

DELIVERY AFTER CESAREAN SECTION

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THE method of terminating pregnancy following cesarean section is still a controversial matter in the present-day practice of obstetrics. Numerous articles have been published favoring or discrediting the famous dictum "once a cesarean, always a cesarean." There have been relatively few series of cases of pregnancy following cesarean section published, especially in the English literature, to illustrate the truth or fallacy of such a statement. At this time we do not wish to present any additional argument on the subject, but merely to record the outcome of all viable pregnancies which have been delivered in the Woman's Clinic of the New York Hospital following a previous cesarean section. This study covers a twelve-year period from Sept. 1, 1932, to Dec. 31, 1943, and consists of 445 viable pregnancies following a previous section.

In this clinic, each pregnancy following cesarean section is carefully evaluated as an individual problem. The patients are referred to the Dystocia Clinic where they are followed in the latter weeks of their pregnancy by one of the senior physicians. By this time, abstracts of their previous history have been obtained, so that in the great majority of cases the indications for the previous section, and the course of the puerperium are known. Each patient is carefully examined to determine pelvic measurements, approximate size and position of the fetus, and the condition of the scar. Admittedly, examination of the scar is unsatisfactory in the majority of cases, but, in a few, the defect could be palpated through the diastasis of the abdominal muscles. All cases of previous disproportion or relative disproportion are x-rayed, and the measurements and morphology of the pelvis are determined by isometric and stereoscopic methods. Patients are instructed to report any abdominal pain or soreness, and to enter the hospital before their expected date of confinement to await the onset of labor. If labor begins or the membranes rupture before admission, they are to report immediately. In the hospital, they are again re-evaluated by the attending staff. If an elective section is not done, labor is carefully observed and close attention focused on tenderness over the scar, pulse, and fetal heart rate.

Listed in Table I are the indications for the original section in the entire series. In approximately 25 per cent of the cases (112) the original section was performed in this clinic; the other three-fourths were performed elsewhere and came here for a subsequent pregnancy. The indications, in general, are the same in both groups. In our own cases, we have a smaller percentage of patients with disproportion or relative disproportion, and a somewhat greater number of patients with placenta previa and premature separation of the

TABLE I. INDICATIONS FOR ORIGINAL SECTIONS

	TOTAL CASES	SECTION N.Y.H.
Disproportion	253	55
Relative disproportion (i.e., disp. with breech, hydroceph., x-ray disp., unengaged vertex after 12-hour trial of labor)	26	5
Defective powers of labor (i.e., weak uterine scar, desultory labor, cervical dystocia, constriction ring)	30	4
Premature separation of placenta	23	15
Placenta previa	38	11
Abnormal presentation	15	6
Severe pre-eclampsia or eclampsia	20	6
Obstruction to soft parts (i.e., cysts, vesicovaginal fistula)	4	1
Fetal distress (i.e., prolapsed cord, maternal disease)	3	2
Elderly primigravida	3	2
Miscellaneous	7	3
Unknown	15	0

TABLE II. TYPE OF PREVIOUS SECTION

Classical	169
Cervical	141
Extraperitoneal (Latzko)	21
Peritoneal exclusion	1
Total	332

TABLE III. TYPE OF DELIVERY AFTER PREVIOUS SECTION

Cesarean section	257	(58%)
Classical	165	
Cervical	87	
With hysterectomy	5	
Vaginal, operative	98	(22%)
Low forceps	65	
Midforceps	17	
Breech extraction	8	
Other	8	
Vaginal, spontaneous	90	(20%)

placenta. The type of previous section was known in 332 patients, as shown by Table II. In patients with more than one section, that occurring just prior to the present pregnancy is the one recorded.

Table III shows the type of delivery which occurred after cesarean section. Fifty-eight per cent of the patients were delivered by another section. About two-thirds of these were classical sections, and one-third, low flap. There were five sections with hysterectomy because of ruptured uteri. Forty-two per cent of the patients were delivered vaginally. Slightly more than one-half of the vaginal deliveries were operative, and the remainder spontaneous.

Among those patients delivered by repeated section, there are several points of interest. As would be expected, disproportion was the most frequent indication for repeated section (Table IV). A large proportion, 25.8 per cent, were indicated because of a defective uterine scar or febrile puerperium. There was a high incidence of premature separation of the placenta and placenta previa which occurred in this group of patients requiring another section, the incidence being 2.5 per cent as compared to the clinic incidence of 0.84 per

TABLE IV. INDICATIONS FOR SECTION AFTER PREVIOUS SECTION

Disproportion	140
Previous section with fever or defective scar	66
Relative disproportion	7
Previous section	14
Premature separation	4
Placenta previa	7
Abnormal presentation	5
Severe pre-eclampsia	2
Obstruction to soft parts	2
Elderly primigravida with previous section	3
Fetal distress	2
Maternal disease	1
Miscellaneous	4
Total	257

cent. One patient had cesarean sections for premature separation of the placenta on two occasions, and two cases of placenta previa had a repeat section for the same indication.

In cases of vaginal delivery, a routine low forceps is considered the procedure of choice after a previous section. In many cases this procedure was not followed, and in others low foreep deliveries were performed for other indications, as shown in Table V.

TABLE V. INDICATIONS FOR OPERATIVE VAGINAL DELIVERY AFTER PREVIOUS SECTION

	LOW FOR- CEPS	MID- FOR- CEPS	HIGH FOR- CEPS	BREECH EXTR.	MAN- UAL RE- MOVAL PLA- CENTA	BAG INDUCT.	VER- SION EXTR.	MAN- UAL DILA- TION OF CERVIX
Previous section	51	10						
Prolonged 2nd stage	2	2						
Lack of progress in 2nd stage	3	1						
Fetal distress	7	1	1					
Breech				8				
Retained placenta					2			
Maternal distress		2				1		
Mild pre-eclampsia	1							
Transverse presentation (1 twin)							2	
Severe pre-eclampsia						1		
Pulmonary tuberculosis	1							
Intrauterine infection		1						
Cervical stenosis								1

The most marked variation in incidence of vaginal deliveries following cesarean section is found in the group where previous section was performed for the indication of disproportion, as compared to that group in which disproportion or relative disproportion did not enter into the original indication. Of 253 previous sections for disproportion, 78, or 31.7 per cent, had a vaginal delivery at this time. Among 80 of these patients who had had two sections for disproportion, 12 were judged capable of vaginal delivery and went through labor without incident. In contrast to this group are the patients who had previous sections for severe pre-eclampsia, abnormal presentations, desultory labor, and other abnormalities which are not likely to be present in succeeding

pregnancies. This group should represent the greatest possible percentage of patients with vaginal deliveries after section. Among 124 of these patients, 73, or 58.9 per cent, delivered vaginally, the remainder by repeated section.

The more cesarean sections a patient has had, the less chance there is for vaginal delivery to occur in a following pregnancy, and the more vaginal deliveries a patient has had, particularly following a cesarean section, the greater is the probability of vaginal delivery. This is well shown in Table VI.

TABLE VI. TYPES OF DELIVERY AMONG PATIENTS WITH PREVIOUS SECTION

	REPEAT SECTION	VAGINAL DELIVERY
No. with previous section only (315)		
248 one section	148	100
52 two sections	40	12
9 three sections	9	0
5 four sections	4	1
1 five sections	1	0
No. with vaginal delivery prior to section (85)	45	40
No. with vaginal delivery following section (45)		
34 one vaginal delivery	4	30
8 two vaginal deliveries	2	6
2 three vaginal deliveries	0	2
1 seven vaginal deliveries	0	1

Of 85 patients who had vaginal delivery prior to section, 40, or 47.1 per cent, were delivered vaginally after section. However, among patients who had a vaginal delivery following cesarean section, 86.6 per cent again delivered per vaginam. One patient had as many as eight vaginal deliveries following a previous section. Theoretically, the entire group should have delivered normally, but in six, added complications, such as placenta previa, premature separation of the placenta, and abnormal presentation made a repeated section necessary. Section was performed in four patients with one intervening vaginal delivery, and in two with two vaginal deliveries after a previous section. There were 248 patients in this series whose only previous pregnancy had been terminated by cesarean section. In a second pregnancy, a repeated section was performed in 148 cases (58.8 per cent) while 100 (40.3 per cent) delivered vaginally. Fifty-two patients had two previous sections and, among these, only 12 (23.1 per cent) delivered vaginally. The greatest number of sections performed on one patient was six.

In general, it is our policy to sterilize a patient at the time of her third cesarean section. With multiple scars in the uterus, pregnancy is thought to become increasingly hazardous. Sterilization was performed in 67 cases, generally by the Madlener or Pomeroy technique. We have not had any of these patients return, but one patient, who had been sterilized elsewhere, returned here for delivery. Among the 67 sterilization operations at the time of section, 56 patients had three or more living children. Eleven had only two children, but in these cases other indications were also present, such as rheumatic heart disease, hypertension, and marked defects in the uterine scar.

Though there are a large number of patients who have a repeated cesarean section, not all of these have elective operations, but many are given a trial of

labor. Of 253 repeat sections, 76.3 per cent were elective, and the remainder were allowed to go into labor. The average trial of labor lasted 10 hours and 48 minutes. In general, the decision as to whether or not a section was necessary was made before 18 hours of labor. However, there were two cases with a prolonged trial of labor of 40 and 60 hours, after which section became necessary.

The labor of patients having vaginal delivery following a previous section has recently been reviewed by Kuder and Dotter from this clinic. Among patients who had no previous vaginal delivery, labor following cesarean section was similar to that of a primigravida, and lasted an average of 17 hours and 58 minutes. Among patients who had a previous vaginal delivery, labor followed closely the pattern of multiparous labor and lasted an average of 10 hours and 48 minutes. The incidence of prolonged labor, or those of over 30 hours' duration, is 7.5 per cent, and that of precipitate labor of three hours or less is 3.2 per cent; this compares with the clinic incidence of prolonged and precipitate labor which is 9.5 per cent and 6.1 per cent respectively.

TABLE VII. PRESENTATION

	PREVIOUS SECTION NO.	PATIENTS PER CENT	GENERAL CLINIC PER CENT
Vertex	399	91.5	95.0
Transverse	8	1.83	0.09
Face	3	0.66	0.27
Breech	26	5.96	4.0
Twins (not included)	4		
Unknown	4		

As shown in Table VII, there is an unusually high incidence of abnormal presentation among these patients which may be explained on the basis of poor pelvic architecture. Fourteen of the patients with a breech presentation had had a previous section for disproportion, two had previous sections for abnormal presentations (face and chin), and one had a bicornate uterus. The patients with face presentations had all had previous sections for disproportion. Among patients with transverse presentation, one had had two previous sections; and another, one previous section, all of which were again indicated because of transverse presentation. One of these also had a pelvic kidney, and the remainder had previous disproportion with sections in earlier pregnancies. Forty-three out of 399 vertex presentations, or 12.4 per cent, were in the posterior position as compared with the usual clinic incidence of 7.9 per cent.

As one might expect, the pelvic measurements among patients with previous section are remarkable only among those in whom the indication for section was disproportion. In this clinic a pelvis with a diagonal conjugate of 11.7 cm. or below, or an intertuberos diameter of 8.5 cm. or less, is considered contracted and likely to cause dystocia. Fifty-two patients out of 253 who had a past history of disproportion had pelvic measurements which were considered within normal limits. However, the general average for the entire group with disproportion as a previous indication for section was 11.3 cm. for the diagonal conjugate, and 8.8 cm. for the intertuberos diameter. There were

only seven with a diagonal conjugate of 10 cm. or below. The smallest pelvis had a conjugate of 7.5 cm. and a transverse inlet diameter of 7 centimeters.

During recent years, the x-ray has been used more and more frequently as a check on clinical pelvic measurements. In the past, x-ray diagnosis of cephalopelvic disproportion has been notably unreliable, and has undoubtedly been considerably abused. Even now, with accepted methods of pelvimetry, mistakes in judgment are made. There were four patients in this series who had previous sections for disproportion which were based, to a large extent, on x-ray findings. At least one of these patients had an accepted type of x-ray pelvimetry; but when an x-ray series was repeated here, our interpretation was not in accord with the former one and she had an uneventful vaginal delivery.

In this clinic, x-ray interpretation and diagnosis is made by an obstetrician on the staff who, however, has had no contact with the patient whose x-ray he is interpreting. Up to the present time, we have not allowed our clinical judgment to be influenced by his opinion, but use it rather as corroborative evidence of what we find after clinical evaluation. We use the Caldwell and Moley stereoscopic technique which, in turn, is checked by isometric pelvimetry as developed by Steele and Javert of this clinic. As previously stated, part of our routine check on patients with previous section for any questionable disproportion consists of pelvic x-rays. It should be remembered that x-ray evaluation of these patients is made without any knowledge of their previous obstetric history.

The x-ray had not been used extensively in this clinic until the past four or five years, and, consequently, there are only 92 patients with a previous history of disproportion on whom we have secured x-ray data concerning the type of pelvis or prognosis as to method of delivery.

TABLE VIII. X-RAY DIAGNOSIS IN PATIENTS WHO HAD PREVIOUS SECTION ON BASIS OF DISPROPORTION

Elective section	21
Probable section	14
Possible section	21
Vaginal delivery with transverse arrest	8
Vaginal delivery without difficulty	28
Total	92

As shown in Table VIII, in 64 out of 92 cases, trouble was predicted after an x-ray study of the pelvis. In 21 patients, elective section was dogmatically advised. Almost invariably these patients had unusually poor pelvic measurements, and overriding of the fetal head could be demonstrated clinically. However, a didactic opinion of this type is rare. In most cases, the opinion as to probable and possible section are direct interpretation of the x-ray man's description. With statements such as: "poor pelvis, trouble all the way; will need hard long labor," or, "if head engages it may mold through with hard labor," a section was considered "probable." Fourteen cases fell into this

group. With less emphatic statements such as: "advise trial labor," "if vertex engages will deliver vaginally" or "will need good labor to deliver," section was considered "possible"; there were 21 such cases. In 8 patients vaginal delivery was advised, though trouble could be seen in the midpelvis and outlet; in the majority of these transverse arrest was predicted. In 28 cases vaginal delivery or an easy forceps was assured.

TABLE IX. TYPE OF PELVIS IN PATIENTS WHO HAD PREVIOUS SECTION FOR DISPROPORTION

TYPE OF PELVIS	TYPE OF DELIVERY PREDICTED BY X-RAY			
	ELECTIVE SECTION	PROBABLE SECTION	POSSIBLE SECTION	VAGINAL
True Gynecoid	7	6	3	7
Gynecoid-android	1		3	3
Gynecoid-anthropoid	1		2	1
True android	5	2	3	2
Android-gynecoid	2	1	4	3
Android-anthropoid			1	1
Android-platypelloid	2		1	
True anthropoid	1			1
Anthropoid-gynecoid				2
Anthropoid-android		1		
True platypelloid		1	1	1
Platypelloid-gynecoid			1	1

The type of pelvis is described in 71 of these patients (see Table IX). The multiplicity of pelvic forms are described by the classification of the posterior and anterior segments of the inlet into one of the four main morphologic types which they resemble most closely. This group of pelvises is too small to permit definite conclusions. It has been shown, however, that in a group of contracted pelvises the number of gynecoid forms decreases, while the number of android and flat pelvises increases in frequency. The number of flat pelvises show no variation from their normal incidence in the present series, but there is a decrease in the number of gynecoid forms and an increase in the number of android types. The gynecoid pelvis is usually found in 56 per cent of patients in the general clinic and the android in 19 per cent. In this series, though, the gynecoid is most frequent (48 per cent), the android type appears about twice as frequently as one would expect in a normal group of pelvises (38 per cent).

Another consideration of general interest in patients with previous cesarean section is the appearance of the uterine scar at the time of delivery in a succeeding pregnancy. A description of the scar, or a definite statement that no defect is noted in the uterine wall, should be included in the operative or delivery note of each patient. This information is extremely helpful for the evaluation of future pregnancies. Unfortunately, a definite note of the uterine scar was made in only 168 patients in our series. It is probable that notable defects in nearly all the patients who delivered by section are recorded, for abnormalities are generally well described in the operative notes. Therefore, the number of defects described at the time of cesarean section are more likely the defects represented in the entire series rather than the small group which

we have recorded here. Among the 168 cases where attention was directed to the previous cesarean scar, it was noted in 146 sections and 22 vaginal deliveries.

TABLE X. TYPE OF PREVIOUS SECTION WITH DEFECTIVE SCAR

Classical	40
Cervical	15
Latzko	3
Unknown	6
Total	64

Table X shows the type of previous section in cases with defective scars. From the figures presented in this table, the greatest number of defects noted were in the classical type of cesarean section. However, as we have shown in Table II, the classical section was performed in over half of the patients, and data are too inconclusive for any statement as to whether the type of section per se was a factor in increasing the incidence of uterine defects. Furthermore, a small defect would be more easily detected in the scar of the classical section.

TABLE XI. TYPE OF DELIVERY IN CASES WHERE DEFECT NOTED

Cesarean section	54
Previous section with fever	15
Defective scar	12
Disproportion	20
Previous section	2
Ruptured membranes and floating head	2
Ovarian cyst	1
Placenta previa	1
Premature separation of placenta	1
Operative vaginal delivery	7
Low forceps	3
Midforceps	2
Breech	1
Version-extraction	1
Spontaneous vaginal deliveries	3
Total	64

We have already stated that 25.5 per cent of repeat cesarean sections were performed on the basis of a defective uterine wall, either because of a febrile puerperium or faulty repair of the uterine wound. The indications for operation among patients in whom defects were noted in the previous scar are listed in Table XI. In the 46 sections where some degree of faulty union was observed in the previous scar, 22 were suspected prior to operation. The majority of the sections were indicated on the basis of disproportion; less than one-half were indicated because of a defective scar. The difficulty of evaluating the condition of the uterine scar prior to labor is well illustrated by the 62 patients in whom operation was indicated because of a suspected weak scar. Twenty-two, or about one-third, had uterine defects of all degrees; in 18 the scar was well healed or no defects could be noted; in the remaining 22, no mention was made of the previous scar which may be presumed to be unremarkable. However, the history of a febrile puerperium still remains an im-

portant consideration in evaluating a patient in a succeeding pregnancy, as the uterine defects may be expected in one of three such patients, while the incidence among other patients would appear to be much lower. Nine patients who delivered vaginally were noted at examination after delivery to have uterine defects, but in only one, where a wide thin scar was described, were further vaginal deliveries felt to be contraindicated.

TABLE XII. UTERINE SCAR AS DESCRIBED AT TIME OF REPEAT SECTION

No evidence of previous scar	61
Scar well healed	18
Adhesions but no defect	9
Scar thin	18
Small defect	10
Thin with defect	10
Very thin	13
Ruptured	6

The types of uterine scar, as described at the time of cesarean section, are listed as briefly as possible in Table XII. In the majority of cases (60.3 per cent), the scar was either not identified as such, or was described as well-healed. In cases where the scar is listed as thin or with a small defect, in our opinion, the patient could have withstood labor without danger of rupture. In these patients, the myometrium was somewhat thinner along the scar of the previous section, or there were small depressions (1 to 2 cm.) in the muscularis. There were 23 patients in whom the scar was very thin, or who had large defects in the muscularis. In several of these patients, the uterine wall was described as 1 to 3 mm. thick, and many in this group would undoubtedly have ruptured the scar with good labor. The patients with ruptured uteri will be discussed in detail.

The incidence of ruptured uteri was 1.7 per cent. Pertinent data concerning these cases of ruptured uteri is presented in Table XIII. Rupture occurred

TABLE XIII. PATIENTS WITH RUPTURED UTERI

PARA	TYPE OF PREVIOUS DELIVERY	INDICATION FOR PREVIOUS DELIVERY	FEVER IN PREVIOUS PUERPERIUM (DAYS)	DURATION OF LABOR (PRES. PREGNANCY)	TYPE OF DELIVERY	RUP-TURED SCAR	FETAL MOR-TALITY
I	Cervical	Disproportion	10	Early—1 hr.†	Hysterectomy	Yes	0
I	Classical	Placenta prev.	3	17 hours	Hysterectomy	Yes	1
I	Classical	Prem. separ.	2	Early	Class. section	Yes	0
III	3 Classical	Disproportion	3-2-3	10 hours	Hysterectomy	Yes	1
II	1 Breech ext. 1 Latzko	Chin post.	10	0	Low-flap sect.	Yes	0
II	1 Cervical 1 Breech ext.	Face post.	4	17 hours	Hysterectomy	No	1
II	2 Cervical	Disproportion	5	12 hours	† cervical	Yes	1
II	1 Forceps 1 Cervical	Disproportion	3	18 hours	Midforceps Hysterectomy	No	1

three times among those with a previous classical section; three times with a previous low-flap section, once following a Latzko section, and once in a patient where the nature of the previous section was not known, but was believed to be of the cervical type. There is no indication among this group that ruptures occur more frequently following the classical operation, for, as we have already shown, the majority of sections were of this type. In two patients with ruptured uteri, it was very difficult to correlate the rupture with their previous cesarean scar. These cases are reported as follows:

The first case is a 30-year-old para ii, gravida iv, who had a low flap section nine years previously because of a posterior face presentation. Six years previously she had an uneventful breech delivery in this clinic of a 3,900-gram infant. After a normal antepartum course in this present pregnancy, she was admitted in early labor. Twelve hours after moderate and normal labor, the cord prolapsed but was readily replaced. Five hours later, when full dilatation was attained, a midforceps delivery was attempted. Tarnier forceps were applied, but the vertex failed to descend and with continued traction the blades slipped. Vaginal examination revealed a transverse defect in the anterior vaginal wall at the level of the cervicovaginal junction. At laparotomy, a deep and extensive laceration was found to involve nearly the entire vaginal wall extending upward through the cervix and lower uterus. A subtotal hysterectomy was performed. On examination of the uterus there was a laceration extending upward on the left lateral aspect of the uterus for a distance of 4 cm. The scar of the previous section was not detectable.

The second case is a para ii gravida iv, whose first delivery terminated by a difficult forceps and a deadborn infant. Five years ago she had a low flap cesarean section for disproportion. In her present pregnancy she was admitted at term in mild labor. After seven and one-half hours of good labor, the fetal heart was lost and the cervix 8 or 9 cm. dilated. Three hours later, when the cervix was fully dilated, the patient was delivered by midforceps of a 2,550-gram infant. On manual exploration of the uterus, a rupture was felt through the musculature, and the patient's blood pressure began to fall. At laparotomy, a large hematoma was noted under the peritoneal reflection of the bladder. Due to the laceration, it was difficult to make out the landmarks, but, starting at the angles of the rupture, an incision was carried posteriorly and the uterus removed. The pathologic description of the gross specimen is as follows:

"As one explores the uterine cavity, there is a fissure in the midline of the anterior wall extending from a point just within the external os to a point running up into the body of the uterus. This may well be the healed scar from the previous section. There is no muscular defect in this area. On bisecting the specimen, there is no evidence of rupture. From gross examination, it seems we are dealing with a rupture of the vagina occurring in the anterior wall beneath the bladder and 2 cm. from the cervix."

In three patients, rupture occurred at the onset of labor, or before the pains were well established; in the remaining five, labor was well established and varied from ten to eighteen hours in duration. One patient failed to come into the hospital at the onset of labor, but remained at home for ten hours, and was admitted in shock. The remaining were observed early in labor when there was no sign of impending rupture. Usually the signs of rupture developed suddenly, with pain, loss of fetal heart, and rising pulse, occurring in sequence or coincidentally. The fetal death rate among these cases was 60 per cent. No fetal death occurred in three patients where rupture occurred early in labor. When rupture occurred later, the fetal mortality was 100 per cent. There were no maternal deaths in this series. We attribute this directly to

close observation, available blood for transfusion, and prompt action. The only patient who went into deep shock had not come to the hospital early, and rupture occurred at home. Hysterectomy was performed in five of the eight cases. In three, the separated scar was freshened and repaired. One of these cases had a tubal ligation; another one has since had another pregnancy which terminated in cesarean section. All of these patients had had a previous febrile puerperium, yet in most the fever was mild; only two patients had fevers of over five days' duration.

TABLE XIV. MORBIDITY, INCIDENCE 29.8 PER CENT

TYPE OF DELIVERY	INCIDENCE %
Spontaneous delivery	6.6
Operative vaginal delivery	17.3
Cesarean section	42.4
Classical	39.4
Cervical	45.9
Section with hysterectomy	66.6

Puerperal morbidity is defined in this clinic as a fever of 38° C. on two or more successive days (and lasting longer than twenty-four hours) excluding the day of delivery. There were very few extragenital causes of fever among the patients in our series, so that in general, postpartum morbidity can be attributed to puerperal sepsis. The incidence of morbidity occurring in this group is 29.8 per cent. This is abnormally high and is accounted for by the large number of cesarean sections performed, which are responsible for 82.6 per cent of the total puerperal morbidity. The morbidity in relationship to the type of delivery is shown by Table XIV. The morbidity following full-term spontaneous deliveries was 6.6 per cent; following operative vaginal deliveries, 17.3 per cent; but following cesarean section, it rose precipitously to 42.4 per cent. The highest morbidity in section cases was associated with the low flap type where the incidence was 45.9 per cent compared with 39.4 per cent with the classical type. The difference can undoubtedly be explained by the fact that 42 per cent of the patients with morbidity and the low flap section had had labor, while only 21 per cent of febrile patients with the classical section had had labor, which averaged shorter in duration. Generally, the febrile reactions were mild, lasting only 2 or 3 days. Only 16 per cent of the total morbidity was caused by fevers lasting over five days.

The high operative morbidity raises the interesting question as to what constitutes the so-called "febrile puerperium" which, in itself, has become an indication for a repeat cesarean section. The proponents and opponents of repeated sections differ most widely on their interpretation of the significance of the previous puerperal course. As indicated here, the morbidity from cesarean section approaches 50 per cent but the percentage of rupture of the scar is relatively low. If the definition of febrile puerperium is strictly adhered to, few patients will have a spontaneous delivery after once having had a section.

TABLE XV. FETAL MORTALITY, 6.9 PER CENT

	NUMBER	WITH SECTION	WITH VAGINAL DELIVERY
Deadborn	18	11	7
Stillborn	2	7	3
Neonatal	10	2	

The fetal mortality rate of all deliveries was 6.9 per cent. Following vaginal delivery it was 5.8 per cent, and after cesarean section, 7.2 per cent. As shown in Table XV, there were 18 deadborn, 2 stillborn, and 10 neonatal deaths. The 11 deadborn infants occurring among cesarean section cases were attributed to asphyxia, caused by premature separation of the placenta, placenta previa, or ruptured uteri. Among the 7 deadborn infants occurring in the vaginal delivery group, 3 deaths were caused by maternal disease (syphilis, erythroblastosis, acute yellow atrophy) 2 from prolapse of the cord, and 2 in which the cause was unknown. Seven of the neonatal deaths which occurred following cesarean section were caused by such conditions as intracranial hemorrhage, erythroblastosis, prematurity, atelectasis, pericardial effusion, and mongolism. Those following vaginal delivery were caused by intracranial hemorrhage and prematurity accompanied by congenital defects.² The stillborn deaths were attributed to asphyxia, though the cause was not clear in either case.

There were three maternal deaths among our series, a mortality rate of 0.67 per cent. They are reported briefly as follows:

CASE 1.—A 40-year-old para ii, gravida iv, who had a section with her first pregnancy because of premature separation of the placenta. This was followed by a full-term spontaneous delivery. She was admitted in the thirty-seventh week of the present pregnancy with acute yellow atrophy of the liver. As soon as the diagnosis was established a bag induction was successfully used, but the patient was moribund during labor and expired shortly afterwards of hepatic failure. This death obviously had no relation to the method of delivery.

CASE 2.—A 40-year-old para ii, gravida iv, who was a mild diabetic, had had a difficult midforceps delivery with her first pregnancy, followed by a classical section in her second pregnancy which was performed on the indication of a large baby. A repeated section was performed with the present pregnancy because the previous puerperal course was not known. Following section, the patient had a postpartum hemorrhage which failed to respond to tamponade of the uterus and shock therapy.

CASE 3.—A 40-year-old para i, gravida ii, whose first pregnancy had been terminated by a Latzko section, the indication being desultory labor and maternal exhaustion. In the present pregnancy she delivered a premature infant spontaneously, but when signs of moderate hemorrhage and profound shock developed postpartum, the uterine cavity was manually explored. She developed signs of intrauterine infection and peritonitis on the following day, and on the twenty-fifth postpartum day died with signs of an overwhelming septicemia, acute endocarditis, and cerebral embolism.

In this case, the shock following delivery seemed somewhat out of proportion to the blood loss and a possible rupture of the uterus was seriously considered. A careful manual exploration of the uterine cavity by three members of the senior staff definitely ruled out this possibility, but may have contributed to the intrauterine infection.

Discussion

Once a patient has had a cesarean section, statistics show that her chances of requiring another section are 58 per cent. This figure is modified somewhat by the original indication for section. If it was for a condition which is not present in the succeeding pregnancy, she has a 58 per cent chance for vaginal delivery. If, however, it was for disproportion, then there is only a 30 per cent chance. However, if she has had a vaginal delivery following a previous cesarean, then the probability of future vaginal deliveries is very much increased. At the same time, the converse is also true that, with more than one section, the chances of repeated section become greater. As we have shown, disproportion is a relative term and does not necessarily mean that it will be present in future pregnancies. There were few patients in whom we could dogmatically predict cesarean section. This point is well demonstrated by the figures on clinical pelvic measurements and x-ray pelvimetry. In most cases disproportion was modified by the powers of labor, position and size of the fetus, and pelvic architecture. It will readily be acknowledged that disproportion itself exerts an influence on the two former factors.

The great problem among patients with a previous section is the condition of the scar and the possibility of rupture. Careful attention should be paid to the scar at the time of operation or vaginal delivery for better evaluation of future pregnancies. We have found it very difficult to secure any knowledge about the scar before delivery. In only one-third of the patients who were operated on for this indication was any defect obvious. Yet in one-half of all defective scars noted, defects were suspected prior to operation. We feel that this is probably as accurate as one can be in the evaluation of the usual patient. A febrile puerperium is important to keep in mind, as all of the cases where rupture occurred had a previous puerperal morbidity. It is well to realize that the infection does not necessarily have to be a severe one, as the majority of the patients had less than five days of a low grade (38° C.) fever. The fact that our morbidity following cesarean section is high (42 per cent) lends support to the opinion of those who advocate "once a section, always a section." The incidence of rupture of the uterus was 1.78 per cent (corrected 1.3 per cent) and is as favorable as any yet reported. The fact that there was no maternal fatality among patients with ruptured uteri was undoubtedly due in great part to careful observation and prompt treatment. Ruptures occurring early in labor had a low fetal mortality while those occurring later carried almost 100 per cent mortality for the fetus.

Conclusions

1. The termination of 445 viable pregnancies following cesarean section are reported.
2. The majority of previous cesarean sections had been of the classical type (57 per cent).
3. Fifty-eight per cent of the patients in this series had a repeat cesarean section. The greatest number of repeat sections occurred in the group where disproportion had been the indication for cesarean section (68 per cent).

Among patients in whom the original indication was no longer present in the succeeding pregnancy, it was lowest (42 per cent).

4. Once a patient had had a vaginal delivery following cesarean section, the greater was the probability of future vaginal deliveries. The converse was also true; the greater number of sections a patient had had, the less the chance of vaginal delivery. The greatest number of vaginal deliveries occurring in one patient following previous section was eight. The greatest number of sections performed on one patient was six.

5. In the majority of sections for disproportion, the indication is relative to the powers of labor, position, and pelvic configuration. This is demonstrated by both clinical and x-ray pelvimetry. For this reason, x-ray pelvimetry can rarely provide an absolute indication for section.

6. An unusually high incidence of abnormal presentations may be explained on the basis of poor pelvic architecture.

7. It is important to examine the scar of the previous cesarean section at the time of operation or vaginal delivery for better evaluation of succeeding pregnancies.

8. Defects in the uterine scar were noted more frequently following the classical type of section.

9. In one-half of the cases where there was a defect in the uterine scar, it was suspected prior to operation. However, in only one-third of the patients in whom section was performed on the indication of damage to the uterine wall, were any defects noted.

10. Rupture of the previous scar occurred in 1.3 per cent of the patients in this series. There were no maternal deaths among these patients; we believe this to be attributed to close observation and prompt action.

11. The high morbidity (29 per cent) is explained by the high operative incidence.

12. The fetal mortality rate was 6.9 per cent.

13. There were three maternal deaths, a mortality rate of 0.67 per cent.

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