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VAGINAL DELIVERY SUBSEQUENT TO
PREVIOUS CESAREAN SECTION

Gordon E. Fredrickson

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I. Introduction

With the initial decision to do a cesarean section, the physician assumes the great responsibility of determining the pattern of the obstetric future of his patient. The old dictum, "once a c-section, always a c-section," has in recent years been challenged, so that today a considerable proportion of subsequent pregnancies are delivered at term through the normal vaginal route.

What, then, is the proper course to follow? Although a considerable number of excellent hospitals and clinics still adhere to the policy of repeat cesarean section, others strongly advocate a trial of labor provided certain criteria are met. They contend that the overall general welfare of their patients is enhanced when selected individuals have been allowed to undergo labor.

Why is there a difference of opinion? Those who routinely reoperate upon women who have had prior cesarean section argue that the operation is always safer than the danger of inviting complications such as uterine rupture during labor. The proponents of vaginal delivery attempt to prove that comparison of the mortality rate of pelvic delivery following section to the basic mortality in resection shows the former method to be a more conservative one than the latter.

These comments, therefore, point out the highly controversial aspect of the subject in discussion. It shall be the purpose of this paper to present a critical analysis of the question at hand,

primarily through reviews in current literature of statistically
significant cases of delivery after initial cesarean sections.
This will be attempted with particular reference to vaginal
deliveries following cesarean section and an evaluation of the
circumstances of uterine scar disruption. There shall also be
a consideration of the ultimate outcome of actual rupture and it's
correlation to fetal and maternal mortality. The obstetric future
of the cesareanized patient will be discussed with regard to the
number of feasible future pregnancies.

II. Current Thoughts in Management of Subsequent Pregnancies
after Cesarean Section

There is a growing conservative element in the obstetric
field today which is seeking to demonstrate that vaginal delivery
subsequent to previous cesarean section is in many cases a rational
procedure. They strongly contend that it should be carefully
considered prior to repeat cesarean section. This group includes
such men as Cosgrove, (6), Schmitz, (26) and Baker, (2) as well
as others. (7,11,14) There is naturally opposition to any method
deviating from long established procedure. The proponents of
routine repeat cesarean section point out that the incidence of
uterine rupture and it's attendant mortality will always be too
high regardless of how it is reduced by proper patient selection.

Concerning the possibility of rupture of the uterus, which
in essence is the fundamental point, Cosgrove (6) has this to say.
"The incidence of catastrophic rupture of the uterus is low and
although it's danger is admitted, the operation of cesarean
section itself, in spite of it's low mortality, does cause death
to a degree that often more than not counterbalances the risk of
rupture." The most recent survey of a large group of maternal
cesarean section deaths indicates that there is always a risk
from infection, hemorrhage, and anesthesia, even in elective oper-
ation without other complicating diseases. (7)

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The incidence of uterine rupture following previous classical cesarean section, agreed by most writers as the worst type of case to select for a trial of labor, is according to the majority of reports, only 3 or 4%.

Uterine rupture may occur at any time after the sixth month of pregnancy. According to LaMariana, (19) 24 of 135 ruptures took place before term. Probably these were classical, as Lane and Reid (20) report rupture of the upper segment scars character-istically during the last trimester of pregnancy, whereas lower segment scars tend to rupture near term or during labor. Wilson, (27) at New York Lying-In and Bak and Hayden (1) at Chicago Lying-In separately report 50 percent of postcesarean section uterine ruptures before the onset of labor. Hence it would seem difficult to elect a proper time for repeat cesarean section particularly for the patient with the classical type of operation.

Investigators such as Schmitz (26) and Duckering (11) report that the mortality following rupture through a cesarean section scar is from 5-11%. If this is true, the actual maternal mortality of pelvic delivery following section is about 0.3%. Comparison of this figure to the generally accepted one of the basic maternal mortality in resection cases of .5% would reveal that this is the more conservative method. This view, of course, is highly contro-versial in nature and subject to considerable debate by it's opponents.

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Defending their opinion, the proponents point out that there is a distinct difference between rupture of a normal uterus and rupture through a poorly healed section scar. They state that in the former there is a sudden rupture through all coats of the uterus, extrusion of the fetus into the abdomen, profuse bleeding, and rapidly advancing hemorrhagic shock. The fetus is almost invariably killed and the maternal mortality is extremely high. In contrast to this, in the case of rupture through a weak scar, the contents of the uterus are usually not extruded, the hemorrhage is minimal for a considerable period of time, and the fetus and mother both have an excellent chance if diagnosis and treatment are prompt and efficient. This is particularly true if there is a lower uterine incision initially. (2,14)

Authorities such as Dieckmann (9) and Greenhill (12) advocate repeat elective cesarean section in all cases. Dieckmann reports and incidence of 7 cases of ruptured scars after 1790 cesarean section. However, a very interesting observation was that in 6 out of these 7 cases the rupture was found already present at the time of elective operation before the onset of labor. The same is true in 3 out of 7 cases reported by Cosgrove. (8) This tends to show that elective cesarean section does not entirely avoid the risk of rupture. Nevertheless, one would expect that a

quiet rupture discovered during an elective repeat section in late pregnancy would be of less potential danger to both mother and child than one passing unrecognized into active labor.

Baker, (2) of Liverpool, England, reports on a series he conducted over a 2-year period. One hundred women with a history of one or more previous sections were delivered. All the operations had been of the lower segment type, the incision transverse. Of the 83 women submitted to a trial of labor, 9 ultimately delivered abdominally after a labor varying from 5 to 60 hours when the scar showed evidence of impending rupture. The one case of ruptured uterus in the whole series occurred in a patient with a contracted pelvis submitted to trial of labor. The baby lived. Of the 74 remaining that delivered vaginally, 47 were delivered spontaneously, 27 were delivered by low forceps. Three babies were lost, however none of the deaths was related to the method of delivery. Two died in utero before the onset of labor due to toxemia and antepartum hemorrhage, the third was a mongol with a spina bifida and died 10 days after delivery. In 52 of these women it was their first vaginal delivery following cesarean section, in 9 the second, in 5 the fourth, in 2 the fifth, and in 1 the seventh. An interesting sidelight was the observation that in three cases in which the initial operation was carried out for disproportion, the baby that subsequently delivered vaginally was bigger than the infant delivered by previous cesarean section. Baker concludes

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that many cases of so-called disproportion are in reality examples of inefficient uterine action occurring with a minor degree of pelvic contraction.

In defense of the advocates of repeat section, Kane and Baker, (17) report on a series of 818 cesarean sections. In this study, the indication for operation in 499 or 61% of these patients was previous section. They report an incidence of 7 cases of rupture (1.4%) in the previous cesarean sectioned group. Four ruptured in the last month of pregnancy prior to onset of labor while the other three presumably ruptured following onset of labor. There was one maternal death and five fetal deaths in the seven cases. The single maternal death occurred in the one case that was allowed to deliver vaginally.

As to the best method of cesarean section, both groups will agree that the transverse lower segment procedure affords the safest prognosis. It is commonly agreed that the transcervical scar is less likely to rupture than a classical while the corpus is enlarging during a subsequent pregnancy. Cosgrove (6) states that although all types of scars can rupture, the classical scar presents this potential two to one in comparison to the low cervical scar. The general impression through experience by dif-ferent writers is that a transverse scar in the lower segment infrequently ruptures but it should be pointed out clearly that many cases pass unnoticed. (2,7,8,24)

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Most published accounts of large series of cases fail to differentiate between vertical and transverse incision in the lower uterine segment. There is general agreement that a vertical incision can rarely be kept in the lower segment. Kane and Baker (17) state that even if the transverse incision carries an equally high chance of rupture, such an accident is not so dangerous for either mother or child in that in nearly all of the cases the rupture is an incomplete one insofar that the peritoneum is not involved. Secondly, this is true with a normally implanted placenta because the rupture occurs through less vascular tissue and there is consequently decreased likelihood of excessive bleeding.

III. The Post Cesarean Scar

Just as there is considerable difference of opinion regarding management of a pregnancy subsequent to cesarean section, so is there an equal degree of difference in the healing process of the scar which ensues. McNally (24) states that "the tissue insult to the pregnant uterus as the result of surgery results in the formation of a scar which shows little or no evidence of accompanying muscle regeneration or proliferation."

Holding the other extreme viewpoint, Kennedy (18) states that we should not use the term "scar" in reference to the uterine incision incident to cesarean section. The uterine muscle, in his judgment, is composed of involuntary muscle fibers and an incision into such heals by the union of muscle fibers and not by the intervention of fibrous tissue. He states that it is indeed difficult, or at least should be, in a subsequent section even to see or define the earlier uterine incision. Kennedy stressed that since an incision in the uterine structure heals by intervention of muscle fibers and not by fibrous tissue, one should be prompted to use gentleness, cleanliness, and to avoid introducing foreign material such as buried sutures in the uterine incision. He is thoroughly convinced that the method of closing the uterine incision has much to do with a subsequent rupture. He uses the "mass" or through and through suture of silk to close the uterine incision in all of his sections. By "mass" sutures he

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refers to a through and through closure of the entire uterine wall.
His technique includes Lembert's sutures which are inserted about
a centimeter apart, the tissue included in the grasp is thereby
V-shaped; that is, twice as much is included on the serous surface
of the uterus as that of the mucosal side, so that when the
suture is tied, a greater pressure is made on the external surface
of the organ. He maintains that the smallest size silk suture that
is consistent with sufficient strength should be used. He pre-
sently uses No. I suture, however, he previously employed numbers
2 and 3 suture. In his experience, there has been only one post-
operative complication following the use of silk. This occurred
in a badly infected patient, who, following a cesarean section had
a small amount of bloody discharge from the abdominal incision at
the time of her menstrual cycle (endometriosis). He emphasizes
that the "mass" suture is not an interincisional foreign body and
consequently it does not have the trauma incident to the buried
suture. In his opinion the buried sutures are ligatures which
are always a source of crushed and traumatized tissue and as such
represent a source of unnecessary rupture potential.

Based on the hypotheses that multiple repeat sections could
result in weakened areas of scar tissue, McNally (24) conducted a
study concerned with this problem. He endeavored to report clini-
cal experience on this subject by surveying 18 American and two
Irish hospitals with a total of 130 patients who have had four or
more cesarean sections. This group had 464 previous sections and

44 previous vaginal deliveries. In this group a total of 32,or

7% defective scars were reported and in spite of such a diagnosis,

24, or 70.58% of these uteri with defective scars were not removed

and were considered safe to carry on another pregnancy. This

indicates confusion as to just what constitutes a defective scar

and what degree of weakening of the scar must be attained to

justify hysterectomy. Obviously, no such diagnosis should be made

if the uterus is allowed to remain. He goes on to suggest that

the uterine wall at times presents a thinned area of muscle ele-

ments which could be normal structure for that uterus and not a

defective scar at all. He believes that connective tissue forma-

tion after incision into the pregnant uterus is greater than after

incision into a nonpregnant uterus and thus an old line of inci-

sion may look like a defective scar. He states that it is falla-

cious to hold that a visible scar is synonomous with defective

scar under these circumstances. It is possible that these so-

called thin appearing scars could well account for the high per-

centage of thin and wide scars reported in this series, 16 in a

total of 32. Cosgrove, (7) in several studies, insistently main-

tains that multiple repeat sections do not increase uterine rup-

ture incidence.

Previous infection has been cited often as a contributing

factor to the deficiency of scars and has been termed an important

indication for subsequent section and sterilization. Often it

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has been judged in many clinics that if the first post-operative
days were febrile to any extent, then the maximum limit allowed
that patient should be two additional sections. The previous
morbidity reported in McNally's (24) series involved 32 cases in
464 previous sections. One-third of these are related directly
to the defective scars reported observed at the time of the last
section. The four justified hysterectomies performed gave a
positive history of previous infection.

It was of considerable interest to note that 44, or 8.66%
of deliveries in this series were accomplished by the vaginal
route. Some patients were sectioned for intercurrent pathology
after original delivery through the pelvis with reversion back to
pelvic delivery only to be sectioned later because of disruption
of the section scar. There were three ruptured uteri in this
category, all occurring prior to onset of labor. Two were minor
and were repaired. One did not occur through the site of the pre-
vious section but ruptured through the area of closure of a hemi-
hysterectomy performed 20 years previously for myomas. There were
no maternal deaths accompanying ruptured uteri and one baby sur-
vived.

From these figures one may conclude that infection does not
always lead to a defective scar and that defective scar does not
depend on previous infection. He also concluded that the degree
of deficiency of the scar does not seem to have a direct relationship

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to the severity of the infection. Although it is evident that a previous infection is something to be reckoned with under these circumstances, a fairly high percentage of these could be prevented with present day antibiotics. In conclusion, he states that "although many believe that subsequent labor weakens a section scar, the risks inherent to the performance of repeat sections outweighs the danger of rupture." (19)

This writer would tend to agree with Baker who believes that although uterine incisions probably do not heal by muscle regeneration, careful apposition of the muscle leads to less fibrous tissue formation. Another viewpoint often put forth is the suggestion that fibrous tissue may be less likely to rupture than muscle. In fact, experiments to demonstrate this have been reported to be carried out as early as 1910. Baker (1) states it is frequently observed in repeat cesarean section that the old scar is thin but extremely tough and resistant. It would seem, therefore, that the thickness of the scar may not be a true indication of it's reliability in labor. However, despite these arguments it is probably true that a scar which is thin and which shows a distinctive depression on one or the other aspect of the uterine wall is more likely to disrupt.

How then can one accurately detect scar weakness? Certainly no one professes to be able to accomplish this feat with complete assurance. However, if trial of labor and vaginal delivery are to

be allowed for a woman with a previous section scar in the lower uterine segment, the ideal procedure would be to select the cases in such a way as to exclude those with a weak or already disrupted scar. One of the long established criteria, as mentioned in previous discussion, is a history of pyrexia during the days immediately following delivery. Many authorities believe that this may be some indication in classical sections but is of only limited value so far as the lower segment operation is concerned. It would seem accurate on the other hand, to conclude that the absence of infection does not allow a certain conclusion that the scar is sound. (1,10,19)

During subsequent pregnancies, palpitation of the uterine scar through the abdominal wall has been suggested as an adjunct for determination of weakness. This, however, could only be applicable to a classical incision in the corpus or a vertical incision in the lower segment.

During subsequent labors, the presence of persistent pain and tenderness over the lower part of the uterus during labor is said to suggest impending rupture. After searching through considerable literature, it becomes apparent that this clinical feature is not entirely reliable and at best is only suggestive.

Following subsequent labor, manual exploration of the uterus immediately after vaginal delivery subsequent to cesarean section enables the scar to be palpated. Again, after surveying different

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different authors' experiences in this matter, it is concluded
that valuable information can be obtained by this procedure and
that there is much to be said for practicing it routinely. In
the first place, it is the only certain means of diagnosing rupture
of a lower scar and this at a time before the patient develops
shock. Secondly, it permits an assessment of the scar which can
be used as a guide to the management of subsequent pregnancies.
Baker (I) reports in his series where 64 patients were examined
in this manner and that the scar was judged to be sound in 53. In
these, the examination revealed either no evidence of a scar or
a thin line of uniform thickness which was not depressed below
the surface. In the remaining II cases, the scar, either in
whole or in part, was broad, varying in thickness, and forming a
groove across the front of the uterus. In eight of these it was
found that the original operation had not been strictly lower
segment in type, for the transverse scar was situated either at
the junction of the upper and lower segments or definitely in the
upper segment. In all of these cases the operation was carried
out before labor or during a labor characterized by abnormal
uterine action, i.e., circumstances in which the lower segment
would be poorly formed and less accessible. In the remaining 3
cases in which the scar was assessed as defective, it was definitely
situated in the lower segment. Here the defect consisted chiefly
of widening and thinning at one or the other end of the original
incision.

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Hysterography is another manner of assessing the post-incisional uterine state. Results show that it is possible to determine a gross deficiency in a uterine scar by means of a well taken lateral hysterogram and that the method, though not universally reliable, is of value as a guide to the mode of delivery in a subsequent confinement. This is ideally performed three months after the initial cesarean section when incisional healing is complete and the uterine contour has again returned to it's nonpregnant state.

IV. Management of Labor and Delivery Subsequent to Cesarean
     Section

     In the past few years there has been some accurately detailed
series of cases of delivery after section in which particular
reference to vaginal delivery management has been studied.
Duckering,(11) reports on the results of 445 viable pregnancies
after section from the years 1932 to 1945 with 42% vaginal deli-
veries. In 1950, Cosgrove (6) reported on 500 patients delivered
after cesarean section with a 35.8% delivery incidence. In the
latter group, there were six maternal deaths incident to repeat
cesarean section, but no deaths due to ruptured scar on vaginal
delivery following section.

     Wilson (27) was prompted to evaluate the feasibility of
vaginal delivery when the increasing numbers of pregnant patients
with a history of previous section (now about 1.5%) was realized.
In a series of 943 consecutive viable pregnancies following
cesarean section, he reports a 1.6% incidence of uterine scar
rupture with a 1% complete rupture. There was no maternal mortality
in this series attributable to rupture of a uterine scar. The
only case of maternal death was from hemorrhage following an
elective repeat cesarean section.

     These authors, as well as most authorities interested in the
subject, have attempted to outline more or less specific require-
ments needed before vaginal delivery is permissible. In reviewing

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several writers' opinion on the requisits needed before vaginal delivery is feasible, they all agreed that these basic criteria and conditions must be met. (2,6,10,11,19,27)

1) The patient must seek early antenatal care so that a carefully detailed history is obtained.

2) If the patient's previous section was done elsewhere, efforts should be made to obtain her old record including the indication for the section, type of pelvis, size of infant, duration and progress of labor, the type of section, and the puerperal course, particularly regarding fever, wound infection, intrauterine infection, and duration of hospital stay.

3) The patient should be followed by adequate prenatal visits so that the scar can be palpated if possible and observed carefully. A thorough pelvic examination with clinical pelvimetry is obligatory.

4) X-ray pelvimetry is done usually between the 37th and 39th week.

5) Any suspicious or doubtful cases (questionable cephalo-pelvic disproportion) are admitted one week or more before term for observation and evaluation as to type of delivery, particularly those with a previous classical or any unknown type of section.

6) Careful instructions are given the patient early regarding signs of rupture, and she is urged to report to the hospital if any untoward sign or symptoms develop or at the earliest onset of labor.

7) Carefully conducted trial of labor under observation is allowed if there is no obvious contraindication through natural passages. Factors which should favor trial of labor include early engagement of the presenting part, beginning of cervical effacement, and an anterior cephalic position. This, of course, is particularly true for women who have never delivered vaginally. Women who have delivered several children before having a cesarean section are usually considered prime candidates for trial; and likewise women who give the history of pelvic delivery subsequent to cesarean section are usually easy to deliver from below. A special chart recording the frequency, duration and intensity of the uterine contractions, abnormal pain, abnormal uterine contour, lack of progress, signs of fetal distress, hemorrhage or shock is carefully tabulated.

8) Forceps delivery is usually done as soon as practical unless easy spontaneous delivery appears imminent.

9) The patient is cross-matched on admission and compatible blood is made available. In addition several writers

advocate maintaining a blood bank on the delivery floor
with Group O, Rh negative blood and pooled plasma which
is ready for use on short notice.

10) Intravenous fluids should be started at onset of labor,
using a #18 needle so that blood may be administered
through this veni-puncture in event of sudden hemorrhage
and vascular collapse.

11) The operating room is always ready for emergency surgery
and it's personnel routinely alerted when such a patient
is in labor.

12) Prophylactic antibiotics and chemotherapy are given
antepartum because of the possibility of surgery and
postpartum infection if surgery is necessary.

13) Intrauterine palpation of scars should be carried out
immediately following delivery of the placenta, to dis-
cover unknown or assymptomatic defects for better
evaluation and judgment at a subsequent labor.

V. Perinatal and Maternal Mortality Comparisons

Although there has been broadening of indications for cesarean section in recent years, the incidence has not changed appreciably. The trend toward wider use of section is based on the postulate that, at least in pathologic entities productive of anoxia or when the use of traumatizing forceps is anticipated, the prognosis of the infant might be improved. However, perhaps paradoxically, numerous reports have appeared in the literature calling attention to the high perinatal mortality in repeat cesarean section. Perinatal mortality encompasses all fetal deaths in the categories of "stillbirth and neonatal mortality."

Various figures are noted relative to perinatal mortality when this specific aspect is reviewed. Hess, (15) for example, reports in a series of 340 repeat sections where the total perinatal mortality rate was 4.1% of the total births. This consisted of a 2.1% neonatal mortality plus a stillbirth incidence of 2%. His corrected perinatal death rate (in which death when accompanied by ruptured uteri was excluded) was 3.1%. There were seven stillbirths in his series, three of which were accompanying rupture of the scar of a previous section. There were seven neonatal deaths, none of which was incident to uterine scar rupture.

Hall (13) found that there is at least a 4% perinatal loss in the noncomplicated repeat elective section. This is approximately the same as in uncomplicated vaginal delivery of term infants.

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This then raises the question whether or not there should be more
selection of previous section patients for repeat cesarean section.
The proponents of this philosophy state that it is almost imposs-
ible to foretell which previous cesarean scars will rupture, and
if rupture does occur there is a marked increased in perinatal
loss (approaching 10-12% in different reports). They would also
conclude that this high perinatal mortality would point to the
advisability of preventing the catastrophe by performing routine
repeat sections. However, it is found consistently in the reports
that by far the predominate perinatal losses, (62% in one series)
occur in the 36th to 37th week of gestation. This, obviously,
is much earlier than most obstetricians would do an elective
routine repeat cesarean section.

It would seem fair to conclude from these figures that there
may be some merit to waiting until onset of labor before choosing
the course of action, be it repeat cesarean section or vaginal
delivery. At this point the perinatal mortality may be reduced
for those patients whose uteri will rupture during labor if
accurate evaluation of the scar is made. It seems to this writer
that perhaps this is the only point at which perinatal deaths can
be prevented. Certainly elective resection of a patient, solely
for the physician's view that all patients in this category must
be resectioned, is not going to prevent the fatalities which
arise earlier in the third trimester such as the 36th or 37th week

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of gestation. On the other hand, evaluation of the patient in the first or second hour of labor may well prevent uterine rupture if section is performed and indicated at that time and thus decrease perinatal mortality which may result during active labor.

As to maternal mortality, Douglas and Stromme (10) report that in the 31 ruptured uteri which occurred at the New York Lying-In Hospital from 1932 to 1956 in 80,784 deliveries (1:2,524) there were no associated maternal deaths. However, two maternal deaths have occurred at that institution during the same period following elective repeat cesarean section. The policy and experience at Margaret Hague Maternity Hospital is similar. Cosgrove (6) reported on 500 patients delivered after previous section with six maternal deaths incident to repeat cesarean section, but no deaths due to ruptured uterine scars. At Cornell University Medical Center, as reported by Wilson, (27) maternal morbidity in repeat cesarean section was seven and one-half times that in subsequent vaginal deliveries.

<u>VI.</u> The Obstetric Future of the Cesareanized Patient

It certainly cannot be overemphasized that every patient who has undergone cesarean section deserves her physician's best efforts in answering her questions concerning future pregnancies. Likewise, there is little doubt that authorities would disagree that the uterine incision following cesarean section is always a potential danger and that no certain hard and fast rules can be given indicating which of these scars will ultimately break through. In reality then, just how much protection is the physician afforted who has performed a section on a particular patient should she subsequently become pregnant? Is it enough to say to the patient should she become pregnant that there will be a second or third cesarean section? Just how much protection is the accepted teaching, or at least the well known statement, "once a section, always a section?"

Cosgrove (7) has rather dogmatic answers to several of these questions. If the patient asks if she will have another section, the answer given must be qualified. Every woman should be advised that she may have to undergo another section if she again becomes pregnant. However, there are certain circumstances, particularly in instances of nonrecurring indication, (placenta previa, abruptio, pre-eclampsia) that she be allowed to demonstrate her capacity for vaginal delivery. Of course they shouldn't be told that they will not require cesarean section. He adheres to the belief that the

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increasing safety which may be afforded to repeating the opera-
tion, may also be used as an argument proving the decreasing risk
of rupture if the original operation is properly performed. He
maintains that the incidence of rupture of the uterus is low and
that the operation of cesarean section, in spite of it's low
mortality, does cause death to an extent that more than of ten
counterbalances the risk of rupture. A recent survey of a large
group of section deaths indicated to him that there is always a
risk of infection, hemorrhage, and anesthesia, even in elective
operation without other complicating diseases.

One point, which seems to be established during this study,
is the fact that repeat cesarean section, even if performed elect-
ively a few days prior to the expected date of confinement, does
not prevent the occurrence of rupture of the scar. Generally
speaking, it appears that from one-third to one-half of such
ruptures occur prior to labor and prior to the date of elective
termination. In fact, Kennedy (18) has found that in more than
95% of the ruptured uteri he has witnessed, the rupture has
occurred before the eighth month and often times even earlier.
However, it is at the same time reasonably evident that rupture
of the scar, when it does occur, is not always as catastrophic as
earlier reports would indicate. Frequently it is not the calami-
tous emergency of other types of uterine rupture, particularly if
the rupture is through a low segment scar.

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How many babies can the patient have in the future after undergoing an initial cesarean section? It would seem that a significant segment of the writers on this subject believe that if a pregnancy subsequent to the section is terminated by vaginal delivery, there is no physical limit. Citing one example, (6) a woman at the Margaret Hague Maternity Hospital had eleven babies vaginally after an initial section for eclampsia. One obvious point still remains however, and that is that the occurrence of a successful vaginal delivery after section does not indicate that the possibility of future ruptures is curtailed. Each pregnancy must of necessity be conducted under proper safeguards. These safeguards include competent continuous observation, evaluation of unusual symptoms and signs, and facilities available to perform any surgical procedure necessary. Opponents quickly retort that such safeguards are not universally available. If such a situation exists, I am convinced that danger of handling any such pregnancy is decidedly increased and likewise the patient's protection is lessened.

If all the patient's children must be delivered by repeat cesarean section, the number of future pregnancies must be limited in accordance with the integrity of the uterus. Some obstetricians sterilize after an arbitrary number of cesarean sections. In one sense this would seem to be an outmoded practice and a position open to sizeable debate. Perhaps twenty years ago when the

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mortality was sufficiently high, this argument was worthy of consideration. In the present era of chemotherapeutic medicine, abundant blood, and relatively standardized safe techniques, it is invalid. It has been fairly well substantiated that the uterine scar, the formation of adhesions and the presence of uterine varicosities are as likely after one operation as after several.

VII. Summary

It has been the intention of this writer to present to those interested in the subject of vaginal deliveries following a primary cesarean section, an analysis of it's feasibility versus repeat surgical intervention. This has been based on a review of recent series of cases which evaluate the circumstances of scar disruption.

It would appear that the increasing conservative proponents of a normal route delivery following a cesarean section are basing their conclusions on rather solid support as revealed by convincing statistical evidence.

Most articles written on this topic tend to indicate that this is indeed a rational procedure in selected cases and more specifically true when the indication for the initial cesarean section is nonrecurring in the subsequent pregnancy. Although statistical figures vary considerably, it is concluded that there is an approximately 2.5% incidence of uterine rupture in subsequent pregnancies. However, the actual maternal mortality as determined by investigators following uterine rupture through a cesarean section scar is from 5 to 11%. This then would give a figure comparable to the value generally accepted for the basic mortality in resection cases. Assuming this is a reasonably accurate figure, it is this writer's view that the operation is not always the safer course to follow as was previously almost

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universally taught. Vaginal delivery is safe, however, only when

the certain previously reviewed criteria are satisfied. Though

enthusiastic opponents of the vaginal delivery claim low incidence

of scar disruption even in classical sections, only the trans-

verse lower uterine section repair can be relied upon for minimal

rupture occurrence.

One disturbing fact brought to the viewer's attention dur-

ing this study is the finding that though repeat cesarean section

is performed electively several days before the calculated due

date, prevention of the uterine scar rupture, when it does occur,

is often not accomplished. Figures, ranging from 30 to 50%, are

cited as the incidence of disruption prior to the date of elective

termination. This seems to add more support in favor of a normal

route delivery, or section after labor has begun, in that occasion-

ally miscalculation of the duration of pregnancy could handicap

the infant by prematurity. It is well recognized the fact that

premature children delivered by section, in general, do poorly.

Detection of uterine scar rupture prior to or during labor

cannot be accurately assumed by presence of the more commonly

considered signs and symptoms. For this reason, more desirable

methods of assaying the uterine scar strength are needed. Pre-

sently, the two most reliable procedures, which may be used for

determination of subsequent vaginal route delivery, are the manual

exploration of the uterus immediately after vaginal delivery and

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hysterography performed some three months after the original
section. While it is not so reliable as intrauterine palpation,
hysterography is the only method available on which an assessment
can be made for the first labor following cesarean section.
Unfortunately, neither is the result obtained by manual exploration.
available for the first vaginal delivery after a cesarean section.

Once the decision for a trial of labor has been made, manage-
ment of the labor and ensuing delivery should be conducted only
after certain basic criteria are met. These include previous low
transverse uterine segment type of section, absent demonstrable
cephalo-pelvic disproportion, readily available blood, and constant
observation of the patient by properly qualified personnel.

Finally, the increase in the use of cesarean section to
solve problems other than disproportion is causing an undue increase
in the number of women subjected to a primary section. This simply
serves to remind us that the problem at hand will always be sub-
ject to controversy. Perhaps attention will be directed to better
surgical repair of the uterine wall once it is opened. Certainly,
it should be emphasized that the incision should be placed as low
in the uterus as possible and that the angles of the incision
should be particularly well sutured. It should be remembered by
all attending obstetricians that once an incision has been made
into the uterine wall for delivery of a child, the potential danger
of death to mother and child in each subsequent pregnancy is a
responsibility that cannot be considered lightly.

VIII. Conclusions

1) Vaginal delivery following lower segment cesarean section is an accepted mode of delivery in the majority of the large maternity hospitals in this country today.

2) Although the mathematical chances of a lower segment scar undergoing disruption in labor have never been assessed, experience shows that the risk is small. To reduce this risk to a minimum, careful selection of cases, avoiding those with a weak scar, is an essential. Two methods presently available for evaluating scar strength are manual exploration of the uterus and hysterography.

3) A woman, who has been subjected to a cesarean section, can look forward to subsequent pregnancies with a confidence that she may increase her family without undue risk to herself.

4) There is a plea for better judgment regarding indications for cesarean section in the primigravida, at least a trial of labor when there is not an emergency for either the mother or fetus.

5) If enough routine elective repeat sections are done, there must be considered the occasional premature infant who fails to survive, as well as the minimal, though still definite, maternal mortality risk.

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