ORIGINAL COMMUNICATIONS.

ON THE SOURCE OF HÆMORRHAGE IN PARTIAL SEPARATION OF THE PLACENTA.

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THERE are few subjects in obstetric medicine of greater scientific interest, and none of greater practical importance, than that of the anatomical source of hæmorrhage in cases of partial separation of the placenta. Upon its right understanding may be said to depend not only the whole question of the extraction of the placenta, in cases of placenta prævia, but also the general treatment of uterine hæmorrhage in all its several forms; and yet there is probably no subject upon which so much diversity of opinion prevails, or in regard to which mere speculative notions have been more freely allowed to take the place of original observation. With the view of aiding in the solution of this question, I am induced to submit to the Society some investigations which were specially undertaken for the purpose of elucidating it.

On referring to the published writings of various obstetric authorities, it will be found that three different opinions prevail at the present day respecting the anatomical source of hæmorrhage in cases of partial separation of the placenta. The first affirms, that it is principally or wholly uterine; the second, that it is principally or wholly placental; the third, that it is both uterine and placental, the blood escaping partly from the exposed uterine, and partly from the detached placental surfaces.

Further, it will be found that uterine hæmorrhage, whether occurring in connection with partial or entire separation of the placenta, is generally considered to be principally venous. "Uterine hæmorrhage," says Dr. Simpson, "after the separation of the placenta, in any of the stages of labour, is *not arterial* in its character. The utero-placental arteries are numerous, but so long and slender as to become readily closed; first, by the tonicity of their coats; secondly, by contraction of the uterine fibres upon the course of these vessels themselves, as they pass through and amid the uterine structure; and thirdly and principally, by the changes in their tissues produced by the mechanical rupture of their coats,—*torn arteries* being little, if at all, liable to bleed, and the placenta being separated by a true process of *avulsion*. "When the placenta is only separated," says Dr. Radford, "the blood which is lost is chiefly venous." "When the placenta is separated partially from the uterus," Dr. Murphy observes, "any hæmorrhage must arise chiefly from the broken veins, and not from one but from both of their divided extremities." "It is," says Dr. Robert Lee, "from the great semilunar valvular-like venous openings, in the lining membrane of the uterus, and of the arteries which are laid open by the separation of the placenta, that the blood alone flows in uterine hæmorrhage." I have made these quotations for the purpose of showing, that the question at issue is one of a very complex character. It is one which has reference, not only to the organ from whence the blood escapes, but to the particular system of vessels from which it is poured out also.

On reflecting upon these circumstances, I was led to believe that some light might be thrown upon the question, by ascertaining experimentally the source of hæmorrhage in an animal whose placenta, like that of the human female, was both decidual and fetal. A pregnant bitch was accordingly obtained, which had nearly completed the full period of gestation: and it having been placed under the influence of chloroform, the uterus was exposed and opened, and the following observations were made.

I. It was observed, on separating the placenta, that blood flowed freely and continuously from the denuded uterine surface, increasing with the detachment, whilst none escaped from the detached portion of the placenta.

II. That the blood which escaped from the uterus was distinctly arterial, being of a bright arterial character.

III. On rupturing a placenta whilst still partially adherent to the uterus, it was found that a small quantity of dark venous blood escaped from the part torn; but only to a very trivial extent.

These observations were made with different placenta, and uniformly with the same results.

Thus it would appear, in the canine species, that the source of hæmorrhage in cases in which the placenta is partially detached, is exclusively the denuded uterine surface, so long as the placenta is entire: that the hæmorrhage which takes place is of an arterial character; and that although a certain amount of blood may escape from the placenta, if lacerated or torn whilst still partially adherent, yet that this is very trivial in quantity, and of a dark venous character.

Considering, however, the different distribution of the veins in the maternal portion of the placenta in the human and canine species, I am aware that this experiment cannot be regarded as decisive of the source of hæmorrhage under similar circumstances in the former. We know, for instance, that in the human placenta, the utero-placental arteries open into large cells or dilated capillaries in the maternal portion of the organ, between which a free intercommunication exists; whereas in the bitch, the venous vessels of the maternal part of the placenta do not constitute a cellular or cavernous structure, but in form and distribution resemble ordinary veins. These circumstances were particularly pointed out by Dr. Sharpey, to whom I communicated the results of the experiment I have related; and in the course of a subsequent conversation he observed that, in his opinion, the best mode of ascertaining the source of hæmorrhage in partial separations of the placenta in the human female, would be to obtain a uterus to which the placenta was still partially adherent, to inject the hypogastric arteries with defibrinated blood, and to observe whether it escaped from the uterus, the placenta, or from both.

In the early part of April 1853, I had an opportunity of carrying out this suggestion. A poor woman under the care of Messrs. Clark, Norway, and myself, died of hæmorrhage during the progress of a labour, rendered protracted by malposition and impaction of the fetal head. A *post mortem* examination of the body was made on the following day, and as it was found that the placenta was still partially adherent, although much of it had been detached, it appeared to me that it would serve the purpose in view. Accordingly the uterus and placenta were removed to University College, where the following observations were made under the immediate superintendence of Dr. Sharpey.

The uterus, which had been cut off somewhere above its orifice, was first carefully inverted, and several loose unadherent coagula were removed from its interior. It had the appearance of being very exsanguine; and on the surface from which the placenta had been detached, the ramifications of the utero-placental arteries could be plainly seen, but free from any plugging or coagula; about a fifth of the placenta was still adherent. In the next place, the vessels along the cut surface of the uterus were secured by ligatures placed along the line of its division, and the hypogastric and ovarian veins were also secured by ligature. An injecting pipe was now fixed in one of the hypogastric arteries, and some defibrinated blood was steadily injected. The results of the operation were as follows. The blood escaped freely from the orifices of the utero-placental arteries, which had been torn across by the separation of the placenta; none escaped from the torn utero-placental veins, nor did any pass away from the placenta. The injection was continued for some time, but with no variation in the results. It was now thought advisable to ascertain the force with which the blood was injected; and tested by the hæmadynamometer it was found not to exceed that of the heart, acting under ordinary circumstances. In the next place, the opposite hypogastric artery was injected; and in this case it was found, as in the other, that blood escaped freely from the orifices of the torn utero-placental arteries, that

none passed out of the torn utero-placental veins; whilst in this case a small quantity escaped from the surface of the placenta, contiguous to that which was still adherent. The injection was repeated several times with the same results; the great bulk of the injected blood escaped readily from the orifices of the torn utero-placental arteries, a small quantity only came from the placenta, whilst none could be observed to pass out from the torn utero-placental veins, whose orifices were plainly visible and carefully watched. Nor, it should be added, were the vessels plugged with coagula.

Looking then to the results of this experiment, it would appear that the source of hæmorrhage in partial but extensive separations of the placenta is principally uterine, and only slightly placental, and further, that it is arterial rather than venous. It would, however, be too much to assume that the experiments are conclusive as to the source of hæmorrhage in all cases of placental separation. It must be remembered, that in this case the placenta was very greatly detached, and as, consequently, little blood only could have entered it, much could not be expected to have escaped from it; whilst, again, the tonicity of the arterial system could not have been great during life, as evidenced by the little resistance offered by the utero-placental arteries to the escape of the blood injected. Admitting however the full force of these and other considerations, it yet appears to me that the results of this experiment, coupled with those of the one previously related, and taken in connection with various clinical facts, afforded strong grounds for the belief that the *principal* source of hæmorrhage in cases of partial separation of the placenta is uterine rather than placental, and arterial rather than venous.

What then it may be asked are the grounds upon which it is affirmed that these hæmorrhages are respectively either venous or placental? The best reply to this question is probably that given by Dr. Simpson, in the passage I have quoted from his writings. "Uterine hæmorrhage," he observes "after separation of the placenta in any of the stages of labour, is *not arterial* in its character, because the utero-placental arteries are so long and slender as to become readily closed: 1. By the tonicity of their coats. 2. By contraction of the uterine fibres upon them. 3. Principally by the changes in their tissues, produced by the mechanical rupture of their coats." These probably constitute the entire grounds upon which the opinion in question is maintainable; and I will therefore proceed to consider respectively their nature and validity.

I. The assertion "*that uterine hæmorrhage after the separation of the placenta in any of the stages of labour, is not arterial in its character,*" is one which, so far as I am aware, is not only unsupported by any evidence, but directly at variance with many trustworthy observations. On the 23rd of September, 1853, I had an opportunity of investigating this point, and of satisfying myself that the hæmorrhage which took place from the uterus, between the birth of the child and the expulsion of the placenta, was distinctly of an arterial character. On the 10th of October, 1853, whilst in attendance upon a case of labour, my attention was directed to a rather profuse flow of blood which followed the birth of the child; and I observed, as it passed over the vulva, that whilst the greater part was of a bright arterial colour, a small portion was of a dark venous hue; the striking difference in the colour of the two portions left no doubt in my mind that they were respectively arterial and venous. The same thing was observed in the experiment I have related, in which the placenta was detached from the uterus of the bitch. The blood which flowed freely from the denuded uterine surface was of a bright florid colour, and such as to convince both Mr. Marshall and myself that it was arterial. I further find that the observations I have myself made, as to the character of the blood lost in uterine hæmorrhages, are similar to those which have been made by other medical men; and therefore, in the absence of any evidence to the contrary, we may, I think, conclude that uterine hæmorrhage after the separation of the placenta is rather of an *arterial* than a *venous* character.

II. The second point affirmed is, "*that arterial hæmorrhage from the uterus is prevented by the tonicity of the utero-placental arteries*". It is far from my intention to assert that, in a state of health and tranquillity of the circulation, this is not the case; but, under other circumstances, it may be doubted whether the principle in question can be relied upon for the attainment of this object. The tonicity of the arteries, like every other vital property, is liable to be modified or affected by a variety of circumstances; and, regarded as a modification of the principle of contractility, may be supposed to be influenced by the same general causes; to be increased by those which tend to augment the strength and vigour of the body, diminished by those which tend to enervate or exhaust it, and disturbed by those which tend to disturb the nervous and vascular systems. Now, if we consider the circumstances under which uterine hæmorrhages are most liable to occur, we shall find that they are respectively those which tend to enervate or exhaust the constitutional powers on the one hand, or morbidly excite or disturb the vascular system on the other. One of the most alarming cases of *post partum* hæmorrhage which I have ever witnessed occurred in the wife of an eminent obstetric physician, whose nervous system and energies had been prostrated by the unexpected death of her mother about three weeks before the accession of labour. The poor woman, whose uterus was the subject of the experiment I have related, died of internal hæmorrhage consequent upon partial separation of the placenta, when her strength had been exhausted by long parturient efforts; and numerous cases are related of fatal hæmorrhages occurring in women who had been previously anæmic and weakly. On the other hand, every practitioner must have met with profuse uterine hæmorrhage in connexion with morbid excitement of the heart and circulation; and hereafter it will be shown that, of the causes of such excitement, some have a sympathetic, and others a direct mode of operation. Further, I may appeal to the condition of the utero-placental arteries in the case of the patient who died of uterine hæmorrhage, as showing that no plugging or particular contraction of them had taken place during life. Here indeed was a physical demonstration of the condition of these vessels, as they must have existed during life, after fatal hæmorrhage consequent upon partial separation of the placenta, the placenta having been separated during life: and if it can be clearly shown, as it was, that they had neither been so contracted or plugged during life as to prevent the escape of blood from them when injected with no more force than that of the heart's action after death, then it must follow, that neither could they have prevented the escape of blood from them during life, when injected under the ordinary force of the circulation. On these grounds, then, we may venture to doubt the correctness of the dogma, that the tonicity of the uteroplacental arteries is, under all circumstances, capable of preventing the escape of blood from their orifices when torn across by the separation of the placenta.

III. In the next place, it is affirmed, "*that hæmorrhage from the utero-placental arteries is prevented by contraction of the uterine fibres upon the course of these vessels, as they pass through and amid the uterine structure*"—a doctrine which is manifestly at variance with the well known fact, that there is often no direct relation between the degree of uterine contraction and the degree or tendency to uterine hæmorrhage. "The observing practitioner," says Dr. Gooch, "must have been frequently struck by the little proportion that existed between the want of contraction and the degree of hæmorrhage; having found the uterus bulky without any hæmorrhage, and a profuse hæmorrhage without greater bulk of uterus. Nay, further, I have witnessed a profuse hæmorrhage, though the uterus had contracted in the degree which commonly indicates security; and I have ventured to do what is seldom justifiable, separate the placenta before the uterus had contracted, without more hæmorrhage than after a common labour." The correctness of these remarks, and their pertinency to the question under consideration, must, I think, be generally admitted;

but, besides these, two other series of facts may be adduced, in opposition to the doctrine above propounded. First, that, in several instances, the placenta has been spontaneously or artificially separated from the uterus before the birth of the child, and, consequently, under circumstances in which contraction of the uterus could not take place, without any hæmorrhage supervening; and, secondly, that, when it has been attached to the os and cervix uteri, its separation has been effected in many cases without any particular hæmorrhage resulting, although it is affirmed by some anatomists, that there are few or no contracting fibres in the structure of the os and cervix uteri.

iv. The last proposition affirmed—"that hæmorrhage from the utero-placental arteries is prevented by the changes in their tissues produced by the mechanical rupture of their coats, torn arteries being little or at all liable to bleed, and the placenta being separated by a true process of avulsion"—is completely invalidated by the results of the experiment performed upon the pregnant bitch, which I have described in the former part of this paper; for, on detaching the placenta from the uterus, and thereby lacerating or tearing through the utero-placental arteries, arterial hæmorrhage was observed to follow. That is to say, having separated the placenta by a true process of *avulsion*, it was demonstrated that such proceeding was not productive of those changes in the torn coats of the utero-placental arteries which are assumed to follow such operation, and by which, it is alleged, arterial hæmorrhage is prevented. And, to appreciate the full force and importance of this fact to the present inquiry, it is necessary to bear in mind that the placenta of the canine, as of the human species, possesses a maternal as well as a fetal portion; that the utero-placental arteries in both pass from the uterus into the maternal portion of the organ, as do the utero-placental veins from the latter to the uterus; and that the chief difference in the anatomical structure of the two organs consists in the different distribution of the veins in their maternal portions. Accordingly, it must follow, that a separation of the placenta must equally give rise to a laceration of the utero-placental arteries in both species; and if it is clearly shown that hæmorrhage from these arteries is not thereby prevented in the one, it must follow that it cannot thereby be prevented in the other.

I have thus critically examined the several grounds upon which it is alleged that hæmorrhage does not occur from the torn utero-placental arteries in cases of partial separation of the placenta; and, having shown the insufficiency of the data upon which this doctrine has been assumed, I proceed to observe, that if blood does actually escape from these vessels, it must follow that proportionately little will escape from either the uterine veins or the placenta; because, according to the well known laws of hydraulics, fluids circulating in closed vessels will only continue in their regular course when due pressure is maintained upon them. Now, under the circumstances stated, this condition is not fulfilled; and, accordingly, the greater part of the blood entering the utero-placental arteries will escape from their open orifices, rather than be continued onwards into either the uterine veins or placenta. In this respect, it must be borne in mind that the character of the utero-placental circulation must materially differ before and after separation of the placenta. In the former case, the pressure upon the circulating blood is equalised throughout; whereas in the latter, it is unequally distributed, and accordingly there will be a tendency to hæmorrhage where this pressure is removed, or wherever openings exist in the utero-placental arteries.

The correctness of this view is further supported by a variety of circumstances, which go far to prove that the principal source of hæmorrhage in these cases is neither the uterine veins nor the placenta. As opposed to its placental origin, I may mention: First, the character of the blood lost; which, as I have stated, is principally arterial, rather than venous. Secondly, the rapidity with which the blood escapes, and its fluidity in many cases of puerperal hæmorrhage, would tend to show that it was rather poured out directly from the utero-placental arteries, than indirectly from

the placenta. Thirdly, the peculiar cellular, cavernous, or reticulate structure of the maternal portion of the placenta, may be referred to as being calculated to prevent placental hæmorrhage, by producing stagnation and coagulation of the blood in this part of the organ, when separated from its vascular connexion with the uterus. Fourthly, the occurrence of profuse hæmorrhage after the entire separation of the placenta, both before and after the birth of the child, may be referred to as showing that it has no necessary dependence upon this organ. Fifthly, the small amount of blood which escaped from the placenta when the utero-placental arteries were injected in the experiment I have related, affords strong evidence against the placental origin of these hæmorrhages. Whilst, sixthly, the escape of blood from the orifices of the torn utero-placental arteries, by lessening the quantity of blood which would otherwise enter the placenta, affords an additional argument against their placental origin.

As opposed to the venous origin of the hæmorrhage, I may adduce the following facts: First, that the blood lost is for the most part not venous. Secondly, the absence of hæmorrhage in many cases, in which those conditions exist which are most favourable to the occurrence of venous hæmorrhage, namely, relaxed and distended states of the uterus. Thirdly, the absence of hæmorrhage in many cases in which the placenta has been attached and separated from the os and cervix uteri; where the contractile mechanism of the uterus does not exist, by which it is alleged venous hæmorrhage is prevented. Fourthly, the occurrence of profuse hæmorrhage when the uterus is contracted, and when consequently the uterine veins must be firmly compressed. Fifthly, the escape of blood from the orifices of the torn utero-placental arteries; which would equally tend to prevent venous as well as placental hæmorrhage. Sixthly, the fact that no blood was observed to flow from the uterine veins when the utero-placental arteries were injected in the experiment I have related. Seventhly, the normal course of the uterine circulation being from the uterine veins to the vena cava, it must follow that venous hæmorrhage can only occur as the result of a retrograde, and consequently abnormal, movement of the blood.

Upon the whole, then, two things would appear to be certain: first, that no *necessary* relation exists between the degree of hæmorrhage and the degree of separation of the placenta; or, secondly, between the degree of hæmorrhage and the degree of contraction of the uterus; uterine hæmorrhage having been variously moderate or excessive under similar degrees of separation of the placenta, and similarly moderate or excessive under the opposite conditions of relaxation and contraction of the uterus. Can it then be doubted that the absence of, or disposition to uterine hæmorrhage must depend, in many cases, upon other causes than the anatomical connection of the placenta with the uterus on the one hand, or the contractile mechanism of the uterus on the other; or further, that these are to be sought for in the occurrence of arterial hæmorrhage, and the various conditions of the utero-placental arteries, as modified by the general condition of the arterial system? Bearing in mind this view of the case, we can understand how it may happen that, the tonicity of the arterial system being great, uterine hæmorrhage may be prevented when the uterus is most relaxed and when consequently the conditions most favourable to venous hæmorrhage exist; that under the influence of morbid excitation of the heart and arteries, it may be profuse when the uterus is contracted, and when, consequently, venous hæmorrhage would be most effectually prevented; and that its degree may vary in different cases with the same amount of separation of the placenta. Let me however be distinctly understood as speaking of *pathological*, rather than of *physiological* puerperal hæmorrhage, and of its *principal*, rather than of its *exclusive* source; because on the one hand, it can scarcely be supposed, that the placenta can be separated from the uterus, under the most favourable circumstances in child-birth, without some hæmorrhage resulting, which therefore cannot be regarded as pathological; nor, on the other, can it be supposed that

such hæmorrhage should be derived exclusively from the torn utero-placental arteries. It has indeed been experimentally shown that some blood does actually escape from the detached portion of the placenta when the hypogastric arteries are injected, and the quantity so escaping will doubtless vary in different cases, and I have referred to an observation in which venous blood was discharged mixed with arterial, in a case in which hæmorrhage preceded the expulsion of the placenta. It is therefore highly probable, that in all cases the source of hæmorrhage is of a mixed character. But, looking to its source in those which are so considerable as to endanger the safety of the patient, it appears to me that the facts adduced are sufficient to justify the conclusion that it is principally arterial; and that, although blood may simultaneously escape from the utero-placental veins and placenta, the quantity lost by these channels considerably falls short of that which escapes from the torn utero-placental arteries.

In conclusion, we may, I think, deduce from a consideration of these facts some rules of practical importance in the treatment of puerperal hæmorrhages, whether occurring in connection with partial or complete separation of the placenta. In particular, we may learn the importance of treating them upon broader principles than those derived from a consideration of the condition of the uterus or the degree of separation of the placenta; and the necessity of investigating carefully the physiological and pathological states of the nervous and vascular systems, both before and during labour, with a view to the adoption of measures of a preventive, as well as curative character. It is not my intention to enter at length upon this subject; but a brief reference to the principles upon which the prevention of puerperal hæmorrhage should be attempted, will not be inconsistent with the object of this paper.

Apart from the anatomical condition of the uterus and placenta, it will be found in practice that hæmorrhage during labour is liable to be excessive, in connection with two opposite states of the vascular system. In the one, there is morbid excitement of the heart and arteries, directly or sympathetically induced; in the other, there is a state of extreme depression of the circulation dependent either upon atony of the blood vessels, or an impoverished condition of the blood. As both these conditions may exist and be recognised before the accession of labour, I will briefly advert to the curative indications they suggest.

Hæmorrhage occurring during labour, in connection with inordinate excitement of the circulation, has been well illustrated by Dr. Gooch, as well as the treatment it requires, in his paper on a peculiar form of hæmorrhage from the uterus. The patient before the accession of labour was flushed, and had a very full quick pulse. Abstinence from meat, wine, and warm drinks, a cool room, and a saline purgative, diminished but did not remove this state of the circulation, which continued in a considerable degree when the child was born. It was expelled very gradually, and after the removal of the placenta the uterus felt contracted in the ordinary degree. Nevertheless about twenty minutes afterwards, there came on one of the most frightful hæmorrhages which, Dr. Gooch observes, he had ever witnessed. Twelve months afterwards he attended the same patient in a subsequent labour, and was struck on observing the same state of circulation which had preceded the first. The labour proceeded naturally, but was again followed by profuse and alarming hæmorrhage. Reflecting upon these facts, Dr. Gooch was led to believe that the hæmorrhage depended not upon want of contraction of the uterus, but on want of tranquillity of the circulation; and he concluded if she again became pregnant, that a mode of treatment which would cause her to fall in labour with a cool skin, and quiet pulse, would be the best means of preventing a recurrence of the accident. In due time he had an opportunity of testing this practice; and although in the first instance he was unsuccessful, yet in another, by means of an abstemious diet, saline aperients, and the moderate abstraction of blood from the arm before delivery, the

labour was completed without the smallest degree of flooding or faintness. The principle upon which this variety of uterine hæmorrhage should be treated, is sufficiently indicated in these details.

In a second series of cases, it has appeared to me that hæmorrhage during labour has been immediately dependent upon a disordered state of the circulation, excited by functional derangement of the liver and digestive organs. Such patients suffer for some time before labour, from constipation, flatulence, and other symptoms of indigestion; and if the stools are examined, they are found to be of a pale, o-clay colour.

Profuse hæmorrhage under these circumstances may either immediately follow the birth of the child, or may continue to recur for some time after labour. In two instances recently attended by me, profuse hæmorrhage followed delivery; and in both the state of the hepatic functions, was such as I have described. The recurrence of hæmorrhage led to an examination of the stools; in each case they were found to be clay coloured, and almost destitute of bile; and on restoring the action of the liver, the disposition to hæmorrhage was in each case removed. From these facts I have been led to believe, that many instances of puerperal hæmorrhage might be prevented by inquiring into the condition of the liver and digestive organs before labour, and adopting such means as would rectify any derangement which might exist.

The second class of cases I have referred to, are those in which puerperal hæmorrhages occur in connexion with an enfeebled state of the circulation; and this, inasmuch as it may have existed long antecedently to labour, is eminently amenable to preventive measures of treatment. It is met with in females whose physical health has been deteriorated or depressed by bodily disease, laborious or unhealthy occupations, or mental anxiety, and comprehends a very numerous category. In these, either from atony of the blood vessels, or an extreme fluidity of the blood, but little or no barrier is opposed to the escape of this fluid; and if preventive treatment has not been adopted, but little good will sometimes result from any other. In all such cases the treatment should be of a prospective character, and directed to the improvement of the health before labour by the employment of such measures, hygienic and medicinal, as will amend the condition of the blood and augment the tone and vigour of the arterial system. In proportion as anæmia preponderates, iron will be indicated; where atony of the nervous and vascular systems is the more prominent condition, strychnia should be preferred; whilst in cases in which both these pathological elements coexist, a combination of both remedies will answer best.

As regards curative treatment, I would wish more especially to direct attention to the advantages likely to be derived from the employment of galvanism in these cases; not, indeed, locally applied to the uterus, but employed in a more general and diffusive manner, with the view of imparting increased tone to the arterial system at large. This, I believe, may be accomplished by passing somewhat powerful single currents from the upper portion of the spinal cord through the uterus. The opportunities I have had of observing the action of galvanism in obstetric practice, induce me to think favourably of it in these cases, and some investigations commenced with the view of determining its power in arresting arterial hæmorrhage support this opinion: whilst it must not be forgotten, that several cases have been published in which uterine hæmorrhage has been thus speedily arrested. I will only add, that if my view of the source of hæmorrhage in cases of partial separation of the placenta is confirmed, it will prove a most valuable auxiliary in the treatment of placenta prævia; simultaneously tending to the arrest of hæmorrhage, and the dilatation of the uterus.

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