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## The Effect of Childbearing on Fibroid Tumours of the Uterus.

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THE mutual reactions of fibroid tumours of the uterus and child-bearing are considered by authors dealing with these subjects more commonly from the point of view of how the course of pregnancy, labour, and the lying-in period is affected by the fibroid than from that of how the fibroid is affected by the processes of child-bearing. This is natural, for abnormalities in labour or in either of the other two divisions of the process are often conditions of urgency, and necessitate operations which can be compactly put on record as completed events, whereas the results to the fibroid are often not at all striking. It is, however, important that the behaviour of fibroids in this connection should be carefully studied, so that a knowledge of the modifications in their life-history which may be expected to be produced by the presence of an ovum, may be founded on facts and be of value in forming the prognosis of any case, and in deciding upon the best line of treatment. For this purpose it is necessary, except in instances where some acute change in the tumour takes place, to have a patient under observation for a somewhat long period; in the case of hospital patients this is not, as a rule, easy, and the opportunities of one individual are too few for him to do more than add a small contribution to our knowledge on the subject.

Speaking in general terms, it may be said that the fibroid shares in the changes which affect the uterine muscle while this is developing in pregnancy, and also while it is undergoing involution.

This statement may in certain cases comprise all that is to be said; but often the tumour comes under other influences, very commonly mechanical, which considerably modify the simple lines of this course. Very much depends on its relation to the uterine wall—whether it grows on the inner or outer surface, or is interstitial, and whether it lies at a level above or below that of the pelvic brim.

The circulation of blood and lymph in and around the tumour may be interfered with by many conditions, such as the torsion of the pedicle of a subperitoneal growth, or more often the compression of an interstitial tumour during labour, between the fœtus and the pelvic wall; or by the sudden change from the copious blood-supply of pregnancy to the starvation brought about during and after labour by the contraction of the blood-vessels of the uterus in general, by thrombosis and by the compression of the vessels in the capsule of the tumour caused by uterine retraction.

It will be most convenient to consider the subject under the headings of Pregnancy, of Labour, and of the Lying-in period respectively.

#### PREGNANCY.

**Nutritive Changes: Growth.** It is a matter of common observation that fibroids grow in pregnancy in practically all cases. The rate of growth varies from the smallest perceptible amount to the degree reached in tumours described as having increased from the size of a fist in the second or third month, to one which at the sixth month caused the uterus to be as large as it should be normally at term. I have had the opportunity of watching a patient who before she became pregnant had no recognisable tumour; but who, before she reached the end of her pregnancy, had a mass measuring 7 inches in length by  $4\frac{1}{2}$  inches in breadth, and feeling to be 3 or 4 inches in thickness, as it lay between the back of the child and the examining hand.

It appears doubtful whether the growth is most active in the earlier or the later months. Von Strauch<sup>1</sup> is of decided opinion that the first three or four months are the most important period in this respect, and he considers that this is due to the blood-supply being suddenly increased beyond the needs of the ovum. In the later months his experience is that the tumour does not grow as a rule—indeed, in some cases he has seen it shrink—and he ascribes this to the appropriation by the fœtus of the greater part of the nutrient material of the uterine blood. Other authors do not

entirely agree with this statement as to time. It is an important matter, for if we could assume with certainty that a fibroid would not grow after, say, the fifth month, we could decide what course to pursue in the case of a tumour which by the end of that month had reached a large size, but still not a size which would endanger either the woman's life or the successful termination of pregnancy. But we cannot assume this with safety, and the possibility of further increase in the tumour must be a weighty argument in deciding the line of treatment to adopt.

In some cases, probably in most, the growth is mainly a true hypertrophy, of similar nature to that which is undertaken by the proper muscle of the uterus: in others the increase in size is due to œdema. In the former class the hypertrophy of the myoma cells is more marked than that of the proper muscle cells. Doran<sup>2</sup> has dealt with this change in a paper in the *Obstetrical Transactions*, where he gives two drawings illustrating the hypertrophy, and the relations of the connective tissue in the tumour to the muscle cells. He says that "The proportion between the muscle-cells in the normal tissue and in the new growth was maintained in this case, that is to say, the myoma cells were larger than the uterine tissue cells, as in non-pregnant cases." Doléris<sup>3</sup> states that the commonest form of enlargement is by increase in the connective tissue, with sometimes myxomatous changes, but his view is not that of other observers. Doran's case was one of pure myoma, but fibro-myomata undergo similar changes as regards their muscle cells.

*Œdema.* Fibroids, whether interstitial, subserous, or submucous, are frequently found to become œdematous during pregnancy; and, further, there may be spaces in the tissue filled with serum, or in some cases with brownish fluid containing red corpuscles and lymph-cells (Kaltenbach<sup>4</sup>). In a few instances, Doléris has found extravasations of blood in the tumour. He says that where this occurs there is a good deal of pain, especially if the affected areas go on to suppuration, but that mere œdema, however rapidly it develops, gives rise to no pain. .

The softening brought about by the œdema is a very fortunate happening, for a tumour situated in the pelvic cavity is by this change able to adapt itself during labour to what available space there may be, and thus allow a living child to be born where there seemed to be no chance of the head being able to get past the obstruction.

*Necrosis.* It is very rare for necrosis of the tumour to take place

during pregnancy, but cases in which the tumour was breaking down in the centre are described by Mackenrodt,<sup>5</sup> and by Hammarschlag.<sup>6</sup>

*Peritonitic Adhesions: Hæmorrhage.* The peritoneum over fibroids sometimes becomes inflamed during pregnancy, just as it may in the non-pregnant condition, and more or less firm adhesions are formed. Such adhesions may prevent the ascent of the uterus, and if they occur in connection with a tumour in the pelvic cavity may cause incarceration and abortion; or if, as sometimes happens, the uterus with the tumour rights itself suddenly, there may be dangerous intraperitoneal hæmorrhage. Von Strauch seems to consider this alarming result of ruptured adhesions a not unlikely thing to happen if artificial reposition of an incarcerated uterus is made.

**Changes in Shape.** These tumours if observed carefully during pregnancy are nearly always found to undergo a notable flattening. This is probably due to the increase in area of the uterine surface, and the adaptability of the softening mass to its widening base. After labour the fibroid again becomes a definite and probably a prominent lump on the uterine surface.

**Locomotive Changes.** In a very large majority of instances in which the pelvic cavity is occupied by a fibroid, even if it grows from the lower uterine segment, and in a still larger proportion where the tumour is situated in the upper part of the uterus, there will be a readjustment of the mass before the end of pregnancy, and the pelvic canal will be made free for the passage of the fœtus. Although this is not the place to discuss the treatment of fibroids in pregnancy, it is obvious that it is of the greatest importance to remember this tendency when the question of operating on a fibroid which seems likely to obstruct labour, is being considered in the earlier months. A striking instance of this adjustment is recorded by Von Strauch.<sup>1</sup> A woman who had a myoma filling the whole of the true pelvis and raising the uterus at the second month of pregnancy so high that the cervix was above the level of the symphysis, and could be reached only with great difficulty on vaginal examination, had on three occasions during the two following months marked symptoms of incarceration—severe vomiting and attacks of pain in the abdomen. In spite of these indications he did nothing in the way of attempting to raise the tumour out of the pelvis. At the end of the fourth month the tumour had begun to move upwards. This upward movement was completed and the child's head was able to sink into the pelvic brim. Labour was unobstructed, and required some aid by

the forceps on account of uterine inertia alone. On examination soon after birth the fibroid could not be recognised; but four months later it was found as a tumour of the size of an apple growing from the posterior wall near the fundus. Olshausen<sup>7</sup> relates a similar case.

*Torsion of the pedicle* of a subserous fibroid during pregnancy has been met with in only a few cases; but when it happens it gives rise to serious peritonitic changes, and interstitial hæmorrhages. (See two cases quoted by Olshausen,<sup>7</sup> p. 778.)

#### LABOUR.

**Nutritive Changes.** Fibroid tumours situated in the lower part of the uterus which fail to rise above the pelvic brim in pregnancy, or early in labour, and past which the foetal head has to be dragged or forced, are very likely, unless they are polypoid, to be injured to such a degree that degenerative, and in some instances necrotic, changes subsequently take place in them.

It is asserted by some observers, notably by Hammarschlag, that traumatism is not a necessary factor in such changes, but that they take place soon after labour in the absence of any injury of a mechanical kind. This cannot be anything like the rule, for every obstetric physician must remember numbers of cases in his practice where a fibroid has passed through labour and suffered no hurt, nor shown a sign afterwards of any change.

I have the notes of a case of my own which is a good example of what a fibroid will stand. The patient had had a pediculated fibroid removed 8 years before; and when I first saw her she had been married 3 years, and she gave the following history. Labour had been induced at the 8th month of her first pregnancy for a fibroid growth which lay below the pelvic brim and threatened to cause obstruction in labour. It was found at labour to be attached as low down as the internal os. It gave rise to great obstruction even at this month, and the head was very forcibly dragged past it. The child died soon after its birth, presumably from injury to its nerve centres. The mother nearly died from septicæmia, the exact variety of which is not recorded. The tumour was not expelled, and remained as before in spite of its rough handling. In the following year she again became pregnant, and it was decided to induce abortion on account of the tumour. The year after there was another pregnancy which was ended by an abortion ascribed to influenza. Both these abortions took place at the third month.

Not many months after this she again became pregnant, and was put under my care. I saw her first when she was  $6\frac{1}{2}$  months advanced in that state. I found on abdominal examination that there was a fibroid the size of a Jaffa orange at the left cornu. There was a distinct thickening of the uterine wall in the right side of the uterus just above the brim. This had an ill-defined upper limit and could be made out to extend inferiorly into the pelvis. On bimanual examination the thickening, which was, of course, the fibroid previously observed, was found to end inferiorly at about the level of the internal os, and it gave the impression of a mass of two or three inches in thickness, occupying a considerable space in the pelvic cavity. On examination a month later I found that the fibroid at the left cornu was almost imperceptible, but could still be felt as a flattish, fairly soft mass lying over the child's breech. Of the mass lower down in the right uterine wall there was hardly a trace. There could be no doubt that the right course was to let the pregnancy go to term. Labour took place at the proper time, and was perfectly normal. The lower fibroid was not perceptible. On being seen 3 weeks after labour the fibroid above was found to be very distinct and mainly subserous, and there was again the somewhat ill-defined tumour to be felt low down in the right wall of the uterus. Since then there has been no pregnancy, and the patient has not been in any way made conscious of the fibroids.

The softening and flattening which occur during pregnancy prevent damage to a large number of those tumours which remain in the pelvis; but if the growth is a large one it is very likely to be compressed and bruised in spite of these changes, and degenerative processes of some kind may be started. These will be more properly described in the section on the lying-in period.

It is, however, a fact that labour very seldom finds one of these tumours seriously in the way. In the records of 5,500 patients delivered at the General Lying-in Hospital there is no single instance of any obstruction to labour being caused by fibroids. Budin, in the Paris Maternité, and Porak and Macé in the Charité, have recorded similar experiences.

**Locomotive Changes.** Alterations of position of fibroids during labour are common. In most cases, though not so often as in pregnancy, a fibroid, especially if it be subserous or interstitial, will rise above the brim in time to be out of the way of the advancing head if it has anything like a chance. That is to say, unless its implantation is so low down—and this is most likely when the tumour

is in the posterior wall—that it is imprisoned effectually by the presenting part of the child, the upward tractile force of the retracting uterus, combined with the plasticity of the tumour itself—which enables it to be squeezed out of the pelvic cavity like so much putty, or like fluid in a bladder—will gradually, or in some cases suddenly, raise it above the brim of the pelvis and out of harm's way.

Olshausen<sup>7</sup> records an instructive case of this kind. In a woman near the end of her first pregnancy he found a tumour the size of a child's head bulging the posterior vaginal wall forward, and pushing the cervix high up on the left. He made an attempt at reposition under anæsthesia, but was unsuccessful. Labour began 25 days later. The tumour was found to be softer, and lay with about two-thirds of its bulk in the true pelvis. Reposition was again unsuccessfully attempted. After 24 hours' pains with early rupture of the membranes, the os slowly dilated and moved towards the middle of the pelvis. With more pains the tumour withdrew itself entirely out of the pelvis and labour ended spontaneously. The tumour gave rise to no trouble in the puerperium.

It will be remembered that there is some possibility of *intraperitoneal hæmorrhage* if by the considerable change of position required in such a case, vascular adhesions of the uterus to surrounding parts are torn. The tumour may also be damaged and afterwards *slough*. And a fibroid which has suppurated during pregnancy has been *ruptured* with fatal consequences during labour (Krukenberg).

*Expulsion.* Submucous fibroids which were in the way have been expelled by the advancing head, and this has happened occasionally in the case of tumours which have become polypoid and the stalk has yielded to such an extent as to allow the polypus to come down to the vulva. The stalk has then been cut through or has given way. Submucous fibroids nearly always cause abortion even when, which is very rare, pregnancy has occurred in a uterus which contains one; so the expulsion of a pediculated fibroid during labour is not a common occurrence. Cases have been recorded where *inversion of the uterus* during or immediately after the third stage of labour has happened, with immediate detachment, spontaneous or artificial. It is conceivable that in some cases where inversion has taken place the state of affairs might not be recognised, and the fibroid might be allowed to slough away, as it undoubtedly would do, with probably fatal result to the woman, during the puerperium.

I have recorded a case of expulsion of a fibroid in labour.<sup>8</sup> There is no doubt that many fibroids in the lower uterine segment, owing to their exposure to pressure and traction during labour, become

loosened in their capsules to a varying degree, for, as is well known, such tumours are not infrequently extruded in the lying-in period.

*Cervical Fibroids.* Fibroids growing in that rare situation, the cervix, have been pushed down by the head, and squeezed out of their bed. They have been removed by incising their capsule when they were discovered to be in the way; or if of small size they have remained in their place, and have either sloughed or survived in an unaltered condition.

#### LYING-IN.

**Nutritive Changes.** If a fibroid tumour survives the strain of labour without injury, the usual course it adopts is to undergo *involution* along with the normal muscle-fibres of the uterus to such a degree as will bring it down to its bulk before pregnancy. In some cases the tumour is found to have become smaller than it was before the pregnancy; and if this process is repeated on several successive occasions, the fibroid may shrink to a quite unimportant size; or it may even disappear, at all events in a clinical sense.

*Absorption.* There are also well-established instances of fibroids disappearing after a single pregnancy. Doran, in a paper in the *Obstetrical Transactions*,<sup>9</sup> cites 37 cases of disappearance, more or less complete, of fibroids, and of these 13 occurred in connection with pregnancy.

As regards the mode of absorption, partial or complete, it seems at least probable that the myoma cells undergo the same process of involution as the normal muscle cells. It has been stated by many authors that disappearance is brought about by fatty degeneration; but this opinion is not supported by any weight of evidence (Gusserow<sup>10</sup>). It was no doubt suggested in analogy with the fatty degeneration which was supposed to occur in normal involution—a degeneration which is now known to be limited to cases in which some pathological change, usually inflammatory, has affected the uterine muscle. The normal process of involution has been described by Helme.<sup>11</sup> He found that although there was some indication of degeneration, partly fatty, in the connective tissue, there was none in the muscle cells, these latter probably disappearing by simple atrophy, *i.e.*, a kind of solution. Many cases have been recorded, however, in which very definite degeneration has taken place in fibroids during the lying-in period.

Hammarschlag<sup>6</sup> asserts from the observation of a series of cases in his own practice that a myoma undergoes in the lying-in period



distinct changes which often lead to necrosis. He considers that these are brought about by the sudden cessation of the very free blood-supply which exists in pregnancy. The fibroid has during pregnancy become a large tumour which demands a large supply of nutrient material. Then, immediately after labour, the retraction of the uterine muscle surrounding the capsule and of the capsule itself cuts off this supply: the arteries thrombose and calcify; extravasations occur and the tissues necrose, and they sometimes suppurate in places. He fully describes four cases illustrating this. He believes that these changes occur apart from injury, or from any perimetritis over the tumour. In this he differs from Gusserow, who considers such changes, with the fatty degeneration and pus-formation described by others, as due to traumatism in labour. Gusserow describes the usual change as consisting in the formation of a cavernous structure owing to shrinking of the muscle cells from the containing framework of connective tissue. The spaces thus formed are found to be filled with serum. The final stage is a kind of cirrhosis. It will be seen that this process is not very far removed from the normal mode of involution. He quotes Gebhard on this point, and agrees with him.

It will be noticed on referring to Hammarschlag's article<sup>6</sup> that most of his cases had some complication, such as great pain in the abdomen, or free bleeding, and the tumours were removed on this account; so they must not be considered as material on which large generalisations can be made. Although, therefore, we may admit that diminished nutrition is caused in the way he describes, we must remember how many cases go through not only one, but many labours, without suffering any of the changes he believes to be so common.

**Locomotive Changes.** Expulsion of the tumour during the puerperium is not all uncommon. I have met with two cases: one in which the tumour was expelled spontaneously four days after labour, and one where the fibroid presented at the external os on the 15th day of lying-in, and was removed. Both tumours were of about the same size—that of an orange, and both were flattened to a thickness of about an inch. Herman<sup>11</sup> describes a case in which the tumour presented on the 10th day at the external os and was removed three weeks afterwards. When such partially separated tumours exist, attention is usually called to them by hæmorrhage. The tumour has in a large proportion of instances been found to be partially gangrenous, and the patient in a good many cases has died of septicæmia.

On reviewing the facts which have been accumulated on the results of the coincidence of pregnancy with fibroid tumours of the uterus, one is brought to think that the tumour is not apt to suffer so often or so severely in labour as might be expected, considering the somewhat imperfect vascular supply and the disturbances which must take place in it owing to the diminution of the total quantity of blood entering the uterus as a result of the ending of pregnancy, and considering also the compression and dragging that must, in most cases, take place during labour.

It would appear from the results of large numbers of observations that a pregnancy complicated in this way will in almost all cases go to term, and that the tumour will survive the stress of labour and the starvation of the puerperium with impunity. Olshausen's case of spontaneous reposition during a late stage of labour is very striking in this respect. At the same time there are bound to be cases where labour is brought to a standstill by a deep-lying fibroid, and the tumour, if it cannot be removed from the path, must be evaded by Cæsarean section.

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- <sup>3</sup> DOLÉRIE, *La Gynécologie*, 4me. ann., 1899, p. 493.
- <sup>4</sup> KALTENBACH (quoted by Olshausen).
- <sup>5</sup> MACKENRODT, *Zeitschr. f. Geb. u. Gyn.*, Vol. xxxi., p. 452.
- <sup>6</sup> HAMMARSCHLAG, *Monatschr. f. Geb. u. Gyn.*, Vol. xii., p. 8.
- <sup>7</sup> OLSHAUSEN, *Handb. der Gyn.*, bearb. v. Gebhard, Veit, Schäfer, u. Olshausen, p. 772.
- <sup>8</sup> DAKIN, *Obstetrical Transactions*, Vol. xli., p. 195.
- <sup>9</sup> DORAN, *Obstetrical Transactions*, Vol. xxxv., p. 250.
- <sup>10</sup> GUSSEROW, *Die Neubildungen des Uterus*, Billroth u. Lücke, *Deutsche Chirurgie*, Pt. lvii., 1885, p. 31.
- <sup>11</sup> HERMAN, *Obstetrical Transactions*, Vol. xxxiii., p. 30.