THE CONDUCT OF LABOR AFTER CESAREAN SECTION*

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In Touro Infirmary there were but two cesarean sections done for eclampsia in 1924, which seems to prove that the conservative treatment of this condition will markedly decrease the number of such cases presenting themselves for delivery in subsequent pregnancies. The same rate of decrease is noted in abdominal delivery for such conditions as placenta previa, face and brow presentations, etc., and it is probable in the future that the main field for cesarean section will be in contracted pelvis. As such cases, of necessity, should always be delivered abdominally, we may eliminate them from further discussion at this time.

There are but two methods by which to deliver a case on which a cesarean section has formerly been done: another abdominal section, or an attempted labor with delivery by natural channels. In either method there is danger, and some authorities consider that the latter offers the more risk. In fact Newell, while admitting the possibility of safe delivery in the natural manner, believes the risk is so great that he inclines to the doctrine, "Once a cesarean, always a cesarean," and accordingly advises all cases which consult him to submit to operative delivery again. In the same connection he gives the incidence of ruptured cesarean section scars as 2 to 3 per cent.

In earlier years the rupture of these scars was frequent, due to the ineffective methods of suturing in vogue. Since the adoption of the Sänger method of suturing in tiers, however, the incidence of rupture has greatly decreased. From 1882 to 1895 Sänger collected a series of 500 cases without a rupture, and from 1895 to 1911 but 40 cases of rupture were reported. In an investigation covering the last five years I could find but two instances of ruptured scar at Touro Infirmary and only one instance at Charity Hospital, while during the same period there were delivered 3,096 women at Touro Infirmary and 5,555 women at Charity Hospital. It is interesting to note that the Charity Hospital case ruptured twice. The first rupture occurred when she was seven months pregnant, at which time laparotomy was promptly done and the uterine scar excised; a prompt recovery ensued. A year later the scar again ruptured at full term. Hysterectomy was done at this time, and an uneventful recovery followed. The outcome of such accidents, however, is not always so fortunate.

The strength of the uterine scar seems to depend primarily upon the method of closure of the uterine incision; if this is done correctly and

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there is no subsequent infection, the scar will be able to withstand the strain of pregnancy and labor. Experiments have been made by attaching weights to a section of a uterine wall containing a scar, and it was found that rupture usually took place in the muscle, or else began in the scar and extended through the musculature at the side of the scar.

The transverse fundal scar seems to have had more than its share of ruptures, in view of the fact that this type of operation is done much less frequently than the classical operation. Within the last few years the low cervical incision has been advocated because of its decreased chances of rupture. As a general thing we may say that if the uterus is properly sutured in tiers and the convalescence is afebrile, primary healing has probably taken place, but we must admit that the scar is an unknown factor in all cases.

In their recent textbooks Williams, DeLee and Polak have failed to discuss the handling of cases formerly delivered by cesarean section, and this omission, it seems to me, should be rectified in future editions, in view of the problems which such cases ordinarily present to the inexperienced practitioner.

I have been able to collect a small series of 21 cases of subsequent pregnancies following cesarean sections done for other causes than the absolute one of contracted pelvis. Of these six were later delivered by repeated cesarean, with two deaths, and fifteen were allowed to go into labor, three of which ruptured, with a fatal termination in two instances. The other twelve were delivered by the vaginal route by breech extraction or mid or low forceps. It is only fair to state, however, that two of these cases were admitted after the rupture had taken place and had not been carefully supervised during pregnancy and labor. It is also worthy of note that one of the twelve patients has delivered five times by the natural route since her first delivery by cesarean section.

Recently a patient of mine, twenty-eight years of age, who had had a cesarean section ten years before for eclampsia, developed pre-eclampsia at eight months, her condition becoming progressively worse in spite of intensive treatment. When her blood pressure had reached 170/100 and her albumin 25 per cent, labor was induced with one of the larger Voorhees' bags. Her pains were controlled by morphia and nitrous oxide anesthesia. When the bag was expelled, the membranes were ruptured, and when the head had reached the midplane, forceps was applied, ethylene being used for complete relaxation. A live baby was delivered without episiotomy. The albumin disappeared entirely within four days, the blood pressure dropped to normal shortly, and convalescence was uneventful. The baby is thriving. There was no difficulty in this particular case, but it should be emphasized that each of these patients should be considered as an individual problem, and

each should be watched carefully throughout the entire pregnancy by someone with sufficient training and experience to detect the first untoward sign.

It seems almost unnecessary to state that any case of former cesarean section should be delivered in hospital, and that no pituitrin should be given before delivery. If the former cesarean was done for contracted pelvis, another abdominal section is indicated. If the first operation, however, was done for other than the absolute cause, I believe the risk is less if the patient is delivered vaginally than if the cesarean is repeated, particularly in view of the fact that the average mortality rate for this procedure is at least 10 per cent.

There are certain points to be borne in mind if vaginal delivery is determined upon. The former convalescence should have been afebrile, and the pelvic measurements should be ample, with the baby not oversized. The induction of labor with Voorhees' bags two weeks before the expected date of confinement is a wise procedure in many cases. The patient should never be delivered outside of a hospital, the severity of the pains should be controlled by morphia and a general anesthetic as indicated, and midforceps should be applied and episiotomy done to relieve the strain of the second stage as soon as possible. It should be emphasized also that these precautions are necessary in every subsequent labor. One successful test of labor by the natural channel does not guarantee the scar against rupture in all following pregnancies.

Considering the fact that the incidence of ruptured cesarean scars is reported as being from 2 to 4 per cent, while the mortality following cesarean section averages 10 per cent or more, I believe it is both safer and more logical to attempt to deliver through the natural birth canal those selected cases in which the requirements we have laid down above can be met.

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DR. ADDLEY H. GLADDEN, JR., read a paper on **The Conduct of Labor After Cesarean Section** (see page 642).

DISCUSSION

DR. PHILIP'S J. CARTER.—Rupture of the cesarean scar is due to one of two things. Infection is the first cause, not necessarily an obvious infection, but the low grade type which produces practically no clinical symptoms because the toxins are absorbed as they arise. The second cause, and it is a most important one, is the type and kind of suture material employed, plus, of course, technic, and the resistance of the uterine muscle to the sutures. When we suture in tiers and include the entire musculature of the uterus, we sometimes pull the sutures too tight, and when we do, a breaking down of the muscle is almost sure to follow. In the scars which give way you will always notice that rupture occurs where the scar is thinnest. I recall assisting in one operation in which the imminent rupture could be detected abdominally beforehand, and when we opened the abdomen we found the scar as thin as paper. Tying the sutures too tight will cause strangulation of the muscle fibers of the uterus and is dangerous. I cannot give a personal follow-up on any of my own cases of former cesarean, but in several instances at the hospital I have heard indirectly of some of these cases being delivered safely afterwards by natural channels. I believe interrupted sutures are the safest. It is my practice to use about a dozen chromic No. 2 sutures, running through all the layers,

including the endometrium, and all interrupted. Then I go over the top with a Cushing suture. In that way the first line is completely covered. If infection does occur, only a few sutures may be involved and not the entire line.

DR. W. E. LEVY.—I should like to report six cases, which are possibly included in Dr. Gladden's figures, which I have personally delivered by the natural channels after a previous abdominal section. Of course in no case was the first operation done for contraction. In the average case in the clinic we had to take the patient's word for it that the previous convalescence was smooth or stormy, so that we could decide upon the possibilities of a previous infection. We delivered all these cases in the hospital, and in more than one instance the operating room was ready in the event that rupture did occur. I recall delivering one woman twice *per vaginam* after cesarean section. The second stage of labor should be made as short as possible in all these cases. The woman who has had her first baby by cesarean section is for all practical purposes a primipara, and the delivery meets as much resistance from below as if it were her first child. Four of my cases, as I recollect, were terminated by forceps as soon as these could be safely applied, that is, after full dilatation had occurred. I take issue with Dr. Gladden's theory that labor should be induced ahead of term. We do not know the condition of the scar in any case, and in my opinion it is just as likely to give way at eight as at nine months. If rupture should occur, the danger of peritonitis is certainly greater if a foreign body has been introduced into the uterus than if the patient has been allowed to fall into labor normally. Of course, induction by the modified Watson method is perfectly safe, but I should certainly hesitate to do a mechanical induction. The best work on the uterine scar after section of which I have knowledge has been done by Otto Schwarz of Washington University at Barnes Hospital. He makes the point that there is no true muscle regeneration present, and that the fibrous thickness is dependent upon the type of healing and whether or not infection is present. This we cannot decide upon, but I would emphasize the point that we are gambling somewhat when we risk natural delivery after cesarean section, although, as Dr. Gladden says, the chances are in our favor in view of the notoriously poor results of cesarean section in the average hands.

DR. HILLIARD E. MILLER.—I have had the good fortune to take some five of these cases through a second labor, where the original cesarean had been done for conditions other than contraction, and I have had no rupture or threatened rupture in any of them. In all of them, however, as Dr. Levy has emphasized, as soon as the cervix was fully dilated and the head far enough down to make delivery possible, the patient was relieved of the strain of the second stage by forceps delivery. I believe the danger of rupture is rather greater after the low operation, because the incision is made through the thinned out lower segment of the uterus. which has already been subjected to considerable stretching. Dr. Losee of the New York Lying-In Hospital some time ago made an extensive study of cesarean scars which were removed at subsequent operations, and he found that in practically every instance where the scar was weak, there was definite evidence that it had healed by granulation, or that the endometrium had not been properly closed and seepage of the lochia or clotted blood had occurred. For this reason he lays stress upon the necessity of closing the endometrium also. The old idea, which is contrary to this view, was that if the endometrium were closed, the lochia would infect the stitches as they went through it, but careful studies of cases in which closure of the endometrium was done proves that there is no particular danger from this source. For my own part, I propose in future cases to include the endometrium in my suture line. I might add that in one case in my series, in which I delivered the patient of her second baby by forceps, Dr. Jeff Miller recently delivered her of triplets without instrumental assistance.

DR. E. L. KING.—We are always gambling, as Dr. Levy has said, when we deliver these cases by the natural route. I believe, too, that the incidence of rupture of the scar is more than the 4 or 5 per cent commonly reported. Several years ago Holland collected a series of several thousand cases delivered by cesarean section and made a report thereon in the *British Journal of Obstetrics and Gynecology.* Four hundred and forty-eight of these women were subsequently delivered of second babies, the incidence of rupture being about 4 per cent. In 352 cases, however, delivery was by a second cesarean operation; in other words, there was no chance of rupture, for natural delivery was not attempted. That left only 96 patients who were allowed to go into labor, and as 18 scars ruptured, the incidence is raised to over 18 per cent. You will note how that compares with Dr. Gladden's series of 15 cases with 3 ruptures. I take it that we are really deluding ourselves when we say that the incidence of rupture is from 3 to 5 per cent, but I still believe that the chances are in our favor when we attempt delivery from below. The method of suturing has attracted much attention, and in this article of Holland's to which I refer the statistics seem to show a leaning towards interrupted, buried silkworm sutures to close the uterine wall, reenforced by catgut for the uterine peritoneum. The series of silkworm cases, however, was too small to justify basing any definite conclusions thereon. To my mind the suture material does not make nearly so much difference as the technic. We have to bear in mind always that in these uteri, involution is going on and a wound originally 4 inches, say, at the end of a few days is not more than half as large, so that there is bound to be some slack in our stitches, and the wound may open up and heal secondarily instead of primarily. Dr. Gamble of Johns Hopkins studied histologically a series of 15 uteri removed at operation subsequent to a former cesarean section, and compared the condition of the scar with the temperature chart of the former operation. He found no apparent correlation between the condition of the scar and the former convalescence. Patients with febrile charts showed strong scars, and patients with practically normal temperatures showed weak scars, which seems to prove that reliance on the history of the former convalescence may give us a false sense of security. I believe that we are right in attempting the delivery of selected cases from below, but I also believe that we are running considerable risk of rupture, and if this does occur, the mortality rate will be high. I remember one patient who was delivered of her first baby by cesarean section. In her second labor she was in the operating room on the table, ready for laparotomy, when rupture of the scar occurred, and death ensued before the operation could be completed. I would like to add to Dr. Gladden's series a case which was recently delivered at Touro with excellent results by midforceps. I have information also regarding another case, which is possibly included in Dr. Levy's number. She had her first baby by cesarean section at Charity Hospital many years ago, her second baby by cesarean section at Touro, her third baby was delivered there by Dr. W. E. Levy by midforceps, and her fourth baby has recently been delivered by the natural channel without instrumental assistance of any sort.

DR. GLADDEN (closing).—I did not, of course, intend to try to draw any conclusions from a series of 21 cases, but I did mean to make the point that the old theory that one cesarean means a second cesarean is not necessarily good obstetrics. All of the literature I have consulted on this subject seems to stress approximation of the uterine layers as the most important single factor in guarding against subsequent rupture, and not including the endometrium, as it would weaken the scar. The idea of inducing labor in these cases prematurely is that it is easier to deliver a five pound baby than an eight pound one, and that the strain on the uterine muscle with its possibly weak scar is certainly less. I can see Dr. Levy's point, however, that there is an added danger of infection if rupture does occur and there has been interference.