

Assessment of Cesarean Section Scar Strength: Still a Challenge?

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ABSTRACT

Objective: To assess the integrity (strength) of cesarean scar of uterus during interval period (nonpregnant state) by ultrasonography (USG), hystero-graphy and hysteroscopy and their correlation. **Material and methods:** The study was conducted in the Dept. of Obstetrics and Gynecology and Dept. of Radiology, SN Medical College, Agra, Uttar Pradesh. Three hundred nonpregnant women with cesarean section in past were recruited to undergo USG, hystero-graphy and hysteroscopy along with proper history and other routine examination. The thickness and appearance of anterior uterine wall, especially at scar area, were noted down during investigations. **Results:** The mean scar thickness was more (11.59 ± 1.33 mm) in women with only one cesarean section in comparison with women having more than one cesarean section (9.08 ± 9.2 mm). Healthy abdominal scar healed with primary intention correlated with good uterine strength. More breaking on hystero-graphy was associated with thin scar on USG. When scar area was found irregular and wide on hysteroscopy, the thickness of scar was less on USG also. **Conclusion:** A prospective idea of uterine scar strength can be obtained by careful history taking, local examination of abdominal scar as well as per vaginal findings along with USG, hystero-graphy and hysteroscopy in nonpregnant women. If findings are suggestive of weak scar, a lady can be counseled for planned cesarean section in her future pregnancy in spite of trial for vaginal birth after cesarean. Accordingly, if she can afford further risk and cesarean section, she should become pregnant otherwise should avoid further confinement in future.

Keywords: Cesarean scar integrity, ultrasonography, hystero-graphy, hysteroscopy, interval period

Cesarean section is the most commonly performed surgical procedure involving the uterus in fertile women with low transverse incision being the most common type of uterine hysterotomy.^{1,2} Every woman who has undergone cesarean delivery aborts the chances of normal vaginal delivery in future pregnancies. Almost all of us are very frequently asked by most of the women who have undergone cesarean section recently or in past, "Doctor, will I have a normal

vaginal delivery (NVD) in future or not". It will be better, if we have some method, which could assess strength of uterine (cesarean) scar before a lady plans for her subsequent pregnancy/delivery. To seek an answer to this important and frequently asked question by almost every woman, this study was contemplated.

In women, who have undergone a cesarean section, a previous cesarean section casts a shadow over any future pregnancy, though under favorable circumstances, a repeat cesarean section may not be necessary. Today, a more up-to-date version of the old saying 'once a cesarean always a cesarean' would be 'once a cesarean always a hospital delivery'. Effort to encourage vaginal birth after cesarean (VBAC) appears to be the most productive approach to lowering the cesarean rate. Since, a fair number of cesarean sections are done for nonrecurring indications, the question of allowing a vaginal delivery in the future becomes a pressing problem in the mind of the Obstetrician, especially in developing countries like India.

Poidevin (1959) found that, on opening all uteri, which had previously been subjected to lower segment cesarean section (LSCS), a larger or smaller depressed scar would always be seen.³ If the depression is not

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>5 mm deep, the scar can be relied upon not to give way. A defect within the lower uterine cavity in patients with a history of cesarean section has been described by Simpson et al on hysterosalpingography.⁴ Ash et al described that patients who had a cesarean section will exhibit anatomic abnormality in lower uterine segment on ultrasonography (USG).⁵

MATERIAL AND METHODS

This was a prospective study done on 300 women - 160 women had one cesarean section and 140 women had two cesarean sections - attending the OPD in Dept. of Obstetrics and Gynecology, SN Medical College, Agra, Uttar Pradesh. The age group varied from 15 to 45 years. Detailed obstetric history along with general, systemic and local examination was done along with urine pregnancy test. Women having recent pelvic infection and/or allergy to dye were excluded from the study.

Under local examination, any healing defect, scarring, pain, tenderness and any discharge from stitch line were noted. Genital tract examination was done to see the condition (mobility) of cervix, uterus and adnexal pathology. Every woman was subjected to USG, hysteroscopy and hystero-graphy along with other routine investigations.

On ultrasound, scanning was done in serial longitudinal and transverse planes across the whole length of scar in postmenstrual phase with full bladder (Fig 1). Scar was identified as a hyperechoic small line or dots (equal sign) in lower part of uterus and its thickness was measured at various points by moving probe from side-to-side. Hysteroscopy (direct visualization of scar) was performed on 9th postmenstrual day or when bleeding stopped completely and whole of the anterior uterine wall was scanned up to internal os. Scar was identified as whitish and fibrotic area or line horizontally (Fig 2). The findings of scar area were compared with the findings by means of other methods. Hystero-graphy (hysterosalpingography) was also performed on 9th postmenstrual day or when bleeding stopped completely and films in lateral view were taken (Fig 3). The depth of breaking/notching or filling defect was identified, measured and categorized in three groups (<1 mm, 1 mm and >1 mm). These findings were also compared with findings by means of other methods.

RESULTS

As shown in Table 1, in women having only one cesarean section, the mean scar thickness was 11.59 ± 1.33 mm

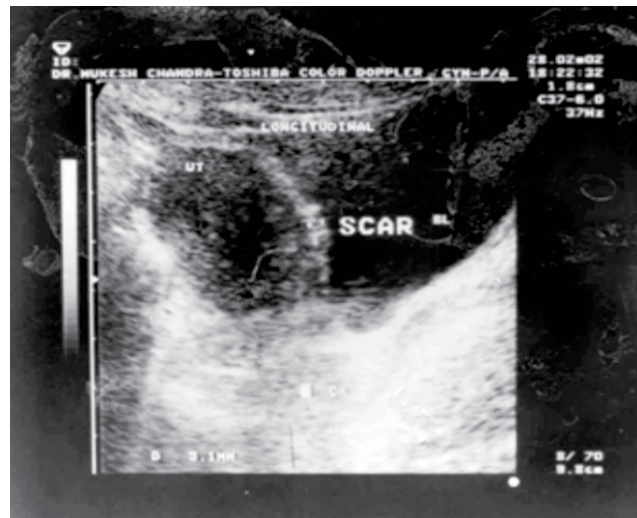


Figure 1. Anterior wall thickness at scar area (white marker) on USG.

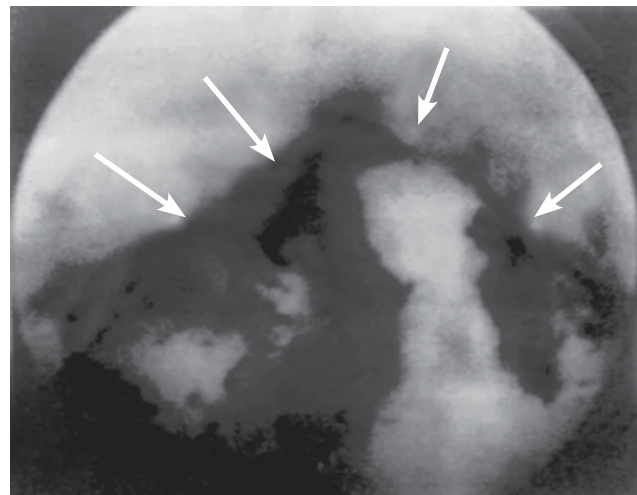


Figure 2. Hysteroscopic view of dehiscent scar (white arrows).



Figure 3. Hystero-graphy after cesarean section reveal a wide and deep scar at the level of subisthemic incision (white arrow).

and in women having two cesarean sections, the mean scar thickness was 9.08 ± 9.2 mm; this is statistically significant. It was concluded that in women having more number of cesarean sections, the scar becomes thinner, which can also be proved by hystero-graphy; the deformities shift to the larger type as the number of cesarean sections increase.

According to Table 2, on hystero-graphy it was evident that 70 patients had depth of beak >1 mm and mean scar thickness of 8.86 ± 1.36 mm, and equal number of patients had a beak of 1 mm and mean scar thickness of 10.00 mm. There were 160 women who had <1 mm deep beak and mean scar thickness of 10.75 ± 1.25 mm. On comparing the two groups, <1 mm and >1 mm deep beak, scar thickness was found to be statistically significant ($p < 0.05$). It was concluded that if scar was found to be thin on USG, there will be more beaking in anterior uterine wall (scar area) on hystero-graphy.

On hystero-scopy, interior of uterine cavity was seen and classified into two groups according to the regularity and irregularity of scar area and again, whether it was wide or linear. If uterine outline, anteriorly at scar area, was found irregular or wide, both conditions indicate a weak scar. It was further confirmed by USG as well as by hystero-graphy (Table 3).

As seen in Table 3, 230 cases had fine linear abdominal scars and mean scar thickness of uterus by USG was

10.24 ± 0.9 mm while 40 cases had wide puckered scar over abdomen and mean scar thickness of uterine scar was 9.50 ± 1.12 mm. There were only 30 cases having keloid/hypertrophic scar formation over abdomen and mean uterine scar thickness of 8.67 ± 1.2 mm on USG. The values are statistically significant ($p < 0.05$). Table 4 summarizes the distribution of cases and their scar thickness by USG according to hystero-scope findings.

DISCUSSION

Although not many studies are available regarding uterine scar status especially in nonpregnant condition, Alfred Warionch in his study in 1967, using hystero-graphy concluded that as the number of cesarean sections increases, the scars become thinner.

Osser et al also found that myometrial thickness at the level of isthmus uteri decreases as the number of cesarean sections increases; the frequency of the large scar defect increases.⁶ This was also found in our study. Now many surgeons have started practicing excision of scar area after identifying it as fibrosed, nonvascular thinned portion during cesarean section in a hope to get a healthy and good strength scar in future.

During hystero-cervicography, a steep oblique or lateral view may be helpful in better defining this particular cesarean section scar because certain defects can be obscured on a frontal view.⁷ Though, in the interpretation of hystero-salpingography, awareness of the appearance of cesarean scar defect is important in avoiding misdiagnosis of the scar for underlying pathology or normal variant such as prominent cervical glands, post myomectomy diverticulum, synechiae and focal adenomyosis.^{4,8}

On hystero-salpingography, the defects were categorized by location (lower uterine segment, uterine isthmus,

Table 1. Distribution of Cases and their Ultrasonography Findings According to Number of Cesarean Section

No of cesarean section	Scar thickness by USG (mean ± SD in mm)	No. of women
1	11.59 ± 1.33	160
2	9.08 ± 0.92	140
Total	10.37 ± 1.2	300

t = 2.181; p < 0.05

Table 2. Distribution of Cases According to Hystero-graphic (Isthmographic) Findings and its Correlation with USG Findings

Depth of beak on hystero-graphy (mm)	No. of cases	Scar thickness by USG (mean ± SD in mm)
>1 mm	70	8.86 ± 1.36
1 mm	70	10.00 ± 0.00
<1 mm	160	10.75 ± 1.25
Total	300	10.37 ± 1.20
>1 vs. 1	t 0.272	p >0.05
<1 vs. >1	3.531	<0.05
1 vs. >1	2.567	<0.05

Table 3. Distribution of Cases According to the Abdominal Wall Scar Status and its Relation to the Uterine Scar Thickness on USG

Abdominal scar on per abdomen examination	No. of cases	Uterine scar thickness on USG (mean ± SD in mm)
Fine/Linear (FL)	230	10.24 ± 0.9
Wide/Puckered (WP)	40	9.50 ± 1.12
Hypertrophic/Keloid (K)	30	8.67 ± 1.2
Total	300	
FL vs. WP	t 2.463	p <0.05
FL vs. K	3.610	<0.05
WP vs. K	0.926	>0.05

Table 4. Distribution of Cases and their Mean Scar Thickness by USG According to Hysteroscopic Findings

Uterine outline on hysteroscopy	No. of cases	Scar thickness on USG (mean \pm SD in mm)	't' test	P value
Regular	250	10.68 \pm 0.93	3.965	<0.05
Irregular	50	8.80 \pm 1.17		
Wide	90	9.44 \pm 1.17	3.262	<0.05
Linear	210	10.76 \pm 0.97		

upper endocervical canal), side (right, left, bilateral, small midline) and size by Surapaneni and Silberzweig.⁷

In comparison with hysterosalpingographic diagnosis of cesarean scar defect, Regnard et al detected a similar rate of cesarean section scar (57.5%) via saline contrast sonohysterography.⁹ Fabres et al suggested that the defect may be related to the suture material used, the suturing technique itself or a combination of both.¹⁰ It is presumed that the most ischemic technique and slowest reabsorbable suture would be the worst combination and thus most likely to produce a cesarean scar defect.¹⁰

In the study by Surapaneni and Silberzweig, out of 148 women with history of cesarean section and technically adequate hysterosalpingography, 89 (60%) were found to have anatomic defect.⁷ In a study by Ofili-Yebovi on USG lower segment, uterine scars were detected in 321/324 women with a history of previous cesarean section; 63 women had evidence of deficient cesarean scar.¹¹

CONCLUSION

If we want to avoid more and more encounters with impending dehiscence and uterine rupture following cesarean section, we have to be alert since the beginning of the story. We have to correct anemia before a lady gets pregnant and during her pregnancy. During labor, we should be alert for warning signs and should shift the patient in time. Nonabsorbable or slow absorbing sutures and very tight stitching (ischemic technique) should be avoided. Postoperative anemia and infections must be avoided.

The integrity of scar is affected by various factors like general condition of woman at the time of cesarean section, technique of stitching, type of suture material, preoperative, peroperative or postoperative infections as well. If the thickness of scar area is <10 mm on USG or depth of beak on hysteroscopy is >1 mm or if it looks wide and irregular on hysteroscopy, all are indicative of a weaker uterine scar.

This procedure can be done during the interval period and the patients accordingly counseled with regard to their chances of achieving their subsequent reproductive goals. Repeat elective cesarean section, then, is chiefly indicated in case of established weak/deficient scar found by above mentioned method and investigations as in disproportion and after a classical operation.

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