

THE
Journal of Obstetrics & Gynaecology
of India

VOLUME XIV, No. 2

JUNE 1964

CAESAREAN SECTION

(A 33 year survey — 1929 to 1961 (Both years inclusive))

(At the Govt. Hospital for Women and Children, Madras)

by

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Caesarean section is one of the oldest obstetric operations. Its history and career are to the obstetrician still thrilling. The results of the operation in the near past, its present position after the complete establishment of blood transfusion and antibiotic therapy, form a comparative study from which may be gained some important information with regard to its future. The operative mortality from caesarean section prior to the present era of antibiotics and blood transfusion was much higher than in a hazardous vaginal delivery. The safety conferred on abdominal

surgery in the present era has extended the use of caesarean section in obstetrics to a considerable degree, with the result that there is in every country an increasing tendency to caesarean section in preference to vaginal delivery even on the flimsiest indications. What are the results of such a procedure? How far are we guilty of such accusations and where do we stand today? My aim is to look at the evolution of caesarean section as has taken place in this hospital, and to evaluate our results critically — the results of the past, the present and if possible to visualise the future.

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Paper read at the 12th All-India Obstetric and Gynaecological Congress at Ahmedabad in December 1963.

I have tried to analyse, with the records available, all caesarean sections, done from 1929-1961 (both years inclusive), i.e. a period of 33 years. These 33 years have been divided into 4 periods — first period extending from 1929 to 1940 (both years inclusive). During this period we had no

blood transfusion, no antibiotics; chemotherapy with sulphonamides became available from 1938, and in 1940 World War II was on. The second period extends from 1941-1947. This is actually the period of war and the immediate post-war years. The sulphonamides were available throughout this period. Towards its latter half penicillin became available in very restricted quantities and blood transfusion as a proper service was just beginning to be organised. 1948-1953 is the third period wherein even though we had almost all the modern facilities, the aftermath of the world was still in evidence. The fourth period extends from 1954 to 1961 wherein, in addition to the firm establishment of a well-organised permanent transfusion service and antibiotics, there were available much more potent broad spectrum antibiotics, and further developments in anaesthesia. In addition there was the emergence by this time of the paediatrician as an intergral part of a modern obstetric outfit and with improvements in paediatric service better results were obtained in the perinatal mortality rates from caesarean section. It is because of these various developments at varying stages that I have arbitrarily divided them into four periods.

The incidence of caesarean section

Table I gives the total number of deliveries, after the 28th week, during the 33 years under review and also the total number of caesarean sections. Caesarean hysterectomy (327 cases) is excluded from this table and is discussed separately.

TABLE I

Period	Total No. of deliveries	Total No. of caesarean sections	Incidence
1929-1961	219,090	3,554	1.6%
Primary caesarean sections			2768
Repeat caesarean sections			786
Incidence of repeat section			22.2%

The advent of chemotherapy, antibiotics, blood transfusion and advances in anaesthesia have revolutionised the outlook in surgery. Necessarily this had a profound effect on surgical procedures and it is common knowledge that there is an increasing tendency everywhere to resort to caesarean section, to get out of a difficult obstetric situation. All over the country, here and everywhere, we hear the older generation of obstetricians warning the younger generation against the flippant use of caesarean section. There are many who believe that we will shortly be approaching an era when, if we go on at this rate, vaginal delivery will be a forgotten art. It is very necessary that we guard ourselves against this growing tendency to resort to caesarean section on the flimsiest grounds, because of the safety afforded under modern conditions to surgery. How far we have kept to this ideal can only be ascertained by comparing the incidence in the different periods. This is shown in Table II.

It would appear that in the last period the incidence is nearly three times that during 1929-40. A slow and steady increase through the years is discernible. Even so the figure of 2.1% could be accepted as reason-

TABLE II
Incidence of caesarean section in 4 different periods

Period	1929-40	1941-47	1948-53	1954-61
No. of deliveries	43,658	34,060	44,434	96,938
No. of caesarean sections	370	361	763	2,060
Incidence %	0.8	1.1	1.7	2.1

able, even by the most conservative obstetricians. It is realised that there is no special sanctity about a particular percentage. In general all over the world the incidence ranges from 3 to 15%. It is important to realise that environmental and other factors also influence the incidence of caesarean section and hence the relative incidences may not be really comparable.

The indications for caesarean section

It is difficult in all cases to point out the indications specifically. In the majority it is possible to do so but there exists a group — not small in number — wherein the indications

are an admixture of various indirect factors which by themselves may not necessitate a caesarean section but in combination may justify it. Another group contains a number of caesarean sections done for various indications, as for example, caesarean section for tumours complicating pregnancy, diabetes, vulval atresia, congenital abnormalities of the uterus, and such other lesions; also included are RH incompatibility, elderly primigravida, post-maturity, bad obstetric history and others. All these are clubbed together under one heading — “Miscellaneous indications”. These indications and their incidence are given in Table III below:—

TABLE III
Indications with their incidence in year periods

Indications	Period & Total No. of caesarean sections				Total	% of All caesarean sections
	1929-40	1941-47	1948-53	1954-61		
	370	361	763	2060	3554	
1. C.P.D. & contracted pelvis including repeat caesarean section for C.P.D.	260 61.1%	234 64.8%	310 40.5%	680 33.2%	1484	41.02
2. Placenta preavia	33 8.9%	32 8.2%	87 10.3%	226 10.4%	378	10.3
3. Accidental haemorrhage	2 0.8%	10 2.7%	17 2.2%	35 1.7%	64	1.8

Indications	Period & Total No. of caesarean sections				Total 3554	% of All caesarean sections
	1929-40	1941-47	1948-53	1954-61		
4. Anomalies of uterine forces	0	8	44	214	266	7.5
			5.7%	5.4%		
5. Cervical dystocia including those after prolapse repairs	2	4	16	125	147	4.1
	0.6%	1.1%	2.1%	6.1%		
6. Pre-eclampsia & eclampsia	6	12	73	124	218	6.1
	1.6%	3.01%	9.9%	6.1%		
7. Foetal distress including cord prolapse	—	12	20	170	202	5.9
		3.3%	2.6%	8.3%		
8. Malpresentations including unengaged head	4	15	58	191	268	7.5
	1.08%	4.1%	8.0%	9.3%		
9. Failed forceps or internal podalic version	4	18	20	18	60	1.6
	1.08%	5.0%	3.6%	0.8%		
10. Miscellaneous indications	59	16	115	277	467	13.1
	15.9%	4.4%	15.1%	13.5%		

It is not proposed to discuss in detail each of these indications. It is more interesting to note the changing trends.

In any series of caesarean section the largest indication would be *cephalopelvic disproportion* and contracted pelvis. Amongst the 3554 caesarean sections this accounted for 41.02% of cases. More intriguing is the incidence of this indication periodwise. In the first and second periods the incidence of this indication was 61.1% and 64.8% of all caesarean sections done during that period. In the third and fourth periods the incidence fell to 40.5% and 33.2% respectively.

The advent of chemotherapy and antibiotics, the development and per-

fection of lower uterine segment operation and improvements in anaesthesia has now made the extended use of trial labour possible in any modern institution. With these advances in surgery there has also been an improvement, to a certain extent, in the nutritional status of the mothers so that gross forms of pelvic deformities and contraction have now become a rarity. In the last two periods our ability to assess the capacity of the pelvis at all levels and also to assess the degree of disproportion has been considerably enhanced by accurate radiopelvimetry where indicated. A combination of all these factors has led to a diminished incidence of elective caesarean section

and to a larger increase of successful trial labour, and hence a lowering in this particular indication.

Placenta Previa

In the first and second periods the main treatment of placenta previa consisted in hastening vaginal delivery as soon as bleeding started, irrespective of the type of placenta previa or term of pregnancy. For achieving vaginal delivery various methods were resorted to: namely, artificial rupture of membranes and pitocin injections, bipolar version, metryurynter, Willett's forceps, plugging the vagina and various other methods. Caesarean section, if possible, was avoided, and, only under exceptional circumstances in cases of central placenta previa was it resorted to.

This was because caesarean section was associated with a very high maternal mortality. With the dawn of the modern era, caesarean section became a safe procedure. Macafee demonstrated the value of conservative management of these cases prior to viability to improve also the foetal prognosis, and caesarean section was rightly extended widely to cases of placenta previa. Table IV below

shows this very great change in the different periods.

There can be no better proof to demonstrate this very great change in the trends towards caesarean section with such improvements in maternal mortality rate.

Accidental Haemorrhage

There has not been any marked alteration in the incidence of caesarean section for premature separation during the different decades. All of us have been motivated by a desire to avoid an unrewarding caesarean section, as the foetus is almost always dead in severe cases, and the milder types respond to artificial rupture of membranes and oxytocin drip. Evidently this policy seems to have persisted right through.

Anomalies of the uterine forces

This includes hypotonic inertia and inco-ordinate uterine action of all types. During the first period of 370 caesarean sections there was not one done for this indication. In the second and third periods the incidence of caesarean section for this complication rose to 2.2% and 5.7% of all sections, while the last period, accounted for 10.4% of all caesarean

TABLE IV

Period	No. of cases of placenta previa	No. treated by caesarean section	Incidence of caesarean section in placenta previa	No. of deaths in caesarean section	Percentage
1929-1940	319	33	10.3%	7	21.2%
1941-1947	201	32	16.0%	7	21.8%
1948-1953	227	87	38.2%	4	3.6%
1954-1961	410	226	50.2%	4	1.3%
Total	1157	378		22	

sections. Here again one notices a distinct increase in the incidence of caesarean section.

Cervical dystocia including those due to previous operations on the cervix

This is a group with heterogenous aetiological factors. In some the cervical dystocia was due to unknown aetiological factor, in some due to scarring as a result of previous lacerations and in the rest due to operations on the cervix, amputation or Fothergill's operation. It also includes cases of congenital hypertrophic elongation. There has been a marked increase in the incidence of caesarean section for this complication from 0.6% of all sections in the first period to 6.1% in the fourth period. To a certain extent this increase is due to the very large number of Fothergill's operations done in the child-bearing age, from 1940 onwards, as a result of the large increase in the number of admissions for genital prolapse.

Pre-eclampsia and Eclampsia

In the first period 1.6% of all sections seems to have been done for pre-eclampsia and eclampsia. This gradually increased to 9.9% in the third period and fell to 6.1% in the last period. In the first and second periods caesarean section was never done for eclampsia and the few that were done were for pre-eclampsia with some other added indication like an elderly primiparity or malpresentation. In the third period our attitude towards the management of eclampsia gradually changed. Realising that all types of conservative therapy resulted in an average

maternal mortality of 15%, an attempt was made, from 1952, to submit to caesarean section all antepartum eclamptics who did not respond to conservative therapy. This policy was instituted for the first time towards the end of 1952. Encouraged with the results, the policy was firmly established that all antepartum eclamptics, who did not respond to conservative therapy and in whom factors favourable to induction of labour were absent, should be submitted to caesarean section.

This policy accounts for the increased incidence. The safety of surgery under modern conditions made this possible. Inevitably for severe pre-eclamptic toxæmia also caesarean section was a little more freely employed even though in the vast majority induction was the main line of treatment in non-responsive cases. In the fourth period the incidence of caesarean section in eclampsia fell, because we had by that time available better hypotensive and sedative drugs like chlorpromazine and other hypotensives. The control of convulsions became better and hence the incidence of caesarean section in eclampsia also dropped.

Foetal Distress

The increasing incidence of caesarean section for this indication is obvious. From 0 in the first period it has risen to 8.3% of all sections in the 4th period.

Malpresentations

The incidence of caesarean section from this indication rose from 1.08% in the first period to 9.3% in the last. The main factor responsible for this

is the safety of surgery which invariably made the obstetrician hesitate to undertake hazardous vaginal delivery which necessarily increased foetal risks and resulted in maternal trauma. The incidence of internal podalic version fell sharply as the in-

British Congress. My aim is to show the gradual evolution in this hospital which might be considered delayed and slow but steady. The table below gives the incidence of the two types of caesarean section during the four periods.

TABLE V

Period	Classical	Incidence %	Lower segment	Incidence %
1929-1940	227	61.3	143	38.7
1941-1947	239	66.1	122	33.8
1948-1953	348	45.6	415	54.4
1954-1961	211	10.3	1839	89.7
	1025		2519	

cidence of caesarean section rose in the management of shoulder presentations and unengaged heads.

Miscellaneous

This is a heterogenous group which contains many cases wherein a combination of factors forms the main indication — to mention a few, elderly primipara, diabetes, bad obstetric history, tumours complicating pregnancy etc. Necessarily the incidence of caesarean section in the different periods is not strictly comparable, as it depends upon the incidence of these complications.

Types of caesarean section

In modern obstetrics caesarean section has come to mean almost always the lower segment operation unless otherwise stated. The history of the change over from the classical to the lower segment operation and the establishment of the superiority of the latter was brought out vividly by Marshall in 1949 at the Twelfth

It may be surprising for many to note that even during the 1948-53 period the incidence of classical section was 45.6%. Actually by 1951 the incidence of the classical had fallen to 22% and in the last period the incidence of the classical was 10.3%. In this group 80% were repeat caesarean sections followed by tubal sterilisation. It is rarely that a primary classical caesarean section is done at present. However we do believe that the classical section has still a select limited place — to mention a few, in certain cases of placenta previa, in some cases of prolapsed arm, in cancer cervix complicating pregnancy and where the lower uterine segment cannot be located due to adhesions and tumours. The reasons for preferring the lower segment operation, if possible, at all times are now well known and accepted — namely the smoother convalescence, the better scar healing and lesser chances of the scar to rupture in a succeeding pregnancy, and its comparative safety done late in labour.

The repeat section

Among the 3544 sections, there were 786 repeat sections, an incidence of 22.2%. We do not believe that once a caesarean section it should al-

caesarean hysterectomies, an incidence of 8.4%. Table below shows the number of caesarean hysterectomies done during the different periods.

TABLE VI

Period	1929-40	1941-47	1948-53	1954-61
Number ..	44	33	107	143
Incidence % ..	10.6	8.3	11.1	6.5

ways be a section at the next and subsequent pregnancies. If the indication for the section is a non-recurring one, we believe in attempting to obtain a vaginal delivery after careful assessment of all factors in a succeeding pregnancy. The indications for repeat section in this group were recurrent ones in 73.1% of cases. In the remainder they were due to malpresentations, uterine inertia in labour, bad obstetric history, foetal distress and others. In the fourth period 150 of the 559 sections, i.e. 26.8%, were classical operations. Where the patient is to be sterilised at a repeat section we do not insist on the lower segment operation.

Caesarean Hysterectomy

I have taken this separately as I feel that this should not be mixed up with caesarean section. The indications for hysterectomy are different and it is seldom done as an operation of choice but as one of extreme necessity and when there is no alternative. Naturally the mortality also from this severe operation will be different. Among 3871 sections there were 327

The incidence fluctuates and seems to have fallen significantly in the fourth period. It is difficult to give the real reason for this. But it would not be wrong to accept the advent of broad spectrum antibiotics as a major factor. Instead of resorting to hysterectomy in the presence of, or suspicion of, infection the tendency is to avoid it and deal with the infection by antibiotics. Most of the caesarean hysterectomies have been done for rupture of the uterus. In the last period we resorted to suturing the rent and sterilising the patients instead of doing a hysterectomy always as was the custom previously. In fact this has been made possible only because of the antibiotics and our results have been very satisfactory. Of 152 cases of rupture uterus dealt with surgically during the fourth period, in 29 the rent was sutured and not a single patient was lost in these 29 cases.

Indications for Hysterectomy

I give the indications in two periods.

TABLE VII

Indications	Period and Number	
	1929-1953	1954-1961
Rupture uterus	128	123
Accidental haemorrhage	8	11
Tumour	10	6
Infection	38	3
	184	143

This clearly indicates that it is in hysterectomy for infection that there has been a marked drop. It is undoubtedly due to the advent of broad spectrum antibiotics.

As this paper is mainly on caesarean section it is not proposed to go into the hysterectomy problem in detail except to assess the mortality at a

sections there were 146 deaths — gross mortality of 4.09%.

Seventy of 1025 classical sections died — a mortality rate of 6.8%; while among 2519 lower segment operations 76 were lost — a mortality of 3.10% — half that for classical. The table VIII below gives the mortality periodwise:

TABLE VIII

Period	All types	No. of deaths	%	Classical	No. of deaths	%	L.U.S.	No. of deaths	%
1929-40	370	51	13.7	227	28	12.3	143	23	16.1
1941-47	361	37	10.2	239	29	10.5	122	12	9.8
1948-53	763	23	3.1	348	14	4.1	419	9	2.2
1954-61	2050	35	1.6	211	3	1.4	1839	32	1.7

later stage. We also state we do not favour caesarean hysterectomy as a choice procedure for sterilisation.

Maternal Mortality in Caesarean Section

Maternal mortality in caesarean section varies for various reasons. There is the general health of the patient, the indication for which it is done, the time of operation, the type and facilities available. It needs no stressing that in this era of modern surgery the rate should be minimal. In fact many clinics report large series of sections with no deaths or less than 0.5%. Among the 3554 caesarean

The overall mortality fell from 13.7% in the first period to 1.6% in the fourth period. Even this, according to western standards is high. It has to be stated that over 60% of these cases have had no antenatal care and often patients are brought in from outside after hours of obstructed labour or antepartum haemorrhage. In addition, the general nutrition of the patients is poor, with haemoglobin levels not more than 10.5 grams%, and the hazards are naturally increased. It is this type of obstetrics which keeps our mortality high. Even so it may be stated that, during 1960 and 1961, in 677 caesa-

rean sections the mortality was only 0.58%.

Cause of death

TABLE IX

Haemorrhage and shock	49
Peritonitis	72
Embolism	4
Cerebral thrombosis	2
Renal failure	2
Anaesthesia	6
Eclampsia	2
Transfusion reaction	2
Cardiac failure	2
Intestinal obstruction	2
Not known	3
Total	146

Caesarean section itself cannot generally be implicated as the cause of death. However the indication for the operation may sometimes be a factor in contributing to complications leading to maternal death.

Out of 146 deaths 121 were accounted for by shock, haemorrhage and peritonitis. Six deaths were due to anaesthesia; two from spinal and four from general. From 1929 general anaesthesia has been extensively employed and almost solely employed in caesarean section. Because of two mishaps under spinal during the second and third period

TABLE X

Indications	Period								Total	
	1929-41		1941-47		1948-53		1954-61			
Disproportion	260	8.1%	234	5.9%	310	2.3%	680	1.4%	1484	3.5%
	21		14		7		10		52	
Placenta Previa	33	21.2%	32	21.8%	87	3.6%	226	1.3%	378	5.8%
	7		7		4		4		22	
PET & Eclampsia	6	33.3%	12	16.6%	76	2.6%	124	3.2%	218	4.5%
	2		2		2		4		10	
Accidental Haemorrhage	2	50.0%	10	30.0%	17	11.8%	35	5.7%	64	12.5%
	1		3		2		2		8	
Anomalies of uterine forces	—		8	12.5%	44	2.2%	214	0.9%	266	1.5%
			1		1		2		4	
Cervical dystocia	2	50.0%	4		16	6.2%	125	0.8%	147	1.8%
	1				1		1		3	
Foetal distress	—		12	8.3%	20		170		202	0.5%
			1						1	
Malpresentation	4	50.0%	15	13.5%	58		191	1.1%	268	2.2%
	2		2				2		6	
Failed Forceps	4	50.0%	18	22.2%	20	5.0%	18	5.5%	60	13.3%
	2		4		1		1		6	
Miscellaneous	59	23.7%	16	12.5%	115	5.2%	277	3.6%	467	6.8%
	14		2		6		10		32	

(The figure above the line is the total number of sections done for that indication and the one below, gives the number of deaths.)

it has not been favoured as a choice anaesthesia for caesarean section.

The four deaths under general anaesthesia were due to aspiration of stomach contents; 65% of the sections of pre-eclampsia and eclampsia were done under local infiltration.

Perinatal Mortality

It is difficult to assess the exact foetal mortality in caesarean section, as in many a case the indication by itself plays a major part in the foetal mortality. To mention a few, antepartum haemorrhage, pre-eclampsia and eclampsia. A good idea can, however, be obtained if we ascertain the foetal mortality in mothers delivered by caesarean section who have no complicating factors enhancing foetal mortality. Such is found in cases of contracted pelvis and cephalopelvic disproportion. The gross perinatal mortality for all cases—periodwise is given in the Table XI below:—

Though the perinatal mortality has dropped to half of what it was in the first period still it is high compared to other countries.

I have made an attempt to review the progress of caesarean section in this hospital during the last 33 years. It has demonstrated that though the caesarean section rate has doubled we are still within very reasonable limits. Our results have considerably improved but cannot stand comparison with those in western countries. We have our extenuating factors, absence of antenatal care in the majority of cases, admission of non-booked cases (to the tune of 80%) of complications like anaemia, malnutrition and various other debilitating diseases. Our incidence of anaemia, toxæmia and antepartum haemorrhages has not shown any marked reduction in these 33 years. The incidence of malpresentations and disproportion has continued to be without any significant alterations. Hence we may be

TABLE XI

	1929-40	1941-47	1948-53	1954-61
Perinatal deaths/1000	156/1000	148/1000	110/1000	93/1000

Prematuring accounted for 51.5% of the perinatal deaths. (Infants weighing less than 5½ lbs.) In 41.5% of perinatal deaths the maternal complication was ante-partum haemorrhage.

The corrected perinatal mortality figures are:

justified in presuming that the improvement in maternal and foetal mortality during these 33 years is the result of the improvement in the methods of treatment. In 1929 the maternal mortality rate for this hospital was 35 per 1000 and perinatal loss was 140/per 1000. In 1961 it was

TABLE XII

	1929-40	1941-47	1948-53	1954-61
Perinatal deaths/1000	124/1000	113/1000	92/1000	66/1000

7/1000 and 68/1000 respectively. in the caesarean section rate has contributed its share to the reduction of maternal and perinatal mortality.