

# THE TECHNIC OF CESAREAN SECTION, WITH SPECIAL REFERENCE TO THE LOWER UTERINE SEGMENT INCISION\*

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## THE UNSATISFACTORY NATURE OF THE UTERINE SCAR AFTER THE ORDINARY LONGITUDINAL INCISION

PRACTICALLY all writers have been forced to the conclusion that in a fair percentage of cases the scar after the ordinary longitudinal incision is not satisfactory. Couvelaire<sup>1</sup> states that in 17 per cent of cases there is an unsatisfactory cicatrix, in 10 per cent extreme thinning of the cicatrix, and in 2 per cent rupture of the uterus. Losee,<sup>2</sup> McPherson,<sup>3</sup> and Findlay<sup>4</sup> give somewhat similar experiences.

Eardley Holland<sup>5</sup> organized, early in 1920, among a large number of obstetric surgeons in Great Britain and Ireland, a follow-up inquiry into the subsequent obstetric history of hospital patients who had had cesarean section performed between the years 1912 and 1918, inclusive. He summarizes his results in the following table:

|                                                                                                                                                                                      |       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| Total number of cesarean section patients (excluding fatal and sterilized cases, and cases of repeated cesarean section where the first operation was performed prior to 1912) ..... | 1,605 |
| Number followed up .....                                                                                                                                                             | 1,103 |
| Number in whom no subsequent pregnancy occurred .....                                                                                                                                | 616   |
| Number who subsequently became pregnant .....                                                                                                                                        | 487   |
| Results of pregnancies:                                                                                                                                                              |       |
| Delivery by natural passages .....                                                                                                                                                   | 78    |
| Repeated cesarean section .....                                                                                                                                                      | 352   |
| Abortion .....                                                                                                                                                                       | 47    |
| Pregnant now .....                                                                                                                                                                   | 86    |
| Rupture of scar .....                                                                                                                                                                | 18    |

These figures show that the frequency of rupture of the scar in subsequent pregnancy or labor (cases of abortion and early pregnancy excluded) is 18 in 448, or 4 per cent; also, that the proportion of ruptured scars to cases of delivery by the natural passages is 18 to 74, or 1 to 4.3.

Two of the most important contributions to the macroscopic and microscopic appearances of the uterine scar of the ordinary longitudinal incision are by Gamble<sup>6</sup> and McIntyre.<sup>7</sup> The latter found in his investigations that the scars contained a relatively large quantity

\*Read by title.

of fibrous tissue. He did not find, even where the healing process was most satisfactory, an absence of fibrous tissue and a muscle regeneration, as Gamble states occurs under ideal conditions.

We take it, therefore, that there is definite evidence that the uterine scar after the longitudinal incision is not as sound a scar as is generally supposed, and that it frequently gives way completely or partially.

THE REASONS WHY THE UTERINE SCAR WITH THE ORDINARY LONGITUDINAL  
INCISION IS SO FREQUENTLY DEFECTIVE

If a general surgeon were asked his opinion why the cesarean section wound is unsatisfactory in a number of cases, he would almost certainly give the answer that it is due to faulty technic. The explanation, however, is not so simple, for, as I shall try to indicate, the process of healing in the uterine wound is liable to certain disturbing factors which do not prevail in wounds elsewhere.

The first of these is the difficulty in securing complete asepsis. Now, this is specially difficult with the uterine wound, because of the danger of upward infection from the vagina. As cesarean section has often to be performed with the patient imperfectly prepared, and upon a structure so easily infected, it is not to be wondered at that even in the hands of the most careful and experienced operators infection of the uterus from below cannot always be prevented.

Another very important factor which militates against an absolutely normal healing in the uterine wound is the fact that the uterine muscle fibers during the puerperium are in a state of degeneration. An autolysis occurs in the muscle fibers. It is highly probable, therefore, that the healing process is interfered with in the early days of the puerperium as a result of this degeneration.

A third disturbing factor is the fact that the sheets of muscle which form the uterine wall are irregularly distributed, and this is seen very markedly in cesarean section whenever the uterus begins to retract. The surface of the wound, then, instead of being smooth, becomes irregular and puckered, and no matter how carefully the surgeon stitches the wound it is difficult to prevent the occurrence of small pockets of blood when he brings the surfaces of the wound together.

A fourth disturbing factor is the state of unrest of the uterus subsequent to operation. Not only does the uterus "retract," but from time to time it "contracts." If the uterus contracts before the sutures are inserted it will be observed that the edges and surfaces of the wound gape; while if the sutures are tied they appear strained when the uterus contracts. This alternate contraction and relaxation of the uterus, therefore, disturbs coaptation and lessens the hold the

stitches have on the tissues, and so favors the occurrence of small collections of blood between the coapted surfaces.

A fifth and very important factor is the necessity imposed upon the surgeon of using his ligatures not only as coaptors but as hemostatic agents. For the ideal healing of a wound, next to asepsis comes complete hemostasis. The general surgeon secures this by picking up bleeding vessels and if necessary applying ligatures to them. The obstetric surgeon cannot do this. He has to apply his sutures firmly if he wishes to stop bleeding and prevent the effusion of a certain amount of blood between the cut surfaces of the uterine wound.

There is yet another disturbing factor. If the placenta is situated on the anterior wall, and this occurs in about 40 per cent of cases, the operator will find that he has a layer of tissue peculiarly difficult to stitch and coapt exactly. It is very spongy, very friable, and contains large vessels; and, no matter how carefully he applies his sutures, blood collects between the edges and there is a tendency for a gutter to form along the internal line of the wound. Into this gutter at the subsequent pregnancy the membranes protrude and a hernia gradually develops: this is the ordinary method of rupture in a subsequent pregnancy or labor.

I maintain that these failures very decidedly militate against an absolutely sound uterine cicatrix.

#### ADVANTAGES OF THE LOWER UTERINE SEGMENT INCISION

Anyone who has employed this method and seriously studied the formation and anatomy of the lower segment must be impressed by the following advantages this area presents to the surgeon who is anxious to secure a sound uterine cicatrix. Both Eardley Holland and I have already referred to this matter in our writings on the subject.

1. The wall of the uterus in this area is thin, especially if labor has been in progress for some time; it is often not more than one-sixth of an inch in thickness.

2. The tissue consists of fibromuscular tissue as in the upper segment, but here the fibrous tissue is much more abundant. McIntyre has tried to estimate the relative proportion of muscular and fibrous tissue.

3. It is less vascular. It is surprising how slight is the bleeding when an incision is made in this area.

4. As a result the surfaces of the wound can be more accurately approximated, and the formation of these pockets of blood clot already referred to can be prevented.

5. This area of the uterus, although it does not remain absolutely

inactive after the uterus is emptied, is more passive; and the wound has a chance of healing better, for it is less disturbed than is a wound in the upper segment. One has only to look at the appearance of the lower segment, as shown by frozen sections, to appreciate this point and its importance.

6. The wound is completely covered with the bladder wall and peritoneum. This keeps the wound extraperitoneal, limits slight infection, and prevents any adhesions of the uterus to surrounding tissues and structures.

7. Should infection unfortunately occur, it is an area that can be reached from the vagina should that be thought necessary, for the cervix can be pulled down, the bladder reflected from the cervix, and the wound drained.

8. The wound in the lower segment is not put on the stretch during a subsequent pregnancy: it is only after prolonged labor that this occurs. Very different are the conditions in the upper segment when during the whole time of pregnancy one is in doubt as to how the scar will stand the strain of the ever-increasing distension of the uterus and the active contractions of labor.

9. As far as can be judged from the literature, the few examples of weakening or rupture of the scar with the lower segment incision have been cases in which a longitudinal incision was employed. The objections to this incision are detailed under "Technic."

#### TECHNIC OF OPERATION

The patient is placed in the Trendelenburg position. One-half c.c. of pituitrin is injected into the triceps muscle to secure prompt contraction when the uterus is emptied. A longitudinal incision, about six inches in length, is made through the abdominal wall in the middle line, the lower end just reaching the symphysis pubis. The lower end of the wound is then retracted over a protecting layer of gauze with a Doyen's retractor. The rest of the abdominal cavity is protected by packing off the upper portion of the operation area with gauze. A transverse incision is made through the loose peritoneal covering of the uterus, about halfway down the lower uterine segment. In recent cases my assistant, Dr. Hendry, and I have been employing a curved transverse incision with the convexity directed downwards. The object of this line of incision is to lessen the risk of injuring the vessels at the side. We are convinced that it is a much safer incision than the longitudinal one, for with the latter there is great risk of the wound extending into the upper contractile portion of the uterus. It is an interesting fact that in the few cases of rupture or weakening of the scar of the lower uterine segment incision, the line of incision in all the cases has been vertical. If the head is not

easily accessible, pressure on the fundus through the abdominal wall often brings the occiput into the wound. To avoid handling, especially in presumably infected cases, the head may then be picked up with a pair of short obstetric forceps, used as guides and not as tractors, and the delivery completed by pressure on the fundus. The umbilical cord is ligated and divided in the usual way. A self-retaining retractor is now inserted to keep the sides of the abdominal wall apart. If the cervix is not well dilated, the placenta is delivered by compression of the fundus through the abdominal wall, and traction on the cord. An intramuscular injection of a sterile preparation of ergot is given at this stage. If the cervix is known to be well dilated,—and this is a most important advantage in an infected case,—the placental end of the cord is dropped back into the uterus, the placenta and membranes being expressed *per vias naturales* when the abdomen has been closed. By this means intrauterine manipulations are reduced to a minimum. The edges of the uterine wound are now picked up with fine tissue forceps or temporary silk ligatures. The mucous membrane, with the innermost portion of the muscle coat, is now sutured with a continuous No. 1 chromic catgut suture, the edges of the mucous membrane being directed inwards towards the uterine cavity. The remainder of the muscular coat is then carefully approximated and sutured with a continuous No. 2 or No. 3 chromic catgut suture. Great care must be taken to secure completely the lateral extremities of the incision. The peritoneum over the uterus is then closed with a continuous No. 1 or No. 0 catgut suture, the operation area being thus completely shut off. The gauze packing is now removed, and the abdominal wall carefully closed in layers. The surface of the wound is secured with an anchored dressing.

#### RESULTS OF FIRST AND REPEATED OPERATIONS

The following is a brief summary of results in a series of 107 cases:

|                | TOTAL | MATERNAL MORTALITY | PERCENTAGE |
|----------------|-------|--------------------|------------|
| Clean cases    | 82    | 0                  | 0          |
| Doubtful cases | 25    | 4                  | 16         |

In "clean" cases are included only those in which all preoperative vaginal examinations were carried out in hospital; "doubtful" include all the others. The interference in the latter series varied from the previous unsuccessful application of forceps under domestic conditions to unsupervised vaginal examinations by nurses or midwives: in twelve of the series, including two of the fatal cases, not less than five such examinations had been made in each case.

#### RECORD OF SUBSEQUENT LABORS IN 26 OF THE ABOVE CASES

|                                                           |    |
|-----------------------------------------------------------|----|
| Second cesarean section of the lower uterine segment type | 17 |
| Second cesarean section of the classical type             | 6  |
| Spontaneous delivery of a smaller child                   | 2  |
| Low forceps                                               | 1  |

There were no maternal deaths in this series. In only one of the cases already referred to was any thinning of the scar found at the second operation, and that in a case where the patient had been several hours in labor.

## REFERENCES

- <sup>1</sup>Introduction à la Chirurgie Uterine Obstetricale, p. 141.
- <sup>2</sup>Am. Jour. Obst., 1917, lxxvi, No. 1.
- <sup>3</sup>Bull. Lying-In Hospital, New York, 1910, vii, 181.
- <sup>4</sup>Am. Jour. Obst., 1916, lxxiv, 411.
- <sup>5</sup>Proc. Roy. Soc. Med., 1920, xiv, 22 (Sect. of Obst. and Gynec.).
- <sup>6</sup>Bull. Johns Hopkins Hosp., 1922, xxxiii, 93.
- <sup>7</sup>Proc. Roy. Soc. Med., 1924, xvii, 131.
- The New System of Gynecology, London, Eden and Lockyer, Macmillan and Co. 1917, iii, 527.