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# THE INTERPRETATION OF THE PORRO UTERUS IN RELATION TO THE THIRD STAGE OF LABOUR.

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When Porro, in 1870, performed Cæsarean section according to his well-known method, he not only made the first distinct advance in the perfecting of that operation, but gave obstetricians specimens on which the phenomena of the Third stage could be studied in a way no other natural experiment has since afforded.

Since 1886, when Barbour published the most outstanding and able paper on such specimens, the whole question of the third stage mechanism has been debated without any final agreement as to its nature, and, indeed, at present an apathy on this subject has come over the profession—over both investigator and practical obstetrician.

The real reason of this blight on investigation has been that the question has usually been investigated on the supposition that the separation must take place in such a way as to check hæmorrhage, *i.e.* during a pain; and any view as to its occurrence by any other mechanism, after a pain, for instance, has been viewed with the greatest suspicion, especially by the general practitioner, to whom the phrase, "relaxation after a pain" is anathema, and "uterus like a cricket ball," the only safe and satisfactory descriptive term.

Matthews Duncan held strongly that the placenta separated from shrinkage of the placental site, and when confronted with the fact ascertained by Barbour, that a shrinkage from 7 ins. × 7 ins. to 4 ins. × 4 ins. did not bring about separation, merely remarked in the well-deserved eulogy he gave Barbour, that he had no doubt the placenta separated at a lower shrinkage area.

The great thing to explain in the Third stage is how the placenta separates. If we can explain that, everything else is easy. Curiously enough, in Germany, the question of the third stage is not looked at in this way; separation and expulsion are considered together, and there has consequently never been the controversy there we have had here; the whole question is

resolved into one of expulsion *nach Duncan oder Schultze*, and the general opinion is that it occurs either way.

The anatomical specimens we have for the study of the third-stage mechanism are of two kinds, viz. the Porro uteri and those obtained from cases where the third stage was incomplete, and either the whole uterus cut out, or a section made of the undisturbed cadaver—entire preparations, as I have termed them. These preparations—the Porro and the entire—differ *toto cælo*, and any explanation must reconcile them, and not ignore one. The latter — the entire — are usually put out of court as to evidence, a most unscientific and unwise procedure.

The Porro uteri are all alike practically. The uterine wall is uniformly retracted, the average thickness being about 1½ ins. (3·75 cm.). This is the average of the uterine retraction immediately *post partum*, and appears to express the utmost retraction the parturient uterus is capable of. The placenta is usually at that extreme retraction, unseparated in the Porro uteri. There is no uterine cavity, as Barbour pointed out, the placenta being grasped all round. In a case examined by me the placenta was separated at the centre of the site, and the space occupied by blood clot.

How are we to interpret these appearances? We must first note how the preparation has been treated in the Porro operation. There has been a mesial sagittal and partial incision, and then a transverse and complete one at its lowest part. This has given the uterine muscle power to retract uniformly to its utmost extent. The amount of the thickening of the uterine muscle is equal to that of a *post-partum* uterus. Since the placental area has shrunk from 7 ins. × 7 ins. (17·5 cm. × 17·5 cm.) to 4 ins. × 4 ins. (10 cm. × 10 cm.), it seems to me a legitimate deduction that shrinkage of the placental area does not separate the placenta. The filaments in the spongy layer (Fig. 1) which are torn through in this separation are only a few mm. long at the utmost, and slight disproportion will snap them.

This, indeed, is the conclusion Dr. Barbour comes to, but he adds: "4. *Diminution in area beyond that and the action of the whole on the placenta mass* I regard as the formal cause; the *pains of the Third stage* as the efficient cause of separation."

Practically, therefore, Dr. Barbour places the shrinkage area necessary for separation below 4 ins. × 4 ins., but in the twenty years or so that have elapsed since his opinion and Duncan's were stated, this hypothetical area has not been demonstrated, and although

there is a general opinion held that such shrinkage causes separation, it has been quite forgotten that the demonstration of it has only been expected and not actual.

It is a curious and paradoxical fact that there is one separation of the placenta, as to the mechanism of which we are all agreed, viz. the method of separation of the placenta in placenta prævia. This was described by Matthews Duncan in 1873, and although he expresses himself very cautiously, as he was obliged to do in the state of knowledge then, he yet states very distinctly, "In cases of placenta prævia . . . that which operates is expansion of the seat of its attachment" (*op. cit.* p. 344).

If we now turn to the entire Third-stage uteri we find specimens of a remarkable nature. Where the placenta is attached, the uterine wall is on an average one half-inch on section; where the membranes are attached it is a little thicker. In the cases where the placenta is partially separated, the uterine wall is comparatively thin on section opposite the unseparated portion, but thicker where separation has occurred. In no case, however, is the thickness equal to that of the Porro uterus in any condition. Another remarkable fact, correlated with the above, is that the shrinkage of the placental site is not so extreme as in the Porro cases.

If we take the separation in placenta prævia first, we see that it is due to a disproportion between the placental site and the placental area—the former being uterine, the latter placental—severing the microscopical filaments joining them. We all know, too well, how speedily the placenta separates in placenta prævia, and it is evident that the disproportion of area view in placenta prævia separation is accepted by all.

It naturally occurred to me, in 1886, that a modification of this mechanism would account for the third-stage separations and I then stated that, and now wish to emphasise it.

It has often been said that you cannot apply what happens in placenta prævia to the Third stage, and it has therefore been ruled out of court by the area-shrinkage advocates, apparently on legal grounds, and this has been done wisely, because of its danger as evidence in regard to the Third-stage shrinkage theory of separation. It is evident that the shrinkage area theory in the Third-stage separation, and the placenta prævia separation by expansion are diametrically opposed, and thus the apparent rigid reasoning applied.

The two, however, can be reconciled, if the separation in the

Third stage takes place not during but after the pains, and this is the crux of the question.

I do not discuss the behaviour of the placental area and site during the first two stages of labour when the placenta is in normal position. It is sufficient to say they are always equivalent. In the Third stage, however, the question must seriously engage our attention.

We know that after the expulsion of the infant, the uterus retracts and the fundus sinks, probably from intra-abdominal action and the pressure of the attendant's hand, so that it lies at or about the level of the navel. As Barbour's sections and many others have clearly shown, the placenta is grasped all round, there is no cavity, and the placental area and placental site are equivalent in area, and each 4 ins. × 4 ins. There is, in other words, no disproportion between these areas, and thus no separation can take place. We may put it in another way. If during labour in a case of placenta prævia the lower uterine segment had not expanded in area and the prævial part in the placenta had remained equivalent, then no separation of the placenta could have taken place. Such an occurrence is of course an impossibility, but it helps to emphasise the conditions during the third-stage pain.

Another question crops up here. Those who demand shrinkage of the placental site as the cause of separation of the placenta have never explained why such extreme shrinkage, viz. that below 4 ins. × 4 ins. according to Duncan and Barbour, is necessary to tear across the minute filaments of the spongy layer joining the areas—a minute shrinkage should be enough if such could be effective. The very fact that such extreme shrinkage is not effective shows really that it never can.

A very important phase in the behaviour of the uterus during the Third stage has been always ignored, viz. its enlargement and its softer character to touch after the pain is over. There is a very evident and almost laudable reason for this. The clinical obstetrician knows only too well that where hæmorrhage occurs from the uterine cavity above the retraction ring, the uterus is relaxed and soft, and he can only check hæmorrhage by making it retract and become hard. That, however, does not affect the fact that after a pain is over, the uterus becomes a little larger, feels softer, and the walls of the uterine interior increase in area, all this happening without hæmorrhage.

This expansion is due to two things, viz. (1) *The elasticity of the uterus,* and (2) *the elastic tissue developed between the muscular bundles.*

Of the former little seems to be known, and I therefore do not apply it.

2. *The Elastic Tissue between the Muscles.*—If a *post partum* uterus be stained by Weigert's method so as to display the elastic tissue, we find a very marked amount of it present between the bundles (Fig. 2). I have had prepared such sections, five inches (12·5 cm.) long, showing the retracted body of the uterus, the lower uterine segment, cervix and vagina.

Beginning at the peritoneum, we have a compact layer of muscle alone, about 0·3 cm. broad, and running into the lower uterine segment as a distinct bundle. Then comes a looser layer, almost 1 cm. in breadth, to which our President has drawn attention, made up mainly of elastic tissue and oblique or circular muscular fibres. Next to the uterine cavity is a layer of muscle, 1·5 cm. at its thickest part, but permeated with elastic tissue, the muscle, however, greatly preponderating. There is apparently little elastic tissue in the lower uterine segment and cervix, but this may be due to a close felting with the muscle, and may require maceration to determine it. At the outer part of the vagina, and between peritoneum and lower uterine segment, the elastic tissue is well seen.

When, therefore, a pain has died off, the elasticity of the muscle, and especially of the interpenetrating elastic tissue, asserts itself, we get the softer, bulkier uterus, and, above all, an increase in area of the apposed internal uterine surfaces, the two surfaces sliding on one another without separation. This increase in area is not participated in by the non-vascular, non-elastic placenta (I have found no elastic tissue in the placenta proper by Weigert's stain), and thus we get the disproportion between placental site and placental area, and the tearing of the spongy layer. This occurs after each pain, until at last, when both membranes and placenta are thus separated, the uterus, gathering itself up, as it were, expels the placenta according to Schultze's or Duncan's mechanism, which are really mechanisms of expulsion but not of separation.

The arguments against the theory of separation of the placenta in the third stage of labour by a direct shrinkage of the placental site, are:—

1. Barbour, its most eminent exponent, has stated that the placenta does not separate at 4 ins. × 4 ins. shrinkage.
2. The *obiter dictum* of the area shrinkage advocates is that it must separate at a shrinkage below this. An *obiter dictum*

—*i.e.* a statement of opinion of which no evidence is given—is, however, current coin only in Theology and Law, but a mere promise to pay in Science—a promise not yet met in this instance.

The interpretation of the Porro uterus is for me that of an over-retracted uterus, as Sänger and Champneys long ago urged, a demonstration that shrinkage of the placental area cannot separate the placenta; *that* requires the disproportion only given in the elastic recoil after a pain.

Placental and membranes separation thus follow one formula, both above and below the retraction ring. "Separation can only occur as the result of a disproportion between placental site (uterine) and placental area." Blood effusion, traction of a descending placenta or membranes, are adjuvant but not essential.

The amount of "retraction" is not of importance; what is essential is a disproportion between placental area and placental site. A placenta may thus separate and be expelled while the child is *in utero*, if such a disproportion can occur. This is seen in the well-known prolapsus placentae cases.

We see then that the over-retracted Porro uterus has misled us all, and that the entire uterus gives a more accurate idea of what the third-stage mechanism is.

I have not considered many points of interest corroborative of the view advanced, as these have already been discussed by me in previous papers.

The question finally arises as to what bearing these views have in the practical management of the third stage. The Third stage may be managed in two ways.

In the *first method* the attendant grasps the uterus firmly, brings on pain by friction if he thinks the uterus sluggish, and reinforces each pain by pressure. This is the active method introduced by Crede many years ago (before 1870).

In this way the third stage may be shortened, but the practitioner who practises it will find first, that he has hæmorrhage, and occasional retention of membranes with all their unpleasant sequelæ. He may, indeed, have a disaster if the upper edge of the placenta is at the Fallopian tube angle, and may perhaps expel the placenta and membranes, *minus* a piece of the placenta the size of the tip of the finger. I have found this piece, septic, in a *post-mortem* uterus, where it was responsible for the death of the patient. The introduction of the Crede method has been undoubtedly disastrous in practical midwifery.

The faults of this method are—

1. The placenta is separated, or an attempt is made to separate it, during the pains—the wrong mechanism of separation, I hold.

2. The uterus does not get the necessary rest between its contractions, and thus inertia is brought on.

3. When partially separated, the expression may tear off the bulk of the placenta or membranes from an unseparated portion.

The *second method* is to keep the hand permanently on the uterus, wait for pains, and not to compress the uterus unless there are indications for it, the main one being hæmorrhage. The size of the uterus should be noted, and only when its bulk markedly diminishes, indicating separation, should gentle expression of the uterus or pressure in the supra-pubic region, according as the placenta is in the lower uterine segment or in the vagina, be employed.

This method goes on the theory that the placenta is separated after the pain, that hand pressure will not separate it safely at the time, and that the safe time to use hand grasping is after the placenta has separated.

The time for the Third stage varies from twenty minutes to an hour, and the practitioner who gives the proper time and follows this plan with the necessary patience Nature demands, will have the reward she always gives to those who understand and obey her.

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