INDICATIONS FOR CÆSAREAN SECTION.

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CÆSAREAN section must always be looked upon as an artificial method of delivery. The justification for its performance in many cases is a problem which requires considerable consideration. In a certain number of cases, limited more or less to extreme degrees of pelvic contraction or deformity, there is little choice in the mode of delivery if a living child is to be obtained. In some cases the abdominal route is the only one which will give safety to the mother. In this country, with the exception of those areas in which rickets is prevalent, major degrees of pelvic contraction are rare. In the East the indications are much more apparent, and therefore little doubt is experienced by the obstetric surgeon as to the only possible means of procedure. In the ordinary practice of obstetrics the problem is greater when the minor degrees of contraction are met with. With these may be classified also cases of disproportion between the pelvis and the foetal head. Even in the last few weeks of pregnancy it is impossible to give a definite prognosis. Engagement of the head may or may not take place. In labour also the descent of the head is uncertain. Most of us have had experience of the malflexed head which refuses to engage in the pelvic brim even after full dilatation of the cervix has occurred. When a decision has been made to perform Cæsarean section and preparations are being made, sudden descent may take place and spontaneous delivery is the result.

"Trial labour" is practised frequently in hospitals in those cases in which it is impossible to forecast the character of the labour. If the uterus fails to expel its contents, or if obstruction cannot be overcome with safety, the indication is clearly for Cæsarean section, other conditions being equal.

Contracted Pelvis. It is usually in cases of contraction of the pelvis that we have the problem to face. Cases of tumours, hæmorrhages, etc., are not so difficult of solution.

The most frequent type of contraction we meet with in the London area is that of the small round or generally contracted pelvis in which the degree of contraction is not marked. This is also met with in very young women or those with small physique generally. The diameters are all small but as a rule they are in proportion. When a primigravida with pelvic contraction is seen early in pregnancy a note is made of the condition, and in the later weeks a special watch is kept on the position of the head. From the thirty-sixth week onwards the patient is seen every week and the head is examined for its descent and engagement in the pelvis.

In most primigravidaë engagement of the head takes place from the thirty-sixth week onwards. The head centralizes, flexes and screws its way downwards into the pelvic cavity. When this process occurs there is as a rule little cause for anxiety. If the head does not descend it may be due to the pelvic contraction or to faulty flexion, or to want of proportion between the size of the head and the pelvis. If the head does not push in before the thirty-eighth week, or if it overlaps, it is quite probable that delivery

may only be effected successfully by Cæsarean section. An anæsthetic may be required for more accurate diagnosis as to the degree of disproportion present. The earlier the stage at which the head sticks at the brim, the more likely is Cæsarean section to be required. There are various problems now to be faced. If the head fails to push in, should the patient be allowed to go on to term or should she have an induction of premature labour? Also, is it safe to leave the patient to be delivered at home or should she be taken to hospital? In most cases of the minor degrees of contraction or disproportion it is a matter for arrangement with the patient herself. If induction of labour is advised it can be carried out at home. If trial labour is considered with a good prospect of spontaneous delivery the patient may be permitted to have her confinement at home, provided the prognosis is favourable. In some cases it is difficult to make a decision. The most unlikely patients deliver themselves spontaneously. Others may require urgent obstetric interference. The divergence between the forecast regarding the likely course of labour and the actual occurrence is a matter of unending interest in obstetric practice. Many factors require consideration such as parity and age of the patient, uterine action and the condition of the fœtus during labour. It is difficult to estimate the elasticity of the pelvic joints with any degree of accuracy until labour has commenced.

Domestic practice in obstetrics is fraught with many anxieties when abnormal conditions are present. Trial labour in the home, if unsuccessful, causes a general upheaval. Difficulties arise as to transport or hospital accommodation. Expense also is a consideration when the patient is called to meet it unexpectedly. In hospital practice trial labour gives little anxiety as the means for Cæsarean section are at hand if required. A good rule in obstetric practice is—when in doubt never interfere, but always have the means at hand if prompt surgical treatment should be indicated.

In some cases the pelvis appears to be normal, or only slightly contracted in its upper area but contracted at the outlet, presenting a minor degree of the funnel type of pelvis. Labour progresses until the head reaches the outlet and there it remains. Forceps if applied may cause considerable risk to the fœtal skull by traction over the bony barrier. These cases may not be diagnosed until delay has occurred and several vaginal examinations have been made. Cæsarean section in such conditions gives unfavourable results with regard to pyrexia in the puerperium, the membranes having usually been ruptured for some time. Yet it may be the only method of obtaining a living child. Antenatal examination will reveal the condition by measurements and by palpating the narrow subpubic angle with the finger. In such cases vaginal examinations should not be made during labour. The patient or the fœtus should not be allowed to have become exhausted when Cæsarean section is decided upon.

In the case of a *flat* pelvis there is less of a problem than in the generally contracted type. If the head goes in past the brim labour is usually straightforward. If it does not descend or cannot be pushed in the indications for Cæsarean section are clear. In many cases, however, the head remains above the brim during the first stage of labour, then suddenly descends and spontaneous delivery occurs, often precipitate in character. In such cases injury to the fœtal skull may be considerable. In multiparæ podalic version often serves to bring about a good result and obviates the necessity for Cæsarean section or craniotomy.

Asymmetrical Pelvis. In cases of asymmetrical pelvis each patient must have individual consideration. The head at term may descend in the larger portion of the pelvis or it may be prevented engaging in the narrowed oblique diameter. Spontaneous delivery is not infrequent. Induction of labour is of little value, as the premature head may take the wrong turning and suffer from pressure. It is better to let these cases go to term, give a trial labour, and if obstruction occurs perform Cæsarean section. There are other factors to be considered in cases of pelvic contraction. It is impossible to lay down general rules for treatment. *Age* and *parity* are important. An elderly primigravida is more likely to desire Cæsarean section than a young woman or a multipara. In very young women the operation is contra-indicated unless the pelvic deformity is marked. Induction of labour is to be preferred in such cases if carried out after the thirty-sixth week, preferably not before the thirty-eighth week. Previous difficult labours resulting in stillbirths or neo-natal deaths are an inducement to perform the operation, as the head may be large or unduly ossified.

Malpresentations, etc. Malpresentations such as a persistent breech with extended legs may give cause for anxiety, especially if the patient is an elderly primigravida, or if there is a slight degree of pelvic contraction. Some of these patients, contrary to all expectations, go through labour successfully. Persistent transverse presentations are an indication for Cæsarean section when version has failed or a pelvic presentation is inadvisable. In that rare occurrence, a brow presentation, Cæsarean section may be required. In some cases of persistent occipito-posterior presentations which resist all manipulations, Cæsarean section may be necessary if there is undue delay in labour. In cases in which the birth of the child is much desired, delay in labour owing to uterine fatigue, particularly if associated with foetal distress, is an indication for delivery by Cæsarean section. The administration to the mother of camphor 3 gr. in oil solution intramuscularly is beneficial in stimulating the foetal heart.

Hæmorrhages are not frequently an indication. The results of the treatment of toxic antepartum hæmorrhage by Cæsarean section as shown in published reports are not encouraging. In some severe cases in which hæmorrhage cannot be controlled, the operation with or without hysterectomy may be the only method of delivery. Central placenta prævia is an indication when the pregnancy is at term, provided the mother is not collapsed by hæmorrhage and the foetus is alive. It has been found that in some cases, although the foetal heart was beating at the time of operation, the enfeebled infant did not survive the extraction. Version is a much safer method for the mother.

In *prolapse of the umbilical cord* Cæsarean section if done in time gives good results, but there is little time to waste after prolapse has occurred, and the operation may not be practicable.

Heart Disease. It is difficult to make a decision in regard to the advisability of Cæsarean section in cases of heart disease. The cardiologist's opinion should be sought in order to obtain information about the condition of the myocardium. With prolonged rest before labour and with the administration of sedatives and anæsthetics to relieve shock, these cases as a rule do well and delivery is spontaneous. Cæsarean section is seldom advisable unless some definite obstetric indication is present. There is always the danger of possible shock or sepsis after operation. If sterilization is agreed upon, Cæsarean section gives an opportunity for its performance. Sterilization is best accomplished by excision of the uterine end of each Fallopian tube. Sterilization, except in more advanced cases, may not be desirable, as the patient may worry over her

mutilated condition. This is especially the case if later her heart condition has improved. Quite a number of patients go safely through pregnancy after an interval of several years in which their heart condition has time to react well to treatment.

Tumours.

In the case of fibroids, Cæsarean section is indicated if there is obstruction to delivery. The safest time for myomectomy is at term and it should be combined with Cæsarean section. If performed during pregnancy abortion is liable to take place. The indications for removal of fibroids are infrequent in pregnancy, the two main urgent conditions being marked pressure or degenerative changes. As a rule fibroids give little trouble unless they are situated low in the pelvis. Permission should always be obtained for hysterectomy at the time of delivery by Cæsarean section in the case of fibroids, as hæmorrhage may occur after myomectomy, or the fibroids may be found to be degenerating or septic.

Ovarian tumours as a rule are removed as soon as diagnosed during pregnancy, owing to the risk of torsion of the pedicle. If an ovarian tumour causes obstruction during labour an abdominal operation with or without Cæsarean section is required. Tapping an ovarian cyst from the vagina is an emergency operation reserved only for those cases in which the skilled assistance of an obstetric surgeon or hospital accommodation are unavailable. After labour removal of the cyst is imperative.

Rigid Cervix and Malformations.

A rigid cervix may cause serious delay in labour, as dilatation may not take place and Cæsarean section is then the only resort. This condition occurs rarely. It is found in elderly primigravidæ, or in cases of septic scars and in cases in which previous amputation of the cervix has been performed. Owing to the latter risk in future pregnancies, I have made it a rule not to remove the cervix in women during the child-bearing age, except in cases of undue elongation. In the two cases mentioned below the patients had undergone this operation.

Malformations of the vagina or uterus may prevent delivery by the pelvic route. Scarring of the vagina from disease or trauma is a source of danger during labour. Lacerations and hæmorrhage may occur if there is contraction.

In cases of prolapse in which an extensive repair of the vaginal outlet has been carried out, one is tempted to do Cæsarean section in order to avoid lacerations.

Eclampsia.

In cases of eclampsia Cæsarean section seems an ideal method of delivery, but on investigation of the literature the results appear to be unsatisfactory. I have seen few cases in which the operation is indicated.

Repeated Cæsarean Section.

It has been said that "once a Cæsarean always a Cæsarean." This applied to the earlier operations in which rickets caused extreme pelvic deformity. It still holds good for any marked pelvic contraction. In minor degrees of pelvic contraction, subsequent labours may end without abdominal interference. In nine cases in the Obstetrical Unit of previous Cæsarean section, delivery by the vaginal route took place with good results. Placenta prævia, prolapse of the cord, etc., are conditions which are not as a rule recurrent. It is to be noted that there is always the risk of rupture of the uterine scar in late pregnancy and during labour. Hernia of the scar may occur and has serious consequences if the placenta is situated in its vicinity. In one case a small rupture of the uterus took place near term. Hysterectomy was immediately performed and a living child obtained. The patient had had two previous Cæsarean operations, one followed by sepsis in the wound. After seeing the patient at intervals in the ante-natal clinic, I came to the conclusion that

Cæsarean hysterectomy should be performed owing to the risk involved in a further pregnancy, and the advisability of sterilization. The accident of rupture, however, made the operation one of emergency.

In cases in which previous Cæsarean operations have been performed it is advisable to operate before the onset of labour or just when it begins.

Induction of premature labour is an alternative method of treatment in many cases of disproportion and contracted pelvis. It has the advantage of causing little risk to the mother and can be carried out by the private practitioner. There is more risk to the infant from prematurity and pelvic pressure. Forceps applied to a premature head may cause considerable damage. In young women with a first pregnancy induction is advisable. It is of use in cases in which there is a history of the birth of post-mature infants. If induction has been decided upon and failure in delivery occurs it is risky to perform subsequent Cæsarean section. As a rule, therefore, the decision must lie between induction of labour about the thirty-eighth week, or allowing the patient to go to term for a trial labour to be followed by Cæsarean section if trial labour fails. In the Obstetrical Unit for some years, induction of labour was performed fairly frequently. Trial labours at term are now being to some extent advised. The Cæsarean section rate has risen to a slight degree as a consequence, but the results to the infants are on the whole improved.

**A Review of
182 Cases of
Cæsarean
Section in the
Royal Free
Hospital Ob-
stetrical Unit
for ten years,
1921-1931.**

The indications for the performance of the operation are given below. The operations were carried out by myself and by my senior assistants. In the earlier years the main number of operations were performed before the onset of labour. Latterly all cases, with a few exceptions, were those of early labour. Some of the emergency cases, however, had been for some considerable time in labour. The advantage of having the patient in early labour is that better drainage of the uterus takes place from the dilated cervix. Uterine contractions prevent hæmorrhage and the placenta is more easily separated. Perhaps also the chief advantage lies in the fact that in quite a large number of cases in which Cæsarean section was under consideration the patients delivered spontaneously or with the assistance of low forceps. The chief disadvantage of operating during labour is that the obstetric surgeon cannot fix the operation for a convenient time.

Although a number of patients were admitted as emergency (1) cases, the majority came from the ante-natal clinics (2). In these clinics a very large number of abnormal cases are seen, the patients being sent mainly by doctors, or from the antenatal clinics of the London Boroughs.

(1) AN ANALYSIS OF THE EMERGENCY ADMISSIONS.

Placenta prævia.—3 cases. 1 patient died of shock, infant died. Maternal pyrexia, 1 case. Others did well.
Delay in labour.—4 cases. Pyrexia in one case. Mothers and babies did well.
Impacted shoulder.—1 case. Long labour. Version attempted outside hospital. Mother and child did well.

(2) ANTENATAL SUPERVISION was exercised in the following cases :—

Before 20th week of pregnancy	...	...	69 cases
After 20th week	...	...	96 cases
Seen for first time at term	...	...	9 cases
Emergency admissions	...	...	8 cases
			<u>182 cases</u>

The ages of the patients treated is shown in this Table :—

INFLUENCE OF AGE.

AGES OF PRIMIGRAVIDÆ.

1 was 18 years

2 were 19 years

128 were between the ages of 20 and 30 years

27 were between 30 and 35 years

12 were between 35 and 40 years

11 were between 40 and 46 years

1 was 44 years and had been married 19 years

All the others were between the ages of 20 and 30 years.

TOTAL NUMBER OF OPERATIONS—182.

Multipara—82.

Primipara—100.

Cæsarean Rate in Royal Free Hospital for ten years, 1921-1931, is 1·9 per cent. of all In-patients.

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	Total	Primi-gravidæ	Multi-parae	Remarks
Generally contracted pelvis ...	54	29	25	10 had previous C.S. 3 had 2 previous C.S. 3 had breech with extended legs 4 had breech 1 had prolapsed cord, 1st stage
Generally contracted flat pelvis...	11	4	7	2 had 1 previous C.S. 1 had 2 previous C.S. 1 had breech with extended legs
Flat pelvis	19	10	9	4 had a previous C.S.
Disproportion without pelvic contraction	32	17	15	2 had a previous C.S. 1 had 2 previous C.S. 1 breech Several post-mature
Asymmetrical pelvis	9	7	2	Induction is not done in these cases
Breech with extended legs ...	6	3	3	1 had previous C.S. Version had failed in 5 cases
Transverse. Pelvis rather small	5	2	3	Version had failed or foetus had turned again into transverse
Central placenta prævia ...	11	10	1	Majority of primigravidæ were over 32 years
Heart disease	13	4	9	1 had a previous C.S. 5 were sterilized 1 had small pelvis
Tumours. Fibroids	6	6	0	1 was aged 46, with a flat pelvis. Hysterectomy was not performed in any case Myomectomy in 5.
Bony tumour...	2	2	0	
Rigid cervix	2	1	1	Both patients had amputation of cervix performed 1 had a previous C.S. for same condition
Eclampsia	1	1	0	Infant died
Double uterus and septate vagina	1	1	0	The smaller uterus was removed

MATERNAL MORTALITY 3·6 PER CENT.

7 Deaths.

Cause of Death	Time after Operation
(a) Toxæmia and shock (after 3rd C.S.)	21 hours
(b) Shock after placenta prævia	29 hours
(c) Shock and secondary hæmorrhage	8 hours
(d) Shock. Failed forceps	3½ hours
(e) Peritonitis	6 days
(f) Peritonitis complicated later with volvulus	25 days
(g) Pulmonary embolus	14 days

INFANT MORTALITY.

Stillbirths, 1·6 per cent. Neonatal Deaths, 1·6 per cent.

Resuscitation failed in 3 cases.

- 1 Case of placenta prævia.
- 1 Case of prolonged labour with foetal distress.
- 1 Case of infant weighing 12½ lb.

Neonatal Deaths in 3 cases.

- 1 Case of asymmetrical pelvis. Lived 8 hours.
- 1 Case of eclampsia. Lived 4 hours.
- 1 Case of disproportion. Lived 24 hours.

STERILIZATION WAS PERFORMED IN 19 CASES—10·7 PER CENT.

Indications.

Heart disease	8 cases
1 Previous C.S.	6 cases
2 Previous C.S.	3 cases
Difficult labours with forceps and stillbirths	2 cases
Total	19 cases

COMPARISON BETWEEN INDUCTION RATE AND CÆSAREAN SECTION RATE.

Year	Induction %	Cæsarean section %
1921	0·41	0·83
1922	3·5	1·9
1923	2·4	2·9
1924	3·1	2·01
1925	3·1	1·1
1926	4·5	1·6
1927	5·4	2·5
1928	3·7	2·2
1929	3·9	1·6
1930	2·8	3·06
1931	2·9	1·5

REMARKS.

Some cases had had previous manipulation outside hospital. The risk of sepsis was considered and preventive measures taken. *In no case in the clinic has craniotomy ever been performed on a living fœtus.* Cæsarean section was always the alternative chosen.

Cæsarean section is the easy way out of an obstetrical problem, hence its great

temptation. The results are dramatic. It has its dangers, more especially those of shock and sepsis. In a young woman it leaves a mutilated uterus which is always a source of anxiety during subsequent pregnancies. The convenience of the surgeon should never be an indication for adoption of the operation. It should be the aim of the obstetric teacher to encourage future general practitioners to obtain the best possible results by the natural pelvic route. *Cæsarean section is only indicated when obvious conditions for it are present or when normal labour has failed.*

If vaginal examinations have been made during labour the risk of sepsis is increased. This also applies to cases in which the membranes have been ruptured, and the amniotic fluid drained away. In cases of suspected sepsis the placenta and membranes are better delivered through the cervix and vagina. Sepsis is less frequent if there is good drainage through the dilated cervix. Operations performed late in labour are associated with more shock than those early in labour.

Hæmorrhage is prevented by giving pituitrin just before incising the uterus. If a large tampon of gauze soaked in glycerine is inserted into the cavity of the uterus before the walls are sutured and removed before the stitches are tied, hæmorrhage seldom gives rise to anxiety. It is a good plan to have the uterus held perfectly still by the assistant, no massage being carried out, until clots are expelled at the end of the operation. A woollen pad placed between the uterus and the symphysis pubis before applying the binder will keep the uterine vessels on the stretch and thus control hæmorrhage.

The best anæsthetic is gas and oxygen with ether or chloroform. A few cases were operated on with spinal novocain. The contraction of the uterus was a very marked feature and the relaxation of the abdominal contents. After Cæsarean section the onset of lactation is as a rule delayed longer than in ordinary deliveries.

FOR NOTES.