1947

Indications, contraindications, and mortality of cesarean section

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INDICATIONS, CONTRAINDICATIONS, AND MORTALITY OF THE CESAREAN SECTION OPERATION

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Senior Thesis Presented To The College of Medicine, University of Nebraska, Omaha, 1947.

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"That operation is called Caesarean by which any way is opened for the child than that destined for it by nature. Though for that purpose we sometimes cut through the common and proper coverings of the abdomen, we are generally obliged to open the uterus also, and it is particularly in this latter case that the operation has received the name Caesarean; for in the former, it may be ed simply by that of Gastrotomy. It seems to me useless to distinquish into abdominal and vaginal, as has been done lately; comprehending under that new denomination all operations performed in the neck of the uterus without affecting the neighboring parts; for we might with as much reason give the name to incisions in the perineum, the to that of the hymen, tumors, etc., if the child could not be borne without these aids." (1)

Such was the definition of the operation of cesarean section given by great obstetrician, M. Jean Louis Baudelocque (1746-1810), over 150 years ago (1790). (2) It could not be improved upon. The term "vaginal cesarean section" is still used in textbooks, but the term "vaginal hysterotomy" is much to be preferred as suggested by such

writers as Williams (3), Newell (4), Munro Kerr and others. In a case of true cesarean section, an incision through the wall of the uterus is a necessary part of the operation. Newell (4) says, "The name is not properly applied to operations for the removal of the child from the abdominal cavity after rupture of the uterus, or for the delivery of a child in cases of abdominal pregnancy, but should be restricted to the abdominal delivery of a child normally situated in the uterus."

Surprising though it may seem, this operation is one of the oldest in the history of medicine and without doubt the greatest; the oldest in that the history of its origin is lost in the mists of antiquity, and the greatest in that it is the only operation in which two lives are concerned. Few surgical procedures have been the subject of such bitter controversy, and it is only in the years, or thereabouts, especially in this country, that it has changed from a last minute attempt to extract a living child from a mother almost moribund, to a carefully planned operation, done at a selected time. It was the advent of asepsis, following the work of Pasteur and Lister, plus the introduction of anesthetics and marked improvement in surgical

technique, which brought about this happy change.

The origin of the name of the operation is still obscure, and periodically comes under discussion both in medical and classical journals. The popular belief is that Julius Caesar was brought into the world by this means. It is almost certain, however, that this derivation is incorrect, as Aurelia, mother of Julius Caesar, was still alive when the Emperor under took the invasion of Britian. Such a recovery in those times when the sciences of anatomy and surgery were so crude and imperfectly understood is scarcely credible, and as Campbell (5) points out, it is not all probable that a Roman slave could have had the audacity to propose, more especially one of the first patrician families in Rome, so desperate an alternative, particularly during such ages of despotism and tyranny.

The earliest writers of medicine are silent on the subject of cesarean section, and it seems more than probable that if either Julius Caesar or Scripio Africans had been brought into the world in the manner suggested by Pliny, Celsus, who lived before him and wrote the book,"De Re Medica", about A.D. 30, the best book of its time, would not have failed to notice this method of preserving the life of the

child, even after the death of the mother. Yet he gave careful directions for the extraction of the dead child from the mother by means of the crochet.

Again there is the suggestion that the term is derived from the Latin work, "caedare", meaning to cut, and therefore that it simply implied delivery by means of cutting; which is quite probable, since children derived from dead mothers by abdominal section were known as "caesones". This origin of the word was strongly supported by Hull. Haggard and Newell, on the other hand, favor quite a different explanation. In 715 B.C., Numa Pompilius, King of Rome, made a law included in the Lex Regia, whereby it was forbidden to bury a pregnant woman until the child had been removed from her abdomen, even when there was but little chance of the survival of the child, in order that the child and the mother might be buried separately. Newell suggests that the Lex Regia became the Lex Caesarea under the rule of the emperors, and thus the operation became called the cesarean operation. Other suggestions are that the name came from the fact that one of the Julia family born by the operation had blue eyes (oculis caesios), and that the operation was too grand to have been performed on ordinary mortals, so was called after Caesar, mean-

ing emperor; just as the Germans gave it the Kaiserschnitt in the days when the Kaisers were important personages. The term cesarean birth was first used by Rousset (1581),(enfantement Caesarienne) in his book published in 1591.

None of the references of the early cesarean sections would justify a belief that the was performed on a living women, but it would appear fairly safe to assume that a large proportion of the early races, if not all of them, recognized the propriety of cesarean sections on women who died in pregnancy, in hope of preserving a foetal life which might prove to be of value to the community. According to Boley (6) the oldest operation with an authentic record of a living child born by means of the section is that of Gorgias, a celebrated orator of Sicily, 508 B.C.

The operation has had to run the gauntlet of religious criticism. Mohammedanism absolutely forbids it, and directs that any child so born must be slain forthwith, as it is the offspring of the Devil. Christianity, on the other hand, being concerned with the saving of souls as well as the lives of the children, in the Roman ritual dealing with the baptism of the child, it is ordered that the operation

be performed as soon as possible after the death of the mother; but it is not permitted to sacrifice the mother's life to save that of the child. There is a tradition that Robert the II, King of Scotland, was born by means of the section, an accident befallen his mother. Another royal personage who is supposed to have born by this means was Edward VI on October 12, 1537.

Cesarean section in the living is of more recent date but its beginnings, too, are utterly obscure. It is quite possible that it was known to certain of the early races, notably the Jews. In the Mischnagoth, which is the oldest book of this people, published in 140 B.C. and earlier according to some, and in the Talmud, which is next oldest book, the cesarean section is mentioned in terms as to make it extremely probable that it was resorted to before the start of the Christian era. Perhaps the strongest suggestion of the possible early development of cesarean delivery on the living among uncivilized peoples is furnished by Felkins account of the operation as it was formed by a native surgeon in Uganda, and was witnessed by Felkin himself (1884).

The first cesarean section performed in

United States was a self-inflicted operation. The operator and subject was a quadroon, fourteen years of age, illegitimately pregnant with twins, and in active labor, when she opened her abdomen with a razor, while lying in a snowbank. The incision was L-shaped and extended through the abdominal wall into the fundus of the uterus. ivered herself per vias naturales of an infant which she had buried in the snow, and a second protruding through the wound. This happened on January 29, 1822, however, Dr. Pepper has reported a case about thirty years prior to in his book.

A number of cases are on record where women far advanced in pregnancy have had their abdomens ripped open by the horns of bulls, cows, and other horned animals. The question of precedence must arise--Did a man, women or animal make the first cesarean section? The propensity of the bovine family to rip with horns was recognized by Moses 3,500 years ago, and s el laws were made to deal with such accidents. The earliest known case occurred in 1647, and Harris (1887) collected nine cases where pregnant women were gored, with subsequent expulsion of a fetus through the wound,

either immediately or after a short interval. Gould and Pyle (7) mention three others.

It would appear, therefore, that it is quite impossible to ascertain exactly when the first operation of cesarean section was performed, whether on a living women or post-mortem. There is no doubt, however, that it is of great antiquity. During the first seventy-five years of the nineteenth century, prior to the introduction of the Porro section in 1876, the abdominal delivery came to used more and more frequently, especially on the continent of Europe. It was also performed for the first in this country.

British practitioners with few exceptions, viewed the operation with disfavor. Destructive procedures to the child, such as craniotomy, were much more popular, and cesarean deliveries were most often done as last resorts--a terrible mortality amongst the mothers being the obvious consequence.

On the continent of Europe, the obstetricians were much more ready to perform the section, but their efforts were severly criticized in this country. Not only in Germany and Holland, but even in France, where the surgeons and physicians, to their credit be it said, are usually among the foremost to adopt

any acknowledge improvement of the healing art, is this operation far more frequently resorted to than with us but it is often undertaken under circumstances with every unprejudiced person, be he medical or not. The general opinion among British obstetricians, with a few exceptions, was that the cesarean was not justified if the child could be extracted by any other means.

Before the work of Porro and Sanger, the mortality following the operation was appalling. Meyer (1867) collected 1605 cases from the literature, with a mortality of 54%; while in eighty cases performed in the United States up to 1878, collected by Harris, 52.2% of the women died. According to Budin, not a single successful cesarean performed in Paris between the years of 1787 and 1876. Such poor results were obtained that Harris in 1887 pointed out that the operation was more successful when performed by the patient herself, or when the abdomen was ripped open by the horn of an infuriated bull. He collected nine such cases from the literature with fine recoveries and stated that out of eleven cesarean sections performed in New York City during the same period, only one

It was in the year 1876, when Porro advised amputating the body of the uterus and stitching the cervical stump into the lower angle of the abdominal wound in order to lessen the danger from hemorrhage and infection. This procedure, being followed by satisfactory results, soon became quite popular, so that in 1890, Harris was 264 operations from the literature. After the technic for supravaginal amputation of the uterus had become perfected, similar methods were applied to the Porro operation, the cervical stump being covered by a flap of peritoneum and dropped into the abdominal cavity; while in a small number of cases particularly when the cervix was carcinomatous, the entire organ was removed.

In 1882, Sänger revolutionized cesarean by insisting upon the necessity for suturing the uterine incision and by describing an accurate technic for the purpose. As the uterus was not sacrificed in this operation, it was designated as the conservative, in contradistinction to the Porro, or radical cesarean section. With increasing perfection of surgical technic, as well as with better knowledge of the indications for its performance, more and more satisfactory results have been obtained

while the radical operation has became less popular.

In 1907, Frank, of Cologne, who had become dissatisfied with the results following the classical conservative section, particularly in women who had been exposed to the possibility of infection prior to the operation, described a new operative technic. In this procedure a transverse incision made through the anterior abdominal wall several centimeters from the symphysis and the peritoneum separated from the posterior surface of the bladder and the anterior surface of the lower uterine segment. After proper exposure, the latter is then incised transversely, the child is extracted by forceps, the placenta removed manually, and the wound closed. By this method, the entire operation is done extraperitoneally, and according to its inventor, may be safely employed in such cases where conservative section would be contraindicated.

The extraperitoneal technic was enthusiastically taken up in Germany, and subjected to minor modifications by Latzko, Sellheim, and others, while Döderlein resuscitated the operation of laparoelytrotomy, which had been suggested by Philip Syng Physick and by Baudelocque in 1823 to be afterward abandoned in favor of the classical section. In

general it may be said that, after a fair trial, the various methods of the extraperitoneal section have been somewhat fallen into disfavor but in the five years seems to be making a comeback--yet still they take a back seat to the low cervical operation.

Therefore, in looking back over the times, we see that the origin of the term cesarean section is not truthfully known nor is the early history of the actual operation clearly pictured. We can see that the removal of the baby through an incision in the abdominal wall and the uterus was a disestrous procedure until very modern times. Because of the appalling number of deaths from infection, Porro in 1876, advocated removal of the body of the uterus with suture of the cerivx into the abdominal wall. The mortality was lessened but still very high. Sänger revolutionized the use of cesarean section when he insisted in his epoch-making paper (1882) that the uterine incision must be sutured. Although deaths from infection were greatly reduced, the mortality was still considered great. Then Frank of Cologne in 1907 proposed the extraperitoneal route as a safeguard against infection. The mortality again decreased. The next step in perfecting the operation was due more to the incision in the lower segment

than to avoiding the peritoneal cavity. This idea was widely accepted and from it has developed the low cesarean section. More recently the Portes-Gottschalk procedure has met with some favor in infected cases. The uterus is lifted the abdomen and the abdominal wall sutured to the uterus and the delivery performed. The uterus is kept covered with sterile moist dressings for several weeks. The abdominal wound is then reopened and the uterus dropped back into the abdomen and the wound closed. Pfaneuf has reported good results.

INDICATIONS FOR CESAREAN SECTION

On the avowed basis of protecting mother and child, certain so-called indications have appeared which upon closer critical analysis are conveniences of the physician. Such pseudo-indications as the "prophylactic" use of forceps, routine version, and cesarean section for occiput posterior or breech presentations fall into this category and can only be condemned.

On the maternal side, relatively few indications are uniformly accepted, other than those which have come down from the days when child-bearing was viewed as essentially physiologic in character, that is, disproportion, obstruction, and inordinate prolongation of the birth process (8). With the increased safety of abdominal delivery under aseptic surgical technic, the need for the older "absolute" and "relative" indications for cesarean section has largely disappeared. Definite disproportion determined by physical findings suggest the need for abdominal section. Attempts to overcome actual disproportion by the use of high forceps or podalic version are no longer justified, although in pre-aseptic days were useful procedures.

The same statement can be made regarding the use of induction of premature labor, which is no a reasonable method of treating cephalo-pelvic disproportion. When the disproportion is at all marked, elective cesarean section before the of labor is the procedure of choice but when the disproportion is slight, it may be advisable to postpone final decision until the efficiency of the forces of nature can be determined. should be drawn between a "trial labor" and a "test of labor." The former represents a number of hours of labor contractions with evidence that labor is progressing, but with the devolopment of conditions unfavorable to the descent of the On the other hand, a real "test of labor" is possible only after the cervix is fully dilated and the membranes ruptured, conditions which in normal parturition alone make possible of the fetus through the birth canal. Uterine contractions which do not produce effacement and dilatation are not, properly speaking, labor pains, and do not constitute a "trial labor."

Obstruction of the pelvic c vity by a tumor mass large enough to prevent passage of the fetus and not displaceable by ordinary procedures is viously an indicatíon for abdominal delivery.

Uterine fibroids, ovarian cysts, and ectopic organs may gravitate into the pelvis and the source of the obstruction, while, in rarer instances, intrinsic tumors, or pelvic exostoses may be present.

Since there is no adequate definition of "normal labor", it is difficult to define undue prolongation of parturition. No delay in the stage of dilitation, in itself, constitutes an acceptable indication for radical operative intervention. First stage inertia is best treated by the liberal exhibition of sedatives and by the maintenance of proper food and fluid intake, under which the patient can usually be carried to complete dilatation, which operative delivery can be effected with relatively little risk. Only where there objective signs of maternal exhaustion should delivery through the incompletely dilated be given serious consideration.

The simple procedures, such as low forceps and breech extraction, may be employed in many instances to spare the parturient who has some complicating disease, for example, toxemia, tuberculosis, chronic nephritis or cardiac disease, in the belief that bearing-down efforts are

be harmful or that prompt delivery is desirable.

The majority of other maternal indications are debatable, or there is an honest difference of opinion concerning the proper therapeutic procedure. Antepartum hemorrhage falls into the latter category. Placenta previa presents a accepted indication for intervention, But there is one group of authorities who argue that all such patients should be delivered abdominally, while others insist that this method of attack should be reserved for exceptional cases. Especially in the marginal and partial varieties, delivery from below after rupture of the membranes or the introduction of a Voorhees bag is at least as safe for the mother. Certainly when the child is premature, as is usually the c se, the increased fetal mortality rate is of little concern, since the size of the child inevitably prejudices its chance for survival. Premature separ tion of the normally implanted placenta most frequently results in only mild bleeding which is followed by the onset of lobor. In the occassional case, particularly when the placental separ tion is complete, Operative intervention is required and cesarean section is widely advocated, although there has recently developed a tendency toward less radical procedures.

In a ten year survey at the St. Louis Maternity Hos ital from 1927 to 1937 reported by Saule contracted pelvis was the most frequent indication for operation on both services, accounting for 40.5 per cent of all ward and 26.9 per cent of priv te operations, a combined incidence of 34.2 percent. During the first five years, 6.8 per cent of all ward operations were performed for medical reasons; during the second period 42.2 per cent were operated for similar causes. This group of patients included cardiac, pulmonary and thyroid disease, essential hypertension, arthritis, with marked varicose veins, psychiatric and neurological conditions. The medical condition is considered to be the fundamental indication for operation with the sterilization indication induced by the unde lying medical state. It is this change in indication which is chiefly responsible for the increase in incidence of cesarean operations on the ward service. The indications

INDICATIONS
1927-1937

PRIVATE	NO. CASES	PER CENT
Contracted pelvis	38	26.9
Tumors	15	10.6
Medical Indications	12	8.5
Postmaturity	11	7.8
Placenta previa	11	7.8
Toxemia	9	6.4
Previous section	8	5.7
Cervical dystocia	7	4.9
Previous plastic	6	4.2
Miscellaneous	23	16.4
WARD		
Contracted pelvis	66	40.5
Medical indication	43	26.4
Toxemia	24	14.8
Tumors	8	5.0
Postmaturity	5	3.2
Cervical dystocia	4	2.5
Placenta previa	3	1.3
Miscellaneous	10	6.3

With the experience of many years as ground, professors of obstetrics, such as DeLee and Williams (10), have essentially agreed that the indications for sections are divided groups, namely; the absolute and the relative.

Accordingly, the Elstons (11), of the absolute, the following are generally accepted as indications:

1. Contracted pelvis with conjugata vera of six or six and one half centimeters
2. Immense child
3. Narrowing of the outlet due
   a. Exostoses
   b. Irremovable tumors
   c. Stenosis of cervix or vagina
   d. Neoplasms prolapsed before the

Relative clinical indications for section:

1. Where the delivery might possibly be made other methods, but where a section offers the least risk to life of mother, child, or both. These include, among others, the following:
   a. Conjugata vera of six and one half to nine centimeters
   b. Placenta previa
   c. Eclampsia
   d. Abruptio placenta
   e. Prolapse of cord
   f. Habitual death of

In this series among the primipara, the predominating causes for section were generally contracted pelves, usually the so-called borderline cases insofar as pelvic measurements were concerned. Only one case in this series was in the absolute indication group, i.e., with a conjugata vera of six centimeters or below. The majority of them were actually closer to nine centimeters, but in all except the eclamptics there had been prolonged trial labor before the section done, with little if any engagement. Eclampsia formed the indication for eighteen of the sections in primiparas. In all of these the convulsions had become fully developed before being brought to the hospital. In the multiparae, the greatest number of cesareans were done because of previous for generally contracted pelves.

In a series of 1,066 cesarean sections, Matthews (12), gives the following indications for primary operations:

INDICATIONS FOR PRIMARY CESAREAN SECTIONS

1932 to 1937

Contracted pelvis	120
Pre-eclamptic toxemia and nephritis	21
Uterine inertia and cervical dystocia	17
Placenta previa	13
Previous gynecologic operations	7
Pelvic tumors	8
Cardiac	11
Other medical and surgical complications	8
Malpresentations of fetus	12
Eclampsia	2
Premature separation of placenta	1
Elderly primipara	5
Congenital malformation of vagina or uterus	1
Pendulous abdomen	0
Miscellaneous	9

Hennessy (13) reports a series of 316 cases in which cesarean section was performed. This covers the years 1928 to 1941 inclusive at the St. Ann's Hospital (New York) with an incidence of 3.44 per cent. Although the ward and private deliveries were approximately equal, the incidence of section was higher on the private service. Over half of the sections were performed because of contracted pelvis. Previous stillbirth and difficult delivery was the next most common indication, followed by elderly primiparity. There were 88 patients with one or more previous sections. Two of these ruptured their uteri during labor and one died following repair of the rent.

Mohler (14) states that the present Philadelphia Lying-In Pennsylvania Hospital was opened on July 1, 1929, and up to March 1, 1942, 27,829 babies were delivered in the institution. The operative incidence for all deliveries was 63.2 per cent when all but spontaneous births were considered operative deliveries. During the whole ten-year period, 1,322 cesarean sections were done; 785 operations or an incidence of 9.3 per cent on private patients; and 537 or an incidence of 3.6 per cent were done on the ward service. The occurance is high because of the selected group of patients which are referred to the hospital, and

because of the liberal view taken by the staff toward the operation. Most of the patients were primiparas and secundiparas, because the policy of the staff is to give all patients the opportunity for sterilization at the time of the second

CHIEF INDICATIONS

Disproportion	534
Previous cesarean section	299
Placenta previa	84
Toxemia	66
Premature separation	44
Heart disease	36
Fibroids	35
Cervical dystocia	33
Previous vaginal repair	24
Elderly primipara	19
Transverse lie	10
Sterilization	8
Uterine inertia	8
Ovarian cyst	7
Brow or face presentation	4
Bicornate uterus	4
Obtain living child	3
Acute appendicitis	3
Uterine rupture	5
Tuberculosis	4
Postmortem to save baby	3
Abdominal pregnancy	2
Pyelonephritis	8
Imperforate anus opening into vagina	1
Unclassified-not of obstetrical importance	1

Lohmann and Mietus did 48 cesarean sections with caudal anesthesia. They used as indications for their operations as follows:

Previous section----------16

Cephalopelvic disproprotion----------12

Premature separation of placenta------5

Toxemia without convulsions----------4

Malpresentations----------3

Placenta previa----------2

Dystocia----------2

Toxemia with convulsions----------1

Previous extensive vaginal repair-----1

Previous stillbirth in an elderly primipara----------1

Fetal distress----------1

None of the women with whom previous section was listed as an indication was permitted to fall into active labor. Although it is not their practice to routinely subject a women to section because of a previous one, it might be mentioned that none of this group had ever in the past been delivered of a live baby per vaginum. All twelve of those listed as celhalopelvic disproportion were given the benefit of an adequate test labor. The two listed under the ambiguous term "dystocia" include instances where the cervix failed to efface and dilate with an attempt at delivery through the normal channels ,

The term cephalopelvic disproportion includes all the cases of absolute contraction of the pelvis as well as the borderline cases where the fetal head was too large to enter the pelvic inlet. The increased incidence of cesarean section in cases of placenta previa and premature separation of the placenta would lead one to believe that the more radical method these conditions has gained favor in the last ten years in spite of the fact that there is quite a controversy as to its advisability. One is impressed with the fact that previous cesarean section as the only indication, increased from 16 to 54. This would also show "once a cesarean always a cesarean" has gained more followers during the last decade. Another interesting figure is the marked decrease in the number of cases delivered by the section where the only indication was sterilization. many of the other causes might be questioned.

even with the benefit of Duhrssen's incisions, not deemed advisable.

Lull (16) compiled a study showing a comparison between cesarean section in 1931 and 1941 in Philadelphia.

TOTAL INCIDENCE OF CESAREAN SECTION

	1931	1941
Total births in city (live & still	35,284	34,389
Birth rate per 1,000 population	17.3	17.6
Total births in hospitals	23,511	30,939
Percentage of hospital deliveries	66.6	88.4
Total cesarean sections done	573	894
Per cent of total deliveries	1.6	2.5
Per cent of hospital deliveries	2.4	2.8

INDICATIONS FOR CESAREAN SECTION

Indications	1931	1941
Cephalopelvic disproportion	339	450
Placenta previa	442	79
Toxemia and eclampsia	44	56
Newmature separation of placenta	19	55
Previous section as only indication	16	54
Uterine inertia	11	47
Cardiac condition	21	31
Fibroids	0	26
Abdominal presentation	26	20
Tuberculosis	5	7
Recent plastic	5	7
Habitual intrauterine death	0	7
Diabetes mellitus	0	5
Pelvic tumors	9	4
Elderly primipara	0	4
Adhesions of old scar	2	4
Kidney disease	0	4
Ruptured uterus	3	3
Elective for sterilization	10	2
Multiple pregnancy	1	2
Appendectomy and appendicitis	0	2
Deformity of hip	2	0
Monstrosity	3	0

In the seven year period studied by Keetel (17), there were 383,277 total deliveries in Wisconsin, with 7,729 cesarean sections or an incidence of 2.02 per cent. This survey covers the years 1934 to 1940 inclusive. An incident of 2.02 per cent gives a ratio of one cesarean for every 49 deliveries.

INDICATIONS FOR CESAREAN SECTION--WISC. 1940	
Contracted pelvis and disproportion	572
Previous cesarean section	214
Toxemia	110
Placenta previa	106
Reason not stated	70
Premature separation of placenta	45
Uterine inertia	40
Eclampsia	35
Prolonged labor	33
Elderly primipara	31
Breech	28
Other maternal complications	19
Occiput posterior	16
Transverse presentation	14
Previous pelvic surgery	13
Elective procedure	13
Maternal congenital defects	12
Contraction ring	11
Miscellaneous	10
Other cephalic malpresentation	9
Heart disease	8
Ruptured uterus	8
Fetal asphyxia	4
Diabetes	4
Prolapsed cord	3
Fetal malformation	3
	1,439

Arnot (18) declares that the primary reason for cesarean section is to obtain a living child, although it may occassionally be necessary in cases of hemorrhage, in order to save the life of the mother regardless of the state of the baby. However, Since the maternal mortabty from cesarean is from four to five times higher than from vaginal delivery, one should have a very good reason for it before subjecting a woman to the great additional risk.

Indications are either relative or absolute. It is easy to assume that the only absolute indication is where the pelvis is to small or deformed to permit the birth of a live baby. All other indications are, therefore, relative and the number of patients delivered by this method will vary as the diagnostic acumen, the courage, the patience, the experience, the honesty and the technical ability of each physician varies.

In a review of cesarean cases (187) in private practice and (378) sections performed at the University of California, Arnot gives the following indications: previous sections, 31.5 percent of total; contracted pelvis, 10.3 per cent of total; toxemia, 7.9 per cent of total; hard or

normal previous labor with difficult or normal delivery and dead baby, 6.3 per cent of total; heart disease, 5.3 per cent of total; term or overdue, large baby, unengaged head, over-riding head, posterior, relatively small pelvis, 5 per cent of total; elderly primipara, 4.23 per cent of total; placenta previa, 3.17 per cent of total; previous operation on the uterus, 2.11 per cent; tumors, 1.58 per cent; premature separation of the placenta, 1.05 per cent; eclampsia, 1.05 per cent of total; sterilization, 1.05 per cent of total; pulmonary tuberculosis, 0.52 percent of total; and miscellaneous which includes such factors as request, hysteria, varicosities of labia and right leg, incarcerated uterus, bowel obstruction, etc.

Low (19) gives a report based on a survey of the cesarean sections preformed in the public wards of the Burnside division of the Toronto General Hospital during a fifteen year period, 1925 to 1939 inclusive.

INDICATIONS		
	Number	Per cent
Disproportion	118	34.4
Previous section	83	24.2
Placenta previa	43	11.9
Heart disease	37	10.7
Toxemias	25	7.2
Accidental hemorrhage	11	3.2
Tumor	6	1.7
Ruptured uterus	5	1.4
Miscellaneous	17	4.9

The cesarean section incidence at Ancker Hospital for the ten year period (1933 to 1934) reported by McGee (20) was only 0.4 per cent. The highest incidence reported in this survey is 8.35 per cent at the Cedars of Lebanon Hospital. Ancker hospital seems to be unique in that cephalopelvic disproportion is not the main indication for performing cesarean sections. This factor probably explains the low incidence of abdominal deliveries. Disproportion accounted for only 22.2 per cent of all cesarean sections. Placenta previa was the indication for section in 42.1 per cent of the cases. The other indications

were as follows: ablatio placenta, 11.1 per cent; obstructing tumors, 6.6 per cent; medical reasons, 6.6 per cent; abnormal presentations, 4.4 per cent; carcinoma of the cervix, 2.2 per cent; and fetal distress, 2.2 per cent. Everyother hospital in the literature reported disproportion or previous section as the predominant indication. As for placenta previa, most men feel that cesarean section is indicated at least in all central or complete types with live babies and that marginal or partial types can be handled well from below.

Stephenson (21) files the following as indications for section in his work:

INDICATIONS	
Repeat	61
Pelvic dystocia	55
Elective	51
Toxemia	28
Cervical dystocia	6
Placenta previa	6
Fetal distress	5
Premature separation	4
Extensive repair	3
Fibromyomata	3
For sterilization	2
Compound presentation in twins	2
Acute appendicitis (not diagnosed)	1

In the "elective" indications are placed many patients whom Stephenson's judgment decided for the operation rather than delivery through the natural passages, although in many instances such

a delivery could have been accomplished. Into this group fall several patients who had been badly torn in previous deliveries and had been successfully repaired by second operations. Oftentimes, it is wiser in such cases to do a low cesarean than to risk disturbance of the successful operation.

Normandie (22) has published a five year study (1937-1941) in Massachusetts as to the indications for cesarean section. During this period, there were 333,731 births, of which 272,752 occurred in hospitals. The incidence of abdominal deliveried was 3.3% or 11,030 sections, 45 per cent of the cesarean sections were emergency and 54 per cent were elective.

INDICATIONS FOR CESAREAN SECTION

INDICATIONS	1937	1938	1939	1940	1941	TOTAL
Previous section	576	635	608	726	722	3267
Contracted pelvis or disproportion	539	477	336	350	491	2193
Placenta previa	183	175	215	211	237	1021
Toxemia	123	125	78	107	114	547
Eclampsia	10	9	11	15	8	53
Malposition-baby	68	110	79	113	109	479
Dystocia	94	202	220	279	246	1041
Previous surgical operation	45	43	36	56	50	230
Associated medical condition	59	61	51	51	46	268
Previous obstetric diseaster	64	47	52	73	76	312
Elderly primipara	48	70	58	57	58	291
Obstructing tumor	15	18	24	21	44	122
Fetal distress	5	7	6	7	11	36
Prolapsed cord	9	3	4	4	7	27
Following operative attempt	3	7	7	8	10	35
By request, or for sterilization	27	17	10	9	10	73
Ruptured uterus						
Spontaneous	1	1	2	2	2	8
Previous section	1	7	6	2	5	20
Abnormality of G-U tract	3	4	2	3	7	19
Twins	2	0	0	3	5	10
Postmaturity	8	4	3	8	8	31
Malformation-fetus	4	1	4	9	1	19
Varicosities-vulva	1	2	0	1	1	5
Unengaged or floating head	5	0	0	3	0	8
Congenital dislocation-femur	0	1	0	0	1	2
Fractured pelvis	0	6	0	0	1	7
Error in diagnosis	2	0	1	1	1	4
Surgical emergency	0	0	1	0	1	2
Early rupture of membranes	0	0	0	0	2	2
Young primipara	0	0	0	1	0	1
Multiparity	2	0	0	0	0	2
Prolapse of uterus	2	0	0	0	1	3
Premature labor	3	0	0	0	0	3
Feeblemindedness	1	0	0	0	0	1
Social, economic reasons	0	3	0	0	0	3
Abdominal hernia	0	1	0	0	0	1
Obesity	0	1	0	0	0	11
Desire for live baby	0	1	0	0	0	1
Bizarre	55	25	32	19	19	150
Not Reported	47	48	52	63	39	249

This is the largest series of cesarean sections ever reported from one community, and the results are remarkedly good. Examining them superficially, one could not criticize them; but on analysis, one must conclude that many unnecessary cesareans were done. Because of this, the number of repeat sections will continue to increase and will always give a certain number of deaths. The same criticism is true regarding the indication "contracted pelvis or disproportion." Cesarean section is an easy way out of a difficulty, but it often has serious consequences for the mother in future pregnancies.

Eastman (23) points out that during the past 25 years the incidence of cesarean section in the majority of hospitals in the U. S. has increased more than five fold. The operation of the section is about seven times more dangerous than normal delivery. When we consider the increasing number of cesarean sections which are being performed in this country, and the high maternal mortality, immediate and remote, associated with the operation, it becomes plain that the indications for the procedure must always be weighed with meticulous care before the final decision is reached.

The common conditions, which under certain circumstances, may be indications for cesarean fall into four main groups:

I Disproportion between child and birth canal:
  (a) Contracted pelvis
  (b) Excessive size of child
  (c) Neoplasms blocking birth canal

II History of previous cesarean section.

III Placenta previa and premature separation of placenta.

IV Non-convulsive toxemias.

The Wm. H. Coleman Hospital was formally dedicated by an address by Dr. Palmer Findley in Oct. 1927. During the period of eight years and two months described, there were 7,368 patients at or past viability delivered, as reported by Gustafson (24). The number of cesarean sections during this period was 306, and incidence for the entire period of 1 to 20.1 or 4.8 per cent.

INDICATIONS	
Contracted pelvis	126
Previous section	99
Placenta previs	29
Non-convulsive toxemia	35
Eclampsia	17
For sterilization	9
Heart conditions	8
Cervical dystocia (1 Carcinoma of cervix)	5
Abruptio placentae	5
Fibroids	5
Ruptured uterus	3
Previous dystocia	5
Prolapsed cord	3

(continued)

Fetal distress	2
Previous plastics	4
Toxic goiter	2
Age	2
Miscellaneous	7

Manahan, Connally, and Eastman (25), present a series of 1,333 operations, 718 of these sections performed because of contracted pelvises. These indications were as follows:

PRIMARY INDICATIONS

		Cases	Per Cent
Contracted Pelvis and Mechanical Dystocia: 54.4%	Contracted Pelvis	595	44.5
	Uterine inertia	72	5.4
	Malpresentations (45);	59	4.4
	Oversize baby (14)		
	Tumor blocking birth canal	21	1.5
	Elderly primigravidas	35	2.6
	TOTAL	781	58.4
Toxemias: 15.0%	Pre-eclampsia	104	7.7
	Hypertensive vascular disease	93	6.9
	Eclampsia (before 1920)	6	0.4
	TOTAL	203	15.0
Previous Cesarean Section: 11.2%	Previous cesarean section	115	11.2
	TOTAL	115	11.2
Hemorrhage: 6.6%	Placenta previa	40	3.0
	Premature separation of placenta	48	3.6
	TOTAL	88	6.6
Intercurrent Disease: 3.0%	Heart Disease, Tuberculosis etc	40	3.0
	TOTAL	40	3.0
Unclassified: 5.8%	Sterilization (before 1930) 34; Others, 72;	106	5.8
	TOTAL	106	5.8

Adair (26) reports an incidence of 4.4 per cent at the Chicago Lying-in hospital from 1938. He states that at this hospital they have insisted more vigorously on reaching a decision for or against cesarean section after 12 hours of ruptured membranes or 24 hours of labor. This has not resulted in an increase of cesarean section regardless of this rule. On the question of outlet contraction, it is important to recognize it early as it is a bar frequently to natural or instrumental delivery. If it is not diagnosed early the contraindications for the section will arise before it is recognized and, of course, then the operation is to late to be advantageous.

In Free's (27) report and analysis he has studied a group of 500 consecutive cesarean sections performed at Chicago Lyin-in Hospital from March 1, 1938 to March 6, 1942. During this period there was a total of 11,281 deliveries at Lying-in Hospital, giving a section incidence of 4.43 per cent for this particular group and period.

Indications for Cesarean.

There was a total of 306 primary sections in the series (61.2 per cent). This is an inclusive figure comprising the total of laparotrachelotomies,

cesarean hysterectomies, classical and vaginal sections.

Dystocia and Disproportion.
Cephalopelvic disproportion, 75; contracted pelvis, 30; fibroid uterus, 16; prolonged labor with inertia, 9; elderly primipara, 4; stillbirth history, 4; cervical dystocia, 3; contraction ring, 2; transverse, 2; uterine anomalies, 2; dystrophy-dystocia syndrome, 1; brow, 1; face,1; ovarian cyst blocking pelvis, 1. Total- 160 cases (32.0%)

Toxemias.
Pre-eclampsia, 37; eclampsia, 8 (8.0 per cent); hypertension, 22; nephritis and pyelitis, 13 (7.0 per cent). Total 75 cases (15.0 per cent)

Hemorrhage;
Placenta previa, 39; abruptio placenta, 13; ruptured uterus, 2. 54 cases (10.8 per cent).

Cardiac;
12 cases (2.4 per cent)

Other indications for primary section.
Diabetes, 2; pulmonary tuberculosis, 1; premature rupture of membranes with intrauterine death of fetus, 1; spastic paralysis, 1. 5 cases (1.0 per cent)

The predominating indication for operating the remaining 194 (38.8 per cent) cases was previous section. This was combined with a desire to sterilize in many instances; in others, the primary indication carried over and enhanced the reason for the section. Cases of contracted pelvis, hypertensive vascular disease, nephritis, and certain chronic diseases are illustrative of continuing concomitant indications which reinforced

the decision for the second section.

In the five major hospitals in Oakland, 290 cesarean sections were performed during the year 1943. This represented 4.07 per cent of the total deliveries in these hospitals. The incidence of cesarean section over a five year period reported in another study a few years ago was 5.06 per cent. The incidence varied in 1943 from 1.14 per cent in the country hospitals to 9.97 per cent in a private institution.

INDICATIONS FOR CESAREAN SECTION	
Previous section	80
Disproportion	66
Contracted pelvis	42
Placenta previa	23
Toxemia	19
Premature separation of placenta	16
Breech presentation	7
Elderly primipara	5
For sterilization	4
Myomas	4
Cervical dystocia	3
Heart disease	2
History of difficult labor	2
Failure to dilate	2
Anthropoid pelvis	1
Face presentation	1
Active tuberculosis	1
Borderline pelvis	1
Intestional obstruction	1
Asthma	1
Polyhydramnios	1
Uterine rupture	1
Severe nausea and vomiting	1
Post term	1
Dystocia due to soft parts	1
Old spinal injury	1
Epilepsy	1

Only 40 of the patients operated on for disproportion had had labor pains of some kind, while 26 had no trial of labor. Only four had reached the second stage of labor. In two of these, delivery by forceps failed. In many of these the length of labor was only a few hours. Twenty-one patients had an unengaged or floating head after a few hours of labor pains. X-ray pelvimetry was done in only six patients. Nine patients were 34 to 41 years of age. It was often difficult to separate the cases of contracted pelvis from those of disproportion. Many of those listed as contracted pelvis by the attendant could have been put with the cases of disproportion because no pelvic measurements were noted. Several patients with deformity of the pelvis had no X-ray study.

Twenty-three patients had cesarean section on account of placenta previa. In one case, there was not even bleeding to substantiate such a diagnosis. In only a few was the diagnosis verified by vaginal examination before operation. In seven cases the placenta was marginal and in five central. In the others the type was not recorded. In only two cases of placenta previa were blood transfusion used.

In the seven patients in whom breech presentation was the main indication for cesarean, three had labors from six to 27 hours and then operation because of no progress or no engagement. One patient also had a small pelvis but no diagonal conjugate was recorded and no X-rays were done. In one patient, in labor six hours without progress, the additional notation was made that she was hysterical with each pain and was non-cooperative. Another patient had had a previous normal labor. A fourth patient, who had a breech with a "large baby" weighing seven pounds, twelve ounces, was not permitted to go into labor before operation.

All the five elderly primiparas had cesarean sections without a trial of labor. The ages ranged from 35 to 42 years. Four patients had elective cesarean sections because of the desire for sterilization, an unjustifiable procedure. All had had one to three previous children. In two patients had a history of long and difficult labors so had cesarean sections without allowing labor to start.

Selley (29) has arranged a series of indications as follows:

	Cases	Per cent
Disproportion	60	42.9
Previous section	30	21.4
Hemorrhage	21	15.0
Chromic organic disease	7	5.0
Chronic glomerulonephritis		
Diabetes and Toxemia		
Epilepsy and Toxemia		
Fragilitas Ossium with Breech and no progress		
Multiple Sclerosis		
Vaginal and Cervical Dystocia and Atresia	7	5.0
Atresia of Cervix		
Atresia of Vaginal		
Cervical Dystocia		
Cardiac	4	2.8
Toxemia	2	1.4
Others	5	3.6
Habitual abortion, elderly primipara with breech		
Optic atrophy		
Congenital dislocation of hip		
Separation of symphysis and both sacroiliacs		
Multiple Fibroids	4	2.8

Jackson and Titus (30) report a series of cases from private records with special reference to cesarean section. Among 2,539 consecutive cases in private practice, the number of cesareans was 258 or 10 per cent. O f these 171, or 66.6 per cent, were primary cesareans, while 87 or 33.3 per cent were repeat cases. The indications for operation were as follows:

Previous cesarean	87
High presenting part in pelvic disproportion	57
Toxemia	26
Previous hard labor	15
Separated placenta	14
Cardiac disease	8
Extensive repairs	13
Placenta previa	8
Age	7
Complicating fibroids	5
Constitutional diseases	5
Nephritis	4
Sterilization	3
Eclampsia	3
Diabetes	2
Ruptured uterus	1

From Atlanta, Ga., McCord (31) has a series of 220 cesarean sections in seven hospitals. There was an incidence of one section in 92 deliveries. The main causes for the operation were as follows: Contracted pelvis, 26.2 per cent; toxemia of pregnancy, 20.2 per cent; placenta previa, 15 per cent; and dystocia, 10.4 per cent. Sterilization was done in 23.1 per cent.

At the Cleveland Maternity Hospital, Barney, Fish, and Riemenschneider (32) deal with the obstetric cases delivered by abdominal cesarean section from the years 1931 to 1941. Their report comprises an analysis of 1,317 such operations thus permitting a rather thorough study of certain phases of the subject. The cases included are from both the staff and private services. The private incidence is 6.0 per cent while that of the staff service is 6.3 per cent.

INDICATIONS FOR ABDOMINAL CESAREAN

Repeat section	404	30.1%
Small measurements etc	354	26.8
Placenta previa	120	9.1
Premature separation	102	7.7
Toxemia	101	7.6
Cervical dystocia	64	4.8
Medical indications	59	4.4
Pelvic turmor	38	2.8
Unclassified	70	5.3

Lull and Ullery (33) report 112 cases of cesarean section done under continuous caudal analgesia. Those indications for operation were:

Disproportion, Twin pregnancy, toxemia	1
Disproportion, pre-eclamtic toxemia	1
Disproportion, previous section	11
Disproportion, pulmonary tuberculosis	1
Disproportion (cephalopelvic)	62
Diabetes	2
Eclampsia	1
Pre-eclampsia	5
Multiple uterine fibroids	4
Previous hysterotomy	2
Rheumatic heart disease	3
Heart disease	8
Previous difficult delivery	3
Uterine inertia	1
Epilepsy	2
Severe contractile burn & scar of perineum	1
Advanced pulmonary tuberculosis	3
Premature separation of placenta	1

Feiner (34) remarks that cesarean section is accompanied by a greater morbidity and mortablity than uncomplicated simple laparotomy. It would appear from a study of the situation that the technical surgery involved is far less important

than a well organized effort to intelligently interpret and evaluate the attendant general and obstetric status of the patient. Mature deliberate obstetric judgment plays a much more important role than the equally necessary obstetric operation.

The classification of indications as outlined by Gordon (35) with such modifications as are explained under the proper headings.

1. Cases of contracted pelvis
2. Cases of eclampsia and other toxemias of pregnancy
3. Cases of antepartum hemorrhage (placenta previa and accidental hemorrhage)
4. Other conditions

The most frequent indication for section was contracted pelvis, totaling 206 cases or 59.3 per cent. In the second group was 7 cases of eclampsia and 14 cases of pre-eclampsia. The third group was composed of 23 cases of placenta previa and 9 cases of ablatio placentae, 4 total and 5 partial. Among other conditions were listed the following:

Cardiac disease - - - - - - - - - 14
Disproportion - - - - - - - - - -24
Cervical dystocia - - - - - - - - 19
Multiple fibroids - - - - - - - - 5
Breech - - - - - - - - - - - - - - - 2
Persistent occipitoposterior - - 3
Habitual stillbirth - - - - - - - 2

and one each of the following: interposed uterus, ruptured uterus, paraplegia following encephalitis, previous third degree lacerations, torsion of

uterus, ventral fixation, hemiplegia, transverse presentation, psychosis, previous myomectomy, previous polio, hypertension, hemiplegia plus hypertension, pulmonary tuberculosis, unengaged head, hyphotic pelvis in an elderly primipara.

The contracted pelvis group included 55 cases of absolute contraction in which the indication was obvious and the delivery by cesarean section, either elective or following a short trial labor. The larger proportion were borderline contractions which necessitated the most deliberate obstetric judgment in their management. The crucial decision has been to determine where the margin of safety ends beyond which is the specter of an exhausted mother with diminished resistance to hemorrhage and infection, and a badly jeopardized baby.

From the Bronx Hospital comes a report by Rosensohn, Kushner, and Wahrsinger (36) on a series from July, 1932 through Dec., 1942. There were 494 cesarean operations among 20,763 cases. This represents and incidence of 2.4 per cent.

INDICATIONS

Indication	No. of cases
Contracted pelvis	163
Cephalopelvic disproportion	93
Previous section	89
Placenta previa	67
Premature separation	29
Malpresentation	8
Cardiac, elective	5
Toxemias	7
Stenosis of the vagina	2
Previous gynecologic operations	6
Fibroids complicating pregnancy	9
Postmaturity	1
Abdominal pregnancy	1
Fetal distress	3
Elderly primigravidas	11

The next table gives the indications for which cesarean section was performed at the Queen's Charlottes' Hospital during the years 1926 - 1936 inclusive, analyzed by Phillips (37).

Indications	No. of cases
Contracted pelvis and disproportion	421
Placenta previa	68
Cardiac disease	56
Breech (with some complications)	58
Previous obstetric difficulties	59
Fibroids	8
Ovarian cyst	8
Prolapse of cord	9
Miscellaneous	69
TOTAL	756

The indications in the miscellaneous cases were:

Absolute Indications	
Tumors impacted in pelvis	1
Tumors of pelvic bones	2
Carcinoma of cervices	2
Atresia of cervix	1
Carcinoma of rectum	1
Previous abdomino-perineal excision of rectum	1

(continued)

Relative Indications	
Concealed accidental ante-partum hemorrhage	1
Rigidity of perineum (perineorrhaphy)	7
Sear in uterus from myomectomy	3
Bicornuate uterus	2
Malpresentations (other than breech)	5
Eclampsia	1
Hydramnios (diagnosed as ovarian cyst)	1
Varicose veins of the vulva	1
Chronic nephritis	4
For sterilization	5
Age, with some obstetric abnormality	6
Acute intestinal obstruction from previous abdominal operation	1
Edema of vulva	2
Albuminuria	1
Contraction ring	1
Tuberculosis	2
Uterine inertia	4
TOTAL	60

Kohn and Morrison (38) analyzed 1,088 cesarean sections done at the University Hospital of West Virginia from 1920 to 1934. The material was divided into three eight year periods for purposes of comparison. There were 613 white and 475 colored patients, 347 private and 741 ward. Since there was a total of 49,778 deliveries during this period, it represents an indidence of 2.1 per cent.

INDICATIONS				
	1920-27	29-35	36-43	Total
Cephalopelvic disproportion	105	139	192	436
Placenta previa	23	107	87	104
Premature separation of placenta	5	42	38	185
Eclampsia	30	8	0	38
Pre-eclampsia	13	41	50	104

(continued)

	1920-27	29-35	36-43	Total
Post eclampsia	0	0	6	6
Previous cesarean section	1	2	20	23
Heart disease	4	5	10	19
Hypertension and sterilization	0	10	8	18
Prolonged labor	13	2	0	15
Mental deficiency and sterilization	0	10	2	12
Transverse presentation	2	5	4	11
Breech presentation	4	1	6	11
High amputation of cervix	1	2	6	9
Elderly primipara	1	1	6	8
Miscellaneous (5 or less)	13	19	40	72
TOTAL	215	394	475	1,084

Under the indication cephalopelvic disproportion has been grouped all cases of contracted pelvis plus those cases in which the pelvis was apparently normal or borderline with a large baby. A "trial labor" rather than a "test of labor" is the clinic rule and a number of these cases have come to section after such a "trial" has failed to produce the desired decent of the presenting part.

Fraser and Sparling (39) say that the performance of this operation should be limited in the bulk of cases to the following five reasons:

1. Pelvic contraction, or cephalopelvic disproportion.
2. Neoplasms obstructing the birth canal.
3. Hemorrhage (placenta previa).
4. Toxemia.
5. Repeat sections.

A well trained obstetrician will strive to avoid rather than to choose delivery by cesarean section in the face of an obstetric emergency, and many

times will be entirely successful where the untrained man would subject his patient to the greater risk of section. Any hospital with a high proportion of its total deliveries accomplished by cesarean section may be looked upon with grave suspician. This indicates that the obstetric ability of its attending physicians, who are responsible for this, is below average.

Two questions arise when this operation is chosen for a patient by her medical attendants. The first is whether the decision was an honest one, and the second is whether they are competent to make the decision. Lynch (41) says that this operative furor can be combated by creating the sentiment in the profession that only the qualified obstetricians should be allowed to undertake major obstetric surgery.

On the conservative side, Cosgrove and Norton (42) say that cesarean section should not be undertaken at all except with the concurrence of at least two physicians, one of whom should be, if possible, an obstetrician of acknowledge competence and experience. This rule should govern its employment according to definite regulations in all properly organized hospitals.

Historically, cesarean section has been employed only for high degrees of feto-pelvic disproportion. Indeed, until about fifty years ago its validity on any other grounds was not recognized. In the last forty to fifty years, however, the term relative disproportion has become so liberalized as to connote any degree of feto-pelvic disproportion which makes vaginal delivery unusually difficult or which carries more than a minimum hazard for the baby's survival in vaginal delivery. This trend, while undoubtedly conservative in expert hands, has been pernicious in the hands of the occasional operator lacking the obstetric capacity to adequately judge corollary conditions affecting individual situations.

Paralleling the more liberal attitude involving the feto-pelvic relation of size is the use of cesarean section for other mechanical interferences with labor, such as malpresentation, occasional factors of dystocia of the soft parts in the birth tract and tumors extrinsic to the uterus. Another group of indications comprises now. Mechanical abnormalities peculiar to the pregnant state, such as certain types of placenta previa, abruptio placentae and severe, rapidly progressive toxemia. Still another group involves disease conditions

in the mother primarily dependent on the pregnancy, such as tumors of the uterus or other organs not necessarily mechanically obstructing labor but indicating from its nature ablation, rare cases of heart disease, disease of the central nervous system and acute infectious diseases.

The surveys and stastical results obtained from the leading obstetric clinics are well publicized, appreciated, and duly admired. They represent the par for the course. Excellently staffed, well equipped and with all decisions and techniques under the direct control of obstetric specialists, it is only reasonable to expect superlative results. However, the bulk of obstetric practice does not take place in these leading centers. It is largely entrusted to the hands of the small, moderate-sized voluntary and community general hospital, wherein every general practitioner does his "confinement work" and thereby directly influences the incidence, type, morbidity, and the mortality of abdominal delivery.

This survey by Liccione (43) represents the eleven year study of cesarean section in such a 200 bed hospital in which fifty odd general practitioners "do obstetrics" and when in trouble,

call upon the services of several surgeons or obstetricians to help them out. This situation undoubtedly more truly represents nation-wide conditions.

INCIDENCE OF SECTION

Year	Births	Sections	Year	Births	Sections
1930	822	19	1936	689	22
1931	823	15	1937	781	17
1932	790	17	1938	752	23
1933	746	14	1939	831	23
1934	635	13	1940	830	22
1935	662	19	TOTAL	3,883	107
TOTAL	4,478	97			

INDICATIONS

	1930-35	36-40
Contracted pelvis, before labor, elective	6	15
Dystocia, cephalopelvic disproportion	34	33
Pre-eclampsia	0	4
Eclampsia	16	4
Abruptio placenta, accidental hemorrhage	3	6
Placenta previa	9	13
Repeat section	14	12
Cardiac	4	3
Previous operative repair	3	3
Fibromyoma	4	4
Pulmonary hemorrhage	1	0
Sterilization	1	0
Interest of child	2	9
Chorea of pregnancy	0	1
TOTAL	97	107

Not withstanding the availability of X-ray pelvimetry, it is apparently still very difficult for the general practitioner to evaluate properly comparative cephalopelvic proportions. Injustification, may it be said that proper evaluation of a pelvis is still the most difficult task which

confronts the trained obstetrician, not to mention the lack of uterine force and the deficiency of mental and physical stamina with which so many of our modern women approach labor. These is a marked reduction in sections for eclampsia from 16 per cent to 4 per cent. The small number of repeat sections in both groups is striking. Undoubtedly, the economic factors attending the depression decade with its marked increase in elderly primiparas has precluded further pregnancy in this group. The group of sections done primarily in the interest of the child shows a marked increase in the second series. As the typical American family shrinks in size, the value of each baby proportionally increases. The elderly primigravida, with breech presentation or the sterility problem who has finally become pregnant after much expense, is not in a mood to gamble with the safety of the child when confronted with the possibility of its loss.

COMPARATIVE INDICATION STATISTICS

Indications	Mt. Vernon, N.Y. 8,459 Deliveries 204 sections (2.6%)	Chicago Lying-in Hospital 18,000 Deliveries 1,000 sections (5.5%)
Disproportion & Dystocia	44.0 per cent	47.0 per cent
Placenta previa	10.6 per cent	7.9 per cent
Abruptio placentae	4.3 per cent	4.6 per cent
Eclampsia	9.6 per cent	0.9 per cent
Pre-eclampsia	1.9 per cent	6.5 per cent
Repeat section	8.0 per cent	28.0 per cent

This is a comparative analysis of the indications at a small hospital and a large obstetric center. The marked disparity in the figures for eclampsia is obvious. The tendency in the first series was to operate during the stage of convulsion. In the second series, the staff of the small hospital learned but apparently not soon enough to treat the eclampsia medically when fully developed. The striking difference in repeat sections is noteworthy. This, of course, contributes to the larger cesarean percentage figures for the obstetric center and by dilution with clean, uninfected cases improves the morbidity statistics for the larger center.

In determining the indications for a cesarean section, one should consider the patient "as a Whole;" namely, her age, history of previous labor, condition of cervix, and position of fetus, as well as future

chance of child bearing, in addition to the true obstetric indication. In private practice, this complete knowledge of the patient often tends to place too high a value on the child; in the clinic case the tendency may be in the opposite direction and labor may be considered as a purely mechanical problem, thereby often minimizing the risk to the infant. At any rate, each case should be judges on its own and complete individual merits and the obstetrician, cognizant of the two schools of action, can only hope to develope an "obstetric conscience," which is the ultimate objective to be desired (44).

The indications for cesarean section may be briefly stated as contracted or deformed pelvis, unexplained dystocia, abruptio placenta, placenta previa, previous cesarean section, toxemia of pregnancy in certain instances, obstructing pelvic tumors, and constitutional disease such as advanced mitral stenosis according to Nash (45).

This report (45) comprises a series of 348 consecutive cesarean sections performed by 19 surgeons and involving the patients of 43 doctors at Bethany and Providence hospitals in Kansas City, Kansas, during the years 1938-1942 inclusive.

The total number of obstetrical patients for the same period of time was 4,875, which makes the incidence of cesarean section 7.1 per cent. This is misleading since these years still saw many normal deliveries in the home, while many doctors, doing deliveries in the home, hospitalized complicated or potentially complicated patients.

It is obvious from the following table that a higher incidence of cesarean section, as a whole, is largely manifest in the increased number of recorded cephalo-pelvic disproportion. This would indicate either a tendency toward elective cesarean or a misinterpretation of a trial labor. A liberal tendency to section a placenta previa and a abruptio placenta is also evident in this group, a fact with which Nash agrees. Previous section was not clearly distinguished as an incication for succeeding abdominal deliveries.

COMPARATIVE INCIDENCE AND INDICATION FOR SECTION

NAME	Keetel	Wentsler	Monahan	De Normandie	Hennessy	Seley	Adair	Nash
NUMBER	7729		1333	11,030	198	140	1000	348
INCIDENCE IN PER CENT	2+	1.4	5.9	3.3	4.3	1.5	5.5	7.1
CEPHALO-PELVIC DISPRO-PORTION	39.7%	15%	44.5%			42.9%		61%
PLACENTA PREVIA ABRUPTIO-PLACENTA	10.5%	3%	6.6%					12%
TOXEMIA OF PREGNANCY	10.0%		15.0%			1.4%		8.6%
DYSTOCIA						5.0%		4.2%
PREVIOUS CESAREAN SECTION	14.9%	60.6%	11.2%	9.7%		21.4%		
MISC.		5.0%	3.0%					5.7%

COMPARATIVE INCIDENCE OF CESAREAN SECTION

	Number	Incidence	Maternal Mortality
DeNormandie	11,030	3.3%	2.4%
Keetel	7,729	2.0%	2.77%
Wentsler	233	1.4%	2.1%
Monahan	1,333	5.9%	2.8%
Nash	334	7.1%	1.1%

If the incidence of cesarean section is to be reduced without hazard, each patient must be considered as an individual problem. The obstetrician cannot lose sight of the fact that he is responsible for the immediate welfare of the mother and her fetus plus the distant welfare of the mother and her succeeding pregnancies.

In the experience of Cosgrove (46), embracing more than 14 years, 73,703 living births, and 1,891 cesarean sections, there is adequate material for the discussion of cesarean section. In his work there is an incidence of 2.81 per cent of live births for the whole period. Annual rates have varied from 2.49 per cent to 3.60 per cent. Also the historical value of the operation continues to be exemplified, for the most frequent proper indication for section (in 56 per cent of the whole) is feto-pelvic disproportion. Ten and a half per cent, the second largest group, was

done for previous abdominal birth. Among other mechanical factors characterizing labor difficulty for which section has been performed, (and each accounting for but a fraction of one per cent of the operations) are:

1. Rupture of uterus:
   Spontaneous
   Through old cesarean section scar

2. Obstruction by neoplasms:
   Fibromyomata
   Cancer of the cervix

3. Obstructions by anomalies of soft parts:
   Congenital
   Resulting from previous surgery

4. Uterine inertia - rare as only factor:
   Frequently coexisting with feto-pelvic disproportion, and when it does, contributing importantly to the failure of spontaneous delivery.

5. So-called "Cervical Dystocia", which in Cosgrove's opinion hardly ever exists in the absence of neoplasms, post-operative cicatrices, etc. Should generally be recognized as feto-pelvic disproportion.

6. Anomalies of presentation.

There are three important, non-mechanical obstetric indications for section:

1. Placenta previa:
   (a) When bleeding is very profuse and delivery is not imminent.
   (b) In central previa in the presence of an unprepared cervix, especially in primigravidae.

2. Abruption of the Placenta:

(a) In the mild group, seven-eights of them may be properly managed by expectant treatment.

(b) Forty-two per cent of them will deliver spontaneously, somewhat more by relatively simple artificial delivery procedures.

(c) In the severe group, 22 per cent will deliver spontaneously, and about the same number by simple artificial interference. In this group cesarean section finds special application as a direct means of saving mother's lives

3. Toxemias and associated conditions. Eclampsia itself is not an indication for section, but is definitely a contraindication unless there is a concomitant mechanical indication. Fulminant and increasing pre-eclampsia, hypertensive toxemia and nephritis not infrequently justify the operation to promptly terminate their effects on the mother, and to salvage the baby.

Age of the mother in itself is not an indication for cesarean section, but in combination with other factors of difficulty it may weight decision to resort to section. Medical and surgical complications of pregnancy require appropriate medical and surgical treatment without disturbance of the pregnancy.

DISCUSSION

No obstetrician will deny that a suprapubic vagina would have solved his greatest headaches. Surely it seems that nature provided in man a most difficult manner of birth, a paradoxial reward for submitting to the profound biologic urge upon which continuity of the race depends. For parturition is complicated by a birth tract not only bony-walled and curved but subjected to compromising variations in size and shape. As if this were not enough, there are added to it, variants in the adaptation of organs and tissues to the passage of a fetus which itself is no fixed factor.

The first labor is the crucial one for most, sice it tests the pelvic capacity as well as the effectiveness of expulsive efforts upon the infant. Tnue, hazards exist for subsequent parturitions, but a patient once successfully delivered at term of a normal infant never again presents the same problem. It is a tribute to the fact that the majority of dangers at the time of childbirth are dependent upon feto-pelvic relationship and the successful continuity of the numerous physiologic changes which we encompass in the word "labor".

Cesarean section represents the alternate birth tract. Let no one ever believe it is the best. (47) In its most successful applications, it carries a maternal death rate for higher than that noted in statistical compilations of vaginal deliveries. In less competetent hands or under less favorable circumstances, the mortality may reach unbelievable figures. Yet when the indication is just and the performance is good, the procedure of cesarean section embodies a far better prospect for the principals than vaginal delivery.

Cesarean section is the supropubic delivery of an intrauterine fetus. It is probably very ancient and has been practiced even among primitive peoples.

Historically, it
(1) was very rarely resorted to,
(2) carried a prohibitively dangerous mortality, and
(3) was indicated only in the very smallest pelvises, through which it was absolutely impossible to deliver a live baby, and almost impossible to deliver a dead one.

With the advent of antisepsis, asepsis, and the suture technic of Sänger, there has, in a very few years, been a tendency to change these historic facts by

(1) employing it much more frequently, because
(2) it is technically easy and is mistakenly regarded as a safe operation; and this account
(3) it is used for much more numerous and broader indications than formerly.

There is abundant reason for believing that this change in attitude has been so excessively sweeping as to create in many hands an actual abuse of a most valuable and life-saving operation. It is further believed that this abuse is not because refinement of technique in cesarean section has not kept pace with improvement in other lives of surgery, but rather because it is all too frequently employed without discriminating judgment based on sound obstetric knowledge of the dangers, limitations, and indications for its use. (46)

Of all life-saving operation, cesarean section is the most spectacular, and also, to a great extent, the most life-saving operation. (48) In most cases two lives are at stake, that of the mother and that of her unborn child. Modern obstetrics would be greatly handicapped were it not for this operation in cases where indicated. Yet, owing to the temptation of the general surgeon, as well as the inexperienced obstetrican to resort to cesarean section, all to often, when not indicated or even when contraindicated, has caused this most valuable operation to fall into disrepute.

With the good statistical records, a wider

field of indications was suggested. True, in the light of our improved technique and the better results we are now achieving with the low cervical and extra peritoneal sections, some wider causes are justified. We do resort to cesarean section in placenta previa, in malposition, especially in old primiparas, in certain cases of toxemia, or cardiac decomposition when indicated. However, in some hospitals the orgy of cesareans become quite abhorrent; and the only contraindications for a section with some is when the mother refuses to subject herself to the operation, or when the baby is coming before the preparation of the operating room is complete. Indications for cesarean should be passed upon only by obstetricians with long experience and integrity. Cesarean sections in the best hospitals have still a mortality rate of about 2 per cent.

Originally devised and utilized to overcome insuperable abstacles to delivery and thus to conserve maternal and infant life, this operation has been prostituded to the convenience and passibly even to the financial well-being of the physician. It still remains, as it always has been, the most dangerous method of delivery,

and is responsible in itself for a large percentage of all maternal deaths. In spite of these facts, the incidence of its performance is steadily increasing and one wonders when the end of this operative orgy will appear. (49)

There are approximately 33,750 cesarean sections each year. With the maternal mortality rate at five per cent, a figure which probably represents a fair approximation, it appears that nearly 1,700 mothers die following the operation. This constitutes roughly fifteen per cent of the total annual maternal mortality for the country, and data from special surveys support this statistical approach.

The original indications for abdominal delivery are still universally accepted, but the field has been broadened by some operators until there is practically no limit, and the so-called "indications"have become nothing more than "excuses." Occipital posterior positions, breech presentations in primigravidas, and even the desire of the patient to avoid the discomforts of labor are occasionally offered, but can be given no serious thought since they obviously have no scientific weight. Another growing, but disturbing, tendency is the performance of abdominal delivery solely for the purpose

of effecting sterilization.

This method of delivery is the quickest and most painless, and it can be such an easy choice for the practitioner faced with a difficult case in labor. These are the basic factors underlying the abuse of the operation. Practitioners with facilities for operative treatment but not trained as surgeons, feel confident to perform it. The public is unable to assess the risks of the operation or the decisive factors of operative skill.

DISCUSSION OF THE MOST COMMON INDICATIONS

It might now be wise, after giving the various indications for cesarean section, to discuss some of the more common ones. Probably the first most common indication for cesarean section is:

CEPHALOPELVIC DISPROPORTION (or maladjustment)

A careful abdominopelvic examination, clinical and X-ray measurement and Hillis maneuver at term, generally serve to make those cases of actual disproportion obvious, with early resort to elective section. It is the borderline case which poses the question, often unanswerable until time for elective operation has long since passed. Some clinics so frequently recognized the fallibility of experienced judgment that the chiefs of service commonly utilize reciprocal consultation before deciding to operate.

Whitridge Williams (67) claims that 80 per cent of all cases of contracted pelvis can be expected to end in natural delivery given time, patience, and a watchful eye on the patients' condition rather than on the clock. Bright Banister pointed out that in five large British hospitals 63 per cent of the sections were done for contracted

pelvis; "an unwarrantable slur upon modern feminine physique" was his comment.

Cases of gross pelvis deformity are almost always recognized in pregnancy, and a cesarean section performed before the onset of labor. Similarly, cases in which the head is engaged, or can be made to engage at or near term can as a rule be safely left alone. It is the doubtful case, with the unengaged head which will not push in, which requires careful investigation. Contracted pelvis is probably the rarest cause of a floating head. If the promontory cannot be felt, it can be assumed that there is no gross deformity, and the case can be allowed to go into trial labor. In this way a section is avoided, as most cases of minor disproportion end in a natural or an assisted delivery. Difficulties due to a small outlet are rare in cases in which the head is engaged at term, or early in labor. If any doubt exists regarding the outlet, valuable information can be obtained from a stereoscopic X-ray examination of the pelvis, and from a vaginal examination under anesthesia. It the case is fairly put to the patient or her relatives, it is rare for the baby's life to be placed before the interests of the mother and, although it is not always possible

or politic to discuss risks with a patient in the theories of labor, it is only fair to explain to her before a trial labor begins that cesarean section carries a much greater risk to life than natural delivery. A risk she should not take in many circumstances. "It is better to lose an occassional child than an occasional mother." The ideal is to save both mother and child but, if a choice is unavoidable, the baby of a young primigravida should be sacrificed to her future child-bearing possibilities, and of a multigravida to her existing children and responsibilities. In women over forty years of age, pregnant for the first time, the child should be given more consideration, as no further conception may occur, and a live baby on this occassion may be the only chance to satisfy the patients maternal instincts and fulfil her reproductive function.

Eastman (23) says to beware of recommending cesarean section on the basis of external pelvic measurements. The intercrestal and interspinous measurements measure only the false pelvic basin and have no relationship to the diameters of the true pelvic cavity. Most fallacious of these external measurements is the external conjugate. It has been known for years that the external

is not in the same plane as the conjugate vera. More important is the fact that the thickness of the sacrum and pubis is not constant but shows the greatest variation. As a result of these two sources of error, the amount to be subtracted from the external conjugate to give the conjugate vera is not constantly 8 centimeters, but as shown by many authors, ranges from 4 to 13 centimeters. It is possible for a woman to have a marked diminution in the external conjugate measurement with a normal obstetrical conjugate and, on the other hand, she may have a normal external conjugate with a substantial degree of inlet contraction. Much more dependable is the diagonal conjugate diameter, that is, the distance from the under margin of the symphysis pubis to the sacral promontory. If this measurement is over 11.5 centimeters, the pelvic inlet can ordinarily be dismissed as normal. If it is under 11.5 centimeters the pelvis is contracted, and if below 11.0 it may possibly give rise to dystocia. In the presence of definite contraction, X-ray pelvimetry is of the utmost value.

Dieckman's (50) practice is to perform an elective cesarean if the true conjugate is less

than 8.0 centimeters, or the transverse diameter of the outlet is less than 7 centimeters with the baby estimated to weigh 3,000 grams or more. With the true conjugate greater than 8.0 centimeters, patient is given a test of labor. This means that the patient has hard uterine contractions at 3 to 5 minute intervals, lasting at least 35 seconds, for 12 to 18 hours. A maximum of two vaginal examinations are made. These patients should have at least one vaginal examination after some hours of labor before they are subjected to the risk of cesarean section. If in this time, the cervix has not dilated satisfactorily, or the head has not descended to the level of the spines, an abdominal delivery is performed. Dieckmans' deadline is 24 hours of ruptured membranes or labor. In patients who are in labor for a longer period, delivery is effected vaginally, if necessary by craniotomy, or by cesarean hysterectomy.

Nash (45) says that a contracted pelvis is one with a true conjugate of less than nine and one-half centimeters or an outlet whose posterior sagittal and transverse diameters total less than 17 centimeters. These measurements are not necessarily indications for cesarean section.

Management of the patient with a contracted inlet is facilitated by an adequate trial of labor. Contraction of the outlet is in itself rarely an indication. Trial of labor is not helpful in evaluating. A contracted outlet but may be utilized in pelvic tumors or undetermined obstruction, elderly primipara, and some toxemias, varying the duration of the trial to suit the particular circumstances.

Gustafson (24) gives almost all of his cases of cephalopelvic disproportion trial labor. The duration of labor varies . Some which he has done sections on, have gone to complete dilatation. Many times delivery from below takes place after trial labor, when if doing elective cesarean section because of pelvic contraction, abdominal delivery would have been resorted to- Gustafson states that in his experience, pelvises with enough contraction of the outlet to warrant cesarean section are few and far between.

Laparohysterotomy may be absolutely indicated for disproportion, or it may be chosen because the prospects for the mother or child or both appear relatively safer than be vaginal delivery. Absolute indications are not common. It is agreed that

vaginal delivery of a full term living child is impossible if the antero-posterior diameter of the outlet is so contracted that the combined intertuberous and posterior sagittal diameters are less that 15 centimeters. The pelvic cavity maybe so obstructed by tumors that vaginal delivery is impossible or would involve serious damage to the child or mother. Mutilating operations on a dead fetus permit extraction through a less spacious pelvis but the shortest true conjugate permitting even such operations is said to be 6 centimeters. Under such conditions, there is no alternative treatment; cesarean section must be chosen and should be performed before labor or as soon after its onset as possible (51).

In the borderline group are usually placed pelvises with a true conjugate of 9 centimeters and up, unless, as in the android type, some other barrier is present in the cavity or at the outlet. It is said that 75 per cent of the cases in this borderline class can be delivered spontaneously or with slight operative aid, while the other 25 per cent require abdominal delivery. Undoubtedly, a test of labor should be given until events of early labor suggest a wiser course.

By a test of labor, Frawley (51) means a trial by the vaginal route, made under such conditions that the obstetrician may with comparative safety, turn to the abdominal route if it appears advisable. Signs that vaginal delivery may be reasonably expected include engagement, increased flexion, decent or rotation. Unfavorable signs are excessive overlapping of the fetal head at the inlet, deflexions, non-descent, early rupture of the membranes, poor dilatation and prolapse of the fetal cord.

No general formula in terms of time, frequency or strength of pains has found general acceptance. These cases cannot be treated as a class. Each must be decided by the particular circumstances present. Frawley says that in his own cases, the tests of labor have averaged from twelve to twenty-four hours if the membranes have not been ruptured over a few hours.

PREVIOUS CESAREAN SECTION

Previous section is one of the most frequent of indications and not always a valid one. It is an indication to be qualified by the initial section decision, the type of operation performed, the post-operative course and the factor of fetal size. With a previous low-transverse operation, good recovery and non-recurrent indication, it is Water's (52) practice to allow many subsequently

to deliver vaginally. Of course, with a previous classical operation, he does a repeat section when labor starts rather than chance uterine rupture.

It is often said "once a cesarean, always a cesarean". Like all aphorisms, its origin contains an element of truth only. It has its start in the fear of rupture of the uterine scar should a subsequent natural labor be allowed. If the previous cesarean section was performed by an able surgeon under good conditions, the uterine muscle carefully sutured, the subsequent puerperium afebrile in its course, and the present pregnancy at or near term does not show any obstructive element, then a natural labor can be allowed. It should be carefully watched and a cesarean performed should a rupture actually occur.

Plass believes that although the character of the earlier convalescence may give some clue to the strength of the scar, it is impossible by direct examination to confirm the impression thus gained, and consequently every scar must be looked upon with suspicion. If the first operation was performed while the patient was still a primigravida and not in labor, it would seem unwise to subject the scar to the strain of vaginal delivery. On the other hand, if the cesarean section was

on a parous woman for some incidental complication (such as placenta previa) conditions are entirely different and a subsequent delivery from below is much more reasonable and may frequently be conducted safely.(53)

Statistically, Dieckman (50) reports that rupture of the uterus has a hospital incidence of 0.05 per cent. Recent reports from maternity hospitals give an average maternal mortality of 40 per cent, ranging from 20 to 80 per cent and an average fetal morality of 65 per cent. Twenty to one-hundred per cent of the spontaneous ruptures, especially where there was no dystocia, are due to rupture of a uterine scar. The incidence of rupture of the cervical scar is at least 0.3 per cent.

Gustafson feels that with the incidence of rupture of the uterus after classic section (about 4 percent) that in patients having had a cesarean section, that repeat cesarean is the safest procedure. This is especially so in those patients never having delivered from below and even moreso if the section had been performed for contracted pelvis or if a definite wound infection followed. There is no way to evaluate the scar before the operation.

Kuder and Dotter (54) have a most interesting study on the character of vaginal delivery following cesarean section. In 34,356 obstetric patients admitted to the New York hospital, a previous section had been performed in 496 or 1.44 per cent. Of this group of 496 patients, 109 or 21.97 per cent, were delivered vaginally of a viable infant, without having had a vaginal delivery previous to the abdominal delivery. The average duration of labor of the first vaginal delivery in a patient who was delivered by section of her first child is virtually identical with that in a primipara. In the group of 109 patients with cesareans followed by vaginal births, there was one maternal death, due to cerebral embolism. The fetal mortality in this series was 4.58 per cent.

In regard to a previous section, James (55) concludes that full notes of a previous cesarean operation should always be obtained if possible. The abdominal scar is not necessarily a true indication of the nature of the uterine scar. Great vigilance is necessary in all cases previously delivered by the section and subsequently allowed a natural labor which must take place in a hospital. Definite signs of overstretching

of the scar usually precede the actual rupture, and contractions of a weak nature may occur before the rupture. Early diagnosis of impending tear should reduce the mortality to a minimum.

PLACENTA PREVIA

Placenta previa can cause death from hemorrhage more quickly than almost any other condition, although the factor of shock is less notable in abruption of the placenta. Waters (47) believes that cesarean is a safer and better way to deliver women with a placenta previa than any type of vaginal interference, such as bagging or Braxton-Hicks version. An exception is made in patients who bleed from partial previas only after considerable cervical dilatation is attained and especially in a multipara. Here, rupture of membranes and presenting part tamponade of the placenta may effectively check the bleeding and permit vaginal delivery. But dilatory management of a bleeding placenta previa with non-dilated cervix, notably primipara with no previous labor experience, denies the patient a decent chance to survive.

Phillips (37) says that section in placenta previa is usually done to save the babies life alone. All textbooks seem to agree that the operation should be performed in cases of central placenta previa.

From the treatment point of view, this definition is useless and dangerous. It is not safe to postpone the diagnosis until the os is completely dilated. Placenta previas in which the lower edge does not reach the internal os or pass across it, rarely need a section. Even in the type where the placenta passes across the internal os, a section can often be avoided in multiparae when the membranes can be ruptured and a leg brought down or the vagina plugged. It is difficult to lay down hard and fast rules in cases of placenta previa. Before a case can be considered suitable for this operation, a number of things have to be taken into account, viz: the position of the placenta, the condition of the cervix, the amount of blood lost, the prospects of controlling the loss effectively by vaginally delivery, the presence or absence of uterine contractions, the general condition of the patient, her parity, and her age-whether or not she is over forty years of age and a primigravida. If sufficient of these factors weigh against a vaginal delivery, then a section would be the better treatment. Section is usually reserved for patients in whom, owing to the length or rigidity of the cervix, much time will be required for dilatation and much blood lost, and for cases where

there is so much overlap of the placenta that it is difficult or impossible to control hemorrhage in a vaginal birth by delivery-obstetrical procedures.

During the past two decades, there has been a constant and significant decline in maternal mortality from placenta previa. Attempts to analyze this trend by large surveys of the world literature have repeatedly pointed to the increasing use of cesarean section as the major factor in this progress. It appears likely that the transfusion is a greater aid to abdominal delivery than to the vaginal in this condition, for the section offers immediate termination of labor without further trauma to the cervix and opportunity to deal with the dangerous third stage under direct vision. Further loss of blood is, therefore minimized (54).

Watson and Gusberg (54) present 76 cases of placenta previa. This group includes only cases where the placenta was definitely palpable on pelvic examination or proved low at operation. It includes 19 cases of central placenta previa, 19 cases of partial, and 38 cases of marginal placenta previa.

RESULTS OF TREATMENT IN PLACENTA PREVIAS		
	BAGGING	SECTION
No. cases	26	29
Fetal mortality	50%	11.1%
Maternal mortality	11.5%	3.4%
Shock	61.5%	10.3%
Hemorrhage	46.1%	13.7%
Morbidity	57.6%	37.9%

These results indicate the marked advantage of cesarean section over bagging for both mother and baby. Even the most serious forms of placenta previa, the cases with marked hemorrhage and shock on admission to the hospital, have responded better to abdominal delivery following transfusion and supportive treatment.

These men do not desire to urge cesareans as a universal treatment for placenta previa. Each case must be considered individually and many cases can be successfully treated by simple artificial rupture of the membranes. When such treatment is contemplated, obstetrical judgment must be used in the evaluation of:

a. the condition of the cervix

b. the quantity of the bleeding

c. the irritability of the uterus or the quality of the labor

d. the type of previa

The conditon of the cervix is the most important factor, for on it depends the time which must elapse before delivery can be anticipated by the pelvic route. Their figures bear out the efficacy and safety of simple rupture of membranes when used in the proper cases. Of twelve incidences of marginal previa where the procedure was used as a specific therapy, it successfully controlled hemorrhage and was

followed by spontaneous delivery in eleven.

MARGINAL PLACENTA PREVIA; COMPARISON OF RESULTS FOLLOWING RUPTURE OF MEMBRANES AND BAGGING		
	BAGGING	ARTIFICIAL RUPTURE OF MEMBRANES
No. of cases	8	12
fetal mortality	25.0%	16.6%
Maternal mortality	25%	0
Shock	62.5%	0
Hemorrhage	37.5%	0
Morbidity	50.0%	8.3%

When a diagnosis of placenta previa has been made and the child is still quite premature, they feel justified in waiting if the following conditions are fulfilled:

a. the patient can be kept in bed in the hospital

b. hemorrhage ceases with bed rest

c. little or no bleeding is evoked by gentle vaginal examination

d. patient's general condition is good

Arnot (18) teaches that stopping and controlling the hemorrhage is the prime objective in mothers with previa. If the bleeding is only slight and the patient is progressing in labor, she should be left alone. Occassionally, simply rupturing the membranes and giving the pituitrin, will force the head down against the placenta and control the bleeding until the delivery is made. If the patient is well dilated and bleeding

considerably, version and extraction is probably the quickest, safest, and most easily available method. If the patient is dilated two centimeters or more and has a lateral or marginal type, the membranes can be ruptured and an intra-ovular application of a No. 5 Voorhees bag made. As a general rule, cesarean should only be done in the complete or central type where there is a viable, live child and insufficient dilatation to perform version and extraction, and in those with a thick, firm, undilated cervix regardless of whether the placenta is lateral, marginal, or central.

Watson's (55) studies show that vaginal delivery is accompanied by a maternal mortality ranging from 0-11 percent, with an average of 6 per cent for all hospitals and 3 per cent for maternity hospitals. Delivery by cesarean section has a range of 0-11 per cent with an average of 4 per cent in all hospitals and 2.4 per cent for maternity hospitals. The cause of death in placenta previa is either from hemorrhage or from infection. Kellogg and Irving state that the inexperienced physicians have a lower maternal mortality with cesarean section than with delivery vaginally. If the insertion of a bag or a Braxton-Hicks version are required to control the

the hemorrhage, Watson's studies showed that 60 per cent of the cases required a serious operative delivery. Any patient who is 30 weeks or more pregnant with complete placenta previa is best treated by cesarean section. About 25 per cent of the cases fall in this class. In general, cesarean section is the operation of choice in the treatment of placenta previa. Where the placenta is palpated one or more centimeters from the os, or when it cannot be palpated but is said to be low-lying, vaginal delivery can usually be safely carried out. Early and repeated transfusions will aid in decreasing maternal mortality. (56)

ABRUPTIO PLACENTA

Miller (57) believes that the indications for cesarean section in the treatment of premature separation of the normally implanted placenta should be extended wherever ideal conditions are obtainable. Under ideal surroundings the section, even in the presence of shock, can be safely employed, providing adequate methods are used to combat shock by transfusions and fluid administration. Also the operation must be performed under expertly given anesthesia which is suited to the patients needs. Experience of the Hartford Hospital over many years has shown that cesarean can be employed

without increase in mortality and without severely limiting subsequent childbearing, and further that in the presence of a live child, fetal losses are greatly diminished.

Contrary to Miller, Holmes (58) says that the elimination of eclampsia as an indication for the section has probably contributed more to the lessening of the mortality of the disease and of the section than all the improved therapy of one and the bettered technique of the other. There is peculiar anology between eclampsia and ablatio; specifically, the toxic type. Eclampsia and toxic ablatio have poisons bathing maternal and fetal tissues, great nervous depression and coma, destruction of nephritic and hepatic tissue with an arrest of function. As a result of their similarity, it is as illogical to perform cesarean sections for ablatios as for an eclampsia. It is needless to state contributary indications may make a section imperative.

There is a clear trend of the world's experts to limit, even to discard, cesareans for all types of placental separation. The experience of the Rotunda Hospital and of Irving, is indicative of this change. The French Obstetrical Congress, in 1000 cases, reported the mortality following the

section as 19 per cent, and for the conservative vaginal handling, it was 6 per cent. Furthermore, in no sense is hysterectomy an essential part of the management, although special cases may require it.

Following the same practice, Walkins (59) does very few cesareans for the treatment of ablatio placenta. He claims that the chance of error in early diagnosis is not inconsiderable. There is a high percentage of toxemia found in every group studied. Such patients do not tolerate major surgery well. With added blood loss, their risk is increased. The severe separation may force one to do a section, but for the mild or moderate case, it has been his policy to treat the patient conservatively, delivering vaginally if possible.

Bartholomew (60) with substitution of supportive measures, induction of labors, and a minimum of trauma, has effected a reduction in mortality from the figures of 15 to 20 per cent to 5 to 7 per cent for toxemia. He is coming to the same viewpoint in regard to separation of the placenta. Eclampsia and separation of the normally implanted placenta are fundamentally of the same nature. The latter is preceded by typical manifestations of toxemia in the majority of cases and the pathology

in the placenta is identical with that of eclampsia. However, in separation, there is hemorrhage to be controlled and a marked tendency to shock; the second being particularly dangerous. The employment of conservative treatment is most important.

Lynch (62) remarks that it is fruitless to deny that many premature placental separations in multiparae can be managed best by so-called conservative treatment, with vaginal delivery awaited. A placental abruption in any patient, especially a primipara, with active bleeding, exhibition of shock and a closed cervix, is best treated by cesarean. Suitable measures must be taken to combat shock and blood loss. In the mild type of abruption, almost any form of treatment will give passable results.

TOXEMIAS OF PREGNANCY

The mortality from cesarean section in the treatment of eclampsia ranges from 2 to 88 percent. Cesarean section is indicated in toxemia patients if there is cephalopelvic disproportion. In pre-eclamptics, where the blood pressure, proteinuria, and edema are increasing despite treatment, or where symptoms develop and the cervix is not effaced, an elective section is indicated. Only the patient with the severe type [illegible] and a thick, uneffaced cervix should

after 8-12 hours of proper medical treatment, be delivered by cesarean. Patients with mild eclampsia are treated medically for days until the cervix is effaced. Approximately 40 per cent of the patients have antepartum eclampsia, but only one-fourth of the cases is severe.

Swift (63) points out that cesarean section has been reserved for those cases of fulminating pre-eclampsia either not responding or rapidly growing worse under conservative treatment. Consultation between two or more staff members is used in all cases before operation. Decision to operate was largely made on the clinical picture through blood chemistry, especially uric acid determination and CO_2 combining power. Lives have been saved by doing sections on primipara not in labor and having thick, closed cervices, who were rapidly growing worse on conservative treatment. In this condition, local anesthesia is the anesthesia of choice.

Strauss and Fisher (64) present a study of the sections done for toxemia of pregnancy in the Michael Reese Hospital during the ten year period of 1929-1939. During this period, 681 sections were performed in a total of 15,555 deliveries, the indication being toxemia in 94. From 1922 to 1927, four sections were done for toxemia, as compared with 57 in the

following five years-1927 to 1932, (six were done for eclampsia and the remaining 88 for pre-eclampsia). Hospital figures give the incidence of non-convulsive toxemia of pregnancy in the United States as varying between 0.2 and 29 per cent, or an average of 4 per cent. In 20 per cent of these, the pregnancy was terminated by cesarean section. Dieckman and Brown cited an incidence of cesarean operations of 16 per cent in the Chicago Lying-In series.

YEAR	TOTAL NO. OF SECTIONS	NO. OF PATIENTS WITH TOXEMIA	SECTIONS FOR TOXEMIA	PER CENT PATIENTS, TOXEMIAS, TREATED BY SECTION	PER CENT SECTIONS DONE FOR TOXEMIA
1929	72	59	15	25	21
1930	77	48	9	19	12
1931	67	40	6	15	10
1932	47	39	7	19	15
1933	39	37	6	16	20
1934	68	35	7	20	10
1935	59	40	8	20	14
1936	87	62	9	15	10
1937	89	51	13	26	15
1938	76	53	14	26	18
TOTAL	681	464	94	220	146

INCIDENCE OF VARIOUS TYPES OF TOXEMIA		
	NO. OF CASES	PER CENT OF SECTIONS
Pre-eclampsia	70	72
Eclampsia	6	6.3
Nephritic Toxemia	8	8.5
Cardiovascular diseases	3	3.2
Other Toxemias	7	7.4

It is generally agreed that the mortality of premature babies born of toxemic mothers is lower when these infants are delivered by cesarean section than by the vaginal route. It is especially true that babies do not tolerate labor well if delivered of toxemic women. In this series, the gross fetal mortality was 13.5 per cent.

These cases represent both the private and ward services of eleven operators. Most of the patients were hospitalized and given trial conservative treatment. This treatment was quite uniform, consisting of sedation by the Stroganoff technique, absolute bed rest, restricted diet, purgative, and intravenous dextrose and magnesium sulfate. The large percentage of patients subsequently operated upon represents cases in which, despite adequate medical management, the toxemia was progressive or stationary and the pregnancy 32 weeks or beyond, with the fetus viable. Seventy-two per cent of the sections for toxemias were done on primiparas. The majority of multiparas in those cases in which the toxemia does not improve, the fetus is viable, and the cervix "unripe" for vaginally delivery.

Diekman (65) states that cesarean section should be used only in the pre-eclamptic patient when eclampsia seems imminent and when delivery through the vagina

seems unwise. Strauss and Fisher are of the opinion that it is an unnecessary risk to both mother and baby if the toxemia is allowed to reach a point where eclampsia is imminent and that section should be performed at the earliest time consistent with the safety of the baby if the toxemia is progressive or does not improve in spite of hospital medical treatment. They also believe that the sooner an unborn baby within the period of viability is separated from its toxemic mother, the better is its chance for life; and conversely, the longer it is attached to its toxemic mother, the less likely it is to survive. The long-continued toxemia of pregnancy is more productive of chronic arterial and renal disease than toxemia of short duration.

Dieckman (65) gives three indications for sections in toxemic patients; (1) if there is cephalopelvic disproportion (2) after medical treatment has been used in severe pre-eclamptic or eclamptic patients who are near term with a closed, uneffaced cervix (3) in patients with severe vascular or renal disease if termination is deemed necessary between 38 weeks gestation. Sterilization per se is not an indication. Cesarean section should not be used as a last resort.

Rubonits (66) says that there is an occassional toxemic patient in whom the conditions are quite ideal

for the performance of vaginal cesarean section, especially for a multipara with a roomy pelvis and relaxed tissue. Another point to consider is the advisability of performing a section even though the patient has already developed convulsions. If the convulsions have been mild or easily controlled and a number of hours have elapsed without evidence of more seizures, then we should not be deterred by the rule which has been adopted in many clinics-- a patient once having developed convulsions should not be sectioned. Falls (67) follows this same practice. His rule is that a section is never done on an eclamptic patient if it can be avoided. If a section is done, it is because he feels that the danger of allowing the patient to go further in pregnancy is greater than the danger of doing the operation. The greatest danger is in procastination in trying to get the obstetrician to make up his mind, that there is an indication present that will be defensible if he does a section and loses the case.

Phillips (37) does not believe eclampsia is an indication for abdominal delivery. In his 13 year series from 1924 to 1936, cesarean section was done for eclampsia only one time, and the patient died. Section doubles the mortality rate of this dreaded complication which by universal agreement is now

treated by non-surgical measures. Pre-eclamptic toxemias, with severe and obstructive edema of the vulva, are treated by section. Waters (52) has the same theory about the care of these patients. In his estimation, the toxemias of pregnancy are not indications for operation and eclampsia almost never is. Antepartum eclampsia when brought under control may be followed by cesarean if the severe toxic condition persists or reoccurs. In primiparae, severe pre-eclampsia not responding to antitoxin therapy, justify section.

HEART DISEASE

Fewer cesareans are being done im women with heart disease as it is being shown that they stand labor fairly well and that the mortality among those delivered vaginally is considerably lower than for those delivered by section. Cesareans should only be done upon those cardiacs who show signs of insufficiency upon less than ordinary physical activity or while at rest. Any decompensation should be treated and compensation restored, if possible, before operation is performed.

Phillips (37) believes that sections, although necessary in a minority of carefully selected cases, is by no means a certain method of obtaining a live baby. Generally speaking, it more than doubles the maternal mortality rate. In many of the patients seen

the lesions are old, healed, or well-compensated. The cardiac reserve and the response to effort are good. These patients stand childbearing well, and do not require cesareans or sterilization; they include the majority of cases. When the lesions are serious, recent, and progressive, when the response to effort and the cardiac reserve are poor, and especially if signs of heart failure have developed, it is best to perform a section with sterilization but getting the patient to go as far as the thirty-sixth week of pregnancy, if possible, to improve the chance of fetal survival. The operative risk is high enough in a healthy woman; that it should be a great risk in cases of severe heart disease is readily appreciated. All patients in whom a section is contemplated should be seen by a cardiologist, and the final decision left to him. It is also important to remember that multipare with grave cardiac disease often have short and easy labors, and that sterilization subsequent to the confinement, sometimes by deep X-ray therapy is much safer than laparotomy at or near term. In a series of sections at Queen Charlotte's Hospital for heart disease, the mortality was 18 per cent. Latter on a series delivered from below had a mortality of 4.7 per cent.

Feiner (34) feels that most cardiac patients can be delivered from below. Nature often appears very kind to those so afflicted, and the ease of their delivery often furnishes an agreeable surprise. In selected instances, most of which have been cases of mitral stenosis, occuring in primiparas with a previous history of decompensation, the condition has been considered sufficiently serious to warrant abdominal delivery. This has applied particularly to those patients whose cardiac condition would be unlikely to tolerate favorably the second stage expulsive efforts. This includes both the immediate risk as well as permanent residual additional pathology to already damaged heart.

ELDERLY PRIMIGRAVIDA

Rarely should the elderly primipara have a cesarean for that reason alone.(68) She should be allowed to go into labor and, at least, be given a fair test to see whether or not she can deliver normally. In Skeel's experience, women of this age stand pain better, fuss less, work and cooperate better than younger ones. This makes up for any difference in firmness and rigidity of tissues,

cervix, or muscles that exists between the two groups. Many of them have easy labors of eight to ten hours and go along as quickly as much younger women. About the only reason for doing a cesarean in an elderly primipara as such, would be a breech presentation with a large baby, particularly if there had been long standing sterility. An elderly primipara with a cephalic presentation should be allowed a test of labor, regardless of the length of sterility.

Dieckman defines elderly primipara as a patient who has her first child when she is 35 years of age or older. Kuder and Johnson report an incidence at the New York Hospital of 2.7 per cent. They noted an increased incidence of toxemia, contracted pelvis (especially funnel), prolonged labors, myoma, and increased maternal and fetal mortality. Dieckman's practice in these patients near term, if possible, is to permit the usual test of labor, If the membranes rupture prematurely, and if labor cannot be started with functional doses of pituitrin, and if the pelvis is empty, he performs a section within 24 hours. In the case of elderly primiparae, Lazard (69) says there should be another indication other than age alone, that is, size of baby, presentation, and the type of pelvis should enter into the consideration.

MALPRESENTATIONS

Generally speaking, malpresentations are not indications for section. They are occasionally treated by cesarean section, usually when disproportion or some other complication increases considerably the danger of natural delivery. (70)

BROW AND FACE PRESENTATIONS

From 1930 to 1939, there were 74 brow presentations and 28 face presentations at Queen Charlotte's Hospital. In these 102 cases, six sections were performed (5 for brow) with no maternal loss. Nearly all were done for pelvic disproportion or failed vaginal delivery. Among the 96 cases delivered by the vaginal route, there were two maternal deaths; and 43 babies were born dead or died in the hospital. Danforth (71) says that face or brow presentations in which dilatation is slow or fails to occur, or if the head fails to engage, should be treated as cases for tests of labor and delivery, if need be, by section.

BREECH PRESENTATIONS

In Phillip's ten-year series, there were 925 breech labors, 660 complicated, that is, associated with other conditions such as placenta previa, contracted pelvis, and toxemia. In all 13, sections were done with no maternal deaths. Extension of the legs without the complications is not an indication.

If a breech with extended legs is associated with some other condition which makes vaginal delivery more dangerous, such as placenta previa, minor disproportion, fibroids, or if the patient is a primigravida of forty years or over, and the child is large, there is a good case for cesarean section.

A full term breech in a primipara is not per se an indication for section. An unengaged breech after adequate pains for several hours may be. Here again, the exercise of judgment must balance the hazards to maternal soft parts, and fetus of vaginal delivery against a major operation. (72) Mengert of Iowa relates how cesareans have been advocated as method of choice in breeches, but when one considers that the fetal mortality rate from this procedure in Iowa is practically the same as that generally reported from vaginal delivery, it offers no advantage. (73) On the other hand, the obvious disadvantage of cesarean is the greater risk. The breech itself offers no greater maternal risk, while a ten-fold increase in fatality plus a definite restriction on her future pregnancies, comes with cesareans. It is felt that section delivery should not be employed for breech presentations, however, an occasional patient with a contracted pelvis, justifies the use of the section. The disproportion can only be told in vertex presentation. Therefore, if versions fail, the section is advisable.

OCCIPITOPOSTERIOR POSITION

Early recognition of the occipitoposterior position is most important, as the complication always interferes with labor-sometimes to a serious degree.(75) The first stage of labor is much prolonged and should be so managed as to minimize the suffering and exhaustion of the mother. In Hennessy's series, abdominal delivery was resorted to in 17 cases out of 600 occipitoposteriors, but in no case did the position alone furnish the indication; prompt operation would probably spare the mother much risk and additional pain and save the life of the baby in many instances. This is especially true with regard to the borderline pelvis with non-engaging head. Kelley (76) agrees with this attitude also. He says there are rare cases of disproportion between head and pelvis where cesarean is an indication, not because of the occiput posterior position only, but because of an abnormal pelvis etc.

TRANSVERSE LIE

In Phillips (37) ten-year period, there were 83 cases of transverse lie. Two were treated by cesarean section and two by cesarean hysterectomy, without any maternal deaths. Of the 79 cases delivered from below there were three maternal deaths and 53 lost babies. A persistant transverse arrest in a primigravida should always raise the question of a possible contracted

pelvis. If a cesarean section is done, it should be early in labor; late cases impossible to deliver by the vagina require cesarean hysterectomy as a rule. Mock (77) says that no hard and fast rule can be made for transverse or compound presentations. These commonly occur with small babies or multiple pregnancies and set forth no problem--but a large fetus in neglected labor fixed in transposition with risk of uterine rupture or extraperitoneal cesarean section. Because of lower maternal mortality and morbidity and better fetal salvage, the latter procedure is the one of choice.

PROLAPSE OF THE CORD

Waters (52) states that there is appreciable fetal salvage from section when the cord prolapses through a non-dilated cervix following early rupture of membranes. This is especially true of primiparae. The circulation in the cord must be strong and maintained to justify the operation. Respiratory attempts may succeed in other circumstances, or certain conditions may warrant conservative treatment with accepted risks of fetal loss. When the patient is elderly, primiparous or the social value of the child high, operation should be done promptly is reposition cannot be maintained. In cephalic and transverse presentations, versions are usually the operations.

of choice, but forceps are indicated when the head is already deep down in the pelvic canal. In frank breech presentations a foot, or preferably both feet, should be brought down and extraction promptly completed. If the dondition of the cervix precludes manual dilatation, the chances for the child are poor unless section is promptly done. In a few of these patients, particularly elderly primiparae, are those in whom a subsequent pregnancy appears undesireably, cesarean section is indicated when the cord has prolapsed early in labor and no contraindication to the operation exists. Where cesarean section is deemed inadvisable in those cases, the only hope lies in replacing the cord and retaining it in place until the cervix dilates.

CESAREAN SECTION FOR STERILIZATION

Cesarean section should never be performed solely for the purpose of sterilizing essentially normal women, as it leads to lax views concerning its indications. (10) Every obstetrician is often confronted by a number of women sent to him suffering from insanity, feeblemindedness, or other conditions with the request that they be sterilized at the time of labor. Unless they present a definite indication for section, they should not have one merely for

sterilization. Spontaneous labor should be allowed to occur and during the early puerperium, sterilization undertaken by the most appropriate procedure. By this means the mortality is reduced to a minimum. It is now the practice of most obstetricians to perform puerperal sterilization, if indicated, on the fourth day after delivery, instead of within the first twenty-four hours.

RIGIDITY OF THE CERVIX AND INEFFECTIVE UTERINE CONTRACTIONS

All obstetricians of experience will agree that given time and patience nearly all cases of uterine inertia and rigidity of the cervix end in a natural delivery, or a successful forceps birth, after a normal labor. It is argued that the cervix is rigid, that further dilatation will be slow, that the baby will be born dead, that the risks to the mother are not negligible, and that therefore, a cesarean is the better treatment—especially if a lower segment operation is performed by a skilled obstetrician under good conditions. It would be wrong to say that a section should never be done in such circumstances; there is little doubt that rigidity of the cervix with uterine inertia is a

bad indication for section, and that, as a rule, sedation, and patience secure a natural delivery, with less risk to the mother. Each case must be carefully considered on its own merits, and that, when vaginal examinations have been carefully made and when it is desirable to have a lower segment operation done under ideal conditions by an experienced obstetric surgeon, occasionally cases of this type will be better treated by a section.

CARCINOMA OF THE CERVIX

A natural labor in such a condition is associated with greatly increased risks of hemorrhage and dissemination of the disease. Therefore, a cesarean hysterectomy or the Wertheim operation is advisable. If the disease is advanced, however, a section, followed by a subtotal hysterectomy and then radium or deep x-ray therapy, is the usual treatment. Stander teaches that carcinoma of the cervix is an absolute indication for cesarean section, as it is inadvisable to allow a carcinomatous cervix to be subjected to the dilatation incident to labor. Trauma to the cervix, as well as the chance of spreading the cancer cells, are the contraindications to vaginal delivery.

OVARIAN TUMORS

If not obstructing delivery, these can be left alone and removed at a latter date. If they can not be dislodged from the pelvis during pregnancy, it is better to remove the tumor and allow the pregnancy to proceed. It is possible to do this even one week before labor is due, and to find that the abdominal suture wound interferes little with the course of natural delivery. If, during laparotomy, at or near term, an ovarian cyst cannot be removed from the pelvis, even after eventration of the uterus, there is no alternative to a cesarean.(37)

FIBROIDS

The consensus of opinion is to interfere as little and as late as possible in pre gnancy. Cervical fibroids, and large broad ligament or lower segment tumors, obstructing labor, are absolute indications for cesarean section, followed by hysterectomy or myomectomy, according to the age, parity and requirements of the mother. (10)(37)(46)(50) The majority of other fibroids, soften, flatten, and are drawn up and out of the pelvis, exerting but little influence on labor. Myomectomy during pregnancy is so likely to interfere with the blood

supply to the placental site, and is so often followed by miscarriage, that it is needless and unwarranted risk, especailly in view of the good results of natural labor in the majority of cases, and of cesarean section near to term in the selected minority. It is astonishing how many fibroids complicating pregnancy end in natural delivery if only they are left alone; but tumors preventing descent of the head or causing a transverse lie, are notable exceptions. The opinion of an experienced obstetrician is always an advantage.

CESAREAN SECTION IN DYSTOCIA

To do a crushing operation or a reduction in patients where the presenting part has been well engaged or could be easily immobilized by an assistant, and where there has been no dangerous thinning of the lower uterine segment is relatively easy and of course, there should be no maternal mortality directly attributable to the procedure. If it is very difficult for an assistant to immobilize it, there is then a different picture, In this last group, it is extremely difficult to reduce the size of the presenting part and the results following the attempt are so disastrous that a better solution of the problem was sought. Delivery

by the abdominal route can be performed in thirty minutes, during which time steps can be taken to overcome the condition of shock and collapse from which these patients suffer. This treatment can be carried out while the surgeon is operating. This includes the use of saline solution or whatever other means one has at hand.

Contrast this with the long-drawn-out destructive operation, where there is more or less hemorrhage and shock to the patient throughout. The decision of the method to be used should be left to the patient or her family after proper explanation has been made of the advantages and disadvantages of each procedure. (79)

The operation of embryotomy and delivery by natural passages is not without considerable mortality, as can be seen from the following statistics:

Kerr reports 10 per cent; Perry, 38 per cent; Gussman, 6 per cent; Merryweather, 8 percent; and Shanta, 6 per cent. Dr. Champney says that intra-uterine craniotomy is the most dangerous of all obstetric operations. These dangers are due, first, to the previous futile efforts at delivery; second, to the great difficulty in its performance. Therefore, in cases in which craniotomy is even more difficult

and hazardous than usual, cesarean section and drainage offers the safest and best means of delivery, and should be performed in preference to embryotomy.

Higgins (80) suggests that the operation of section involves less risk than difficult vaginal delivery, and that the indication for abdominal delivery may be considerably extended with advantage to mother and child. In order to access the value of cesarean section, it is necessary to estimate the risk to mother and child. Crude maternal mortality figures are of little value. In a healthy mother, the risk is affected chiefly by the operative technique and by the influence of labor.

In elective operations, cesarean sections at the time of choice is associated with a much lower maternal death than is usually supposed. Probably the risk should not be greater than that associated with any simple laparotomy. In potentially infected cases when labor becomes obstructed, cesarean section may be employed as a rescue operation with brilliant success. Nevertheless, every effort must be made to prevent a clean case drifting into the potentially infected category by not deferring intervention to long. In many doubtful cases, the attendant will have to decide between the alternative of delivery by forceps or by section. In emergency cases, with

obstructed labor, the fetal mortality rate is very high. It must be remembered that section was introduced to save the child, and the operation should be considered in all cases where delivery by the vagina is likely to be hazardous. In the elderly primipara in the presence of dystocia, when vaginal delivery is possible but difficult, the use of forceps is associated with definite risk to the mother and the outlook for the child is bad. Delivery by section should be more often used in these cases. In presence of dystocia, when labor is often prolonged, the use of forceps carries an obvious practical and theoretical drawback, because delivery cannot be completed until the cervix is fully dilated. Under such conditions, it is difficult to see the object of waiting until vaginal delivery by forceps is possible. It is better to realize that when labor departs from the normal pattern, the process becomes pathological, and delivery is not necessarily the normal result because it is vaginal. Indeed, it may be easier to repair a cut in the abdominal wall than a laceration of the pelvic floor. In all such cases, it seems that the trauma to the mother is less and the outlook for the child is much improved if delivery is accomplished by cesarean section.

PULMONARY TUBERCULOSIS

For advanced, active, or very recently healed pulmonary tuberculosis, cesarean section under local or spinal anesthesia, may be indicated, especially in primiparae. Patients that have been healed or quiescent for six months or more will probably go through labor without exacerbating the tuberculosis but should be aided with analgesia in the first and forceps in the second.(18)

MISCELLANEOUS INDICATIONS

These include such factors as request of patient, hysteria, varicosities of labia and right leg, incarcerated uterus, bowel obstruction, bicornuate uterus, and vaginal stenosis. Another indication is the occassional patient who has had an extensive vaginal repair (or a cervical amputation) as a vaginal delivery would undoubtedly reproduce the condition for which she had undergone the plastic operation.

So far in this paper, I have tried to give the indications for cesarean section reported by various men and from different hospitals in the country. The most common indications have been discussed. Before reviewing the contraindications, I would like to mention a few cases, rather rare ones, that have required a cesarean section.

Walker (81) has a most interesting series of seven cases of congenital coarctation of the aorta in which pregnancy occurred. Two of these died during pregnancy, one from cerebral hemorrhage, a fourth from rupture of the aorta into the pericardum. The other three were delivered successfully by cesarean section with an uneventful recovery.

Kanter (82) has a very unusual case report. On March 8, 1944, Mrs. L.B., aged 26, white, came to his office with a history of severe pain throughout the entire abdomen and extending down both thighs--greatest in the right and left iliac regions. There was difficulty in sitting down and breathing. The first symptoms occurred October 5, 1943, with severe abdominal pain. She was placed in the hospital and the symptoms ceased. After six days hospitalization, she was again seized with severe abdominal pain and vaginal bleeding. The abdomen appeared as an eight month pregnancy. Because of the size of the abdomen an attempt to induce labor was tried unsuccessfully and she was sent home. Kanter's first examination (March 8) revealed a well-developed, fairly well-nourished individual, six feet and three inches tall and 141 pounds in weight. The physical examination

was entirely negative. The uterus was up to the ensiform cartilage. There was marked fullness and protrusion of both the right and left lower abdominal regions. The right side was more marked and protruded considerably. It formed a round mass about the size of a child's head. Masses in these regions seemed fixed but the uterus was freely movable from below. There was no fetal heart tone heard and the fetus was palpable beneath the umbilicus. The vaginal revealed a slightly relaxed perineum. There was no ballottment as masses on both the right and left side seemed to be crowding the uterus and pushing it posteriorally and upward. The laboratory findings were negative. The due date was calculated as between May 15 and 20, 1944. On May 5, due to increased pain and enlargement of the abdomen, the patient had a section. A nine pound, seven ounce baby was delivered. Examination of the right pelvis revealed a large cystic ovary on a twisted pedicle. The blood vessels were much enlarged and marked varicosities present. Both ovarian cyst and tube were removed. The left side also revealed a large ovarian cyst which was removed. Had she been permitted to deliver vaginally, it is evident that there would have been rupture of either of the ovarian cysts, causing internal hemorrhage due to the increased size of the blood vessels and resulting

in the death of the mother. Patient and child made an uneventful recovery, and left the hospital on the tenth day.

Massive edema of the vulva in pregnancy is quite rare, there being but ten references in the literature in the last twenty years. Usually multiple puncture before labor is complete, allows enough collapse for delivery to take place through the vagina. In this case, the edema was of the labia majora while that pictured in two cases of Thorp and Wangeman was of the labia minora.

In this case, the inner surfaces of both labia majora became gangrenous and sloughed off; exposing the subcutaneous tissues in a crater-like ulcer which measured 2 by 10 centimeters in the left labium and smaller in the right. This case is reported by Tospin. (83) The patient was a primipara, colored, aged 23, stocky, with a normal weight of 150 pounds. She was at full term pregnancy, admitted in labor at the onset of the first stage. Two weeks before, she began to have edema of the feet, legs, and face. She had had no prenatal care. Two days before her entrance, she developed massive edema of the vulva. A history was given of fluid discharge from the vagina for two days. There appeared to be two fetuses with two fetal hearts and two heads. The vulva was

greatly swollen, with a clear fluid oozing from a rupture in the skin on the lower portion of the left majorum labium. The blood pressure was 170/120, temperature 101 degrees F., pulse 100, 4 plus albumin, and 28,150 white blood cells. Not-withstanding the toxemia, several consultants agreed upon section as the choice of precedure. Convalescence was characterized by gangrenous slough of the skin and mucosa of the inner folds of both labia majora. The toxemia was treated by I.V. magnesium sulfate, glucose, and free fluids with a salt-free diet. The gangrenous ulceration was healed at the end of twenty days. The infants weighing seven pounds, three ounces and six pounds, five ounces nursed and did well.

FitzGerald (84) had a patient in whom at three months pregnancy, the first examination found no abnormalities except a large mass extending down into the cul-de-sac. It was more prominent on the right side but could be felt on the left side at a slightly higher level, was semisolid and apparently fixed in position. The urine remained normal during the entire pregnancy. On admission to the hospital, the patient was having irregular uterine contractions.

at the time of admission. The mass was still present and was diagnosed as a possible fibroid uteri or an ovarian cyst. A test of labor was given. After several hours of good pains, the head was still floating so a section was done. After the baby was delivered, exploration revealed a retroperitoneal tumor mass deep in the pelvis, posterior to the uterus and anterior to the concavity of the sacrum. Further investigation disclosed a horseshoe kidney fused at the upper poles with the concave parts pointing downward and with a definite ureter extending down toward the bladder on the left side. A few weeks after the section, the patient was free from all symptoms and both she and her baby were doing fine.

Smith and Catheart (85) report a case in which viable triplets were delivered by cesarean section. After 14 hours labor with no progress, a section was done. On opening the uterus, a male baby in the right occipitoposterior was found and delivered; the other male baby was in a breech position and delivered. Both babies were in a common amniotic sac and their cords were attached to a common placenta. After delivering the males, another fetus, a female, was discovered within a separate bag of water and with

a separate placenta. The males were apparently eight months gestation, but the female, in addition to being much smaller, had the development of a seven month fetus. All did well.

Ullery (86) can go Smith and Catheart one better in that he delivered quadruplets by section. The patient was white, aged 31, and delivered by section two years previously for a rapid abruptio placenta. In this pregnancy, L.M.P. was March 12, 1944 with the E.D.C. December 19, 1944. During the first four months, there was considerable nausea and vomiting. In August, the uterus was found to be larger than normal for the duration of pregnancy, the fundus extending three fingers above the umbilicus. X-Ray examinations showed the presence of four fetuses. She was immediately hospitalized and the abdomen enlarged rapdily. O n October 24, she began to have some irregular uterine contractions and the uterus became quite tense. This continued for several days. Because of the previous section and stormy convalence, another section was decided upon. On November 1, 1944 the abdomen and uterus were opened. The first three babies delivered were all females and in a single sac. The fourth was a male and in a separate amnion with a small separate placenta.

The mother and babies made an uneventful recovery.

Scholder (87) had a white female, 33 years of age with a temperature of 99degrees F. and a pulse of 48 beats per minute, B.P. 170/80 and respiration of 20 per minute. The apex impulse was in the fifth left intercostal space in the midclacicular line; no shocks or thrills palpable. The first sound at the apex was obscurred by a loud rough systolic murmur. On consultation, it was decided because of the heart block it would be more expedient to perform a section than to risk a prolonged dry labor in a patient who had a toxemia and who had an organic--though asymptomatic--heart lesion. Cyclopropane was used because a high concentration of oxygen could be used. Mother and baby made an uneventful recovery.

Kohn, Morrison, and Douglass (88) have a case on record in which a women in labor and with a strangulated ventral hernia was admitted to the hospital. Under spinal anesthesia, using metycaine, she was delivered by cesarean section and the hernia repaired.

For the last case, McSweeney (89) has a patient in whom cesarean section had been done eight times previously. Dr. McSweeney doing the ninth section. The patient came in in mild first stage labor with pains every six to eight minutes and lasting 25 seconds.

The B.P. was 112/68, urine negative, uterus at term, and vertex floating. The fetal heart tones were 138 per minute. The pelvis was of the just-minor type, generally contracted with an intercristal diameter of 25 centimeters, an interspinous of 20 centimeters, and an external conjugate of 17 centimeters. The symphysis was narrow and the subpubic arch angulated, suggesting a male type of forepelvis. The intertuberous diameter of the outlet was 8 centimeters and the posterior sagittal, 9 centimeters. Rectal examination found the cervix partly taken up, one finger dilated, membranes intact and vertex floating. A left paramedian scar was resected exposing a thick mass of dense fibrous scar tissue, extending from the subcutaneous plane to the peritoneum. The lower two-thirds of the anterior wall of the uterus were so firmly adherent to he parietal peritoneum that separation was not impossible but unwise since the uterus could be readily opened with the surrounding peritoneal cavity well-walled off by dense adhesions. A classical type of section was done and a seven pound, four ounce baby extracted without difficulty. There was no thinning of the uterus from previous scars. The uterine muscle acted well after intravenous pituitrin and intramuscular ergot.

The patient and baby made an uneventful recovery and were discharged on the sixteenth postoperative day. This patient had had a cholecystectomy and one other operation along with her nine sections--a total of eleven laparotomies.

THE CONTRA-INDICATIONS FOR CESAREAN SECTION

Before going into the contra-indications for cesarean section, it might be interesting to list the pre-requisites for cesarean section postulated by Epstein. (48)

1. A thorough knowledge of the condition of the undelivered child and of the pregnant mother. The roentgenologist is often helpful, but should not be entirely depended upon. The experienced obstetrician will be able to evaluate more accurately such cases with his examining fingers than the roentenologist with his x-ray.
2. The decision for a section should be made as early as possible before the patient becomes exhausted or contaminated.
3. The type of the operation should be determined beforehand; the choice of the type depending on the case, that is, where the patient had a previous section, or the presence of obstructing tumors, placenta previa, etc. Each case may present a different problem requiring a different type of operation.
4. There is no advantage in rapidity of performance in most cases; we must not barter safety for time.

5. A test of labor is very seldom necessary; an experienced obstetrician will not procrastinate, subjecting the patient to the danger of contamination and material exhaustion, an all too often dangerous, even useless ordeal.
6. The fetal heart must be heard, although sometimes in certain cases, in order to save the life of the mother, we have to resort to a cesarean, knowing that the child is dead in utero. Yet there is no excuse for a surgeon who never practiced obstetrics and very seldom ever heard a fetal heart to perform a section without checking first the condition of the child in the uterus. Here the trained obstetrician's services are of paramount importance.
7. Typing of the patient's blood should be done before the section is started; and where possible, also the Rh factor investigated so as to be prepared for all emergencies.
8. In cases of cardiac decompensation, toxemias, placenta previa, a cesarean is not a panacea in many such cases. Obstetrical art is very often more useful than surgery.
9. In positively contaminated cases, the extra-

peritoneal section, that is, Latzko-Waters and some others, is in reality not much safer than the low cervical transperitoneal, intraperitoneal operation.

10. Finally, the slogan, "once a cesarean, always a cesarean", does not hold true nowadays. In a good many cases, that is, when the previous section was made because of relative indications such as placenta previa, pre-eclampsia etc.

Phaneuf (90) lists both immediate and late dangers following cesarean section. As immediate dangers, he cautions against:

1. Hemorrhage as one of the two most serious complications.
2. The other is sepsis in the form of peritonitis. Irving (91) says that infection is still the most important factor in mortality and morbidity.
3. Trauma of operation--improved technique, gentle handling of the tissues, and conservation of the blood supply have decreased shock

As late dangers or disabilities, he gives:

1. Invalidism-following a major surgical operation, a number of women may have poor health for a more or less prolonged period of time. This is expecially true if the operation has been associated with sepsis and hemorrhage.

2. Sterility--In marked infection with suppurative qualities following section, there may be partial or, in the severe cases, complete destruction of the endometrium-sometimes resulting in sterility.

3. Rupture of the uterus--Imperfect healing of the uterine incision with subsequent rupture, in the following pregnancies and labors is contemplated. Statistics show this to occur in about 3 per cent of the classical sections and less than 1 per cent in the low or cervical operations.

As contr-indications, Dieckman (50) says that a section should never be done--

1. As a matter of the obstetrician's convenience or because a larger fee is presented than in other types of delivery.

2. Or because the mother or her family desire and insist upon it. Such desire and insistance arise from ignorance of the factors already dwelt upon in the previous discussion.

3. Cesarean section should never be employed on the unsupported advice of internists and roentgenologists. Only the determination of a really qualified obstetrician or a practioner

qualified by considerable obstetric experience, should decide the issue.

4. Section should seldom be resorted to in any except extreme degrees of pelvic deformity or disproportion without some actual observation of the patients' ability to deliver herself by the natural passages.
5. It should generally not be employed in eclampsia.
6. It should generally not be used on the sole basis of concomitant condition, as heart disease or an acute surgical complication.
7. Section should not be employed as a rule in small babies, previable fetuses, or full babies actually dead or exhibiting such a degree of distress as to make their survival improbable.

A contra-indication to operative delivery exists whereever there is no definite indication for active intervention. In other words, obstetric operations should not be performed solely for "convenience". Other and more positive contra-indications are relatively uncommon, but nevertheless definite. In many pregnancies complicated by disease, such as chronic nephritis, acute toxemia of late pregnancy,

cardiac disease and other chronic conditions, the interruption of gestation is indicated, but can be accomplished safely only after medical therapy has made the patient a reasonable surgical risk. In general, it is wise to follow the dictum that when disease complicates pregnancy, the first indication is to treat the disease, attention to the pregnancy being reserved until later, Contra-indications may be based upon various other factors, such as deficient training, which makes an operator imcompetent to perform the indicated procedure, and inadequate assistants, or surroundings unfavorable to the maintenance of aseptic technic or to providing necessary therapeutic measures. When in doubt, it is wiser not to interfer with the natural forces of parturition. (49)

Eastman (23) warns against:

1. Recommending cesareans on the basis of external pelvic measurements.
2. Recommending section simply on the basis of prolonged labor. Late section is the main reason for the high mortality of the the operation in the United States. With every hour of labor, the danger from the procedure increases. Moreover, the most common cause of prolonged labor is not

contracted pelvis but uterine inertia, and uterine inertia is not an indication for section. Time will take care of most cases of uterine inertia.

3. Recommending section on the basis of uterine fibromyomata unless one is actually blocking the pelvis when labor starts. Even though a fibroid seems to block the pelvic canal early in pregnancy, it is usually drawn upward and out of the pelvic cacity as the uterus grows.
4. Recommending section if a women has had a previous one. If the indication for the first one is still present (as in contracted pelvis) another section would naturally be required. If, however, the original operation was done for some reason such as placenta previa, then another one is not always needed.
5. Recommending cesarean section in eclampsia. The late Dr. J. Whitridge said that those who would suffer least because of the absence of surgical attention were, in his opinion, women with eclampsia.
6. Recommending section if there is any chance that the fetus is dead.

7. Recommending section if there is maternal infection, active or potential. An actually infected patient has fever and other laboratory and clinical signs of infection. A potentially infected patient has been a long time in labor, or subjected to repeated vaginal examinations or has membranes ruptured over 12 hours.

Forward (92) explains that the abuse of the operation comes primarily from those who, because of insufficient knowledge or training, decide on its use through faulty obstetrical judgment, or by those who feel themselves unqualified to do some of the thoroughly intricate obstetric manuevers, but who feel very qualified to do a classical section. The contra-indications most often ignored are three in number. Briefly, a cesarean section should not be done:

1. If there has been vaginal examinations
2. If membranes have been ruptured for more than four to six hours
3. If operative attempts have been made to deliver from below.

Vaginal examination even under the strictest technique is almost certain to carry infection to the uterus if the examining finger extends beyond the cervical opening,

and if they do extend that far there is no need to do a vaginal because a rectal examination can give all the necessary information. As for the second point, Williams, many years ago showed that bacterial invasion of the uterus almost surely occurred within six hours following breaking of the membranes. Thirdly, if an operative attempt has been made from below, then it is little short of suicidal to do a section. As for the second contra-indication, Brown (93) believes that antiseptic vaginal instillations offer a means of preparation of a patient for section which will

1. largely eliminate one of the most important causes of mortality; infection
2. reduce the incidence of positive uterine cultures obtained
3. make it relatively safe to postpone operation until a much later hour in labor
4. lower the indication for more radical operative procedures

For contra-indications, Phaneuf (90) gives:

1. A dead child, except in the presence of an absolute pelvic indication.
2. Poor physical condition of the mother
3. Improper surroundings for technique.

4. A patient infected from protracted labor, vaginal examinations performed with questionable technique and asepsis; rupture of membranes.
5. The classical cesarean section is absolutely contra-indicated in the presence of a potential or frank infection.

The contra-indications given by most of the other authors are very similar to these already listed. Before ending the section on contra-indications, I would like to cite a few other facts for consideration before a cesarean operation is attempted.

Bloxsom (94) gives a careful analysis of 100 cesarean babies in which 42 required active resuscitation against only 18 in 100 normal deliveries. The role played in apnea by analgesia, surgical anesthesia usually with premedication, and such conditions as toxemia, placenta previa or premature placental detachment, indicating the operation, are appreciated. There is absence of respiratory effect on the fetus exerted by alternating pressure and release of pressure as the result of uterine contractions during labor. During a contraction, compression of the placenta forces more oxygen-carrying blood into the fetus.. Thus an accumulating oxygen deficiency might impair the ability of the fetal respiratory center for

prompt response after delivery. In cesarean section, there also is missing the compression of chest and lungs within the birth canal--which in vaginal delivery may be significant for the first inspiration.

Sackett (95) has had two cases of ademomyosis interna uteri as a cause of uncontrollable atony and hemorrhage following cesarean section. Parry (96) reports a series of cases in which a section was done for contracted pelvis. He is convinced that a cause for bowel obstruction was the physical mass of the retroverted post-partum uterus impacted in the true pelvis. He says even if a postpartum uterus was to become retroverted and fall into a normal pelvis there would be impaction there. In the cesarean operation, the uterus is firmly compressed manually. Perhaps, in so doing, it is made small enough to fall into the contracted true pelvis, given that the latter is grossly contracted.

The last remark as to the contra-indications for the section is a study by Schmelzer, (96) of 144 patients who had been delivered by cesareans. Further pregnancies occured in 79 per cent. In 68 per cent of these, conception occurred within the first three years after the operation.

Number of patients subsequently pregnant 83

Number of pregnancies 158

Of these--

terminated in abortion----------26
delivered per vaginum----------87
patients delivered by section----------45
patients had 2 sections each----------24
patients had 3 sections----------9

of 24 patients not subsequently pregnant, 13 did not desire more children. The author concludes that the number of normal deliveries preceding the pregnancy which ended in a section has an influence upon future fertility. In a comparison of the number of pregnancies for equal years of marriage, those having the operation showed a lower total fertility than those who had no operative deliveries. However, those patients subjected to operation at the first pregnancy had an average of 1.46 children subsequently as against 1.0 children brought forth by those having the operation at a second or later pregnancy. Schmelzer feels that in the interest of the child as well as with a view to further pregnancy, cesarean section should be resorted to in most cases of dystocia as well as in placenta previa.

MORTALITY FROM CESAREAN SECTION

Inherent in every cesarean section is the danger of hemorrhage not only at the time of incision into the uterus but immediately before and after operation. In many cases the operation can with advantage be temporarily delayed until the acute anemia has been overcome in whole or in part by blood transfusions. All too often, the preparations for transfusions are postponed until the serious condition of the patient forces the physician to recognize the necessity for it.

Shock is not infrequently a cause of death after section. This may be due to loss of blood, prolonged and rough operating technic, nervous instability in the patient, especially if she is under 18, or exhaustion from pain and long labor. The onset of shock can usually be foretold if a close watch is kept on the blood pressure, and if appropriate measures are taken to combat it, the danger can be minimized. (97)

Occasionally massive collapse of the lung may result fatally during or after section. This can be treated by aspiration of mucous from the bronchial tree through the bronchoscope and forced breathing of 30:70 mixture of carbon dioxide and oxygen.

As to the mortality, Titus (98) states that the obstetric gain has been almost entirely offset in many communities by the unfortunate and radically dangerous belief that this major surgical operation is now safe enough to be undertaken for the slightest of obstetric difficulties by anyone with any degree of surgical skill. In certain communities, there have been operators who will permit women themselves to decide to be delivered by section solely in order to avoid labor pains. Eclampsia was formerly considered an urgent indication for cesarean section. The death rate among eclamptics treated by section is much greater (41.5 per cent in a New Orleans survey) than those treated more conservatively. Section during an eclamptic attack is now viewed as being absolutely hazardous and ill-chosen. The operation offers the surgeon an easy and spectacular way out of an obstetric difficulty, but for the patient, it is not the safest way. The rising incidence of the performance of cesarean section with its attendent risks in outstripping its obstetric gain even when conservatively applied for new but valid indications.

Normandie (22) gives a summary of maternal deaths in sections in Massachusetts.

A SUMMARY OF MATERNAL DEATHS FROM SECTION IN MASSACHUSETTS							
DATE	1937	1938	1939	1940	1941	TOTAL	%
Total maternal deaths	66	60	54	41	52	273	2.46
Emergency	51	39	45	33	36	214	74.7
Elective	15	21	9	8	16	69	25.2
Type of operation							
Low	29	26	24	15	16	110	40.0
Classical	29	24	26	20	30	129	47.4
Extraperitoneal	4	2	2	2	3	11	4.0
Porro	2	3	2	4	3	14	5.1
Not reported	4	5	0	0	0	9	3.0
In labor	31	25	29	22	20	127	46.5
Not in labor	32	30	25	19	32	138	50.5
Membranes ruptured	13	18	15	17	13	76	27.7
Membranes intact	47	37	39	34	39	186	68.0
Not reported	6	5	0	0	0	11	4.0
Babies:							
Living	43	43	42	36	40	204	73.8
Dead	23	17	12	8	12	72	26.1

The causes of death in this series were:

CAUSES OF DEATH	NO. OF CASES	PER CENT OF TOTAL
Sepsis	106	38.8
Hemorrhage	32	11.7
Embolus	28	10.0
Shock	25	9.1
Cardiac	17	6.2
Anesthesia	11	4.0
Eclampsia	10	3.6
Acute respiratory infection	8	2.9
Toxemia	7	2.5
Anaphylaxis	6	2.1
Intestional Obstruction	4	1.4
Premature separation of placenta	3	1.0
Miscellaneous (one each) Chronic nephritis, toxic purpura, throtoxicosis, mesenteric thrombosis, scarlet fever, acute yellow atrophy, anuria, uremia, surgical emergency, carcinoma, no adequate cause and not reported---total 12		4.3%

In Lull's (33) report on sections in Philadelphia, he gives some interesting mortality statistics.

CESAREAN MORTALITY IN ALL HOSPITALS		
	1931	1941
No. of sections in all hospitals	573	894
No. of deaths following cesareans	39	22
Percentage of cesarean deaths	6.8	2.5

LEADING CAUSES OF DEATH FOLLOWING CESAREANS				
	1931		1941	
	No.	Percent	No.	Percent
Sepsis	18	46.15	8	36.5
Hemorrhage, shock	11	28.20	3	13.6
Cardiac conditions	2	5.12	2	9.1
Spinal anesthesia	2	5.12	0	0
Nephritic toxemia	1	2.56	1	4.5
Embolism	1	2.56	1	4.5
Others	4	10.25	7	31.8
TOTALS	39	100.0	22	100.0

In Barney's report from the Cleveland Maternity Hospital from the years 1931 to 1941, he reports the causes of death from 1,317 sections. (32)

CAUSES OF DEATH FOLLOWING CESAREAN SECTION	
MORTALITY	CASES
Bronchopneumonia	9
Postoperative shock (eclamptic)	6
Pulmonary embolism	2
Postoperative shock (separation)	1
Generalized septicemia	1
Acute cardiac dilatation	1
Postpartum hemorrhage	1
Rheumatic heart disease (failure)	1
Peritonitis	1
Chronic pyelonephritis	1

The most common cause of death in Monahan's series from Johns Hopkins Hospital was shock and hemorrhage. A critical analysis of these cases would suggest, on hindsight, that the following errors of commission and omission played important roles in these fatalities:

1. The imposition of a shocking operation (cesarean section, hysterectomy in 5 of the 9) on patients already shocked from premature separation of the placenta, or exhaustion by prolonged labor
2. failure to protect such patients against shock by the liberal use of blood transfusions before, during, and after these operations. Less than six deaths were due to generalized peritonitis, but an equal number were the result of paralytic ileus alone, as attested by autopsy. Of the four anesthetic deaths, 3 occurred in women who had been in labor over 30 hours, a circumstance attesting the fact that patients exhausted by long labors are poor anesthetic risks as well as poor risks from the viewpoint of shock. (25)

Watson (95) has pointed out that the mortality rate in vaginal deliveries may be as low as 1 per

cent and that in many large hospitals, it varies from 0.2 to 0.5 per cent. In the same hospitals, the cesarean mortality rate varies from 2.0 to 5.0 per cent, therefore, the risk of cesarean section is 10 times as great as natural delivery. When the figures of the smaller hospitals and private cases throughout the country are included, the mortality rate for the section rises to 10 to 15 per cent as against 0.4 per cent for natural deliveries, that is the risk is ten times as great when the conditions are not so ideal.

The maternal mortality from cesarean section in the United States according to a review published in 1941, by Gordon and Rosenthal, is probably "at least 10 per cent and possible approaches 15 per cent." Such a high rate seems improbable but various reports since 1930, still give mortalities for section from 0 to 17 per cent. Earlier reports give figures which are even higher for some small hospitals. Furthermore, studies of maternal death reveal that cesarean section had been performed in 24 per cent of the deaths in the fifteen state study, in 20 per cent of the New York City deaths, in 14 per cent of the Philadelphia mortality and in 20 per

cent of the deaths in Chicago.(50)

AUTOPSY FINDINGS IN 1922 CESAREAN SECTIONS		
CAUSE OF DEATH	Range Per cent	Average Per cent
Peritonitis, septicemia, ileus, bowel obstruction	27-50	38
Pulmonary elbolism	0-11	7
Shock and hemorrhage-total	21-36	30
Placenta previa	0-9	5
Abruptio placenta	0-7	6
Heart failure	0-9	5
Eclampsia, toxemia, vascular-renal, pulmonary edema	8-37	19
Lobar pneumonia	0-14	3
Anesthesia-aspiration pneumonia	0-12	3
Spinal anesthesia		(3)*
Incompatible blood transfusion		(2)*
Tuberculosis		(1)*

*Key--() represents numbers based on small series

Phaneuf, in 1943, stated in a discussion that the maternal mortality from section of 1.96 per cent at the Philadelphia Lying-In Hospital was not excessive. He also stated that many deaths after section are attributed to the operation instead of the existing pathology (placenta previa, abruptio placenta, contracted pelvis, toxemia, etc.)

Plass reported that in Iowa, 29 per cent of the section deaths occurred on the first day, and 22 per cent on the second and third post-operative days.

Obviously, almost 51 per cent of the deaths were from shock and hemorrhage or overwhelming infection.(49)

Irving (91) believes that when cesarean section mortality in large clinics over a period of years is less than 1 per cent, then it will be time to broaden the indications.

Kennedy, discussing cesareans has stated "to place a scar in the uterus and abdomen of a young women during her first child birth is to suspend a guillotine over her neck for the rest of her life. Where will she be during her next labor; will she fall in the hands of an accomplished surgeon, or will she die from a ruptured uterine scar." (50)

DeLee always used the term "watchful expectancy" in cases of prolonged labor. Hunt transposed this term to "hopeful procrastination". Mellor's statement "watchful waiting is an essential virtue in obstetric management, but look out for criminal procrastination just around the corner". Book knowledge of obstetrics is necessary, but only the clinical obstetrical experience gained will enable the doctor to decide which is "watchful expectancy", which is "hopeful procrastination", and where "criminal negligence" begins.

Licciane (43) includes some interesting mortality statistics.

COMPARATIVE MORTALITY STATISTICS				
SOURCES	No. Deliveries	No. Sections	Per cent of Sections	Per cent Maternal Mortality
National before 1931	262,852	2,289	0.77	9.45
National 1931-1939	782,718	15,768	2.55	4.69
Chicago Lying-In 1930-39	18,009	1,000	5.5	0.8
New York Lying-In	5,456	153	2.8	0.65
Mount Vernon, New York	8,459	204	2.6	5.1

And finally, Skeel (99) concludes that the primary or basic operative risk of the cesarean section is high (one to two per cent). There is also a definite late or delayed mortality present with every pregnancy and labor occurring after one section. These considerations make the decision to perform the operation a grave one. The risk is real even under favorable circumstances. However, statistics such as are being published from time to time showing the rapidly mounting number of deaths following a section, should not be used as evidence that the operation is being abused. Such statistics merely show the more general use of this procedure in the treatment of grave pathologic conditions complicating pregnancy.

SUMMARY AND CONCLUSIONS

1. The origin of the name of the operation is still obscure.
2. Historically cesarean section
    a. was very rarely resorted to
    b. carried a prohibitively dangerous mortality, and
    c. was indicated only in the very smallest pelves, through which it was absolutely impossible to deliver a live baby, and almost impossible to deliver a dead one.

With the advent of antisepsis, asepsis, and the suture technic of Sänger, there has been, in the last very few years, a tendency to change these historic facts by--

    a. employing it much more frequently, because
    b. it is technically easy and is mistakenly regarded as a safe operation; on this account
    c. it is used for much more numerous and broader indications than formerly.

3. Indications

Relatively few indications are uniformly accepted, other than those which have come from the days when child-bearing was viewed

as essentially physiologic in character, that is, disproportion, obstruction, and inordinate prolongation of the birth process.

4. It is wrong to apply absolute time limits to labor. So-called rules that the second stage must not be permitted to exceed a particular time length is productive of much unnecessary and unwise interference.
5. The question of import should not be "what procedure shall one select by which to interfere in the case" but rather "is it necessary that anything be done to interfere with or modify the natural progress of labor".
6. The technical surgery involved is far less important than a well organized effort to intelligently interprete and evaluate the attendant general and obstetric status of the patient. Mature deliberate obstetrical judgment plays a much more important role than the equally necessary operation.
7. Individualization of the patient is the most important factor in cesarean section.

8. CONTRAINDICATIONS FOR CESAREAN SECTION

a. As a matter of the obstetricians convenience or for a larger fee.

b. Because the mother or her family desire or insist on it.

c. Never on the unsupported advice of internists and roentgenologists.

d. Never in any except extreme degrees of pelvic deformity or disproportion without some actual observation of the patients ability to deliver herself by the natural passages.

e. Generally not to be employed in eclampsia.

f. Generally not to be used on the sole basis of concomitant condition, such as heart disease or an acute surgical complication.

g. Not employed as a rule in small babies, previable fetuses, or full term babies actually dead or exhibiting such a degree of distress as to make their survival improbable.

h. Never only on the basis of external pelvic measurements.

i. Never simply on the basis of prolonged labor.

j. If there have been vaginal examinations.

k. If the membranes have been ruptured for more than four to six hours.

l. If operative attempts have been to deliver from below.

m. If strictly sterile conditions are not at hand.

9. MORTALITY

a. Emergency sections carry a higher mortality than a purely elective operation. Every effort should be made to eliminate as nearly as possible the emergency delivery.

b. It still remains, as it always has, the most dangerous method of delivery; it is responsible in itself for a large percentage of all maternal deaths.

c. More than 1,700 mothers die annually following cesarean section--15 per cent of the total annual maternal mortality.

d. The mortality from the section in the treatment of eclampsia ranges from 2 to 88 percent.

e. The risk of section is ten times as great as natural delivery.

To place a scar in the uterus and abdomen of a young woman during her first childbirth is to suspend a guillotine over her neck for the rest of her life--where will she be during her next labor; will she fall into the hands of an accomplished surgeon; will she die from a ruptured uterine scar!!

DeLee always used the term "watchful expectancy" in cases of prolonged labor. Hunt changed this to "hopeful procrastination". Mellor's statement expresses the greatest wisdom to the obstetrician--"watchful waiting is an essential virtue in obstetrical management, but beware of criminal procrastination just around the corner. Book knowledge of obstetrics is necessary, but only experience, gained through clinical practice, will enable the doctor to decide which is "watchful expectancy", which is "hopeful procrastination", and which is just "criminal negligence".

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