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ON THE PATHOLOGY AND TREATMENT OF OVARIAN DISEASES.

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VII.

PARTAKING of the nature of the cysts last described, to some extent and in some way yet inexplicable, are the mysterious productions known as dermoid cysts.

That these tumours are the result of change in an ovum is about the only part of their history regarding which there can be any certainty. But there may be doubt as to whether the abnormality takes origin in an ovum of the individual bearing the tumour, or in the ovum from which she herself was developed; in other words, whether the tumours are abnormally developed ova or are due to inclusion. That they have any origin in impregnation, we may at once dismiss as excluded from serious consideration, since they have been frequently found in newly-born children, and their most common seat is in the ovaries of young women, chiefly, according to Mr. Spencer Wells, of fair complexion.

The question of their origin, then, lies between the hypothesis of an effort on the part of some overactive ovum in the direction of parthenogenesis which has been based by Dr. Ritchie on Blumenbach's less scientific and more scholastic expression of "excess of formative nîsus", and the equally hypothetical process of inclusion. As far as we know anything about inclusion, it follows the usual law of teratology, that any attached individual, whether developed or blighted, is symmetrically connected. Thus the Siamese Twins and the Millie-Christine monstrosity have the attachment in similar and identical structures, the one to the other (see Vrolik, Von Baer, etc.). I have found nowhere on record that any foetal remains have been found attached to an ovary, or situated in an ovary in any way which could find it a classification under this law. The tissues found are always rudimental, and such as, while they are the product of the ovum after conception, have no anatomical analogy whatever to the tissues of the ovary. I am disposed, therefore, to set aside entirely the view of their origin by inclusion, as the ovary is about the most unlikely structure in the embryo for such a process; and, if they had their origin in such a way, we ought to find dermoid cysts in the testicles of the male quite as often as in the ovaries of women.

There is only left, then, the explanation that dermoid cysts are the result of an altered nutrition of one or more ova; and, if I may lay down a dogma from my own dissections, I should say, of one ovum only. Dermoid cysts are generally unilocular, and, when they are not so, it is not difficult to show, as has been done by Dr. Ritchie, and has been evident in one or two specimens that I have examined, that the secondary cysts are formed by the mother cyst being partitioned off by the growth of ridge-like walls on the inside of the cyst.

The occurrence of cysts having a structure somewhat resembling the dermoid cysts of the ovary in other parts of the body, especially in the neighbourhood of the orbit, has led to confusion in the discussion of the origin of the ovarian cysts. In the orbital cysts we have only aberrations of the normal process of the involution of epithelium from which the structures are developed, and there is no notion, as far as I can find, of these extremely small congenital cysts, which never enlarge in after life, having been found to contain anything but purely epithelial products, such as hair, dead epithelial cells, and fat. In ovarian cysts, however, the variety of products is so great, as to put all analogy between them and inclusive cysts out of the possibilities. Thus, in one ovarian cyst which I examined under the direction of my friend and teacher Dr. Grainger Stewart, many years ago, in the substance of a wall between two loculi, were spread out flat bones which were undoubtedly some of the bones of the skull, and near them could be felt the representatives of the bones of a limb arranged in order. True bone is frequently found in ovarian cysts, and in some that have in them no dermoid structures at all.

Sir James Paget refers to a remarkable specimen in the museum of St. George's Hospital, which exhibits a mass of fatty matter and a lock of dark hair, one and a half or two inches long, attached to the inner surface of the dura mater at the torcular Herophili, found in a child $2\frac{1}{2}$

years old, in whom it appeared to be congenital. He adds, in a footnote, that Dr. John Ogle, who had carefully examined the specimen, and described it to the Pathological Society, was of opinion that the cyst was originally of extracranial formation, but that, at an early period of foetal life, before ossification of the occipital bone had taken place, the cerebral membranes and scalp had become adherent, and that, as the development of the bone went on, the outer integument was drawn in by retirement of the cerebral membranes. In this way some of the cutaneous structures had become included within the cranium. He considers that the cyst possesses characters which warrant the above supposition, and he adds that, in a similar manner, cysts within the orbit may extend into the cranial cavity. No such explanation could include the phenomena of the ovarian tumours which contain such structures as teeth, bone, cartilage, striped muscular fibre, brain and nerve-tissue, etc. The true solution can only be found in a hypererchetic development of an ovum, a cell which has in it the power of formative origin of all these structures. The process of growth of the ovum after impregnation can be followed only after the assumption, either expressed or unconsciously accepted, of such a hypothesis as is contained in Mr. Darwin's "Pangenesis". The germ contributed by the male contains, we know only too well from pathological experience, gemmules having certain powers and functions; and we may, therefore, assume, as indeed we also know, that the female germ contains also such gemmules. It may be that the ovum has in it the origin-buds of certain tissues, and that, under exceptional hypererchetic action, they may go on to the rudimental formation of these tissues without a fusion with the male germ. More careful and accurate description of what is found in dermoid cysts may help to solve this riddle; still better, perhaps, a careful consideration of what tissues are not found in them.

Sir James Paget has, it seems to me, struck the key-note of the pathology of dermoid cysts when he wrote, "It is, perhaps, only during the vigour of the formative forces in the foetal or earliest extrauterine periods of life that cysts thus highly organised and productive are ever formed." A most important point in the pathology hangs on this sentence, and can be decided only by a determination of the age at which such tumours are most frequently found. It is, of course, evident that the ages at which these tumours are removed by the operating surgeon cannot be taken into account, as they are of slow growth, and have often been recognised as being present for many years without perceptible increase. They are quite unlike, in this respect, the ordinary adenoid tumours. Their contents even show that their existence must often have been contemporaneous with the life of their bearers; for we find large balls of hair, the result of the epithelial growth and shedding of a nipple-like process not bigger than the tip of one's finger; and in one sac over three hundred teeth have been found, resembling in many respects milk-teeth; so that we may reasonably suppose that they were the repeated products of a limited dentigenous area. In one of Mr. Spencer Wells's cases, the preparation of which is in the Hunterian Museum, a piece of bone was found resembling greatly a part of the upper maxilla and sphenoid bones, and containing mature molar teeth. In fact, inspection of the specimen almost carries conviction to the mind that the bone and tooth-sacs were produced at an early, perhaps intrauterine, period of the life of the patient, and that they grew and matured as she did till the tumour was removed, at the age of 39.

Dermoid and dentigerous cysts have been so frequently found in children, that it may be suspected that, if the histories of all such as are removed by operation could be traced, they would be found to be, as Paget suggests, either congenital or originating very early in life. Indeed, it seems to me to be impossible that it can be otherwise when we remember how soon after birth all processes of development must cease, and those of growth alone are continued; impossible that new tissues, so strange and displaced, should be developed after the formative powers have ceased to produce new tissues in normal positions. The more we know of pathology, the more we find its processes resemble those of physiology; and it seems to me far more simple to explain the occurrence of dermoid cysts in the ovary by hypererchetic action of an ovum at a time of life when such processes are in vogue in the economy than at some other time when they have entirely ceased everywhere else. In the former part of my paper, I have shown that the formation and destruction of ovarian cells goes on from the earliest to the latest times of existence, the degree of their maturity varying with the periods of life. Fully dilated Graafian follicles have been seen in the ovaries of newly born children, containing ova which are minute, transparent, and structureless cells. But supposing that, during the developmental period of life, some stimulus be given to one Graafian follicle and its contained ovum, which for want of better knowledge we shall call accidental, and that this should lead to the premature maturation of the ovum, so that, were the rest of the organism ready for the process,

might be carried into the uterus and then be impregnated; instead of destruction by rupture of the ovisac, suppose that it remain in the ovisac and share alike with the rest of the economy in developmental activity, there can be only one result, and that is the formation of structures in an incomplete way, which it would evolve completely under more favourable conditions.

In support of my supposition, I may draw attention to the fact, that dermoid cysts have been found in the peritoneum with attachments to its surface, but without connection to either of the ovaries. Such a tumour may be one which I attempted to remove a few days ago, and which, while so intimately and most extensively adherent to the peritoneum that I had to leave it, I had reason to suspect had no ovarian connection. Might not such be developed from an ovum which had escaped from the ovaries in early life, and become attached to the peritoneum, as we know they do in after life, and there have carried on its attempt at parthenogenesis?

The logical conclusion of this view is, of course, that if such an ovum could get into its uterus after its escape, it would develop into a perfect instance of parthenogenesis—a speculation, of course, but no wilder than some of the facts of embryology seemed to us before we understood them.

Whatever be the value of the suggestions I have thrown out, they are certainly consistent with my own clinical experience; for, in one case where I removed a dermoid cyst in a young woman, there were many reasons for believing that it had existed long before puberty. The oldest patient from whom I know that a dermoid cyst has been removed is a case of my own, the woman being in her forty-fifth year. The tumour weighed only six and a half ounces, and was full of hair, which had grown and been shed from one little spot of skin not bigger than the tip of my little finger. The amount of hair in the sac, had it grown from a similarly sized area of scalp, would have taken almost a lifetime to grow and be shed. In Mr. Wells's oldest case (38), the tumour had been recognised for eighteen years; and, in a case (37) not operated upon, but examined after death, the tumour had existed twelve years. The usual age for dermoid cysts to come under the notice of the surgeon is from 17 to 20 years, and then it is generally certain that they have been long in existence. After puberty, the recurrent congestion of the whole sexual apparatus must stimulate into growth what is in readiness for it after having been developed long previously, as I have suggested in my hypothesis. The results of that development may remain of minute, or even microscopic, size, until the stimulus of the menstrual hyperemia so increases them as to make them of surgical importance; just as Hunter's celebrated experiment of the transplantation of the spur of the cock into his comb resulted in an extraordinary increase in length and size of the spur by the altered character of its hæmic nutrition.

Briefly, then, I believe dermoid cysts to be the result of hyperæretic development of an ovum in foetal or infantile life, growing into a tumour during and subsequently to puberty.

Of the modes of origin of the other forms of ovarian cystic tumour, many ingenious explanations have been given, though not one has yet met with general acceptance; indeed, all are too vague and incapable of ready demonstration to commend themselves to practical minds. For this reason, and, further, because my space is getting nearly run out, I think it needless to recapitulate even briefly the various views of the pathology of adenoid ovarian cysts which have been recently advanced. I retain the term adenoid, because it conveniently classes the tumours by reference to the tissue from which they originate, and by the hyperplasia of which they are formed, without giving any theoretical explanation of their formation. All non-cancerous tumours of the ovary are, therefore, adenoid; even the dermoid tumours are so to a certain extent, for they are the result of increased growth of one or other normal constituent of the gland, without alteration, save in quantity. Cancerous growths, on the other hand, introduce tissue which is either not found in the gland normally, or they produce it in a form which is immature.

There are two methods of origin for pathological cysts which are universally accepted, and both of which are instanced in the ovary. The first is by occlusion of normal ducts or tubes, as best seen, perhaps, in the kidney and salivary glands, and in connection with the ovary in the form of cystic dilatation of the Fallopian tube or of its trumpet-shaped extremity, after adhesion to the ovary—tubal and tubo-ovarian cysts. Of these I shall not speak, as I have not met with a case of either. The other form of cyst-growth consists in the dilatation of a physiological cyst-cavity by its own secretion poured out to an abnormal extent; and this secretion may either retain its original character and constitution, or be altered by the addition of blood, or of some of its usual or exceptional albuminous products. This is the common form

of cyst-formation in the ovary; and, in the multiple adenoid tumour and in the dermoid, we have already seen instances of it. The former illustrates the formation of cysts by the retention of its products in the cavity of the normal sac of the gland, these products being the fluid cell-substance and its nucleus the ovum. This is accomplished, as far as I could discover from the specimen I have described, by hypertrophy of the fibrous covering of the gland—a cirrhosis of the ovary; and the nucleus, the ovum, seems to have retained its normal appearance until destroyed by prolonged maceration and pressure. It is, however, possible that some defect of action in the nucleus may have to do with the non-rupture of the sac; for, under healthy conditions, it is undoubtedly the maturation of this nucleus that governs the rupture of the wall of the ovisac, and enables the perfect ovum to escape.

The dermoid cysts, I have suggested, are due, on the other hand, to an altered and increased activity of the cell-nucleus in early life, the results remaining latent for years, until re-excited by the great systemic change. We may look, then, to some other altered condition of the cell-elements for explanation of the remaining variety of cystic tumour of the ovary which has been termed by Mr. Wells and others "proliferous".

I do not like this term as applied to the compound cysts of any kind, for it assumes, what I am quite certain is not true, that the large cysts are directly the parents of the small ones. Thus Mr. Wells, at page 25, defines: "Proliferous cysts—parent-cysts with secondary cysts growing from the interior of the cyst-wall." These minor cysts are secondary, as far as date of growth is concerned; but they are the younger brothers and sisters, not the children, of the larger sacs. In fact, the very caution which Paget gave his hearers in using the term *proliferous* is disregarded in such an application of it, as may be seen from the following quotation.

"In an ovary, it is not unfrequent to find many small cysts, formed apparently by the coincident enlargement of separate Graafian vesicles. These lie close and mutually compressed, and, as they all enlarge together, and sometimes, by the wasting of their partition-walls, come into communication, they may at length look like a single many-chambered cyst, having its one proper wall formed by the extended fibrous covering of the ovary. Many multilocular cysts, as they are named, are only groups of close-packed single cysts; though, when examined in late periods of their growth, and especially when one of the groups of cysts enlarges much more than the rest, it may be difficult to distinguish them from some of the proliferous cysts." (*Surgical Pathology*, p. 415.)

The formation of a compound cystic tumour in the ovary, whether it be of the multiple variety or of the less complete kind of which I am about to speak, may be very well illustrated by blowing soap-bubbles in a basin. If the fluid be not viscid enough to enable the bells to retain their form, then the normal condition of the ovary is represented, its cells bursting and disappearing. The cell-growth is constantly going on, and there occurs some alteration in the state of matters which prevents the cell-walls bursting; the fluid in the basin is so viscid, that the bells do not break, and bubble after bubble is formed, some larger, some smaller, until a large multicystic tumour is the result. The actual appearances of the cystic ovary may be very well imitated in the basin of soap-lees. A large cyst can be made with little ones crowding into it, looking like its offspring, and the walls between two or three may be broken down, making one larger multilocular—the remains of the intervening walls not being left in the instance of the soap-bubbles. If they had been left, the appearances would be identical with what is represented diagrammatically for ovarian tumours in Mr. Wells's book on page 39. In the ovary, we have the continual production of cells, representing the continuous blowing of the bubbles; and we have only to discover what it is that is analogous in the ovary to the increased viscosity in the solution of soap; what it is that keeps the cysts in their entirety, perverting a physiological into a pathological process.

I have already said that I have failed to find anything like ova in any cysts of the tumours I have examined, except the one which I have described; and I have mentioned that I have not seen any reason to believe that the little secondary cysts met with in the walls of some of the larger sacs are what Dr. Ritchie has interpreted them to be, dropsy of the blastodermic vesicles; chiefly because I have failed to see round them anything like remains of the membrana granulosa, and I have seen three or four of them on more than one occasion on the wall of the same sac. In searching for ova in the cysts of the two tumours where I found them, I had seldom occasion to look for them in the walls of the cysts, as they seemed to have been floating about loose, or to have been set free by the opening of the sacs. In other cases, not finding them by the method I have already described, I adopted the further plan of first isolating the cyst to be examined, and, having opened it, I searched carefully in every sediment of its contents for the ovum. Not

finding it, I turned the sac inside out over a ball of cotton-wool soaked in glycerine, smeared its everted surface with the same substance, and, covering it piecemeal with a thin glass, I carefully examined it over its whole extent by reflected light. I never found anything I thought was an ovum.

I cannot reconcile this discrepancy between my observations and those of Dr. Ritchie otherwise than by supposing that, having been one of the discoverers of ova in a certain kind of ovarian tumour, he was too anxious to apply his principle of explanation to all; or he must have had a plan of examination more successful than mine.

The fact that I never found ova in any of the sacs of these multicystic tumours, even the smallest or in those with the most limpid contents, led me to entertain the opinion that in this we have an explanation of their formation. The function of the ovary is one of cyst-formation from its earliest existence to its latest, and in its pathology we need not go far away from its physiology. It seems to me, therefore, *à priori*, very unnecessary to resort to the ingenious explanations of cyst-formation advanced by Dr. Wilson Fox, though they may be fitted to exceptional cases. Experience in the examination of the growths themselves has strengthened this view; for my wonder is greater the more I see of them, that they do not occur more commonly, and with more complexity than they do, considering the apparently reckless amount of ovarian cyst-production that goes on throughout life.

The aim and object of this cyst-formation is the production, maturation, and discharge of the ovum. But if the ovum be not formed, or if it be produced only to a rudimentary extent, may it not happen that the cyst will not be ruptured, but go on aimlessly expanding? Whatever be the source of the change, we know that it does not affect one ovisac alone, but may influence them in great numbers, whether it be in a tumour where the ova have been matured and subsequently prevented from escaping by sclerosis of the coat of the ovisac, or in a growth where the ova are not to be found. There is a great clinical difference between these two kinds of tumour; for in the one the growth is very limited and slow, and in the other it may be, and often is, extremely rapid, and is practically unlimited in extent. In fact, the growth of these cysts without ova partakes somewhat of the character of malignancy, assigned to them originally by Bright for clinical reasons. Malignancy, apart from any association with cancerous structure, is always indicated histologically by a tendency to the production of a form of tissue which is young and immature, and this is certainly the condition of these ovaless ovisacs.

There is in fact a reversion to the premoliminal condition of the ovary, as far as the ova of the affected ovisacs are concerned. The whole ovary does not, of course, become simultaneously implicated, and matured ova may be given off by some ovisacs still unaffected and within reach of the Fallopian fimbriae. Impregnation may thus occur from a degenerated ovary, though it is, of course, much more likely to occur from the one which remains healthy.

We have in these facts the reason that these adenoid tumours occur with greatest frequency during menstrual life, if indeed a future experience may not yet show that they do so exclusively. The menstrual congestion and excitement induces a dropsical distension and growth of a cell which would not be so perverted during childhood or senility, when its blood-supply would be sufficient only for passive nutrition.

The growth of cysts in the wall of the major sacs, appearing sometimes outside and sometimes within in great numbers, depends wholly on the relation of the original adenoid tissue to the cyst-wall; and, as that wall grew primarily in that tissue and surrounded by it, it would be indeed surprising if it did not carry along with it in its expansion some of the cells of the *couche ovigène* from which it sprang. These displaced cells have in their turn a stimulus for development, prematurely, perhaps, on account of the increased hæmic activity of their abnormal surroundings, due to the growth of the sac. They also go through the process of dropsical distension, developing no ovum, not rupturing, but becoming secondary cysts, perhaps ultimately to rival, or even to excel, that which has preceded them, on which they grew, and of which they have been supposed to be the offspring.

The views which I have here advanced are such as do not admit of detailed evidence in support of them within the limits of such an essay as this. They are the results of some years of study and much personal investigation, but even still they are so crude as to be unlikely to meet with general acceptance.

There are, I know, ovarian growths to which none of my explanations would be, in their present form, applicable; and, as my experience grows, I know I may have to alter or altogether abandon them. As they are at present, I submit them for criticism with a faint hope that I may receive encouragement to continue in a line of investigation and practice to which I have devoted myself.

THE LOCAL TREATMENT OF CYSTITIS IN WOMEN.*

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IN choosing the heading of my paper as I have done, namely, "The Local Treatment of Cystitis in Women", I have been guided by the results of my own experience; because, although I do not altogether ignore the benefit of drugs given by mouth, nor the advantage of lulling the system by anodynes, particularly by opium, nor the benefit of rest and improvement of general health, yet, comparatively, their influence is very feeble, tedious, and disappointing.

When I speak of cystitis, I mean the more severe forms; not the trivial mucous irritation which subsides in a few days, but rather that severe form which, amongst other causes, arises from the effects of labour-retention, from malignant disease of the organ, or from paralysis, etc. I have seen internal remedies tried in these cases for a long time, till one has been tired of using them; and, beyond the use of anodynes and those remedies which correct any excess of an acid or alkaline condition, I have no faith in any; I mean as direct means of cure. But, with regard to the local treatment, I can speak far otherwise; and I may say, in view of the benefits thus resulting, that to temporise with the constitutional plan is only to allow a very distressing malady to harass our patient when the relief lies in our hands, if we will use it. With regard to the correctives of the state of the urine, according as it is more acid or alkaline than normal, we should always examine it, so as to make out this point. If, as far as we can make out, the urine enter the bladder overcharged with lithates, then a cautious use of alkalies coupled with opiates will assist; taking care that the alkali be suspended as soon as the urine becomes natural in this respect. Again, should we find it alkaline, it may be advisable to employ some mineral acid for a time, also coupled with an opiate. With regard to an opiate, there is no doubt that this remedy is the most valuable of all internal remedies, partly because it lessens reflex sensitiveness, and thus the bladder is not so frequently hurting itself by its forcible contractions, and partly because it gives relief from pain.

Now I will suppose we have a case of severe acute cystitis, with much pain and frequent or constant desire to micturate; severe scalding along the urethra during micturition; the bearing down constant and intolerable; irritative fever; urine loaded with mucus, purulent and bloody. The first point to make out is, whether the urine be still acid or have become alkaline. I may here add, that it is seldom acid in a case such as here supposed; but at the early stage it may be, before pus has appeared. Generally, it is very alkaline, and commonly also ammoniacal. Supposing it is alkaline and ammoniacal, then proceed in this way. Take a catheter—gum elastic is best, and still better if open at its end instead of the side, as usually made—let it be well greased or oiled and passed gently just into the bladder. Draw off the urine. (The open-ended form is of great advantage in many cases where the mucus is copious and very ropy.) Be careful to enter the bladder the least distance possible, and withdraw the catheter just without the neck when the bladder is on the point of being emptied. This saves the mucous membrane from flapping down on the end. Then, with a syringe, throw up through the catheter warm water slightly acidulated with either nitric, hydrochloric, or acetic acid (vinegar does very well); if nitric or hydrochloric acid, about two drops of the strong to the ounce of warm water. As soon as the patient complains of desire to micturate, allow it to flow away again. More of this acidulated water may be used, till the bladder seems clear of the phosphates and mucus. About half a pint of acidulated water will generally suffice.

Then inject also through the catheter about one grain of morphia dissolved in about one ounce of water; quickly withdraw the catheter from the urethra, and instruct the patient to retain it as long as possible. It is a very rare instance if this single application do not produce very marked benefit. In the very acute cases, the passing of the catheter requires tenderness and care, because of the great sensitiveness of the urethra and lower bladder. But, if the precaution be taken of not introducing the catheter just within the bladder, much pain is saved. The exact distance can, at the first passing, be marked on the instrument. But to avoid the contact of the catheter with the bladder during the washing out, as much as possible, I always pass the injections into the bladder without entering its cavity. This can be readily accomplished by employing an open-ended catheter; a little extra force on the syringe will drive the fluid past the sphincter. If the injections are to be withdrawn, then the instrument can be made to enter, but only, as above mentioned, so far as may be necessary to allow the fluid to flow.

* Read before the East Kent District of the South-Eastern Branch.