# BEHAVIOUR OF POST-CAESAREAN SCARS IN SUBSEQUENT DELIVERIES

**(A Review of 211 Cases)**

by

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With the increase in the number of caesarean sections there is an associated increase in the number of pregnancies with post-caesarean scars. The management of these post-caesarean scars in subsequent pregnancies is still controversial, the important hazard being rupture of the scar. With improvement in surgical technique, the incidence of rupture of the scar has fallen to 2.2% in the classical scar and 0.5% in the lower segment scar (Dewhurst 1957), while Menon's figures are 5.6% for classical scar rupture and 2.7% for lower segment scar rupture. The scar that ruptures is the thin fibrous one whose healing is defective. Schwartz believes that healing is by fibroblasts, but if undisturbed, connective tissue formation is minimal and the ratio of muscle to connective tissue is re-established. With accurate apposition and asepsis, healing can give excellent results especially in the lower segment where the muscles are at rest. The increased incidence of the lower segment caesarean section with better results and a lesser incidence of scar rupture, has prompted several workers to allow vaginal deliveries in selected cases. Browne (1951) noted that vaginal delivery after previous section was not as dangerous as thought. Lawler *et al* confirmed this. In Parikh's series 48.76% were managed vaginally while Menon reported 45.8% incidence of vaginal deliveries and Dalal & De Sa Souza 32.56%. Greenhill (1962), however, maintains that a woman with a previous section should be resectioned in a subsequent pregnancy.

The behaviour of 211 post-caesarean scars (0.76% of all deliveries) in 200 women, who were managed in a later pregnancy in Safdarjang Hospital, from 1st May 1962 to 30th April 1967, is presented. During this period there were 37,494 obstetrical admissions and 27,729 deliveries with 663 caesarean sections, giving a caesarean section rate of 2.3%.

Out of these 211 scar cases only 29 (13.7%) were emergency admissions. The rest had all attended the antenatal clinic and had received

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supervision. There were 166 lower segment scars, 17 classical scars and 28 were of an unknown type.

Of the 17 classical scars 12 had one previous section, three had two previous classical sections and 2 had one classical and one lower segment sections previously. Among the lower segment group, 8 had two previous sections; 7 others had two caesareans but the types were unknown.

Table I shows the indications for the previous caesareans and the present outcome.

A *Repeat section.* (62.5%), Excluding 6 cases which came in as ruptured, of these 211 cases, 112 (54.6%) had an elective repeat caesarean section and in 66 (58.4%) the causes were recurrent — the chief being contracted pelvis-51 cases and successful vesico-vaginal repairs 5, etc. The rest were done for previous classical sections or unknown scars or for 2 previous scars.

Ninety-three patients were subjected to a trial of labour; 76 (37.2%) had successful vaginal deliveries, 17 (8.2%) had to be resectioned, and of these one had a partial rupture during trial. There were 9 other scar ruptures, 6 before admission and 3 were found during the elective section.

B *Successful vaginal deliveries.* 37.2% in this series delivered vaginally, 75 of these had lower segment scars and 1 a classical scar. One case

TABLE I

| Indication for previous Caesarean sections | Vaginal delivery contemplated | | Elective Caesarean section |
|---|---|---|---|
| | Successful | Failed | |
| C.P.D. & contracted pelvis | 7 | 3 | 51 |
| A.P.H. including placenta praevia | 26 | 2 | 23 |
| Prolonged labour with abnormal uterine action & cervical dystocia | 6 | 1 | 10 |
| Malpresentation including breech and oblique lie | 9 | 2 | 9 |
| Bad obstetric history | 1 | - | 1 |
| Post-maturity | 1 | 2 | 1 |
| Elderly primipara | 4 | - | 1 |
| Foetal distress | 6 | 1 | 5 |
| Toxaemia & hypertension | 7 | 1 | 1 |
| Cord prolapse | 3 | 1 | 1 |
| Maternal congenital malformation, fibroid and ovarian tumour & Rh. incompatibility & diabetes | 2 | - | 5 |
| V.V.F. repairs | - | - | 5 |
| Haultain's operation | 2 | - | - |
| Unknown | 2 | 4 | 9 |
| | 76 | 17 | 112 |
| | Total admitted, | 205 | |
| | Ruptured scars | 6 | |
| | G. Total | 211 | |

with 2 previous lower segment scars also was allowed a vaginal delivery.

The duration of pregnancy in all 76, except 15, was over 38 weeks. In 15 it varied from 28-37 weeks.

*Type of presentation*—was vertex in 65 (85.5%) and in 60.1% the head was engaged, 8 presented as breech. There were 3 sets of twins.

*Duration of labour*—varied from 2 hours 25 minutes to 20 hours 10 minutes.

TABLE II

| | |
|---|---|
| Duration of labour: | |
| 0 - 6 hours | 13 |
| 6 - 12 hours | 35 |
| 12 - 18 hours | 21 |
| 18 - 24 hours | 2 |
| Unrecorded | 5 |
| | 76 |

*Method of delivery:* The majority has a spontaneous vertex delivery, often with the aid of an episiotomy. Forceps were not applied routinely. They were used 10 times on the vertex and once on an after-coming head, i.e. 14.4% as against the overall hospital figure of 2.4%. The indications were foetal distress, prolonged second stage and low forceps to cut short a 2nd stage.

*Twins.* There were 3 sets of twins. One set of macerated stillbirths weighed 2,400 gms, and 2,100 gms. The second set were born alive spontaneously and weighed 2,500 gms, and 2,000 gms. In the third set, the first weighing 2,250 gms. was delivered by forceps and the second weighing 2,450 had an internal podalic version and breech extraction.

*Breech:* There were 8 breech deliveries; 2 were premature weighing 1,300 gms. and 700 gms., while 6 were born alive with weights varying from 2,700 gms. to 3,250 gms. One needed forceps on the after-coming head.

In both the breech and the twin deliveries there was no rupture of the scar.

*Post-partum haemorrhage*—It occurred in 6 cases (7.8%) in the group that delivered vaginally, the amount varying from 12 oz. to 20 oz. Post-partum haemorrhage is a sign needing careful investigation as it may mean bleeding from a ruptured scar.

TABLE III

*Birth Weights*

| | | |
|---|---|---|
| Less than | 2250 gms. | 10 (2 stillbirth and 1 neonatal death) |
| 2250 | 2499 gms. | 7 (2 sets of twins—one set macerated) |
| 2500 | 2999 gms. | 24 (1 set of twins) |
| 3000 | 2499 gms. | 25 (2 stillbirths one with cord prolapse and one with disappearance of the foetal heart) |
| 3500 | 3999 gms. | 9 |
| 4000 | 4499 gms. | 3 (1 stillbirth with absent foetal heart sounds on admission) |
| 4500 | 4999 gms. | 1 (weight 4620 gms.) |

TABLE IV

| Relationship of previous deliveries to section | Duration of this labour | Average duration | Average wt. of babies | Types of labour & deliveries |
|---|---|---|---|---|
| Pre and post-section deliveries 9 cases | 2 hrs. 25 min. to 12 hrs. 55 mts. | 7 hrs. 32 mts. | 2883 gms. | Easy & normal |
| Pre-section deliveries only 32 cases | 3 hrs. 15 mts. to 14 hrs. 45 mts. | 8 hrs. 17 mts. | 3239 gms. | Easy, only 1 forcep delivery |
| Post-section deliveries only 24 cases | 5 hrs. 20 mts. to 18 hrs. 5 mts. | 8 hrs. 22 mts. | 2850 gms. | Spontaneous but in prior labours there were histories of forceps deliveries |
| No vaginal deliveries pre & post-section (This being the 1st after section) 11 cases | 5 hrs. 30 mts. to 20 hrs. 10 mts. | 11 hrs. 43 mts. | 3000 gms.. | High rate of forceps 81.8% |

*Relationship of obstetrical history and previous vaginal delivery*

That previous vaginal deliveries both prior and post-section make subsequent delivery quick and easy is shown by Table IV. Those with no previous deliveries had a longer labour with a high rate of instrumental interference (81.8%).

*Vaginal deliveries after section:* There were 21 cases who had 2 or more vaginal deliveries following a previous section. Two cases are illustrated. One after a previous lower segment for uterine inertia and foetal distress subsequently delivered twice, babies weighing 4,620 gms and 4,000 gms respectively. The second case after a Haultain's operation had a lower segment and later delivered two full-term babies vaginally, one with forceps weighing 3,700 gms and one spontaneously weighing 2,750 gms. Repeated vaginal deliveries may, however, also weaken the scar, and Harris maintains that each additional pregnancy and vaginal delivery increases the probability of rupture. The fact that a case delivers spontaneously does not afford protection from rupture in a subsequent one. In this series one case had 5 post-caesarean vaginal deliveries and the classical scar ruptured in her 10th pregnancy.

*Cephalo-pelvic disproportion:* Seven cases out of 61 (11.4%) who had been previously sectioned for cephalo-pelvic disproportion had vaginal deliveries either normally or with outlet forceps within 10 hours, the babies varying from 2,00-3,600 gms. One case had a caesarean section for cephalo-pelvic disproportion for a baby weighing 2,700 gms. and later was delivered normally with a larger baby weighing 3,300 gms.

This is probably because not only does uterine action become more efficient in following deliveries but also to the fact that often other factors like malpresentation, inertia etc. are added to the disproportion. Schultze & Baba (1949) recorded that 1/5th of their patients who were originally sectioned for disproportion later had vaginal deliveries and that a diagnosis of disproportion needing section should not stop an attempt at vaginal delivery if the conditions are favourable.

*Elderly primipara:* There were four elderly primiparae (aged 30-38) previously sectioned, who had in addition complications like post-maturity, toxaemia, breech and prolonged labour. All delivered subsequently vaginally within 6-20 hours.

*B. Failed trial of labour:* A test of labour is the only criterion by which the efficiency of a scar can be judged. In 17 cases vaginal delivery was contemplated but following trials which failed during an interval varying from 5½-16½ hours, labour was terminated by caesarean section. Some of the indications for termination were those which demand caesarean section in their own rights, — foetal distress, cord prolapse, or lack of progress. In two cases there were face presentations with caesarean scars. In one, on sectioning, a haematoma had already formed, with dehiscence of the scar and in the other there was thinning out of the scar. Greenhill maintains that face presentation with a previous caesarean scar needs an elective caesarean section. Five cases had to be terminated for tenderness of the scar but at laparotomy, however, only in the cases associated with face presentation was pathology of the scar found.

*Inspection of the scar:* In the group who were electively sectioned there were 7 lower segment scars which were noted to be markedly thinned out and in one case the scar was intact but fibrous. In two cases the scars were so bound down with adhesions that there were noticeable posterior sacculations of the uteri.

In two cases there were 'windows' in the scar with only paper thin peritoneum over them. These cases would certainly have ruptured had they been subjected to a vaginal delivery. Stabler suggests that these 'windows' in the uterine muscles seen during a caesarean are instances of lack of healing of the original incision and not ruptures. Defective scars consisting of windows may be caused by faulty surgical technique like, improper apposition or tight suturing.

*Placenta over the scar:* There were four cases where the placenta was implanted over the scar. Two were over classical scars; one of these ruptured and died almost immediately, while in the other rupture was partial and haematomas were found over the incision at elective section. The other two were placenta praevia and accreta implanted over the previous lower segment scars. One had a hysterectomy and in the other the placenta had to be removed piecemeal and the tear resutured.

*Tenderness over the scar:* Elever cases had complained of this symp-

tom, 6 in the group who were electively sectioned, among them in four the scars were intact, but one had a dehiscence and one a partial rupture. In the group who were allowed a labour, five labours had to be terminated because of scar tenderness but only one had already partially ruptured while one had a thinned out scar. Tenderness and pain over the scar is not always a reliable sign as often the uterus is found to be intact. However, it is one that cannot be ignored and necessitates a repeat section.

Out of 76 cases who delivered vaginally in 57 the scars were palpated and only one showed a dimple at the right corner. Poidevin and Bockner have, however, suggested that digital exploration following delivery is not conclusive, as the soft flabby lower segment does not give adequate information. They subjected 43 post-caesarean scars to hysterograms and found that not one showed a typical smooth outline.

*Ruptures:* In this series there were 10 scar ruptures (4.7%). Six were admitted with complete ruptures, three were discovered during elective section, while one ruptured partially during a contemplated vaginal delivery. Review of recent articles on the subject shows that a lower segment scar is less likely to rupture than a classical one. Eames' figures of scar rupture are 1.3% lower segment scars against 2.2% classical scars, and Dewhurst's are 0.5% lower segment scar ruptures against 2.2% classical scar ruptures. Seventy per cent of the ruptures were classical scars and of these 6 (85.7%) were complete, while of the 30% lower segment scars only one (33.3%) was complete. Chesterman (1953) stated that most classical scar ruptures are complete while the lower segment ruptures are incomplete. Thirty per cent of ruptures in the series were associated with the placenta being implanted over the scar. This is often quoted as a common cause for rupture, the villi eroding and weakening the scar.

A patient had a previous lower segment caesarean section for severe ante-partum haemorrhage and placenta praevia. She was readmitted in her next pregnancy and at 36 weeks had to be re-sectioned for massive ante-partum haemorrhage. The placenta was praevia and partially accreta and the lower segment had ruptured.

Of 211 scars treated, the previous scars known to be classical were 17 and of these 7 ruptured i.e. 41.2% while in 166 known to be lower segment scars 3 (1.9%) ruptured.

Fifty per cent ruptures occurred before the 37th week and hence proponents of repeat caesarean section cannot forestall this hazard by repeat caesarean section without prejudicing the foetus with prematurity. Of these 50% pre term ruptures, 4 out of 5 (80%) were in classical scars.

*Maternal mortality:* One patient who had the placenta implanted over the classical scar died, giving a ratio of 1:7 (14.3%) of the classical scars which ruptured, and 1:17 i.e. (6%) of all the classical scars admitted and treated in this group. There were no deaths in the lower segment group. Maternal mortality is very low with

lower segment scar ruptures .01%. Eames attributes this to the avascularity of the old scar and noticed that often very little blood is found in the peritoneal cavity.

In the group subjected to trial of labour there was no mortality.

*Perinatal mortality:* In 76 successful vaginal deliveries there were 79 babies with 8 deaths (10.1%). Seven were stillbirths and one died neonatally. These included 2 premature births; a set of macerated twins weighing 2,500 gms. and 2,100 gms. and one antenatal intra-uterine death in a toxaemic mother. These deaths were unavoidable. Foetal death could have been avoided, had an elective section been done, in the case of a cord prolapse and also on a toxaemic mother where the foetal heart disappeared intranatally, (the patient delivered subsequently a live born baby weighing 3,700 gms.) Hence the corrected perinatal mortality in successful vaginal deliveries is 2 out of 79 i.e. 2.5%. The over-all foetal mortality for 129 patients who were sectioned was 10 (7.7%). However only one could be attributed to prematurity due to early section with wrong dates and 2 more were avoidable. The remaining were unavoidable i.e. antepartum haemorrhages and congenital abnormalities, giving a corrected mortality of 2.3% in the sectioned group.

*Perinatal mortality in relation to type of previous scar*

The over-all foetal mortality for previous classical scars was 29.4% and when the scar ruptured it rose to 71.4%, while for previous lower segment scar it was 6% and when the scar ruptured it rose to 33.3%. In the series reported by Parikh the perinatal mortality associated with a ruptured classical scar was 83.33% and when a lower segment scar ruptured it rose from 5.79% to 42.85%.

*Discussion*

The integrity of a caesarean scar can only be proved by a labour. The management should always be by individual selection and depends on the evaluation of the scar and patient, after studying the age, pelvis, type, number and indication for the previous section, uterine behaviour and convalescence in relation to sepsis and finally the size and presentation of the foetus. Early hospitalisation preferably at the 36th week is advisable. If the indication for the previous section is recurrent e.g. contracted pelvis, the patient should be electively sectioned before term, if she has a classical scar and if her dates are reliable. If not, the onset of labour should be awaited to prevent inadvertent prematurity. Not all patients previously sectioned for cephalo-pelvic disproportion require a repeat section. Several can deliver normally and sometimes with large babies; 32.7% of cases in Parikh's series delivered normally after being previously sectioned for cephalo-pelvic disproportion as against 11.4% in this series while figures given by Bhoumik were 19%. Convalescence with pyrexial complications and previous sections on a greatly stretched lower segment should be regarded as contra-indications to a vaginal delivery. There

should be reasonable assurance that the previous scar is well united. An important criterion involved in deciding the route of delivery is previous vaginal deliveries, which greatly facilitates a subsequent delivery.

The type of scar is also important. A previous classical scar carries a high risk of rupture with its attendant high rate of maternal and foetal mortality. The number of previous scars also contributes its share in the management, as such uteri are doubly weakened. Both these categories of patients require a repeat section unless the circumstances are very favourable for a vaginal delivery like a well engaged head and imminent termination of labour. A well-engaged normally presenting vertex with intact membranes and a well co-ordinated labour helps a great deal in the successful outcome of the vaginal delivery.

During a contemplated vaginal delivery any vaginal bleeding or pain and tenderness over the scar necessitates a laparotomy. Pitocin must never be used to induce labour. Vaginal examination of the scar is advisable though not obligatory.

The incidence of scar rupture in pregnancy or labour is 1-2% and the mortality 10-20%. The mortality figures of rupture are 0.9% while those from caesarean are 0.1% (Marshal & Cox). A scar however can rupture in pregnancy. The lower segment in less likely to rupture subsequently compared to a classical, and the foetal and maternal outlook are definitely better in these cases.

In conclusion, it seems that the lower segment scar not only has a lower rupture rate but is also safer for the patient when a vaginal delivery is contemplated. Should rupture occur maternal and foetal prognosis is certainly better than when the scar is a classical one. Hence under expert supervision, vaginal delivery is possible and the dictum "Once a caesarean always a caesarean" may not always hold as under favourable circumstances, a patient with a previous lower segment scar can be allowed a vaginal delivery.

*Summary*

The management of 211 post-caesarean scars is discussed; 112 were electively sectioned. Ninety-three subjected to a test of labour, 17 failed giving an over all incidence of caesarean section 62.8% and 76 (37.2%) were delivered successfully. Rupture was found in 10 scars, 70% being classical and 50% occurring preterm. There was one death associated with a classical scar and none with lower segment scar.

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*References*

1. Bhoumik: J. Obst. & Gynec. India. **10**: 327, 1960.
2. Browne, A. D. & Mc Grath, J.: J. Obst. & Gynec. Brit. Comm. **72**: 557, 1965.

3. Browne, O. D.: J. Obst. & Gynec. Brit. Emp. **58**: 555, 1951.
4. Chesterman, J. N.: J. Obst. & Gynec. Brit. Emp. **60**: 684, 1953.
5. Dalal & DeSa Souza J.: Quoted by Parikh J. Obst. & Gynec. India **14**: 327, 1964.
6. Dewhurst, C. J.: J. Obst. & Gynec. Brit. Emp. **64**: 113, 1957.
7. Eames, D. H.: Am. J. Obst. & Gynec. **65**: 944, 1953.
8. Fleming, A. M.: Am. J. Obst. & Gynec. **71**: 1202, 1956.
9. Greenhill, J. P.: Year Book of Obst. & Gynec., 1962-63, p. 23.
10. Greenhill, J. P.: Obstetric, ed. 13, Philadelphia & London, 1965, W. B. Saunders Co., p. 856.
11. Harris, J. R.: Am. J. Obst. & Gynec. **66**: 1191, 1953.
12. Krishna Menon, M. K.: J. Obst. & Gynec. Brit. Comm. **69**: 18, 1962.
13. Lawler, P. E. & Bulfin, M. J.: Am. J. Obst. & Gynec. **72**: 252, 1956.
14. Lawrence, R. F.: J. Obst. & Gynec. Brit. Emp. **60**: 237, 1953.
15. Marshal & Cox: Quoted from Post Graduate Obstetrics and Gynaecology, ed. 3, London, 1964, Butterworth p. 584.
16. Narvekar, M. R.: J. Obst. & Gynec. India. **7**: 115, 1956.
17. Parikh, V. N.: J. Obst. & Gynec. India. **14**: 327, 1964.
18. Poidevin, L. O. & Bocker, V. Y.: J. Obst. & Gynec. Brit. Emp. **15**: 278, 1958.
19. Schmitz, H. E. & Baba, G. E.: Am. J. Obst. & Gynec. **57**: 669, 1949.
20. Schwartz, O. H.: Quoted from Postgraduate Obsteterics and Gynaecology, ed. 3, London, 1964, Butterworth p. 579.