

ECTOPIC GESTATION WITH VIABLE CHILD; WITH
REPORT OF THREE CASES.¹

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WHILE ectopic gestation is a comparatively common occurrence, the fetus rarely survives the first two or three months of its existence. Rupture of the ovisac usually takes place within the first two months of gestation, and with it or even before that the fetal life is terminated. Occasionally, however, through some fortunate accident, the ovum is not completely detached, at the time of rupture, from its original site and the placental circulation remains undisturbed. In such instances new attachments between the ovisac and the structures with which it is brought into contact are formed, enabling the fetus to survive the catastrophe and to continue its growth until it reaches the period of viability, unless a new or secondary rupture terminates its existence before that advanced stage of development is reached. In spite of the most unfavorable conditions in which the ectopic fetus finds itself placed under such circumstances, cases in which the viable period has been reached are no longer so extremely rare as Sittern ("Ergebnisse der in den letzten 20 Jahren durch Köliotomie bei lebendem Kinde operirten Fälle von vorgeschrittener Extrauterinschwangerschaft," *Archiv für Gynäkologie*, vol. lxxxiv., Heft 1) has recently been able to collect 145 cases from literature in which a living fetus of viable age has been delivered by means of operation. This number could be greatly multiplied were the cases considered in which dead fetuses of advanced age, either macerated and decomposed or in the form of lithopedion, have been removed by operative intervention.

Extrauterine pregnancy with a viable fetus is still, however, of sufficient rarity to command more than passing interest, par-

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ticularly as there are many questions, especially in regard to the treatment, which have by no means been finally settled, and any case of this character may, therefore, help to contribute to a more definite knowledge of this freak of nature and its successful treatment. It is for this reason that I wish to put on record the three cases which it has been my unusual fortune to see during my experience and to give the result of their operative treatment.

As the first case was fully reported in the *New York Medical Record*, November 24, 1894, and in the Transactions of the American Association of Obstetricians and Gynecologists, only a brief review of the most important features will be submitted.

CASE I.—Mrs. F. McC., age thirty-five, referred by Dr. Wallace, of East Brady, was admitted to Mercy Hospital, January 23, 1894, when the diagnosis of extrauterine pregnancy with living fetus of six months was made. Operation was deferred in the interest of the fetus until April 4, when she was delivered by abdominal section of a living child. It was contained in a sac to which numerous loops of intestines were adherent and which terminated between the folds of the broad ligament. The attempted extirpation of the sac was interrupted by a frightful hemorrhage from the placenta; while my assistant used sponge pressure over the placenta, I rapidly clamped the ovarian artery in the left infundibulo-pelvic ligament and with another forceps clamped the branches of the uterine artery along the left border of the uterus, which at once controlled the hemorrhage so that the placenta, which was spread out over the spinal column and the right posterior wall of the pelvis, could now be separated with comparatively little loss of blood. It was, however, impossible to extirpate the sac entirely, as a portion of it was so firmly attached to the intestines that a complete separation had to be abandoned. The freed portion of the sac was then excised and the remainder gathered and drawn together, sutured to the parietal peritoneum and its cavity drained by a strip of iodoform gauze. The abdominal incision was then closed, excepting at the point of drainage. The patient made a smooth and interrupted recovery, and has enjoyed good health ever since. The child, though considerably deformed, was strong and showed considerable vitality and did well for two days. On the third day, however, it became very restless, its breathing became rapid, temperature rose to 104°, in which condition it continued until its death four days after delivery. The cause of death was supposed to be pneumonia, though no autopsy was held.

CASE II.—Mrs. R. B., age twenty-four, referred by Dr. Gentry, was admitted to Mercy Hospital on November 30, 1896. Diagnosis of ectopic gestation at seven and one-half months was made.

Family history negative. Puberty at fourteen, menstruation always regular and painless. Married four years. She had one child twenty-one months ago, labor was very easy and convalescence normal. No miscarriages. Has never been ill of any account. Present illness began in April, when she missed her period, which, however, reappeared May 18. Previous to April, her menstruation had always been very regular.

In September she was compelled to go to bed with "inflammation" for four weeks, and at that time she first discovered quickening. Pains have been very severe since September and more or less constant. On examination the shape of the abdomen was found to be very peculiar and irregular. It contained a large mass about the size of six months' pregnancy filling out the right quadrant more prominently than the left one. Fetal movements could be distinctly felt by abdominal palpation and fetal parts could also be palpated, especially the head, of which the anterior and posterior fontanel were especially well-marked. The fetus apparently occupied a rather transverse position in the abdominal cavity. Bimanual examination shows the cervix to be soft and flabby and with old lacerations. Parts of the fetus can also be very plainly palpated through the vaginal fornix. The uterus was slightly enlarged and pushed to the left. The point of separation between the uterus and gestation sac could be distinctly felt up to the fundus, excepting at the right cornu. The vagina had a decidedly purplish hue. Fetal heart sounds are most distinct below and to the right of the umbilicus. The patient was thin, anemic-looking, poorly nourished and rather feeble; pulse 100 and above and very compressible.

Operation, December 14, 1896. The abdomen was opened freely and the sac exposed. It was found adherent all around, excepting on its anterior surface. The sac was then opened and the fetus rapidly delivered, scarcely one ounce of amniotic fluid escaping from the incision. The placenta was situated in the lower portion of the sac, spread out over a large portion of the pelvis. Without disturbing it, I at once began separating the sac to the upper portion of which the intestines were adherent. Unfortunately, neither the ovarian nor the uterine artery was accessible, and the plan to secure these vessels, which in the first

case had proved so signally successful, could not be carried out at this stage of the operation. We continued, therefore, to free the sac until the placental site was reached, when a terrific hemorrhage interrupted our efforts. Towels and sponges were used to make pressure upon the placenta, and my assistant also compressed the aorta, while I rapidly finished the extirpation of the sac and placenta with the adherent uterus. The appendix was also found adherent to the sac and had to be removed.

As a large quantity of blood had been lost and the operation was quite tedious, the patient left the table profoundly shocked and with a pulse of one hundred and eighty. In spite of very free stimulation during the next two days she succumbed on the third day after operation. The child's arms and legs were slightly deformed, similar to the first case but to a less degree, but it was more poorly developed, small and very feeble and survived the delivery only a few hours. As this specimen disappeared in some unaccountable manner before a very careful investigation of it had been made I am unable to give a detailed description of the sac and placenta.

CASE III.—Mrs. T. L. M———. Thirty years old. Referred by Dr. Burns, of Washington, Pa. Admitted to Mercy Hospital on September 19, 1907. Diagnosis of ectopic pregnancy at about six months. She has had three children, the youngest four years of age. Last normal menstruation, March 13, 1907. In April she had a slight show which kept up almost the entire month and was accompanied with considerable cramps at times. May 1 she had sudden severe pains in abdomen, which was followed by a slight show lasting only a few minutes. No show at all in June until she had a "miscarriage" about the middle of the month, which was, however, not accompanied by much hemorrhage. Curettement was performed on June 22, cleaning out much placental tissue. Pains kept up in spite of all though she was able to be up and around. For the past four weeks she has felt life and feels a "lump" in the left side. She has not seen any menstrual flow since June.

On examination made by me on September 4 I found the abdomen enlarged to about the size of five months pregnancy the tumor extending closely up to the umbilicus and more prominent on the left side of the abdomen, which it fills more completely than the right side. Fetal movements are very distinct. The uterus is soft and enlarged and posterior to the fetal tumor

but apparently attached to it by the upper anterior surface of the fundus. To the left of what seems to be the fundus is another smaller mass about the size of a goose-egg, soft and attached to uterus and fetal tumor. The fetal tumor is firm and solid and pretty well out of the pelvis. Dr. Burns stated to me subsequently that at the time of curettement not only placental tissue but also a small fetus was removed from the uterus, so that there could be no doubt of a uterine pregnancy complicated by an ectopic.

Operation October 17, 1907. After a free abdominal incision extensive omental and intestinal adhesions (several loops) covering the whole upper aspect of the sac, and also anteriorly and laterally, especially on the right side, were carefully separated. These adhesions were not firm excepting on the upper surface. The tumor was now bare and was carefully inspected. The sac itself was of milk-white appearance, very tense and extended down to a little below the brim of the pelvis. On the right side the sac was evidently covered with peritoneum derived from the broad ligament, containing immense blood-vessels, some finger-thick, running from the pelvis up the right lateral part of the sac to its upper portion. As these vessels were thought to supply the placenta the whole bundle was carefully tied with a double catgut ligature, by passing a slender hemostatic forceps between them and the sac, thus drawing the ligature under the vessels. This mass of vessels was then divided between the ligatures. The sac was then carefully opened in the middle upper portion when the back of the fetus was at once exposed, very little amniotic fluid escaping. The opening was rapidly enlarged with the fingers, the fetus extracted and the umbilical cord, after clamping, divided. The head of the fetus occupied the left lower portion of the sac, while the trunk was in the upper portion curled up in a semi-circle, the lower extremities and the arms occupying the cavity of the circle.

The placenta was now found in the lower portion of the sac quite intact and perfectly dry. The posterior aspect of the sac was now delivered from its adhesions until it could be safely removed from the abdominal cavity. It was now found that the whole sac was attached to the right side of the uterus; the pedicle consisting evidently, partly at least, of the right adnexa and broad ligament, the latter being of course very wide, vascular and thick near its uterine attachment. The pedicle was then securely clamped by three-clamp forceps, cut and tied in sections

by a number of heavy catgut ligatures. The only bleeding of any consequence encountered was right in the beginning when separating omental and intestinal adhesions from the sac. The rest of the operation was very much the same as an ordinary ovariectomy with adhesions. It was easy beyond all expectation. The abdomen was closed without drainage. The patient stood the ordeal very well and left the table in good condition. Her convalescence was easy and smooth and not marred by the slightest complication or disturbance. She has been in good health since.

Report of Dr. Robinson, Pathologist of Mercy Hospital.—Anatomical description: Specimen consists of a fetus, white, female sex, and of placenta. The former measures 39 cm. in length, and has 10 cm. of the umbilical cord attached to which is clamped a forceps. The cranial vault is normal. The left ear is folded on itself, the posterior half covering the anterior half. The left side of the lower jaw rests on the folded arms and has been distorted by pressure so that the face is disfigured. At the base of the second and index finger of the right hand is a reddened discoloration probably from pressure necrosis. The legs are folded and show evidence of pressure which has produced deformities. The right leg lies over the left, the thigh being flexed on the body, the leg directed downward and to the left where the ankle meets the middle of the left leg. Here it is bent around the left leg, the convexity being a little above the ankle on the lateral outer aspect. This produces a marked inversion of the foot and when the leg is extended talipes equinovarus. The opposite leg is more deformed, having adapted itself to the position of its fellow and being beneath suffered greater pressure. The portion above the ankle and for half the distance to the knee bears a depression and the tibialis anticus is atrophied here. The foot is acutely everted and flexed forming a talipes calcaneovalgus. At the flexure in the outer right side is a brownish-black pigmentation. The labia are very prominent, the labia minora protruding between the labia majora. The hair of the head is plentiful and the lanugo covers the body, being especially plentiful over the shoulders.

The placenta measures 15 cm. in diameter having a portion of umbilical cord attached. Four cm. from one margin the amniotic sac is divided equatorially and reflexed. Several prominent blood-vessels and some minor ones are seen coursing over the fetal surface of the placenta. On the reverse, the tissues

are deeply congested, irregular and roughened by numerous delicate fibrillæ or broad fibrous tags. Near the latero-central portion is a prominence of firm, pink substance resembling uterine musculature. Directly beneath is a ridge of firm flexible nature seeming to be continuous with the outer surface of the protuberance mentioned and suggesting the broad ligament in its position and formation. Behind and below the prominence is a semilunar mass, yellowish-pink in color, suspended like a hammock, apparently the ovary. At the outer and upper end of this mass is an irregular rope-like, elongated mass ligated at two places with catgut. At the thickest portion of this mass the more or less patent ends of dilated blood-vessels are seen. This rope-like process extends in a long loop diminishing in size until it reaches the area of what is probably the broad ligament and at this end shows tortuous blood-vessels beneath the peritoneum.

A flattened, pyriform mass accompanies the specimen having been discharged from the uterus by the vaginal route the day following the operation. It is firm, deep red, thickened at the narrow portion and thin at the large end, with a yellowish-white membrane within which some yellow flocculent material is seen. It is evidently a cast of the uterine cavity formed by decidua and endometrium.

That all these cases began as tubal pregnancy can hardly be questioned. The time of rupture can be estimated from the history of every case. In the first case it occurred at about the end of the second month; in the second case it seems to have occurred unusually late, about the middle of the fourth month, and in the third case severe cramps about six weeks after the last menstrual period would indicate that rupture took place at that time, though the complication with normal pregnancy and a subsequent abortion causes the symptoms to be rather mixed and consequently less definite than in the previous cases. In none has there been any evidence of a secondary rupture, though what seems to have been the primary rupture in the second case may in reality have been the secondary one, which would account for its late occurrence. In all these cases the fetus was contained in a distinct sac, in the last one possibly in its original amniotic covering. They all contained a scanty amount of amniotic fluid, not more than a couple of ounces at most and the sac in all these cases was tightly drawn around the fetus. The placenta, which in all ectopic cases is considerable larger apparently than in a normal uterine pregnancy, was spread over a large area. In the

first two cases it involved even loops of intestines, but fortunately not very extensively so that its enucleation aside from the hemorrhage proved technically difficult only in the second case.

In none of these cases was the diagnosis attended with great difficulty. In the advanced form of extrauterine the only other condition with which it might be confounded is normal uterine pregnancy. Mistakes in diagnosis are therefore less likely to occur than in the earlier forms of ectopic gestation, though even the latter cases are not usually difficult to recognize. The peculiar, irregular outline of the tumor, the very easy palpation of the fetus which seems to be almost directly under the skin of the abdomen, and the very audible heart-sounds as compared with uterine pregnancy, are such characteristic features of the extrauterine location of the child that they alone would suffice to attract our attention. In addition to this in the first two cases a part of the fetus occupied the lower portion of the pelvis and was so easily felt by the examining finger in the vagina, that it appeared that only the mucous membrane of the vaginal fornix separated it from the vaginal canal. The only difficulty experienced in the examination was the marked tenderness over the whole uterine tumor, necessitating very gentle manipulations and making firm pressure impossible without anesthesia. This unusual sensitiveness may, therefore, also be regarded as an important factor in the differential diagnosis between uterine and ectopic gestation. In all cases the uterus was considerable enlarged, the cervix softened and rather patulous as in uterine pregnancy, with some of the purplish discoloration of the vagina that is peculiar to that condition, though less pronounced than in an ordinary pregnancy. On bimanual examination the lower two-thirds of the uterus could be felt as quite distinct from the tumor, particularly with a little traction upon it with a tenaculum forceps hooked into the anterior lip of the cervix. Under anesthesia the whole fundus uteri could be palpated excepting at the side where the cornu became blended with the fetal tumor.

While it is, therefore, usually not difficult to recognize extrauterine pregnancy when it really exists I have in several instances been greatly puzzled by cases in which ectopic gestation had been suspected but which turned out to be a uterine pregnancy. In these cases there was a very atypical relaxation of a part of the uterus, that part which contained the fetus, while the other half was firmly contracted and hard. The uterine walls surrounding the fetus seemed to be as thin as tissue-paper so that they

could not be felt at all, and fetal parts could be palpated as being immediately under the abdominal skin, just as described in the ectopic cases, while the contracted portion of the uterus gave the impression of an unimpregnated womb. If repeated examinations did not clear up the matter, I have in several cases succeeded in recognizing the true condition by gently introducing one finger into the relaxed and dilatable cervix, pushing it up to the internal os where I was able to make out the intact amniotic sac. As no harm resulted in any of these cases from this maneuver, I can recommend it as a safe, satisfactory, and perfectly reliable means of establishing the exact diagnosis in such truly puzzling cases which have in not rare instances remained unrecognized until the abdomen was opened.

In the first case the operation was postponed until one or two weeks before the end of term, but on account of the marked deformity of the well-developed child delivery at an earlier period was thought more desirable, because by the absorption of the liquor amnii during the last months and the greater size of the fetus, compression of the latter by the surrounding structures would be more liable to cause deformities which an earlier delivery might prevent. While this supposition proved correct in the last two children delivered at seven and one-half months, this advantage was more than counterbalanced by the lack of development, general weakness and poor nutrition shown in the last two cases which have demonstrated to me that an ectopic fetus, which under the most favorable circumstances is at a great disadvantage compared with a child of uterine pregnancy, has very little chance of living when delivered prematurely. It is, therefore, unwise and very dangerous to the child in whose interest the operation is deferred at all, to deliver it much before the end of term.

It may be asked, why postpone the operation at all when the diagnosis of advanced ectopic gestation has been definitely made in view of the fact that ectopic children have so little chance of surviving their birth, while on the other hand the mother is not only kept in anxious suspense for weeks and months, but is also exposed to some danger from rupture and other complications?

Admitting that an ectopic child is illy prepared for life, and that most of them succumb shortly after birth, yet some of them have reached the adolescent period, one at the last report being nineteen and one-half years old. Of one hundred and twenty-

two cases collected by Sittern, sixty-three survived the first month. It seems to me, therefore, that the child has some right in this condition, provided that the mother's life is not unduly jeopardized by the delay. The greatest danger to the mother is undoubtedly from a secondary rupture of the sac. That this, however, is comparatively rare is shown in Sittern's statistics who is authority for the statement that among 579 cases in the second half of ectopic pregnancy, including 179 with viable child, only in 7.4 per cent. secondary rupture occurred.

The life of the mother is, therefore, particularly when under careful and close observation as such a patient always should be, not often very seriously endangered by the delay required to obtain a living child. Neither is the operative mortality greatly increased by postponing the operation until viability of the fetus is reached. I personally at least would favor, therefore, in justice to the child postponement of delivery to as near the end of term as the safety and well-being of the mother would permit.

In all these cases the placenta was removed with the sac, completely in the last two cases, while in the first a small remnant of the sac which was very intimately attached to the intestines, was drawn together, stitched to the abdominal incision and drained. No drainage was used in the last two cases. This brings us to the very interesting subject of the treatment of the placenta and sac. Even at the present time there is a great diversity of opinion as to the best and safest method of dealing with these important products of ectopic gestation. The placenta particularly has been the stumbling block in the treatment of this condition, and the principal reason of this has been the great danger of uncontrollable hemorrhage from these structures during operation. This fear of fatal bleeding has deterred the older surgeons from operating on cases of advanced extra-uterine pregnancy until after the death of the fetus, when the placental circulation ceases and the danger of hemorrhage is considerably diminished. Even at the present day this method finds some advocates, though the number is constantly diminishing. Very recently (*AMER., JOUR. of OBST., February, 1906*) Charles A. L. Reed advises to wait, if no urgent symptoms are present, until two or three months after the fetal death as by that time the placental blood-vessels are mostly obliterated. A delay beyond that period he regards as injudicious because absorption of decomposed products from the fetus might give

rise to symptoms of intoxication, and advanced destruction of the soft parts might expose the patient to pains and mechanical irritation from the loosened bones.

The laudable desire to deliver a viable child has influenced surgeons, however, especially in recent years to overcome the difficulties connected with the placenta and sac in various ways. Some, after delivery of the child, left the placenta and sac undisturbed, sewing the latter to the abdominal walls and draining it. The result has almost invariably been sepsis and secondary hemorrhage, so that Lusk very properly said of these that "the fortunate results belong to the domain of miracles and do not invite to imitation." In view of the fact that a dead fetus with sac and placenta has often been carried in the abdomen for years without any very serious accidents, it was tried to imitate nature by leaving the placenta and sac after the delivery of the child without draining it, that is closing the abdominal cavity completely over these structures after operation. The results, though tried in only a few cases, were not encouraging. Most of the cases became septic subsequently and in spite of reopening the abdominal cavity, proved fatal.

The only rational treatment, therefore, seems to be the entire removal of the placenta and sac whenever possible, or at least the placenta and as much of the sac as can safely be extirpated, leaving as little foreign material as possible in the abdominal cavity to invite sepsis and other disturbing elements, during the patient's convalescence. The cases in which this procedure is not possible should in my opinion be very rare, provided all necessary precautions and safeguards against that one great danger in this operation are made use of—namely, uncontrollable hemorrhage from the placenta.

The placenta derives its blood-supply mainly from the ovarian artery and its anastomosing branches of the uterine artery. If we succeed in controlling these two arteries at the onset of the operation, immediately after the delivery of the fetus no excessive hemorrhage need be feared, as was demonstrated very conclusively in my first case. The most terrific bleeding was immediately under complete control after clamping the infundibulo-pelvic ligament on one side and the vessels leading from the uterine cornu on the other. We should endeavor, therefore, to get at these important vessels as soon as possible with as little disturbance of the sac and placenta as practical. Unfortunately these arteries are not always easily accessible as I

learned in my second case. The fetal tumor completely blocked the pelvis above the uterus, so that the latter could be located only after extensive dissection and separation of the sac. I was greatly hampered by the frightful hemorrhage from the placenta when brought into close contact with the latter. It is, therefore, not always possible to secure these arteries in time to prevent hemorrhage and possibly to save the patient, and in such cases compression of the abdominal aorta is the only means we possess to control this truly alarming bleeding. This was resorted to in my second case but unfortunately not until the patient had lost a large quantity of blood. To anticipate this accident I should, therefore, in the future, at least in all such cases where the ovarian and uterine arteries cannot be reached very promptly, use compression of the aorta as a prophylactic as soon as the delivery of the fetus is accomplished.

As digital compression is not entirely satisfactory for various reasons, some other mechanism should be substituted which effects compression of a wide section of the aorta, the object being temporary occlusion of the artery without injury to its walls or lumen. Surgeons have been experimenting in this line for the treatment of abdominal aneurysms and Halstead (*The Result of Complete and Incomplete Occlusion of the Abdominal and Thoracic Aorta by Metal Bands. Journal of the American Medical Association*, December 29, 1906) has devised a metal band which can be left on the aorta for hours, even days, without damaging its coats in the least. This he has demonstrated by numerous experiments on dogs and in a few instances has applied this method also on the human subject. He, as well as others, has demonstrated that such compression can be kept up for hours with safety and without fearing serious complications. There is, therefore, no reason why it should not be adopted as a means to control the bleeding and prevent the disastrous hemorrhage so much dreaded in dealing with the placenta in these cases.

My plan of procedure in advanced ectopic gestation, especially when the sac fills up the pelvis and when it is impossible to gain early access to the uterus and the ovarian and uterine arteries, would be to begin by exposing the abdominal aorta, encircling it by means of Halstead's metal band or an ordinary broad clamp whose branches have been protected by rubber tubing, such as an intestinal clamp. This should, however, not be tightened until after the delivery of the child, as too early occlusion of the vessel might jeopardize the life of the fetus by

prematurely cutting off its blood-supply. The complete extirpation of sac and placenta could now be effected without undue haste and without fear of hemorrhage. Even those cases in which a part of the placenta has become engrafted upon loops of intestines should not necessarily decide us against completing the radical operation, because resection of the damaged intestine whenever such should be required, could be resorted to, as was done by McDonald in a similar case.

Having, as I firmly believe, in the prophylactic instrumental compression of the abdominal aorta a safe and reliable means to prevent the so much dreaded placental hemorrhage, which has really been the principal stumbling-block in the surgical treatment of advanced ectopic gestation, there seems to be no longer any juster ground than radical operation in this condition, consisting in the complete extirpation of the gestation sac with living placenta an operation which, in my opinion, is the only proper and correct surgical procedure for these cases.

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