

THE ADVANTAGES AND DISADVANTAGES OF THE TWO-
FLAP LOW INCISION CESAREAN SECTION, WITH A
REPORT OF EIGHTY-THREE CASES DONE BY
FIFTEEN OPERATORS*

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THE material upon which this paper is based consists of eighty-three cesarean sections, done according to the technic which I first described in the *American Journal of Obstetrics*, February, 1919. As may be recalled this procedure differs from the classical operation in that the uterus is incised in the lower segment, and an extraperitoneal closure of the uterine incision is effected by utilizing two previously prepared flaps of peritoneum.

Brief notes of the eighty-three cases are recorded in Table I. In addition to the name of the operator, these notes give the duration of labor, the number of hours that elapsed between the rupture of the membranes and the time of operation, and the number of vaginal examinations made during labor. As may be observed, most of the operators employed this technic in cases which would have been considered very poor risks for the classical cesarean section. In fact only twelve of the eighty-three operations might be considered elective. The remainder were done either after an efficient test of labor, or vaginal manipulations offered a distinct contraindication to the use of the Sanger operation.

In seventy-four of the eighty-three reports studied, sufficient data were furnished to enable me to show graphically the three factors which usually are considered in the study of morbidity and mortality following cesarean section.

Figure 1 is a graphic representation of the duration of labor. Twenty-three operations were done either before labor or within fifteen hours of its onset. The remainder, or fifty-one of the seventy-four, had been in labor fifteen hours or more.

The condition of the membranes at the time of operation is shown in Figure 2. They were intact in 21 cases, and ruptured in 53. More than ten hours had elapsed between the rupture of the membranes and the time of operation, in 33 cases.

Figure 3 shows the number of vaginal examinations. Only 25 of the 74 patients had not been examined vaginally before operation.

Notwithstanding the presence of these factors which greatly increase the risk of cesarean section, only 3 mothers died. The gross mortality

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The pie chart illustrates the distribution of cases by rupture status and duration. The 'RUPTURED 59 CASES' section is shaded and divided into 15 sub-sections representing durations from 1 hour to 8 hours. The 'NOT RUPTURED 21 CASES' section is unshaded and divided into 6 sub-sections representing durations from 1 hour to 3 1/2 hours.

Rupture Status	Duration	Number of Cases
RUPTURED (59 CASES)	1 HOUR & CASES	1
	1 1/2 HOURS & CASES	1
	2 HOURS & CASES	1
	2 1/2 HOURS & CASES	1
	3 HOURS & CASES	1
	3 1/2 HOURS & CASES	1
	4 HOURS & CASES	1
	4 1/2 HOURS & CASES	1
	5 HOURS & CASES	1
	5 1/2 HOURS & CASES	1
	6 HOURS & CASES	1
	6 1/2 HOURS & CASES	1
	7 HOURS & CASES	1
	7 1/2 HOURS & CASES	1
	8 HOURS & CASES	1
NOT RUPTURED (21 CASES)	1 HOUR & CASES	1
	1 1/2 HOURS & CASES	1
	2 HOURS & CASES	1
	2 1/2 HOURS & CASES	1
	3 HOURS & CASES	1
	3 1/2 HOURS & CASES	1

NO VAG. EXAM. 25 CASES

NO VAGINL EXAMINATIONS 25 CASES

VAG. EXAM. 1 CASE

VAG. EXAM. 2 CASES

VAG. EXAM. 3 CASES

VAG. EXAM. 4 CASES

VAG. EXAM. 5 CASES

VAG. EXAM. 6 CASES

VAG. EXAM. 7 CASES

VAG. EXAM. 8 CASES

VAG. EXAM. 9 CASES

VAG. EXAM. 10 CASES

VAGINL EXAMINATION

49 CASES

one. A blood culture on the fifth day showed hemolytic streptococci. The third death occurred on the twelfth day, as a result of peritonitis, which in all probability was due to the transmission of infection through the lymphatics. Only two deaths from infection, therefore,

occurred in the 71 "potentially infected" cases, a mortality from infection of 2.8 per cent in this class of cases.

The anterior surface of the pelvic viscera removed at autopsy from the case which died of peritonitis, is shown in Figure 4. The large adhesion (A) covered the scar of a previous cesarean section. The double flaps were firmly adherent (B) over the site of the incision in the uterus and prevented the escape from the uterus of infected material when the uterine wound broke open. The absence of adhesions over the site of our incision is strikingly contrasted with the presence of dense adhesions over the previous high cesarean wound. Areas on

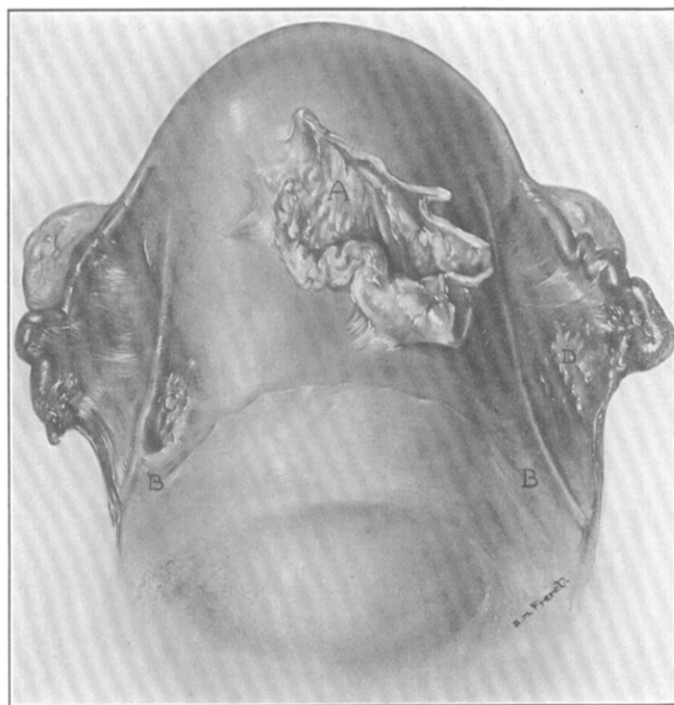


Fig. 4.—Uterus removed at autopsy 12 days after operation. Anterior surface showing (A) omental adhesion which was due to previous high Cesarean section. (B) Firmly united flaps which sealed the incision in the lower segment. (C and D) Point through which infection probably reached the peritoneum.

the broad ligaments (C) and (D), show the points through which the infection travelled from the uterus to the peritoneal cavity. The clinical picture, as well as the autopsy specimen, was similar to that seen in peritonitis complicating puerperal infection after delivery through the natural passages.

The original incision in the anterior wall of the uterus (A—B) Figure 5, was open throughout its entire length, while the adherent peritoneal flaps and bladder prevented a communication between the interior of the uterus and the peritoneal cavity. The lower angle of

the wound (B) is so near the external os that drainage of the anterior parametrium through the cervix and vagina is possible when the uterine wound breaks down.

The classical, conservative cesarean section, because of its technical simplicity and the excellent results which have followed its use in properly selected cases, is regarded almost universally as the standard method of suprapubic delivery. The advantages of any new procedure over this accepted technic, must, therefore, be definitely proved and

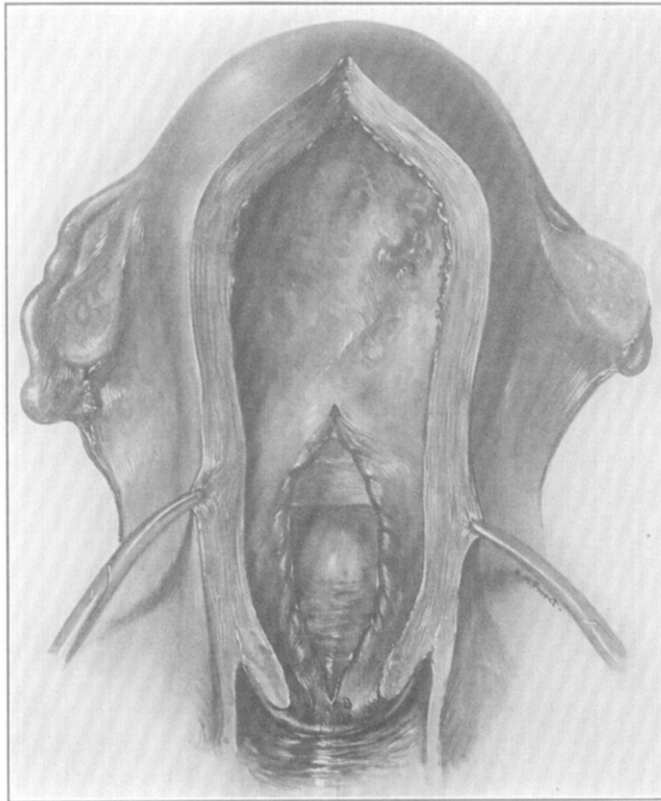


Fig. 5.—Posterior wall incised, showing site of operations. The uterine wound *A* to *B* broken down throughout its entire length. Bladder and adherent flaps prevented contamination of peritoneal cavity when the uterine wound broke open.

greatly outweigh its disadvantages if such a procedure is to survive the enthusiasm which attended its introduction. A considerable experience with the classical operation and the Krönig technic enables us to compare the advantages and disadvantages of the two flap low incision cesarean section, with those of the accepted procedure.

EXPOSURE OF THE FIELD OF OPERATION

The field of operation is more easily exposed when the classical operation is done. In our procedure the difficulty of exposure is less

than that encountered in the usual pelvic operations and is greatly diminished by the use of the Trendelenburg posture whenever the bladder reflection is below the level of the lower angle of the abdominal incision. As this area rises with the progress of labor the field of operation is easily exposed in those cases done some hours after the onset of labor.

TECHNICAL DIFFICULTIES

The dissection of two flaps of peritoneum makes our technic somewhat more difficult. It likewise might be inferred that injury of the bladder is possible. In the hands of one familiar with abdominal hysterectomy this added technical difficulty should be quite insignificant. (Because of the occasional need for hysterectomy immediately after cesarean section, the latter operation should not be undertaken by those who are not capable of doing the former.)

EXTRACTION OF THE CHILD

Section through the fundus of the uterus permits easy extraction of the child. If the presenting part is not fixed in the pelvic brim, the same may be said for the low procedure, provided an ample incision is made. Preliminary disengagement by rectal or vaginal manipulation, or the use of forceps, will facilitate delivery in the difficult cases. Since the incision is in the lower segment, no great haste is required for the delivery, after entering the uterine cavity. The risk to the child, therefore, is not increased by the employment of our technic.

CONTROL OF HEMORRHAGE

In the low operation the placental site is encountered much less frequently than in the high. The former as a result is accompanied by less hemorrhage. Sampson's work shows the area incised in the two flap low incision technic, to be supplied by the terminals of the smaller arcuate arteries. If the midline is followed, very little hemorrhage should occur. This area is much less vascular than that incised in the Sanger operation as is shown in Sampson's x-ray pictures of an injected uterus.

Whenever it is impossible to secure proper contraction of the uterus after the delivery of the placenta, and hysterectomy is indicated for the control of hemorrhage, this operation can be better and more easily done after our procedure, since the lower segment is already exposed and the bladder flap has been previously dissected, an advantage of inestimable value, as in these cases the condition of the patient usually is poor and demands a quick hysterectomy.

Postpartum hemorrhage should not occur after a low cesarean section because postpartum relaxation may be detected and treated as

easily as after a spontaneous delivery, since the abdominal dressings are wholly below the umbilicus and permit the nurse to feel the uterus at all times.

ABDOMINAL ADHESIONS

Following the classical operation adhesions between the uterine incision and the omentum, intestines, and abdominal wall frequently occur. While we have not opened the abdomen of any of our patients who have been delivered by our operation and as a result cannot prove the absence of adhesions, it would seem that the low incision plus the better peritonization, should be followed by fewer adhesions. Bimanual examination one month after operation invariably has shown the uterus to be in excellent position and freely movable, a condition which points towards the absence of adhesions.

POSTOPERATIVE CONVALESCENCE

Because of the location of the field of operation the intestines are seldom seen and never disturbed when our technic is employed. Troublesome complications are usually absent. In fact, the convalescence is quite like that which follows a prolonged labor.

STRENGTH OF THE UTERINE SCAR

In the few cases that have returned for delivery after a previous low cesarean section, the old scar showed no evidence of weakness. The incision is through the same tissues cut in a vaginal hysterectomy and since we have noticed no ruptures following that operation, it is reasonable to assume that the scar in the lower segment is fully as strong as that in the upper. From the fact that the lower segment is passive, it would seem that better union should occur in this region. If, as suggested by Finlay and others, rupture of a previous cesarean scar is influenced by the implantation of the placenta over the site of the previous incision, a scar in the lower segment below the usual level of the placental site is less liable to be weakened by the erosive action of the villi.

DURATION OF THE OPERATION

When our technic was first employed, fully one hour was necessary for the completion of the operation. Greater familiarity with the details has reduced this period to thirty minutes in some cases. Since the classical cesarean section can be completed in from 15 to 20 minutes, the advantage in this respect unquestionably belongs to the latter. If the operator lacks dexterity, or the condition of the patient is such that the addition of a few minutes to the duration of the operation is detrimental, the element of time must be considered. The average surgeon, however, will not regard the extra few minutes re-

quired by a more perfect technic, as a serious disadvantage, when the patient's condition is good.

PROTECTION AGAINST PERITONITIS

Peritonitis following cesarean section is the result of one or more of the following factors: (1) A faulty aseptic operative technic. (2) The "spilling" of contaminated amniotic fluid. (3) Extension of a uterine infection through the lymphatics. (4) The transmission of virulent material through an infected uterine wound, which has developed in the course of a puerperal infection. While the first three modes of infection are possible, *the usual source of peritonitis is through the uterine wound*, and the clinical course is that of a puerperal infection followed by a sudden development of peritonitis due to the leakage of pus into the peritoneal cavity.

Our operation, by placing the incision in the lower segment and doubly sealing it with flaps of peritoneum, offers a two-fold barrier against the usual mode of extension of infection from the uterus to the peritoneum. The greater part of the uterine wound sinks into the pelvis immediately after its closure. Should infection extend through this wound, we may anticipate localization in the pelvis, rather than contamination of the whole peritoneal cavity. In addition to the advantage gained by the more favorable location of the incision, the double flaps offer an added protection. Within a short time after operation, these flaps become adherent and make the wound extraperitoneal. In the event of infection, they are sufficiently united by the time that the uterine wound breaks down, to protect the peritoneal cavity from contamination. Infection is thereby limited to the subperitoneal tissues from which drainage occurs spontaneously, either through the lower angle of the abdominal wound or through the separated edges of the uterine wound into the cervix and vagina.

The transmission of infection through the lymphatics or by the spilling of contaminated amniotic fluid is not avoided by the two flap low incision cesarean section. However, since these are the least frequent sources of peritonitis, the mortality following the procedure advocated in this paper will be considerably lower than that following the Sanger operation in potentially infected cases.

SUMMARY

The shorter duration of the operation, the ease of exposure, the fewer technical difficulties and the less troublesome delivery of the child, are points in favor of the classical operation, and may be regarded as disadvantages of the double flap low incision section. These disadvantages, however, scarcely warrant consideration if further experience with our procedure continues to show that it offers better protection against hemorrhage, peritonitis and adhesions, and is followed by an earlier convalescence and less risk of rupture during a subsequent pregnancy.

TABLE I

HOSPITAL NUMBER	PATIENT'S INITIALS	OPERATOR	HOURS IN LABOR	MEMBRANES RUPTURED IN HOURS	VAGINAL EXAMINATIONS	PUERPERIUM
L.I.C.H.						
1918						
6374	R. W.	J. O. Polak	27	6	3	febrile
6467	V. P.	A. C. Beck	5	0	0	afebrile
1919						
71	A. S.	J. O. Polak	64	18	1	afebrile
858	L. S.	A. C. Beck	48	?	0	afebrile
1151	S. J.	J. O. Polak	13	0	0	afebrile
1403	L. E.	J. O. Polak	4	0	0	afebrile
1831	P. S.	J. O. Polak	13	0	0	afebrile
2120	S. P.	J. O. Polak	4	0	0	afebrile
3130	M. B.	J. O. Polak	0	14	1	afebrile
3297	I. P.	J. O. Polak	0	0	0	afebrile
3326	R. G.	J. O. Polak	0	48	1	infection
3777	M. F.	J. O. Polak	0	48	0	febrile
4167	E. L.	J. O. Polak	48	?	Bag	afebrile
4301	R. B.	J. O. Polak	36	36	1	infection
4476	K. R.	A. C. Beck	48	48	1	afebrile
5239	A. T.	A. C. Beck	36	36	1	febrile
6085	L. W.	A. C. Beck	31	3	0	afebrile
6280	H. B.	A. C. Beck	10	0	0	afebrile
6282	H. B.	J. O. Polak	6	3	fistula	infection
6759	L. W.	J. O. Polak	24	0	0	febrile
6831	F. S.	J. O. Polak	29	72	1	infection
L.I.C.H.						
1920						
311	M. S.	W. A. Jewett	24	18	4	afebrile
782	R. K.	J. O. Polak	0	0	0	afebrile
902	C. L.	T. S. Welton	24	20	many	febrile
910	J. B.	W. P. Pool	24	60	many	febrile
919	A. K.	J. O. Polak	26	6	1	febrile
1348	A. F.	A. C. Beck	17	12	0	afebrile
1427	E. M.	A. C. Beck	55	50	0	afebrile
1862	R. M.	A. C. Beck	68	32	4	febrile
2095	Y. H.	J. O. Polak	36	36	0	febrile
2265	E. G.	A. C. Beck	24	6	0	febrile
2320	S. V.	J. O. Polak	0	0	0	afebrile
2402	G. F.	W. P. Pool	20	10	3	febrile
2460	L. B.	J. O. Polak	0	0	0	afebrile
2614	A. F.	A. C. Beck	24	4	0	afebrile
2757	A. K.	J. O. Polak	26	24	1	afebrile
2886	D. S.	A. C. Beck	72	14	arm pro- lapsed	febrile
2973	S. L.	R. M. Beach	70	72	6	febrile
3124	V. M.	J. O. Polak	0	0	0	febrile
3305	G. N.	G. Gibson	48	60	many	febrile
3692	J. K.	J. O. Polak	17	0	1	febrile
3877	P.	A. C. Beck	72	18	16	febrile
4340	B. F.	A. C. Beck	16	10½	0	afebrile
....	M.	W. A. Jewett	33	9	2 for- ceps	febrile
J. H.						
53373	R. S.	L. S. Schwartz	48	36	3	infection
54175	E. M.	L. S. Schwartz	29	72	1	infection

TABLE I—CONTINUED

HOSPITAL NUMBER	PATIENT'S INITIALS	OPERATOR	HOURS IN LABOR	MEMBRANES RUPTURED IN HOURS	VAGINAL EXAMINATIONS	PUERPERIUM
56430	R. S.	L. S. Schwartz	12	12	many	afebrile
57889	I. B.	L. S. Schwartz	64	61	1	infection
58536	R. S.	L. S. Schwartz	24	0	many	infection
58967	S. S.	L. S. Schwartz	18	?	many	afebrile
59063	M. R.	L. S. Schwartz	24	0	many	febrile
W. H.						
17138		T. S. Welton	0	0	many	febrile
17598		T. S. Welton	42	24	many	febrile
G. H.						
12626		T. S. Welton	72	?	6	afebrile
12842		T. S. Welton	32	7	0	febrile
12877		T. S. Welton	24	10	3	febrile
12950		T. S. Welton	32	24	many	febrile
14071		T. S. Welton	16	9	2	febrile
14158		T. S. Welton	36	10	2	afebrile
14518		T. S. Welton	0	0	many	afebrile
14612		T. S. Welton	72	50	many	febrile
B. H.						
	J. H.	Harold Bailey	24	1½	3	febrile
	B. K.	Harold Bailey	17	8	3	febrile
	J. P.	Harold Bailey	0	0	1	afebrile
S. H.						
9890	M. B.	W. A. Jewett	21	12	7	febrile
C. L. I.		J. B. De Lee	0	?	0	afebrile
L.I.C.H.						
1920						
5712	R. H.	A. C. Beck	20 plus	15	2	afebrile
5621	D. B.	H. B. Matthews	46	?	0	febrile
....	B.	A. C. Beck	40	18	4	febrile
....	M. E.	E. B. Piper	24	0	5	febrile
1459	L. R. R.	C. S. Fleming	18	3	2	febrile
1543	T. J.	C. S. Fleming	8	0	3	febrile
1732	F. X. F.	C. S. Fleming	10	2	1	afebrile
2410	A. W. P.	C. S. Fleming	24	4	2	afebrile
3 cases byJohn Me. GlynnAll unsuitable for the classical operation.						
6 cases byRichard NorrisAll unsuitable for the classical operation.						

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(For discussion, see p. 636.)