which had taken place.

In shape, dermoids are usually globular but they sometimes present great irregularities. Moore describes a case in which there were numerous small cysts connected by slender pedicles, and quite detached from the main cyst. Dr Macleod removed a dermoid in January last which consisted of two cysts communicating with each other by a narrow opening. As has been said, they occasionally occur in conjunction with ordinary mucoid cysts. Sir Spencer Wells gives several instances of this in his work, "Diseases of the Ovaries".

Lebert (vide Prager Vierteljahresschrift, 1860) has classed dermoids into three varieties differing from each other in the complicacy exhibited in the structure of the wall and in the nature of the wall-products. Although the distinctions between typical cases of these varieties are definite enough, the transition from the simplest to the most complicated is so gradual that no

sharp line of demarcation can be drawn dividing one variety from another.

The wall of dermoid cysts consists of two coats, an outside, thick, dense fibrous envelope, and an inner coat presenting the characters of true skin. Between these is a layer of fat analogous to the panniculus adiposus. The inner surface is smooth except in those cases in which projections are caused by the presence of teeth, &c., in the wall. The skin does not uniformly cover the inner surface of the cyst, being, as a rule, arranged in patches. Where not covered by skin, the inner surface is lined by a thin, transparent membrane similar to that of sacs. Small secondary cavities may project from the inner wall (Doran, Lancet, 1881, vol. I). The superficial layer of the dermal coat consists of pavement epithelium, the cells of the succeeding deeper epithelial layer being rounded or polygonal in shape. Under the epithelium is the cutis vera. It resembles that of normal skin except that the papillae, when present (which is not always the case), are arranged irregularly

and do not run in rows like those seen in the skin of the palm or fingers (D. John Williams, in Reynolds's "System of Medicine"). In the areolar tissue beneath the cutis vera, hair follicles usually exist, and into these, as well as on to the inner surface of the cyst, sebaceous glands open. Less frequently, teeth are found in the cyst-wall. These may grow directly from the wall of the cyst, or they may develop from osseous structures which are sometimes met with. The teeth may present the character of incisors, bicuspids or molars. Sometimes they are normal in appearance, and they have been found even to follow the normal order of succession, a deciduous tooth being displaced by a permanent one by a process identical with that which occurs naturally. Usually however, the teeth found in these cysts are rudimentary and imperfect. Sometimes they are shed into the interior of the cyst, and the follicles, continuing to produce others in their stead, may ultimately cause a very large number to be contained within the

cavity. Sir James Paget found 300 teeth in a single cyst, and a like number was counted in a case reported by Reil and Autenrieth. As a rule, however the number is small, usually under a dozen. Small tooth-like bodies consisting of cartilage are also met with in the walls of cysts.

The osseous structures already referred to are imbedded in the cutis or in the areolar tissue beneath it. They usually occur as small laminae though occasionally they grow as large as the palm of the hand. They have usually a very irregular shape with branches and spicula. Hollow bones have also been found, and some cases have occurred in which there were small bones articulated by loose capsular ligaments (Williams, op: cit:) These bones have a structure identical with that of normally developed bone, except that the laminae are larger and fewer, and the canaliculi are less numerous.

Sudoriparous glands have been described as existing in the walls of dermoid cysts (Hoschl),

and brain tissue, characterized by medullated tubes and nerve cells, has been discovered by Bencke, Friedrichs, Ranvier, and others. Virchow found striated muscular fibre in the wall of one of these cysts.

The contents of dermoid cysts for the most part consist of sebaceous matter. It has a yellowish colour, usually solidifies under a temperature of 85° F., and is made up of fat-globules, cast-off pavement epithelium, and crystals of cholesterin. Hair, either free or attached to the wall, is the most common of the solid contents. It is usually of a yellowish or reddish colour, though Dr. Gibbes (vide Amer. Jour. of Med. Science, 1869) reports a case in which it was black; and Axel (vide Barnes' "Dis. of Women" p. 335), in the case of an old woman, found part of the hair to be grey. In a case occurring in a full-blooded negress, Dr. Porter found the hair to be of a black colour, straighter than the ordinary hair of negroes, but possessing curl and crispness to a certain extent.

It is usually fine and is often found in matted tufts or rolled up into balls, the individual hairs being sometimes over two feet long.

Teeth and bones of the kind described are also occasionally found free in the interior of the cyst. Mr. Lawson Tait described a case (vide Brit. Med. Jour. 1879. vol. I) in which large quantities of ciliated epithelium, similar to that of the cerebral ventricles, was found among the fatty debris of a dermoid cyst. No trace of nerve cells was found in the cyst, but Mr. Tait thought that the source of the ciliated epithelium might be similar to that of the brain tissue sometimes found in these growths.

The symptoms caused by the presence of a dermoid cyst of the ovary are by no means characteristic. In some cases, indeed, there are none; and such a tumour may exist for a lifetime only to be discovered on post-mortem examination, while in other cases, its presence becomes known only through the accident of pregnancy. When discovered during life without the concomitant of pregnancy, the subjective

symptoms may simply be those of pressure and bearing down. There may be urinary difficulty or rectal irritation. There is neither amenorrhœa nor menorrhagia. Unless so large as to project above the brim of the pelvis, of course no information is got from abdominal palpation or percussion. Examined per vaginam, a tense, rounded growth may be felt occupying the posterior cul-de-sac; and in this, slight fluctuation can sometimes be developed. The pressure of the growth causes the cervix to be displaced forwards and slightly to the opposite side of that occupied by the growth. On examination by the bimanual method, it is found that the uterus is of normal size and distinct from the tumour. When of large size, the tumour projects above the brim of the pelvis, but as a rule, the physical signs so available are not materially different from those of other pelvic cysts.

Dermoids thus closely resemble other ovarian growths in their symptoms, situation, and the manner in which they extend.

Still, in a few cases it is possible to arrive at a correct diagnosis without resorting to the almost infallible test of tapping.

Excluding the ordinary proliferous ovarian cyst — the mucoid cystoma of Waldeyer — the growths for which a dermoid cyst of the ovary is most likely to be mistaken are fibroid or fibro-cystic tumour of the uterus, retro-uterine hæmatocele, encysted peritonitic fluid, parovarian cyst, renal cyst, and extra-uterine pregnancy. As the points of diagnosis which differentiate between these growths and dermoids are almost identical with those which distinguish them from other ovarian cysts, I do not consider it necessary to state them in detail. Of the growths mentioned, the one which presents the greatest resemblance to a dermoid is extra-uterine pregnancy. Both forms of growth may be somewhat irregular in shape, have a solid feel, and present hard projections; and both are prone to inflame and become adherent to neighbouring organs, and, if the organ be hollow, to discharge their contents into it by the establishment of a fistulous opening. When this takes place,

the character of the growth will be ascertained by the nature of these contents. But if suppuration has not taken place and the tumour is still intact, the following distinctions may serve to form a diagnosis. The growth of the tumour in extra-uterine pregnancy is much more rapid there is always enlargement of the uterus, and softening of the cervix; and ballotement, either with the finger in the vagina, or by palpation of the abdomen with one hand while a finger of the other is in the rectum and rests on the sac, may frequently be produced in the early months. In addition, there may be changes in the breasts and other signs of pregnancy. It is when the pregnancy is abdominal that the greatest difficulty is presented, as the elongated shape of the tumour in cases of tubular pregnancy will assist in indicating its nature.

Even more difficult is it to distinguish between dermoids and the more frequently occurring proliferous cysts of the ovary — the mucoid cystomata of Waldeyer. As has been said, they resemble each other in their shape, seat, symp-

and manner of extension. Dermoids, however, more frequently make their presence known during childhood or girlhood than is the case with mucoids, while the latter, as a rule, have a more rapid growth. Mucoids, again, have a softer feel, exhibit a more distinct fluctuation, and, if left alone, attain a much greater size than that usually reached by dermoids. None of these differences, however, are in the least characteristic, and it is only in those cases of dermoids in which irregularities of form or nodosities from the presence of cartilaginous or bone-like masses can be felt, that a diagnosis can be made with any confidence.

There are conditions other than those mentioned for which dermoids may be readily mistaken. Sir Spencer Wells mentioned a case to the Pathological Society of London, (vide Lancet 1876 vol. II) in which the cyst could be pushed into the right hypochondrium and was thought to be a movable kidney.

The recognition of dermoid cysts in their earlier stages or before the establishment of

fistulous openings is thus extremely difficult, and as a matter of fact, they are seldom diagnosed under these circumstances unless the operation of tapping is resorted to. When this is done and the characteristic sebaceous fluid is obtained, the diagnosis is placed beyond question. But the converse does not obtain, for the fluid may not exhibit the usual fatty characters, and yet the cyst belong to the dermoid class. Occasionally, the fluid contained in dermoids is not of a fatty nature[1]. Again, the canula may happen to enter the mucoid portion of one of those growths in which a mucoid and a dermoid cyst grow together from the same ovary. As an illustration of the possibility of falling into such an error, Sir Spencer Wells instances a case[2] in which three distinct kinds of fluid were found in a number of isolated cysts. In some there was an emulsion of fat and cholesterin, in others; the

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[1] Wells, Dis. of the Ovaries, p. 73. [2] Ovarian & Uterine Tum. p. 9

albuminous fluid usually found in ovarian cysts; and in others small isolated bags, there was serous fluid overcharged with fibrine.

Even after fistulous openings are established, the nature of the case is not always apparent. In all probability, some cases of apparently simple pelvic abscess are in reality cases of dermoid cyst which have undergone suppuration, the characteristic contents escaping notice.

If a dermoid tumour of the ovary does not remain stationary and it is left to itself, its course is usually as follows. Inflammatory action is set up in its wall — either spontaneously or as the result of injury or chill — this goes on to suppuration, and the pus either bursts into the cavity of the peritoneum, or, an adhesion having taken place between the cyst and a neighbouring structure, it finds an outlet for itself either through the abdominal wall, or into the rectum, the vagina, or the bladder. Though in the latter way the fluid contents, and probably such of the solid contents as are not attached to the wall, may be eliminated, it is seldom that a cure

is so effected. The inflammatory and suppurative processes rarely succeeded in destroying the secreting and formative power of the skin tissue, so that these fistulous openings may persist for many years. Dr. Barnes (vide "Diseases of Women," p. 337) had a case in which there were two fistulous openings ~~into~~ the abdomen near the umbilicus, and another into the bladder. Sometimes the abdominal fistulæ discharged urine and pus, while at other times gelatinous pus escaped through the bladder. At the time he wrote, the case had gone on for more than twenty years.

The channel through which the contents of dermoids are most frequently evacuated seems to be the rectum. Next in frequency, the abdominal wall is the elected seat of the fistula; while the cases in which the cyst spontaneously bursts into the vagina or bladder are comparatively few. When the communication is between the cyst and the bladder, urinary difficulties of the most distressing nature, owing to the presence in the bladder of teeth, hair, etc., may occur. In a case where such a communication existed,

a urinary calculus was removed by operation, and to it, Dr. Sluiz found a tooth attached (vide London Med. Rec. June, 1874). In a foot note to the description of this case, another case is mentioned in which a tooth was found to form the nucleus of the calculus. When hairs are evacuated into the bladder, they may come to have a coating of calcareous matter and so present some resemblance to bone (vide Dr. R. Lee, Med. Times & Gaz. 1860, vol. II). But real bone may find its way from a dermoid into the bladder. Wells says that Dieffenbach had to perform cystotomy for the removal of a bone which had got into the bladder from such a cyst.

When the suppuration is not extensive and the pus has free exit, the patient's general health may not suffer very much, but when these conditions do not obtain, hectic or irritative fever is likely to supervene, the patient becomes emaciated, and death may ensue from exhaustion. If the fistulous opening be into the bladder, the fatal termination is probably hastened by the cystitis which is almost certain to exist.

If, instead of finding an outlet for themselves in any of the manners mentioned, the fluid contents of a suppurated dermoid burst into the cavity of the peritoneum, the result is almost necessarily fatal unless operative interference is had recourse to. If the patient survive the shock of its bursting, peritonitis of the most aggravated description is inevitably set up. If this does not cause the death of the patient, however, the pus and the other escaped contents of the dermoid may become encysted. The inflammation may subside for a time, but the cyst continues to follow its natural course, and ultimately the fluid probably finds an outlet for itself. Mr. Coward recorded a case of burst dermoid with encysted contents in which after tapping and the removal of seventeen pints of viscid pus and a large quantity of hair, the patient ultimately recovered (vide Lancet, 1856, vol I). In a case which occurred in Dr. Thomas Keith's practice (vide Brit. Med. Jour. 1878, vol II) the bursting of a large dermoid was followed by double pyelymesia dolens,

the oedema extending over the trunk into the axillae. For months the patient lay poisoned, suffering from great pain and vomiting and often apparently dying; yet after nine tappings she rallied sufficiently to allow of her being brought to town nine months after the bursting of the cyst. Dr. Keith afterwards performed Laparotomy, and he found that a large quantity of bone, hair, and fat had become encysted in the upper part of the abdomen.

Instead of remaining stationary after a time, which is the most usual history of a dermoid, or of suppurating and discharging its contents, which is the result next in frequency, such a cyst may have various other terminations. The inflammation of the cyst may spread to the peritoneum by contiguity, the peritonitis may become general and possibly have a fatal termination. Or the contents of a dermoid may become fetid and cause septicaemia from absorption. Again, rotation of the pedicle may take place, and this may have various consequences. If the veins be compressed while

the circulation through the arteries goes on, there is congestion of the cyst and exudation of serum or haemorrhage into it; while if the arteries be compressed, gangrene of the cyst ensues. If, again, the rotation be gradual, the nutrition of the cyst is impeded, and according to Spencer Wells, the walls shrivel. The contents of a mucoid cyst, in such a case, are entirely absorbed, but of course this is not possible in the case of a dermoid. They would probably, however, cause no trouble under ordinary circumstances. Rotation of the pedicle may have still another effect. A part of the bowel may become entangled by it, and this may cause fatal obstruction.

Occasionally, dermoids, like other ovarian tumours, become spontaneously detached from their pedicles, their life and growth still continuing to go on by virtue of the adhesions existing between them and neighbouring structures. Instances of this are recorded by Mr Knowsley Thornton (vide Lancet, May, 1881) and Sir Spencer Wells (Dis. of Ovaries, p. 184).

More extraordinary than these is a case which occurred in the practice of Dr. Elüge (vide London Med. Rec. June, 1874). Dr. Elüge was sent for to see a lady, aged thirty, on account of her suffering from retention of urine. By great effort a very little urine was occasionally passed, in it being small clots of blood. The hypogastrium was swollen and very painful when pressed. The existence of the hymen prevented any vaginal examination. She got relief after the urine had been drawn off by the catheter. The retention persisted for two days during which the patient had a sense of pressure and great pain in the urethra, and then, by very violent effort, a cyst was ejected. From this time the urine flowed naturally and the other symptoms rapidly subsided. On examining the cyst, it was found to be four and a half centimetres long and three centimetres wide. The outermost layer consisted of epidermis, and under this was the dermis with its numerous follicles widely opened. From these projected long blonde, sometimes brown, hairs of a perfect physiological structure. The inner surface of

the cyst was lined by a thin, smooth, serous membrane formed of connective tissue and covered by small round cells. The cavity contained a small bone-like structure and some fluid. The latter was not sebaceous, though the nature of it could not be ascertained. Dr. Lüge believed that a communication had become established between the ovary and the bladder, and that through this the cyst had made its way.

A somewhat analogous case is related in the same number of the London Medical Record. It occurred in the practice of Dr. Danzel of Hamburg, and the tumour was shown by him at the Surgical Congress in Berlin. The patient, who was twenty-five years of age, had frequently discharged masses of hair per anum. On examining her, Dr. Danzel found a great tuft of hair projecting a couple of inches from the anus. He afterwards removed the tumour from which it grew. It was about the shape and size of a hen's Egg, and was situated on the

anterior aspect of the rectum about three inches from the anus. It was fibrous in structure, contained two fully formed teeth, and was covered externally by skin of a perfectly normal structure, this skin being the source of the hair. No opinion is expressed as to the origin of the tumour, but of the fact of its being ovarian there can be little doubt.

The <u>treatment</u> of dermoid cysts of the ovary has to be considered under very different aspects. The size and condition of the cyst, the symptoms which it induces, and the condition of the patient have all to be considered in determining on the line of treatment to be followed. If the growth has been detected before suppuration or any other serious complication has ensued, probably a correct diagnosis is not possible without resorting to tapping, and this is an operation which, under ordinary circumstances one does not seem to be warranted in performing for diagnostic purposes only. Even in case of ordinary ovarian cyst there is some danger of inflammation and suppuration being set up by tapping

and these sometimes go on to a fatal termination. A fortiore is there danger in tapping a cyst suspected of being dermoid in its character, for dermoids are especially prone to undergo inflammation and suppuration. As these processes rarely result in the destruction of the formative power of the cyst-wall and the ultimate eradication of the tumour, and may make further operative measures more difficult, it would be preferable to remain in doubt as to the precise nature of the cyst rather than be enabled to form an exact diagnosis at the risk which the operation of tapping entails. If it has been ascertained that a proliferous cyst of the ovary exists, it is immaterial, so far as the indications for treatment are concerned, whether it belongs to the mucoid or the dermoid class. The considerations which would call for active interference in the case of the one would do so equally in the case of the other, though action may be deferred in the case of a dermoid with a greater hope of the cyst ceasing to enlarge than in the case of a mucoid.

As has been said, the former frequently remain stationary for many years, sometimes for a lifetime, a circumstance of such rarity in the case of the latter, that its possibility need scarcely be taken into consideration when deciding upon treatment. The cases of proliferous cyst which are most favourably situated for non-interference are those which have characters probably indicating a dermoid, which remain stationary as to size or are of very slow growth, which are uncomplicated by pregnancy, and which are not causing any serious inconvenience. If, in addition to these conditions, the cyst is immovable or nearly so, and there is not the probability of pregnancy occurring, still less is the idea of surgical interference likely to be entertained. It is only when the cyst causes inconvenience or deformity through its great bulk, or when it is observed to increase steadily in size, or when its presence by pressure or otherwise considerably disturbs the functions of neighbouring organs, or when there is great pain, or when there is evidence of the suppuration or gangrene of the cyst, or when

pregnancy intervenes, that, as a rule, is operation had recourse to.

When the conditions are such as indicate the necessity for surgical interference, the question then arises as to whether tapping or ovariotomy is the more desirable operation. Though a less formidable operation, tapping, as has been said, does not always result in a cure. When it does so result, it is generally after years of continued suppuration. If the cyst be of large size, this suppuration may set up irritative fever and wear out the patient. On the other hand, extirpation is attended by more immediate danger to life, but the immediate danger being passed, it gives the certainty of cure. As time goes on and the operation of ovariotomy becomes more and more perfected, tapping, usually only palliative in its results, becomes less and less practised in all cases of ovarian cyst which are not simple and have not watery, non-albuminous contents. Nevertheless there are many cases of dermoids in which tapping must be consid-

used the preferable operation – in fact, it may be the only operation possible. Such is the case when extensive adhesions to important organs or to the pelvis exist; and tapping or incision is the operation generally preferred when the cyst is of small size and has not yet ruptured – Indeed, such a case would probably be regarded as an abscess till its nature was revealed by the peculiarities of the contents. When, again, the case is complicated by pregnancy, tapping is the operation most frequently had recourse to.

If extirpation be the proceeding decided upon, of course the operation differs in no way from that performed for the removal of other ovarian tumours. Its performance is usually more difficult than in other cases as there are generally very firm and extensive adhesions. The fatality attending the removal of dermoid cysts was such as to lead Drs. Battley and Peaslee to form the opinion that the operation ought never to be performed, and this seems to be the conclusion generally accepted in America. Dr. Atlee, for instance mentions a case in which, having tapped and found the cyst to be of a dermoid character, he decided not

to anticipate it. Decomposition of the cyst-contents followed the tapping, the cyst was again tapped, and the patient died soon afterwards. The experience of British ovariotomists, however, would seem to prove that the risk of removing a dermoid is not materially greater than that of removing other ovarian tumours. Of twenty cases operated on by Sir Spencer Wells only two were lost (vide Lancet, 1876, vol II); and Dr. T. Keith informs me that his results are as satisfactory as in the case of other ovarian cysts.

Tapping may be performed with a view to the ultimate obliteration of the cyst, or as a palliative remedy, or merely as an aid to diagnosis. When for either of the two latter objects and the cyst is of large size, the operation is usually done through the abdominal wall as the entrance of air into the cyst is more easily prevented when it is so done. It would be advisable to make use of the aspirator as the contents may be too thick to flow through the tube frequently made use of in tapping other ovarian cysts. It would also be desirable to make use of

a canula fitted with a piston which can be passed through to clear it of any solid material without at the same time admitting air. Such instruments have been recommended for the performance of paracentesis thoracis. In introducing the trocar care must be taken to avoid any cartilaginous or bony structures which may exist in the wall. It is necessary to keep the tubes in warm water during the operation; otherwise they may become blocked from the solidification of the fluid.

When, however, tapping is performed as a curative remedy, it must be followed by free drainage, and this is generally most easily accomplished through the vagina. When the cyst is not of large size it can be done without much risk and with some hope of success, but when of great dimensions, the extensive peritonitis or suppuration which may be so induced may have the most serious consequences. These cysts usually occupy the recto-uterine pouch and may cause a bulging at the posterior cul-de-sac, and it is this part which offers the most advantageous situation for puncture. Probably there is a space of an inch or more between

the anterior wall of the rectum and the os uteri. The cyst is pressed down into the pelvis by an assistant, while the operator passes the trocar, guided by the finger of the left hand, in the space mentioned and in the axis of the pelvis for about an inch. An exploratory puncture by means of the aspirator-trocar may first be made, and the opening may then be enlarged by means of a bistoury, or, when practicable, the thermo-cautery knife; or a large trocar may be used at once - As many of the solid contents as can be removed without pain or unduly irritating the wall of the cyst ought to be taken away, a drainage tube inserted, and the cavity washed out with a weak solution of carbolic acid. For the removal of hairs, D.r Barnes recommends the use of a small hook made by bending the stilet of a catheter but probably ordinary dressing forceps, if long enough, will on the whole be found to be most useful in getting rid of the solid contents. Beyond searching occasionally for solid contents and washing out the

cavity frequently, it would probably be advisable not to interfere with the case further for a time in the hope of the formative power of the cyst-wall being spontaneously destroyed. If, after waiting a reasonable time, it is found that this does not take place, the advisability of using means for the destruction of the lining membrane would have to be considered. If the healing process were prevented merely by the presence of a pyogenic membrane as sometimes is the case with chronic abscess, we should with some confidence expect that the application of such agents as tincture of iodine or tincture of the perchloride of iron would so modify the lining as ultimately to effect the obliteration of the cavity. But as we have to deal with a tissue which is not a mere pellicle but one of some thickness, it is evident that the application of such agents is not likely to be followed by much benefit. My experience of the inutility of such applications is similar to that of

most who have made use of them. For instance, in a case which was originally D^r Gibson's of Newcastle and in which the cyst had suppurated after delivery and opened into the vagina, D^r Barnes and afterwards D^r Jackson of Sheffield steadily injected iodine for some months. The patient suffered from acute general peritonitis on two occasions, probably as a consequence of the injections, but the production of hair in the cyst was not in any way prevented (vide St. George's Hospital Reports, 1874-76). If there is evidence of hair continuing to grow, it is only by the use of such applications as will cause skin tissue to slough that we can hope to destroy the formative elements of the cyst. The skin tissue might be destroyed as suggested by Barnes (op: cit:) by lightly cauterizing the inner surface of the cyst by means of the galvanic battery; or escharotic applications might be made use of. Such proceedings, however, would be attend-

ed by no small risk and their result would be very doubtful. In most cases, indeed, it would perhaps be preferable for the patient to submit to the inconvenience of the fistula rather than run the risks involved by such methods of cure.

When the cyst has suppurated and burst into the rectum, the case admits of very little surgical treatment as manipulations are then difficult to accomplish; and matters are even worse when the bladder is elected as the seat of the fistula. Sir Spencer Wells says (Med. Times and Gaz. 1860, vol. I) that in the latter case no surgeon would attempt ovariotomy. He suggested, with the object of preventing the refilling of the cyst, that tincture of iodine might be injected into it by means of an elastic catheter passed through the urethra, but the difficulty and risk of this proceeding as well as the very doubtful nature of the benefit to be derived from it, are probably sufficient to deter any one from making the attempt. At a later period Sir Spencer Wells seems to have changed his opinion of the value

use as it has been found to be more dangerous and less likely to result in a complete cure than the operation of ovariotomy (Wells, Dis. of the Ovaries, p. 288). But in case of large dermoids which are evidently increasing in size, and in which, on account of pelvic adhesions or for other reasons, the latter operation is contra-indicated, the proceeding described would, I consider, offer a reasonable hope of cure, and it would, at least, prevent the cyst from bursting into the cavity of the peritoneum or into one of the hollow viscera. A case so treated would not materially differ from Mr. Critchett's case, and possibly it might have an equally favourable result.

The treatment of dermoid cysts which have ruptured into the cavity of the peritoneum differs in no way from that of other ruptured ovarian cysts. When the patient survives the primary shock, the operation of ovariotomy is performed without delay. The only case of operation for ruptured dermoid of which I have found a record is that of Dr.

Thomas Keith already referred to. It was one of a peculiarly complicated nature in which the cyst had ruptured nine months before operation, and the unfavourable result cannot be considered as being due to the cyst being dermoid in its nature. The statistics of operation for the removal of ordinary ovarian cysts which have ruptured, are, according to Spencer Wells, surprisingly satisfactory; in fact, the ordinary rate of mortality from ovariotomy does not seem to be much exceeded.

If pregnancy should intervene as a complication of a dermoid cyst, the whole aspect of the treatment may thereby be changed. Should the tumour be of some size, the pressure of the gravid uterus may excite inflammation of the cyst-wall, or, if this does not take place, the tumour may form a complete obstruction to normal delivery. If by reason of the small size or the mobility of the cyst, the passage of the child is permitted, there is a strong

probability that the pressure to which it has been subjected will cause the cyst-wall to inflame and suppurate. In addition, there is danger of rupture of the cyst from pressure of the gravid uterus, and of gangrene from rotation of the pedicle. These dangers are such as to call for active, and, if the cyst be of large size, for early treatment. Occasionally the necessity for this is obviated by the occurrence of spontaneous abortion, and this naturally suggests the induction of premature labour as a method of treatment. It is the remedy advocated by Dr Barnes, but Sir Spencer Wells rejects it on the ground that it necessarily implies the death of the child, with considerable risk to the mother. The treatment recommended by that surgeon — speaking of large ovarian tumours of whatever kind — is to tap through the abdominal wall in the case of single cysts, taking care to prevent the escape of fluid into the peritoneal cavity and the entrance of air into that

cavity or the cavity of the cyst; and in the case of multilocular cysts and solid tumours, to remove the growth by Laparotomy in an early period of pregnancy. He has performed ovariotomy ten times with pregnancy as a complication. With one exception the patients all recovered, and the operation does not seem to have presented greater difficulties than in ordinary cases. In five of the successful cases pregnancy went on to the full time and terminated in normal deliveries. One of these was a cyst of the dermoid class, and contained thirty-two pints of fluid besides a large quantity of loose hair and fatty matter. Sir Spencer Wells has tapped in five cases of ovarian cyst in pregnant women, some of them repeatedly, and in all great relief was afforded, and children were born after labours of moderate duration. In all these cases the tumour was of large size and tapping was performed through the abdominal

wall. But the cyst may be so small as not to rise out of the pelvis, and yet, especially if the pedicle be short, form a complete impediment to delivery. Such a cyst will probably not be discovered till labour has commenced. Even though its existence were known before, however, and it were suspected of being of a dermoid nature, it would probably not be advisable to interfere with it till labour had begun. If it were interfered with before the commencement of labour, it would be by puncturing the cyst, and however carefully this were done, inflammation of the cyst-wall would be liable to follow. This would probably lead to peritonitis and premature labour, and these, under such circumstances, would be attended by the greatest risk. But at the commencement of labour — unless the tumour were so movable as to allow of its being pushed out of the pelvis — it would be necessary to tap, and this would have to be done either through the vagina or rectum. Tapping through the vagina is preferable for many reasons. There is not the risk of dysenteric tenesmus, or of faecal matter

and a wire-coil drainage tube inserted. The patients condition improved after this, and for some years the cyst was represented only by a hard cicatrix. Inflammatory symptoms then again manifested themselves, and some pus was removed by the aspirator-trocar. The ultimate history of the case is not recorded, but the probabilities are that this was not the termination of it. In another case recorded by Dr. Barnes (ibidem) the patient was admitted into the hospital three months after her first confinement. She had had a shivering three days after that event, followed by pain and swelling in the left iliac region. An abscess formed there and burst into the rectum a few days after admission. The patient gradually sank and died two months afterwards. The tumour, which was about the size of a cricket ball, was full of hair.

The case of Dr. Gibson's already alluded to was one in which the tumour

found in those of dermoid cysts, and to this the favourable result may possibly have been due. In Mr. Critchett's case, however, which has been already mentioned, as well as in several other cases on record, hair was present in considerable quantity, and yet complete cure followed on the escape of the contents of the cyst either spontaneously or after its incision. But so far as can be ascertained from the accounts of cases recorded, such a result is the exception and not the rule.