

## ORIGINAL ARTICLE

# Frequency and Clinical Manifestations of Caesarean Section Scar Defects

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## ABSTRACT

**Background:** Caesarean Sections (CS), significantly on the rise worldwide, have been found frequently complicated with the presence of a scar at the site of CS. It is associated with various gynecological problems like postmenstrual spotting, infertility, miscarriage, and uterine rupture. The objective of this study was to determine the frequency of CS scar defects and associated gynaecological symptoms.

**Methods:** This cross-sectional study was conducted at the Department of Obstetrics and Gynaecology, Ziauddin University Hospital Karachi from October 1st, 2017 to March 1st, 2018. A total of 162 patients' (aged 20-40 years) were included, with CS history (elective or emergency) and complaints of chronic pelvic pain, infertility or menstrual irregularities, after an informed consent. Demographic details and medical history were recorded on performa. Chi-square was used to establish association between categorical variable such presence of scar defect, clinical symptoms and the shape of the defect.

**Results:** Out of 162 patients, 86(53.1%) had one and 76(46.9%) had more than one caesarean scar. Majority of the patients 97(59.9%) were found to have scar defect (NICHE) present while in 65 (40.1%) patients had no caesarean scar defect. Regarding menstrual cycle, 58(35.8%) had heavy bleeding, 39(24.1%) continuous bleeding, and 27 (16%) irregular cycle. Significant association ( $p < 0.05$ ) was found between menstrual irregularity, pelvic pain, infertility and scar defects. Different shapes of scar (niche) were noted triangular 46(28.4%) droplet 26(16%), oval and others such as rectangular and inclusion cyst on ultrasonographic.

**Conclusion:** Multiple Caesarean sections are predisposing factors for Caesarean scar defects. Menstrual irregularity, pelvic pain, infertility and scar defects were found significantly associated with Caesarean sections ( $p < 0.05$ ).

**Keywords:** Caesarean Section; Gynaecology; Pelvic Pain.

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## INTRODUCTION

Caesarean Sections (CS) have apprehensions around the world regarding its associations with short and long-term maternal morbidity. The rate of CS has been steadily increasing in not only the developing countries but also in the developed world with highest in America and Europe<sup>1</sup>.

The long-term complications observed in future pregnancies of women with CS scar are scar rupture, dehiscence, and postoperative adhesions, placenta Previa or Accreta well as chances of caesarean section scar pregnancy<sup>2</sup>. In 1995 Morris first described the presence of scar defects on

transvaginal scan in women with previous CS and which other authors later confirmed. The reported prevalence starts from as low as 6.9% and goes up to as high as 69% depending upon the population strata, duration and type of the study and methodologies used<sup>3</sup>.

During the last several years, a number of articles have described a "Niche" as a fault may be observed through ultrasound at CS scar site. "A Niche is defined as a triangular anechoic structure at the site of scar or gap in the myometrium of the anterior lower uterine segment at the site of previous caesarean section"<sup>4,5</sup>.

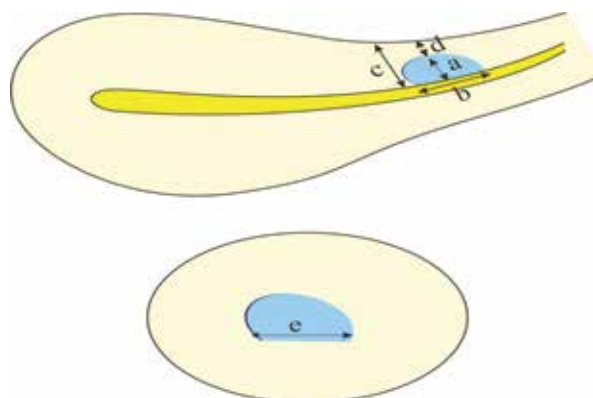
Transvaginal ultrasonography is a simple, economical, non-invasive method used to diagnose CS scar. It highly correlates 100% with hysteroscopy according to a study<sup>6</sup>. It has been seen that transvaginal ultrasound and MRI by using saline infusion are also good choices for the diagnosis of this defect. Methods such as hysteroscopy niche resection and laparoscopic repair in symptomatic women have been attempted in recent times to repair the scar defect or diverticula<sup>6,7</sup>. Our objective was to find out the relationship between the scar defects in patients having a history of past CS and frequency of various clinical features including menstrual problems, pelvic pain and secondary infertility.

### METHODS

This observational cross-sectional study was carried out at Ziauddin University and Hospitals (Department of Obstetrics and Gynaecology), from October 1st, 2017 to March 1st, 2018, after approval from the Ethics Review Committee (ERC) of Ziauddin University Hospital, Karachi. Total of 162 patients of age between 20-40 years were included in the study. All patients delivered previously by caesarean sections (elective or emergency) and presented with menstrual irregularities, chronic pelvic pain or unexplained infertility.

Patient with a history of any other gynaecological surgery on uterus other than caesarean section or any other uterine pathology for abnormal bleeding or refused to give consent were excluded from the study. All women included in the study were subjected to transvaginal ultrasound. The transvaginal examination was performed by the same ultrasonologist on all women. The women were asked to empty their bladder. The machine used was Toshiba NOME0 EMA0 MH ultrasound machine with Doppler unit and a transvaginal probe with a frequency 7.5MH. Examination of the uterus was done in the longitudinal plane to localize the uterine scar and scar defects. The status, shape, and position of the uterus were ascertained. The niche was measured at its detection. The apex of the defect and its distance from its base and the residual myometrium from the serosal surface of the uterus was measured vertically. The myometrium thickness adjacent to the scar will determine in depth and width. Figure 1 shows the scar site without a faults or niche of the myometrium in women.

Patients were divided into two groups, those with a deficient scar and those without a deficient scar. For their quantitative variables like age, parity, number of caesarean section mean and standard deviation were calculated. Chi-square was used to establish association between categorical variable such presence of scar defect, clinical symptoms and the shape of the defect. When p-value of  $\leq$



**Figure 1: Longitudinally, depth is a, b is width of isthmocele; thickness is c and residual thickness of the myometrium is d, transversally length of isthmocele is e<sup>8</sup>.**

### RESULTS

During the study period, a total 162 women were enrolled. The ages of the women were between twenty-four years and thirty-four years. In this study, 34 women were primipara (with history of one caesarean delivery), 106 were multiparas (P5) and 32 were grand multiparous (P5+). The prevalence of caesarean section scar defect was 59.9% in total. Out of 162 patients, 86(53.1%) women had one caesarean scar and 76(46.9%) had more than one caesarean scar.

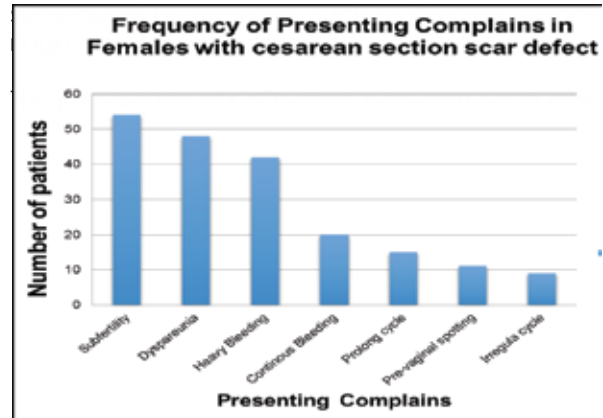
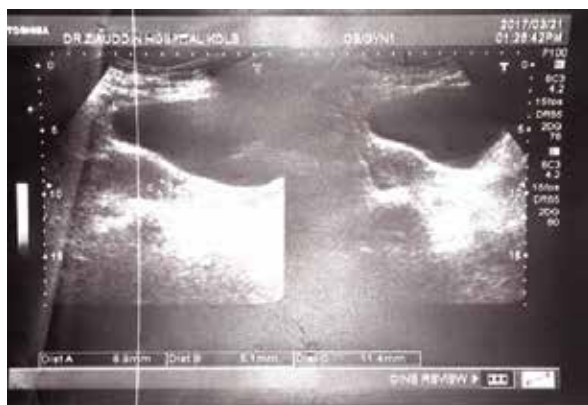
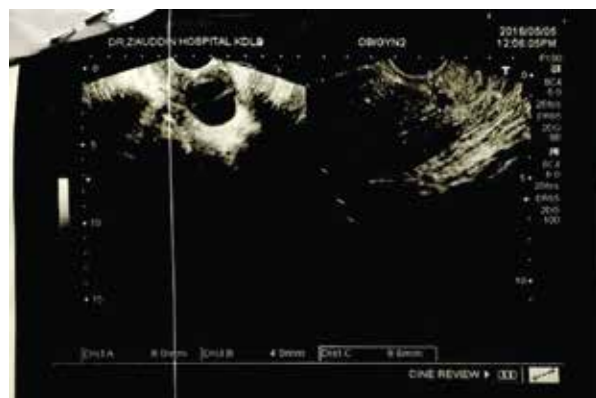
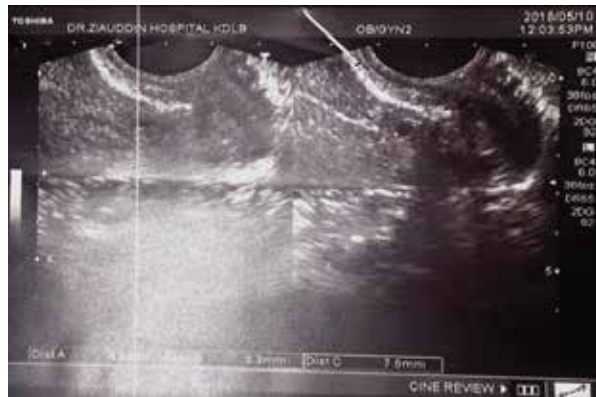
Majority of the patients 97(59.9%) were found to have scar defect (NICHE) present while in 65 (40.1%) patients had no caesarean scar defect. The significantly higher differences (75%) were noted in multiparous women (p value 0.001). Women more than one scar (74%) were observed statistically significant (p value 0.001) with scar defect (NICHE) present. The symptoms, which were found significant, were chronic pelvic pain (p value 0.053). Nearly 68% women who had scar defect were suffering from pelvic pain while in 70% sub-fertility were noted who had scar defect (p-value 0.009).

Women having caesarean scar (NICHE) defects came up with the different presenting complaints such as menstrual problems, sub-fertility, pelvic pain and dyspareunia. According to study data, different shapes of the niche were noted triangular 46(28.4%) Droplet 26(16%), oval and others such as rectangular and inclusion cyst on ultrasonographic examination (Figure 3). We have tabulated different characteristics of caesarean section scar defect in primipara, multipara and grand multipara Table 1.

**Table 1: Characteristics of Caesarean Section Scar Defect.**

Characteristics of Scar Defect		Primipara (N=34)	Multipara (N=106)	Grand Multipara (N=32)
Number of patients with scar defect		16	68	13
Shape of scar defect	Droplet	4	20	-----
	Triangular	10	37	5
	Oval	2	5	-----
	Others	--	6	8
Length of scar defect				

Out of 97 women were having Scar defect (NICHE), different presenting complains and characteristics were found as well. We had compared presence of NICHE with frequency of different presenting complains in Figure 2.

**Figure 2: Presence of caesarean section scar defect with different presenting complains.****Droplet shaped Scar Defect****Oval shaped Scar Defect****Triangular shaped Scar defect****Inclusion cyst****Figure 3: Ultrasonography Illustrations of Different shapes of caesarean section scar defects.**

### DISCUSSION

To the best of our knowledge, this is the first study on frequency and clinical manifestation of scar defects among patients with gynaecological complains in Pakistan. In general the frequency of caesarean delivery had increased leading to the increase in rare complications such as caesarean scar defects. The most common gynaecological complication associated with the scar defect was prolonged menstrual bleeding, postmenstrual spotting and other problems that might affect

pertaining to the study population included and the methodology used<sup>9,10</sup>. In a meta-analysis, the prevalence of CSD was found to be 56% and 84%<sup>11</sup>. Postmenstrual spotting (29 -34%), abnormal uterine bleeding (75-82%) and caesarean scar ectopic pregnancies (1:1800 – 1:2216) were found to be associated with CSD<sup>12</sup>. When there is a previous history of multiple CDs, there is a potential risk isthmocoele. Additionally isthmocoele was also found in advanced stage of labour and uterine retro flexion<sup>13,14</sup>. The age of patients in our study was

between 24 years and 34 years.

Majority of these patients had two or more CS. Another majority had at least one CS. As high as >50% had scar defect (NICHE). These patients were found to have fertility problems. They also complained of continuous heavy bleeding and dyspareunia. Irregular cycle was complained by almost a third of them. There was a significantly strong relationship between scar defect and size of uterus and prevalence of more than one scar.

Some authors reported the presence of a number of clinical manifestations with the presence of scar defect. In Taiwan Wang et al.<sup>15</sup> found that scar defect after multiple caesarean section is related to the high risk factor of retroflexed uterus. This is because of repeated trauma to the isthmic wall, which disturbs normal healing reducing the vascular perfusion<sup>3</sup>. It was found that chronic pelvic pain, postmenstrual spotting, dysmenorrhea etc. has a relationship to scar defects. Relationship was also found between size of the scar defect and position of uterus (i.e. anteverted or retroverted) and previous history of single and multiple CS.

Monteagudo et al.<sup>16</sup> evaluated the association of CSD and previous history of having one or more CSs. They found that frequency of CSDs was almost 60% while other authors reported in their studies they were from 0.3% to 19.4%<sup>14,17-21</sup>. In a Taiwanese study, the author found the prevalence of CSD 6.9% while Ofili-Yebovi<sup>14</sup> found it 19.4%. In contrast to these studies, we have in our study found the prevalence of CSD was higher in comparison to the published studies. We are of the view that a lot many cases of CSD remain unreported and undiagnosed and therefore the exact prevalence cannot be determined in a majority of cases.

It is reported that CSD is higher in patients with retroverted uterus than in anteverted uterus. Wang and team<sup>15</sup> found that depth of CSD is more in patients having retroverted uterus in comparison to anteverted uterus. Ofili-Yebovi et al.<sup>14</sup> did a study on CSD and found that uterine retroflexion is a risk factor for developing CSD. They are of the opinion that this happens because retroverted uterus generally exerts more pressure on lower uterine segment resulting in lower vascular perfusion. This reduces the healing capacity of such scars. In addition to that, multiple caesarean sections may interfere with tissue perfusion.

Another study<sup>22</sup> was conducted to ascertain CSD features in non-pregnant, premenopausal and patients with a history of earlier transverse lower-segment CS deliveries. It was found that almost 58% patients had a niche. Nevertheless, no relationship between prevalence of a niche and symptoms like pain or profuse bleeding was observed. It was observed by the researchers<sup>23</sup> that spotting and bleeding might be indications that a niche is being formed. The authors mentioned that the residual effect of menstrual blood may cause uterine scar.

Drouin et al.<sup>24</sup> did a systematic review of literature and found 24% CSDs cases in women having previous CS.

They are of the opinion that in such cases the scars were either asymptomatic or having the complaints of spotting, postmenstrual bleeding or even infertility. Higher frequency of CSD was associated with number of CS deliveries. However, CSD was not clearly associated with dysmenorrhea, pelvic pain or infertility by these authors, in contrast our study we found that there is an association.

Tower et al.<sup>22</sup> are of the opinion that the gynaecologic sequel and CSD after CS are being discussed only in recent years, previously this was never noted. The authors observed an association of multiple CS and isthmoceles. Based because of published data it can be said that prevalence of CSD increases with multiple CS deliveries. Among the predisposing factors, only the uterine incision closure technique is controllable. The CSD based endometrial abnormalities may cause abnormal bleeding, fragmented or congested overhanging endometrium, existence of endometrial tissue in the scar<sup>23</sup>. With an increase in caesarean section around the world, there is an increased incidence of CSD. The relevant segment of the population including gynaecologists as well as the women having a desire to produce children should be aware of this fact.

It is a general observation that young mothers willingly opt for caesarean section deliver for cosmetics reasons to avoid stitches in the abdomen. However, they remain totally ignorant about the damaging consequences of CS. We feel that a large-scale awareness campaign should be initiated to create awareness about the hazards of CS and educate the women about the pros and cons of normal deliver over CS. It has also been observed that some obstetricians encourage CS because they get higher monetary compensations. At this, place ethics play a very important role. Thus, we feel that ethical professional considerations should also be raised in this regard locally in Pakistan as well as in other countries around the world as well.

Limitations of this study include the lack of information about why the caesarean section was opted at all, was it done based on emergency or was it an elective surgery. Indications for caesarean section i.e. BMI of mother, stage of labour, co-morbid like DM was not noted. However, despite our limitations it is safe to say that multiple CS and uterine retro flexion are two of the major predisposing factors for CSDs.

## CONCLUSION

We conclude that obstetricians should weigh the consequences of caesarean delivery against the possible risks and damages caused to the delivering mother. Avoidance of CS unless it becomes mandatory should be exercised in all cases to prevent maternal and neonatal morbidity and mortality. We have found that patient counselling for opting normal delivery over CS would help them to avoid CSD.

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### CONFLICT OF INTEREST

There was no conflict of interest between the authors.

### ETHICS APPROVAL

The study approval was sought from Ziauddin University Ethical Review Committee.

### PAITENTS CONSENT

Verbal and written informed consent was obtained from all patients.

### AUTHORS CONTRIBUTION

OK conceived and designed the study, acquisition analysis and interpreted collected data, drafted the article and conducted the final revision. She was also responsible for data management and its analysis. AZ helped in writing this article and was accountable for the accuracy and integrity of this article. SS helped in collecting samples and bench work. HSA supervised and provided intellectual support for the conception and design of the study. She also revised the article critically for intellectual content.

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