

AN ANALYSIS OF THE RESULTS IN 130 PREGNANCIES
SUBSEQUENT TO CESAREAN SECTION IN
96 PATIENTS*

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WITH the reduction in mortality as a result of improved technic during recent years, the number of deliveries by cesarean section has steadily increased. Formerly because infection was almost always to be expected with this method of delivery, it was justified only in cases of extreme pelvic contraction or when tumors so encroached on the parturient canal that it offered the only means of delivery. Such absolute indications are, of course, rarely seen even in large maternity hospitals.

While it is true that many of the added indications of today are justified, too often the decision to deliver by cesarean section is made because it is a supposedly safe and quick way out of some complicating condition. Rather than assume the responsibility of managing such conditions so that delivery through the natural passages might be accomplished the choice of delivery by cesarean section is adopted.

When we take into consideration the welfare of the mother during her future child-bearing period, cesarean section is a most serious procedure even in the hands of the expert operator.

There is no doubt that with the low morbidity associated with primary section we have a means of reducing the number of fatalities of childbearing. Nevertheless, its limitations should be known. It should not be used without definite indication because of the effect such an operation will have on the mental condition of the patient

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and her future pregnancies. The fear of a subsequent operation is often so strong as to prevent the patient from desiring to undergo the risks of another pregnancy. Holland, in a study of 1605 patients delivered by cesarean section, reported that of 1103 patients, 616 never subsequently became pregnant. Induced abortions are not uncommon among patients who have had one section.

The most frequent indication for primary section, as shown by the records of a large number of cases, is a moderate degree of pelvic contraction where disproportion between the size of the head and the pelvis was evident at the end of pregnancy.

The custom of making more frequent observations of these patients with moderate degree of contraction during pregnancy or of delaying operation until Nature has had a chance to bring about a possible normal delivery, would greatly tend to lessen the number of patients now being delivered by cesarean section.

In managing cases of placenta previa and accidental hemorrhage, other methods of delivery should have first consideration. Occiput posterior and eclampsia uncomplicated by contracted pelvis or other complications such as placenta previa should rarely require cesarean section.

Today, when cesarean section is performed for such a variety of indications, the problem of managing these cases in subsequent pregnancies deserves more consideration than it is receiving. A repeated section is almost invariably performed because of the fear of rupture with the development of uterine contractions. This fear of rupture is not based on our present-day knowledge of the anatomy of the scar but is more a relic of the days when the scar was in almost all cases imperfect as a result of the infection which was to be expected following such operations.

A great deal of study has been given to the anatomy of the uterine scar from specimens of uteri removed at time of rupture or because of other reasons in patients who had had a cesarean section. The process of healing and the strength of the scar have also been studied by experimental work on animals.

In this country Williams, in 1917, published his work on the study of the scar in ten uteri removed following a previous section. Gamble, from the same hospital, in 1923 reported further studies on eleven additional cases. The clinical analysis of a large number of cases of ruptured uteri reported during the past five years has added much to our knowledge not only as to the incidence of rupture but also the causative factors of imperfect healing.

It is the common belief of all authorities that in every case where proper apposition of the uterine muscle is obtained and no infection follows, the resultant scar is replaced by normal muscle tissue.

In such cases the structure and function of the uterus is not im-

paired, and there should be no fear of rupture from overdilatation during future pregnancies or from the changes in structure which are brought about by labor pains.

Infection which destroys the muscle tissue by necrosis is the most frequent cause of the imperfect scar. The thin area forming part of or the entire scar may contain, in the future pregnancy, some muscle tissue, or be composed only of the peritoneum in contact with the lining decidua. The danger from rupture increases with the severity of the infection and the degree of the imperfection in the scar. Holland reported that in eighty-nine cases of rupture the entire scar was involved in sixty-seven cases, a small area in twenty-two cases.

In the elective cesarean infection is rarely seen when performed by the experienced operator. When the operation is done after a trial labor infection is more frequent if vaginal examinations have been made to determine the progress of labor and especially if there have been any attempts at delivery.

If a vaginal examination is necessary during a trial labor every precaution must be taken to prevent infection. In such cases we should be able to determine the progress by abdominal and rectal palpation. A trial labor should not increase the morbidity if the strength of the patient is watched and sepsis maintained.

A faulty scar may result from improper suturing. To obtain apposition so that firm union results the sutures must be properly spaced and include the entire muscle wall. The suture must not include the decidua. Necrosis may result in areas where the sutures are tied too tightly. Defective scars are rarely seen in cases where the wound is carefully closed by the experienced operator unless infection has occurred.

We have recently analyzed the records of 96 patients who had previously been delivered by cesarean section. These patients were admitted for subsequent pregnancies at the Manhattan Maternity, and during the past six years to the Obstetrical Service of the third division at Bellevue Hospital. All of the primary sections except twenty-two were performed at these hospitals.

It has been our policy for many years in managing such patients to allow selected cases to deliver by the natural passages. If the primary section was performed in some other hospital it was often difficult to obtain satisfactory knowledge of the condition of the patient during the puerperium. Temperature at this period does not always indicate infection of the uterine wall. Infection of the wound in the abdominal wall, alone, is not infrequent. In the febrile cases adhesions between the uterus and the abdominal wall are suggestive of an imperfect uterine scar.

If from evidence during the puerperium, or from examination of the abdomen during the subsequent pregnancy, there is evidence of a

possible defective scar, the method of delivery should be by repeated section. In such cases, if we are to avoid danger of rupture, the operation should be performed before the end of pregnancy because rupture is almost as frequent during the last month of pregnancy as it is during labor. In order to avoid the risk of premature onset of pains and overdistention the repeated section should be performed about the thirty-eighth week. Despite repeated warnings many of these patients do not seek hospital care until labor has already started.

Except where the primary indication was absolute, we consider that there is a possibility of delivery by the vaginal route for many patients in whom we find no evidence of the possibility of imperfect scar.

In the large group of patients who have moderately contracted pelvis conditions are often present in the subsequent pregnancies which make a repeated section unnecessary. In such cases it may be possible to have a normal delivery. I refer to the presence in the first pregnancy of a disproportion due to an oversized child or malposition or malpresentation.

There should be no question as to the method of delivery when the indication in the first pregnancy was for some temporary condition such as placenta previa or eclampsia.

In our analysis of the records of these cases we have considered in each case: age, para, type of delivery in each pregnancy, color, nationality, type of pelvis, indication for each method of delivery, condition of scar and character of adhesions at time of operation, postoperative course, duration of labor, size of child and the result to mother and baby.

Among the 96 patients there were 133 pregnancies following the delivery by the primary cesarean section. Twenty-two of the primary sections were performed in other hospitals. Of the 96 patients 76 required repeated section in 92 deliveries. Of these, four were performed in other hospitals. Two of the patients were delivered by spontaneous premature labor, seven by miscarriage and two by induced abortion. Thirteen of the 76 patients had two repeated sections and one patient three.

Twenty patients were delivered vaginally. Of these, four had two deliveries and one had six deliveries,—a total of thirty deliveries.

SUMMARY

A study of 96 patients with 133 pregnancies following cesarean section disclosed that 76 patients had 92 repeated sections,—five of these were performed in other hospitals. Twenty patients delivered vaginally at term in thirty pregnancies, four had two deliveries, and one had six deliveries. Twenty-two of the primary sections were performed in other hospitals. Two patients had premature deliveries

besides repeated sections. Seven had spontaneous miscarriage. Two had induced abortions.

TABLE I. ANALYSIS OF 76 PRIMARY SECTIONS WHICH HAD REPEATED SECTIONS

TYPE OF PELVES	NO.	LABOR		MORBIDITY	NO. OF REPEATED SECTIONS	SIZE OF BABY		MORB.
		ELECT	TRIAL			LARGER	SMALLER	
Generally contracted	30	19	11 cases 23 hr. average	0	37	14	8	4
Flat	27	21	6 cases 28 hr. average	1-7 days 2 slight temp. No trial lab. in any case	33	15	8	5
Funnel	7	5	2 cases 50 hr. average		8	1	4	0
Deformed	5	1	4 cases 13 hr. average	1 febrile for 8 days 7 hours trial labor	5	1	2	0
Generally contracted flat	3	2	1 case 48 hours		4	1	0	2
Naegele	1	1			1			0
Normal	2	1	Long trial		2			0
Amputated cervix	1	1			2			0
				5.4%				12.6%

Indication for the Primary Section.—Of 76 primary sections followed by repeated sections, there were fourteen of the elective group which had had one or more previous stillbirths due to operative delivery before they became elective in their following pregnancies. Eight of these fourteen had one previous stillbirth each, four had two previous stillbirths, one had four previous stillbirths and one had five previous stillbirths. Of those that had trial labors in their primary section, there were two that had had one stillbirth each for their first pregnancy.

TABLE II. FINDINGS AT OPERATION OF REPEATED SECTIONS

FINDINGS	NO. OF CASES
Moderate adhesions	10
Dense adhesions	8
Adhesive bands	4
Entire ant. wall of uterus adherent to parietal peritoneum	2
Ventral hernia—mesentery and omentum adh. to peritoneum	1
Dense adhesions interfering with operation	1
Scar thin at upper angle	3

Findings at Operation of Repeated Section.—At the time of the repeated section the condition of the scar and the presence of adhesions was noted. There was only one case of rupture. The rupture occurred in a patient who had infection following the primary section. The rupture occurred in a small area at the upper angle of the wound. A small portion of the detached placenta extruded. In three cases small areas of thinning were noticed. All occurred in cases where infection had been noted at the time of the previous delivery. The adhesions were sufficient to

be noted as moderate in ten patients, dense in eight, adhesive bands in four and in one case the adhesions interfered with the operation. The entire wall of the uterus was adherent to the parietal peritoneum in two cases. In one case the mesentary and omentum were adherent to a ventral hernia.

TABLE III. ANALYSIS OF PRIMARY SECTIONS WHICH HAD VAGINAL DELIVERY

NO. OF CASES	PELVES	CESAREAN			
		INDICATION	LABOR		
			TRIAL	ELECTIVE	†
4	Generally contracted	Pelvis	1	2	1
4	Flat pelvis	Pelvis	4		
10	Normal	4 placenta previa		4	
		Eclampsia		1	
		Rigid cervix	1		
		Cyst of ovary		1	
		Large baby	1		
		Unknown			1
		Malpresentation	1		
2	Contracted outlet	Pelvis		1	1

Indication for the Primary Section.—Of the twenty primary sections done in the cases which later on delivered vaginally thirty times there were six cases which had had previous vaginal deliveries. Three of these had primary sections because of

TABLE IV. CLASSIFICATION AND METHOD OF DELIVERY IN TWENTY PATIENTS DELIVERED VAGINALLY

	METHOD OF DELIVERY					SIZE OF BABY		
	INDUCT.		BREECH	FORCEPS		LARGER	SMALLER	MORB.
	SPONT.	SPONT. VERSION	EXTRACT.	MID.	LOW			
Generally contracted		5		1			6	102
			1				1	9 days
				1				20 days
	1					1		
Flat	1						1	
	1							Stormy
	1			1		2		101
								4 days
Contracted outlet				1	1	1	1	
Placenta previa	1						1	
	1					1		
Eclampsia					1	1		
Rigid cer. 30 hr. lab.				1			1	
Cyst of ovary	1							
Large baby	2						2	
Malpresentation	1					1		
Unknown				2		2		

placenta previa, one because of malpresentation, one because of large baby and one because of contracted pelvis. In the latter the section was performed because of the disproportion caused by a large baby.

MORTALITY

- Fetal*
1. *In Vaginal Cases*
One stillbirth, in second stage four and one-half hours.
 2. *In Secondary Sections* three cases or 3.4 per cent.
 - A. Ruptured uterus
 - B. Prematurity
 - C. Prolonged labor
- Maternal*
1. *Three deaths out of eighty-seven cases* giving 3.4 per cent.
 - A. Ruptured uterus
 - B. Ruptured wound of abdominal wall
 - C. Pneumonia and empyema, death one month after section.

Mortality.—In the twenty-nine patients delivered vaginally there was one stillbirth and no maternal deaths. This stillbirth occurred in a patient admitted in labor. The delivery was spontaneous with second stage of four and one-half hours.

In the patients who had repeated sections there were three stillbirths, a mortality of 3.4 per cent. One of these occurred in a ruptured uterus. The second, where the repeated section had been performed at the seventh month because of the onset of pains prematurely and the third in a patient admitted after a number of hours of labor at home.

Maternal Deaths.—There were three deaths in the eighty-seven cases operated upon, a mortality of 3.4 per cent. The first patient died of peritonitis following rupture of the abdominal wound, the second patient died one month following the section, from pneumonia followed by empyema and the third death was due to rupture of the uterus and shock. This patient was delivered for primary section in another hospital following long labor and oversized child. The convalescence was stormy. In the second pregnancy because of normal pelvis and smaller child she was allowed to attempt spontaneous delivery. After twelve hours the patient went into shock. Immediate cesarean, with transfusion, failed to revive the patient and she died three hours later. This patient, owing to the history of the previous pregnancy, should have had a repeated section before labor started.

CONCLUSIONS

The number of cesarean sections could be greatly reduced by more frequent observation during pregnancy, and the use of trial labor in doubtful cases of moderately contracted pelvis.

When cesarean section becomes necessary for delivery the risks in future pregnancies are greatly lessened, if the operation is properly performed.

In subsequent pregnancies when we may expect firm union in the uterine wall, a repeated cesarean should not be performed without definite indication.

If repeated section is decided upon as the method of delivery it should always be performed before the end of pregnancy.

DR. F. W. RICE read a paper entitled **Analysis of the Results in 130 Pregnancies Subsequent to Cesarean Section in 96 Patients.** (For original article see page 591.)

DISCUSSION

DR. AUSTIN FLINT in opening the discussion referred to the value of Dr. Rice's study in adding to our knowledge of the seriousness of cesarean section. According to his belief it is done too often and for insufficient indications. Dr. Flint insisted that the art of obstetrics requires great skill and those without sufficient experience in that art resort to cesarean section because of its ease, but it leaves a woman who, if she recovers, presents the problem as to how a subsequent delivery should be managed. For example, if she is handicapped by a minor degree of pelvic contraction she adds to the danger of a labor through this pelvis, the added risk of having had a cesarean section. Dr. Flint stated that although at one time he favored the dictum "Once a cesarean, always a cesarean," more recent personal experiences led him to modify this. He thought it was difficult to tell which case was safe and which in danger. The important diagnostic point is the character of the convalescence from the original operation from which it must be assumed that prolonged fever would indicate a defective scar. Likewise if palpation shows a thin uterine wall, a prolonged labor is always dangerous.

Dr. Flint pointed out that a statistical study of this kind should make us more careful about doing a cesarean section in the first place. There need be no question in the presence of absolute indications, but in the elective cases it should only be done for very definite reasons and not because it is easy. In this connection he did not favor the operation for placenta previa because the "long rigid cervix" so often assumed, was rarely present in his experience. He preferred other methods of delivery. Dr. Flint had the same feeling about section in eclampsia, on account of the increased risk. Summarizing his remarks Dr. Flint believed that the way to avoid doing repeated cesarean section is to avoid doing the first one and, if required, great care is necessary to preserve asepsis and not to tie the uterine sutures too firmly, so as to avoid necrosis of the tissues. He believed that a great many of the scars became infected from accidental puncture of the decidua by sutures. Section should always be done early in labor before exhaustion supervenes and no attempt should be made to operate rapidly.

DR. JOHN O. POLAK said that in 1921 he made a study of 2200 cesarean sections done by various operators and it was found that cesarean section has a mortality greater than ordinary abdominal operations. The cases were separated into those which were purely elective, in which the mortality was 2.9 per cent in the hands of such men as J. Whitridge Williams, the late Dr. Cragin, the late Dr.

Studdiford, Dr. Hirst, of Philadelphia, and of several men in Brooklyn and New York. In the second class of cases, which had been previously handled, there was a mortality of 6 per cent, and in those cases with membranes ruptured for a long time, or those which had a long test of labor, had applications of forceps or other procedures prior to section, there was a mortality of 14 per cent. Dr. Polak claimed that any one who gets a mortality of 3 per cent should look very carefully over his methods and that greater care is necessary in the selection of cases for cesarean section. There is one factor, queer as it may seem, which does not obtain in Brooklyn, namely the mental fear of section, for in a subsequent pregnancy, patients who have had a section always want another section. They are not apprehensive. Dr. Polak believed that an important point is the site of the incision. The late Dr. Studdiford had studied this subject very carefully and his conclusions have been carefully accepted by obstetricians, namely, that the lower segment of the uterus in the median line can be incised with less danger than elsewhere. Many are apt to hurry and as a result do not "untorsion" the uterus and are then amazed to note the obliquity of the scar. If one takes into consideration the anatomy of the muscular structure of the uterus, one can readily appreciate what is going to happen to the scar which is made obliquely in the uterine wall, no matter how it is sewn up. Again, those who practiced the low section, found another advantage in the fact that there is a fascia in the lower portion of the uterus which can be brought over the line of sutured muscle, as noted by DeLee of Chicago.

Dr. Polak insisted that, during suturing, it is essential to carefully approximate tissue to tissue, without constriction and to avoid involving the endometrium. The observations of Pinley and of Phaneuf subsequently, showed that rupture of the scar is less frequent in the low section than in the high. Dr. Polak referred to the procedure followed in Glasgow by Munro Kerr and Hendry, who use a transverse incision in the thinned-out lower segment. When we realize that in the high section our trouble comes from the fact that we are working in the contractile portion of the uterus, that all infection of the uterine wound comes from the inside of the uterus, and that when we have adhesions it is the result of leakage, we can appreciate that the transverse incision in the thinned-out lower segment of the uterus will leave an intact contracting uterus which will maintain drainage, and finally covering the uterine wound with the bladder reflection makes the procedure extra-peritoneal and adds another safeguard.

Dr. Polak agreed with Dr. Flint that the way to make repeated sections less dangerous is to select the primary sections with care, but believed that there is a place for section in certain cases of placenta previa, because of the necessity in these days of doing obstetrics that produces a live baby and a live mother without much blood loss. He also felt that a large number of these women will go through subsequent labors without complications if watched in the hospital. For it is not the case of contracted pelvis that will go through labor safely, but where a section was done for other indications with a relatively normal child in a relatively normal pelvis.

There was a greater mortality from repeated sections, according to Dr. Polak, than is generally known, because such cases not infrequently have extensive protective adhesions, which become injured during operation. However that protection has not the same resistance as normal structures, and infection and morbidity are therefore higher.

DR. HENRY C. COE referred to the many difficulties which attended this operation in his earlier experience and yet he had not lost any cases, which he attributed to the fact that he was an advocate of the elective operation. Dr. Coe agreed with Dr. Polak about the value of the low median incision, as it avoided weak scars.

DR. ASA B. DAVIS noted that there were about 20 cases in which it was possible to deliver the patient by the natural method, less than one-fifth of those of the total. He did not believe that every time a cesarean section is done it means that the next delivery, or a subsequent delivery, must be by cesarean section, but wherever one cesarean section has been performed, the patient should be in the hospital a considerable period of time, ten days or two weeks before the expected time of labor, and under very careful observation. If she goes into labor, the attendant who is to care for her should remain in the hospital so that there should be a continuity of care, and he should be ready to meet any accident that may come from a rupture of the scar.

At the Lying-In Hospital, in 1924, there were 190 cesarean sections, in 1925, 196, about 3 per cent incidence in all deliveries.

"Measurements of the pelvis are brought up from time to time, but we are learning that measurements do not mean very much. There has been a change in the character of the patients. It is rather rare to see the old time rachitic pelvis or the Nägele pelvis, or similar distortions. More patients are encountered with oversize male type of pelvis. Many of those cases come in with ruptured membranes, the labor drags on, they do not dilate, they are not suitable for high forceps. Occasionally," Dr. Davis said, "we try to ease our conscience and deliver through the pelvis, but after we have gotten through and realize the conditions left behind we are dissatisfied with ourselves. We know we can deliver these cases by cesarean section. We also give the patient a trial labor. We must either deliver the child at a comfortable point or stand by and allow a stillbirth. We do not approve of that."

Dr. Davis recalled a patient who had lost two children. She presented a condition often seen in the male type of pelvis, oversize children with un mouldable heads. She was very anxious to have a live child. He delivered her by cesarean section, of a child weighing over 9 pounds. The next time she came in they dilated the cervix and did a forceps. The next child was almost precipitate. There was a general decline in the size of the children, as proved by their weight, measurements and mouldability of the head.

Dr. Davis had no fear of repeated cesarean sections. One of his cases had had seven and one had six. He believed it very risky to attempt to deliver, or wait for delivery, or allow a patient to go on in labor when she has had a previous cesarean section; and he would like to impress the fact that the surgeon who is to care for the case should be in attendance and be ready to carry the load while the woman is going through her labor, and that as soon as full dilatation occurs, if a trial labor is given, then the labor should be terminated by artificial means.

Dr. Rice in closing said that although English writers agree that rupture does occur less often following the low flap method of operation, in this country we are inclined to withhold our opinion as many cases of rupture are being reported following that type of incision. He felt that if infection was already present, this type of operation offered the best chance; but for a case where it is elective, especially for a temporary condition where there is a possibility for a woman to have subsequent normal deliveries, the low classical was better, because during labor that portion of the uterus is apt to undergo certain physiologic changes which might affect the scar.

Dr. Rice agreed with Dr. Davis that these patients should have more attention in the later weeks of pregnancy, because in a large number of sections it was shown that 46 per cent of the ruptures occurred before the onset of labor, and that we are beginning to get a little careless in allowing the patients to start labor before we perform the repeated section, for damage to the scar may be done before that time, by overdistention.