

THE UNRELIABLE LOWER SEGMENT SCAR*

(A hystero-graphic study)

by

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Although the incidence of scar rupture is less following lower segment than classical caesarean section, there is increasing evidence that any uterine scar regardless of its location presents a hazard during subsequent parturition.

The incidence of transverse lower segment ruptures in hospital patients is variously estimated between 8.3% and 0.5%, the figure quoted in Madras by Krishna Menon being 2.7%. In medically under-privileged communities beyond reach of a hospital the incidence may be higher; study of this problem is, therefore, relevant in India where, through ignorance, many may choose unsupervised delivery at home.

There are in addition an unknown number of unrecognised asymptomatic cases; we are all familiar, on reopening the abdomen to perform repeat caesarean section, with the unexpected finding of a gaping wound

in the uterus, or on routinely exploring the uterus after vaginal delivery of a dehiscant scar. Moreover, for every case of overt rupture in which the uterine contents present through the defect, hystero-graphic and laparotomy findings disclose others with incomplete rupture in which the outermost edges of the myometrium are found bridged by a thin, avascular, translucent membrane of fibrous tissue.

The mortality of lower segment rupture in hospital practice is not high, yet neglected cases may, before aid is sought, sustain serious damage to the bladder and other structures deep in the pelvis.

These cases do not present the classical symptoms of weak scar or impending rupture. Pain and tenderness are unreliable guides, intrapartum bleeding seldom occurs, history of sepsis at the time of primary section is often irrelevant, for satisfactory union has been shown to occur despite its presence. Haematuria or the onset of shock are signs that rupture has already taken place or that an asymptomatic peritoneal window, left in the non-contractile lower segment since the primary

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operation, is in process of extending, due to distension and retraction of the uterus under stress of labour.

Scar healing

Histological study shows normal post-operative healing of the lower segment by fibroblastic reaction, fibrous tissue union proceeding to absorption with eventual disappearance of fibrous tissue so that direct muscle to muscle union with little or no fibrous tissue results.

Post-caesarean hystero-graphy of the lower segment discloses that this sequence is frequently disturbed, that many dehiscences are conceived in the operating room and develop in the puerperium rather than in subsequent pregnancy and labour which only serve to accentuate the defect.

Possible aetiology

Several factors are believed to predispose to poor union and rupture. Post-operative genital sepsis, blood loss at operation leading either to tissue necrosis from overzealous use of haemostatic sutures or wound haematoma with excessive deposit of fibrous tissue, the number of previous sections and the indications for these operations, as for example the devitalising of uterine muscle by interstitial bleeding in abruptio placentae or traumatic muscle necrosis from neglected cephalopelvic disproportion, previous large birth weight leading to unintentional extension of the incision during difficult extraction, overdistension during pregnancy from a large baby, hydramnios or twins, the site of placental implantation, late haemorrhage during the puerperium, and socio-

economic or constitutional factors including poor nutritional status, anaemia, or corticosteroid levels during the puerperium.

A number of other factors relating to operative technique have been blamed, such as inclusion of decidua in the suture line, excess foreign body reaction to thick suture material, tissue ischaemia from continuous as opposed to interrupted sutures, unequal thickness of wound edges, and the site of the incision, the low placed incision late in labour in the ischaemic cervical tissue predisposing to characteristic scar deformities of the upper part of the cervical canal seen in hystero-graphic studies.

Much of this is speculative and there seems to be no reliable index to scar efficiency at present beyond the experience of subsequent labour itself. Even after selection of cases for supervised trial for scar, Krishna Menon reports an incidence of 2.3% of lower segment scars giving way.

Hystero-graphy

Other investigators draw attention to a high incidence of hystero-graphic deformity following caesarean section. Baker and Poidevin found some degree of abnormality in 100% of cases examined, Waniorek in 96% Velasco *et al* in 55%.

Their findings roughly classify as major and minor deformities, invaginations and exvaginations, wedge-shaped guttering, sacculations, retro-vesical extravasation or pouching and formation of fistulous tracts.

Major deformities including sacculations, retro-vesical extravasation or wedge-shaped defects greater than 5 mm depth were found in 25% of

all cases by Poidevin, 26% by Baker; minor deformities in 60% and 74% by the same authors. Invaginations comprised 20% of defects and exvagination 90%, (Waniorek).

Since hystero-graphy discloses frequent deformity in uteri in which an incision has been made, it is important to correlate x-ray findings with precise anatomical and histological changes found at laparotomy if we are to understand their clinical significance. This has been attempted.

Prospective studies show minor hystero-graphic defects to correlate clinically with reliable scars which at operation are slightly paler, thinner and more compact than the surrounding tissues.

Major defect may similarly denote frank dehiscence or failed union or an extremely thin bridge of tissue uniting opposing edges of the wound.

Isthmic defects are believed to occur after sections in which prolongation of the incision has taken place, and may disappear following resection of the old scar at repeat operation. They may also be associated with poor involution or an underlying congenital deformity in the isthmic region which may relate to the primary indication for caesarean section. Invaginations are said to follow multiple sections.

It has also been demonstrated that actual scar dehiscence is not invariably incompatible with successful vaginal delivery.

Report

A study of 154 consecutive lower segment sections at Christian Medical College Hospital, Vellore, between

May 1966 and April 1967, was conducted in the following manner. History, indications for section, certain details of operative technique and postoperative course were noted at the time of hospitalization. When repairing the wound a fine steel wire suture was incorporated in the superficial layers of the myometrium to facilitate x-ray identification of the scar site but this was abandoned later for it proved of little help.

Patients were asked to return for hystero-graphy 3 months later. It was believed that involution and oedema at the incision site would by then have dispersed whereas a longer interval might increase the likelihood of succeeding pregnancy or losing sight of the patient.

Hystero-graphy was carried out in the dorsal position introducing 4 cc of 'Diagenol' slowly into the uterus through a screw-tipped cannula under indirect vision on a television screen with image intensifier. (The introduction at first of larger amounts gives a confused picture from peritoneal spill). The patients were then turned to the lateral and oblique positions on either side while injecting a further 4 to 8 cc of dye and taking further x-ray exposures.

Interpretation was jointly by radiologist and obstetricians; only defects of which pictures were recorded on permanent film were accepted.

Findings

Among 154 patients, only 55 (35%) presented for x-ray investigations. The procedure was abandoned in 5 cases owing to reflux from a patulous cervix in 4 and failure to introduce the cannula in one.

Twenty-five examinations showed normal uterine outline (50%). There was minor deformity in 20% and major deformity in 30%. The arbitrary definition of 'minor deformity' was made for craters, sacculations or filling defects of less than $\frac{1}{2}$ cm. in depth on the x-ray film.

Seven out of 10 cases of repeat caesarean section showed major deformity, the three with normal hystero-grams were those in which the old scar had been excised and re-sutured.

Cases of primary caesarean section were reviewed separately and showed a slight preponderance of abnormal scars among primiparae (47%) as compared with multiparae (33%). A third of these followed prolonged primiparous labour with slow dilatation of the cervix. Three out of four patients with cervical dystocia showed scar deformities. (see Table I).

There was no correlation between

birth weight and subsequent abnormal scar, no difference between operations performed early or late in labour. Haemorrhage at the time of operation was assessed as less than 10 ozs, between 10 and 20 ozs, and more than 20 ozs. There was a rising incidence of scar deformity with increasing blood loss. (Table I). Major deformity was more frequent (44%) following severe post-operative sepsis compared with mild "notifiable" pyrexias and afebrile puerperia (25%).

Cases were reviewed according to other indications for caesarean section, seniority of the operating surgeon, socio-economic status of the patient as determined by husband's occupation, and the patient's post-operative haemoglobin level. No correlation was found between scar quality and these factors.

When details of operative technique were reviewed no difference in

TABLE I

| | Major defect | Minor defect | Normal | Total |
|---|--------------|--------------|-----------|-----------|
| Primiparae | 3 | 6 | 10 | 19 |
| Multiparae | 5 | 1 | 12 | 18 |
| Not recorded | 2 | 1 | 0 | 3 |
| Total | 10 | 8 | 22 | 40 |
| Caesarean section before 2/5 dilatation | 5 | 5 | 13 | 23 |
| Caesarean section after 2/5 dilatation | 3 | 2 | 9 | 14 |
| Not recorded | 2 | 1 | 0 | 3 |
| Total | 10 | 8 | 22 | 40 |
| Less than 10 oz. blood loss | 1 | 2 | 10 | 13 (23%) |
| 10-20 ozs blood loss | 5 | 5 | 8 | 18 (55%) |
| More than 20 ozs blood loss | 4 | 3 | 2 | 9 (77%) |
| Not recorded | 5 | 0 | 5 | 10 |
| Total | 15 | 10 | 25 | 50 |

the radiological scar was evident following inclusion of the decidua, suturing opposing edges of unequal thickness, whether the lower segment was thinned out or thick and uniform, whether Geppert's tear was used as distinct from knife incision or whether the patient was delivered in advanced or early labour. (Table II).

of the utero-vesical pouch or broad ligament—raise the question of their significance in relation to scars which actually rupture during labour. On routine exploration of the uterus in the third stage the chance discovery of scar dehiscence demonstrates that gross deformity is not invariably incompatible with

TABLE II
Incidence of scar deformity according to technique of repair in 40 cases of primary section

| | Major defect | Minor defect | Normal film | Total |
|-----------------------------|--------------|--------------|-------------|-------|
| Decidual inclusion | 2 | 4 | 3 | 9 |
| Decidual exclusion | 4 | 4 | 13 | 21 |
| Not recorded | 4 | 0 | 6 | 10 |
| Thinned out L.U.S. | 3 | 4 | 10 | 17 |
| Thick unformed L.U.S. | 4 | 2 | 7 | 13 |
| Not recorded | 3 | 2 | 5 | |
| Unequal thickness of L.U.S. | 0 | 4 | 4 | 8 |
| Equal thickness | 5 | 2 | 6 | 13 |
| Not recorded | 5 | 2 | 12 | 19 |
| L.U.S. incised | 5 | 6 | 12 | 23 |
| Geppert's tear | 2 | 1 | 5 | 8 |
| Not recorded | 3 | 1 | 5 | 9 |
| Advanced labour | 2 | 2 | 3 | |
| Early labour | 2 | 5 | 8 | 15 |
| Not recorded | 6 | 1 | 11 | 18 |

Conclusion

Our findings do not lend themselves to predictive analysis on account of the small size of the group responding to follow up investigations and the large number of variables to be considered.

Although few minor deformities were found, the high incidence of gross radiological deformity (30%) large retro-vesical sacculation, frank escape of dye beneath the peritoneum

uneventful vaginal delivery. Is it then safe to conclude that radio-opaque substances introduced under syringe pressure may sometimes find their way through tiny apertures in the uterine wall to appear on the x-ray screen as large extra-uterine shadows out of proportion to the seriousness of the underlying defect? How else can the observed behaviour of lower segment scars over the past 25 years be reconciled with a 30% incidence of

radiological defects such as are illustrated in plates I to XIV?

With the exception of a possible causal relationship between blood loss, primiparity in association with cervical dystocia, and multiple caesarean sections and later scar abnormality, the history of preceding delivery, operative technique, postoperative course etc., yields little correlation with subsequent radiological defect. Although hystero-graphy undoubtedly offers the most convincing guide to scar abnormality this cannot invariably be equated with scar unreliability.

More detailed study is required before the predictive value of these findings is known. We propose to follow this series of patients through to subsequent delivery which may yield further information.

Meanwhile, it can be said that hystero-graphy serves to identify a group of patients (30%) among whom the catastrophe of scar rupture seems most likely to threaten.

The maternal mortality from lower segment rupture is not high but there is an associated perinatal loss of 12%. Moreover, the emergency surgery which has to be undertaken is deep in the pelvis, complicated by retro-peritoneal haematoma, and may be difficult and time consuming.

There is a strong case for routinely employing hystero-graphy following caesarean section, and for further reflection on some of the indications for caesarean section in India.

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