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The Natural Mechanism of the Expulsion of the Placenta

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Proper Management of the Placental Period.

By GEORGE T. HARRISON, M. A., M. D.,

Paper read before the New York County Medical Association, June 18, 1888.

[Reprinted from Gaillard's Medical Journal for August, 1888.]

New York:
THE JUDSON PRINTING CO.,
16 Beekman Street.

1888.

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The subject to which I ask your attention this evening may seem to some among you, at first thought, either of slight importance, or else so completely exhausted that further comment is unnecessary and superfluous. A moment's reflection, however, will, I think, convince you that such a judgment is far from the truth. In a paper read to the Obstetrical Society of Edinburgh, in 1871, on the expulsion of the placenta, Dr. Matthews Duncan uses the following language: "No one will dare to say it is unimportant; for there is no truth in nature which, however insignificant it may appear, has not even now, or may not have in future, bearings upon practical rules which may be of value to the obstetrician." Playfair, in his excellent treatise on the science and art of midwifery, declares in reference to the management of the third stage of labor: "There is unquestionably no period of labor where skilled management is more important, and none in which mistakes are more frequently made." In Germany, within the last few years, a most animated controversy has been in progress upon this theme, as the result of which much valuable material has been accumulated, of great help in explaining the physiology of the placental delivery and, as a corollary, in laying down the principles which should

guide us in the management of the placental period. There are still moot points, however, and consequently this may still be considered one of the burning questions of the day. After the Credé method had been adopted by obstetricians in Germany for a quarter of a century, and subsequently had won its way into general use throughout the civilized world, the attention of the medical profession was arrested in 1880 by a publication of Dohrn, in which this author took ground against the active intervention involved in the method of Credé, and insisted upon the adoption of an expectant plan of treatment. Ahlfeld followed him in successive publications, and on the basis of large clinical experience combated the Credé procedure, charging it with producing a greater loss of blood than would ensue if the expectant plan were wholly or in part adopted; and, secondly, holding it responsible for the retention in the uterine cavity of remnants of decidua and chorion to a greater or less degree. And for this writer the retention of such membranes in the cavity of the uterus is often productive of the most disastrous consequences to the puerperal woman. The late Carl Schroeder, in association with his pupils, Hofmeier, Ruge and Stratz, recently studied the physiology of the placental period most carefully, and here, as in so many other directions, we owe a deep debt of gratitude to the Berlin school. So late as the year 1883, Ahlfeld* could complain "that it is certainly a striking phenomenon that the physiological process of the detachment and expulsion of the placenta has remained hitherto almost unknown." . . . "The single attempt to answer the questions here to be solved by a large number of investigations on the living object were made by Lemser in the year 1865, and this work was only lately appreciated." The studies of Schultze and Matthews Duncan upon the mechanism of the expulsion of the placenta, if not fulfilling the conditions laid down by Ahlfeld, have yet shed much light upon this subject and will first be considered, and then certain problems be touched upon belonging here. Only those among you whose duties as active practitioners have not allowed you the leisure requisite to keep you informed upon the recent investigations in regard to the physiology of birth, I wish to make the explanatory statement that in labor the uterus is differentiated into an active contracting upper portion, the uterine body, and a lower passive, flabby uterine segment and cervix, the separation between the active and passive parts being defined by "the ring of contraction." The importance of this division will immediately appear. After the expulsion of the child the placenta arches into the uterine

* Berichte u. Arbeiten.

cavity, forming marked torosities, so that blood accumulates between it and the uterine wall. The completely detached placenta gradually descends into the ring of contraction, presenting its fœtal surface, and in its descent inverting and detaching the membranes of the ovum, until it attains to the space formed by "the lower uterine segment" and cervical cavity. The placenta lies in this space, folded upon its uterine surface, and between these folds a coagulum of blood is contained. This mode of the delivery of the placenta is that described by Schultze. Matthews Duncan maintains, however that it is observed because the natural mechanism is interfered with. He insists that the placenta comes edgeways, its uterine surface gliding along the surface of the uterus; that its foldings, parallel to the length of the maternal passages, are well squeezed together, and that little space is offered for the reception of blood flowing from the uterine sinuses. The uterine wall keeps close to the folded placenta. According to him, in the natural mechanism there is no hæmorrhage worthy of the name. I am convinced from my clinical observations that the mechanism described by Schultze is the usual one, and that what Duncan calls the *normal* is the *exceptional* mechanism. Let us now consider some of the facts which modern investigation has elicited in reference to the anatomy and physiology of placental detachment.

Possessing as we do numerous anatomical studies upon the structure and attachment of the placenta, it is nevertheless a fact that none of them furnish us an anatomical basis on which to construct a theory competent to explain satisfactorily the process by which placental detachment is effected. An exception, however, must be made in favor of the researches of C. Ruge, which undoubtedly help us to a clearer understanding of this process. According to this author,* the following are the microscopical appearances of the zone of attachment of the placenta to the parturient uterus. In consequence of the displacement of the placenta on its place of attachment, called forth by its inability to contract in contrast with the latter, a relaxation begins very soon in the decidua serotina, without, however, going so far as to produce separation. Cords of attachment are formed, to a certain extent, which render it possible for the placenta to follow the contracting surface of the attachment. A species of network of connective tissue is developed which is susceptible of extensive displacement. The connective tissue bands constituting the meshes of this network contain vessels which effect the exchange of gas between maternal and fœtal

* Der Schwongere und Kreessende Uterus, Bonn, 1886.

placenta. This phenomenon furnishes an explanation of the fact that, in spite of the long task of parturition, in spite of frequent labor pains, and notwithstanding retraction of the uterine body, however fully developed, the fœtal circulation is not disturbed. As a consequence of the uterine contractions, a locus minoris resistentiæ is created from the beginning in the placenta, in which also the complete detachment takes place later on. This place is not united to a definite layer of the decidua, but is developed accidentally, sometimes higher, sometimes deeper. In the very beginning of labor, with the first regular pains this phenomenon commences, and the relaxation becomes more complete the longer their duration. It is plain that the effect of the displacement of placenta and uterine wall will be exhibited more in the centre than at the edge, where the attachment is closer. Ruge demonstrated the network developing in the decidua serotina both on the placenta *in situ* and on placenta that had been delivered, and showed that just *here* the separation had taken place. That in spite of the most energetic pains, only this laxity is effected lies in the behavior of the placental place itself. It does not follow the remainder of the uterus in the contractions, and always remains thinner, because the placenta is pressed against it in consequence of the increased intrauterine pressure during "the pain." The contraction and retraction of the muscular tissue is here more incomplete and does not take place so quickly, and instead of the interwoven and shortened condition of this tissue, as we find it under other circumstances, we see here the saw-like and wavy arrangement longest stamped. As, consequently, the place of attachment does not diminish so energetically in all directions as would suffice for the detachment of the placenta, considering its inability to contract, it is rendered possible for the latter, in view of the fact that it becomes thicker, that its fœtal surface shows projections and furrows, and that its edges protrude widely beyond the place of attachment, to preserve its cohesion with the uterus.

From these researches it will be seen that the detachment of the placenta is histologically pre-arranged during parturition up to the moment when the child has left the maternal parturient canal. An important question now confronts us: Does the change in the size of the uterus, appearing immediately after the birth of the child, suffice for the detachment of the placenta, or are several independent contractions necessary? As Barbour observes, there are three ways of detachment. The separation of the placenta is either:

1. The result of the change in the size of the placental place after the evacuation of the uterus; or

2. The consequence of the hæmorrhage or escape of serum behind the placenta; or

3. The result of uterine contractions and of the endeavor on the part of the uterus to expel the foreign body.

Barbour decides in favor of the latter mechanism. Ahlfeld, from the result of his studies, arrives at the conclusion that "the reduction in the surface of the place of attachment of the placenta is the most important factor for its detachment. Since a detachment of the edge in the first stages cannot, as a rule, ensue, the central part becomes separated. The space formed is filled with blood by aspiration." From the observations of E. Cohn, of Berlin, to whose excellent paper on this theme I beg to acknowledge my indebtedness, it is singly and alone the "pains" belonging to the placental period which effect the detachment of the placenta. "The first uterine contraction of the placental period," says this author, "has the most important effect, whether it appears at the time the child leaves the maternal genital canal, or not until after some time of repose. It effects the detachment which had already during parturition been for the greatest part preliminarily prepared, and facilitates the formation of the retro-placental effusion of blood, which is the second important factor." And here I would remark that the exposition of this theme by Barnes, as found in his excellent text-book, partakes too much of metaphysical reasoning, and consequently his views rest rather upon subjective impressions than objective demonstration. The effect of the second uterine contraction is twofold. The placenta is now, mainly by the blood effusion, completely separated up to the insertion of the membranes of the ovum, and yielding to the pressure produced by the uterine contraction, it will make ready to leave the uterine body. This extrusion is completed by the following uterine contractions, aided by the natural weight of the placenta itself. The placenta, with the centre of the fœtal surface presenting, now passes through "the ring of contraction" into "the lower uterine segment," where it makes room for itself by passive distension.

As soon as the placenta is detached the placental area is contracted by contraction and retraction of the muscular tissue to such a degree, that the vessels coursing in it are occluded or very much narrowed; on the other side the retro-placental blood usually coagulates so rapidly that, as a consequence, there is a quick thrombosis of the lacerated vessels. Let us note now the behavior of the uterine body as observed through the abdominal coverings.

With each uterine contraction the fundus ascends higher and

higher, the body becomes smaller and narrower, and the "ring of contraction" which had disappeared immediately after the birth of the child, again becomes very plainly marked—consequently the most certain clinical symptom of the detachment and extrusion from the uterine body of the placenta is the ascent of the fundus uteri, the diminution of its size, the manifestation of the furrow corresponding to "the ring of contraction," and "the lower uterine segment" distended by the extruded placenta. This detachment of the placenta from the uterine wall and its extrusion into the lower uterine segment occurs almost without exception without external aid. Consequently it may be logically inferred that, leaving out of the question pathological cases, the natural forces are fully adequate to effect the detachment of the placenta, and that there is no necessity of any *sort of active intervention on the part of the obstetrician to assist this physiological act.* Having in view the physiological facts just discussed, what it may now be asked is the best method of managing the placental period. Four methods may be enumerated as having advocates among distinguished obstetricians. First is the method of Credé, which is the one most generally adopted, the essential feature of which is that the placenta is manually expressed out of the uterine body. Secondly, the Dublin method described by McClintock and Hardy in 1848, and afterwards by Barnes and Spiegelberg.

This manipulative procedure consists in this, that immediately after the exit of the child's head through the vulva, the hand is laid on the fundus and by friction and kneading energetic contractions are evoked, so that the placenta is quickly separated and is expressed beneath "the ring of contraction." By further pressure it is forced out of the vulva. Thirdly, by the expectant method which has Ahlfeld, Dohrn and Freund as its advocates, the separation and extrusion of the placenta is left, as a rule, to the natural forces. Fourthly, the method of Schroeder—which I give in his own language: "I consider it the best procedure in the placental period, after the expulsion of the child, not to rub or press the uterus, but to wait quietly until the diminution and ascent of the uterine body and the protuberance above the symphysis indicate that the placenta is expelled from the uterine cavity, then by gentle pressure to expedite its passage through the vulva." The observations of Cohn show that the spontaneous expulsion of the placenta out ot the uterine cavity into the "lower uterine segment" requires for its completion five to fifteen minutes. After this is accomplished, further delay is unnecessary, as the placenta can be removed now without injury, and left alone, might remain undelivered hours,

nay, for days. The manipulation which Schroeder employed was to place the side of the hand in the furrow underneath the uterine body and then to exert a general pressure downward. As this procedure requires a good deal of practice and skill, Schroeder recommended subsequently the gentle pressure of the fundus uteri down into the superior strait. As Cohn remarks, the contracted uterine body acts like the piston of a syringe, which drives everything movable in front of it. This method of Schroeder I have found perfectly satisfactory in practice, and would urgently recommend its general adoption. The method of Credé I would reserve for the cases in which the placenta does not become detached, or those in which it has been separated in the way described by Duncan, and consequently has remained with the upper edge fixed in the uterine body. When there is some obstacle which prevents the placenta from escaping completely out of the uterine body, as for example, might occur when a very large placenta had to pass through a moderately contracted "ring of contraction," this method would be indicated. I concur entirely in the views expressed by Credé in regard to the innocuousness of the membranes of the ovum and decidua when retained in the uterine cavity, provided the conduct of the labor has been aseptic. Says this distinguished obstetrician: "I might mention again the fact that in the last four years (1st of January, 1883, to 31st March, 1887), no regard whatever intentionally, was paid to the frequent occurrence of retained remnants of ovum and decidua in 4,969 births which took place in the Leipzig Clinic and Polyclinic, and that no single puerperal woman died of this treatment of omission or was even very sick, and only slight disturbances occured in the uterine secretion (bad odor, moderate, transitory, elevations of temperature, a matter of indifference, the general condition being otherwise good). . . . If we leave the womb at rest with its contents of remnants of the ovum, no disease of any sort of significance follows, to say nothing of a case of death."* The views I have here advocated I believe rest on a firm physiological basis, and with that conviction would commend them to your earnest consideration.

* Archiv. fur Gynækologie, B'd. XXXII. Hft. 1.