International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Agrawal PA et al. Int J Reprod Contracept Obstet Gynecol. 2022 Nov;11(11):3165-3170
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: https://dx.doi.org/10.18203/2320-1770.ijrcog20222814

Original Research Article

Caesarean scar defect: a histopathological comparative study

Pooja A. Agrawal[1]*, Padmaja Y. Samant[2], Gwendolyn Fernandes[3]

[1]Department of Obstetrics and Gynaecology, Government Medical College and Hospital, Nagpur, Maharashtra, India
[2]Department of Obstetrics and Gynaecology, [3]Department of Pathology, Seth GS Medical College and King Edward Memorial Hospital, Mumbai, Maharashtra, India

Received: 16 September 2022
Revised: 10 October 2022
Accepted: 11 October 2022

***Correspondence:**
Dr. Pooja A. Agrawal,
E-mail: pooja.07.agrawal@gmail.com

ABSTRACT

Background: We have evaluated the validity of this syndrome in Indian patients and analysed the gynaecological indications for hysterectomy in women with history of caesarean sections. We have studied pathological changes in the scar area and compared the findings with matched cases without previous caesarean scar.
Methods: A prospective observational case control study was done at tertiary care hospital (Seth GS Medical College and King Edward Memorial Hospital) over two years (December 2018 to December 2020) with universal sampling and enrolled all consenting eligible patients. After hysterectomy histopathological study of the specimens was done. Total cases: 16 hysterectomy samples with history of previous caesarean section. Total controls: 40 hysterectomy samples with history of no previous caesarean section. The difference between the two proportions was analysed using Chi square or Fisher exact test. All analysis was 2 tailed and the significance level was set at 0.05.
Results: Women with history of previous caesarean scar had gynaecological symptoms related to the caesarean scar defect such as abnormal uterine bleeding, dysmenorrhea and chronic pelvic pain, post-menopausal bleeding and the most frequent clinical symptom related to the scar defect was abnormal uterine bleeding. The clinical symptoms were found to be associated with histopathological changes at scar site.
Conclusions: This study compared caesarean cases and no caesarean controls and sheds light on the role of histopathology in detection of caesarean scar site changes. It helped in comparison of various factors affected due to the presence of caesarean scar and its long-term complications, leading to hysterectomy.

Keywords: Caesarean scar, Histopathological, Cases, Controls, Hysterectomy

INTRODUCTION

An isthmocele, a caesarean scar defect or uterine niche, is an indentation, at the site of a previous caesarean section scar representing myometrial discontinuity or a triangular anechoic defect in the anterior uterine wall, with the base communicating to the uterine cavity.

Some authors classified the findings according to the size of the defect.[1] A large defect is described as a myometrial reduction of >50% of the wall thickness.

The suggested pathophysiology is due to a retraction of the scar tissue causing a dilation of the lumen or a pseudo cavity in the lower segment. Other possible mechanisms are the presence of a congested endometrial fold and small polyps in the scar recess, lymphocytic infiltration and distortion of the lower uterine segment could contribute to chronic pelvic pain and dyspareunia, focal adenomyosis confined to the scar could account for dysmenorrhea. There might also be interference with the drainage of menstrual blood justifying its intermittent discharge and so affecting fertility.

The prevalence of symptomatic or clinically relevant caesarean scar defects (CSDs) ranges from 19.4% to 88%. Possible risk factors for CSD include number of caesarean sections, uterine rotation, duration of labour before caesarean section, and surgical technique used to close the incision like location of hysterotomy, closure technique and patient factors.[2]

The CSD contributes to pathologic changes that may predispose the emergence of symptoms like menorrhagia, abnormal uterine bleeding (AUB), pelvic pain, dysmenorrhea, caesarean scar pregnancy and secondary infertility, post-menstrual spotting.[3,4]

The diagnosis can be clinical, histopathological and radiological (by transvaginal ultrasound, hysterosalpingography, hysteroscopy, sonohysterography, gel instillation sonography, MRI). Histopathological changes may be distortion and widening of the lower uterine segment, overhang of congested endometrium above the scar recess, polyp formation conforming to the contours of the scar recess, moderate to marked lymphocytic infiltration, residual suture material with foreign body giant cell reaction, capillary dilatation, free red blood cells in the endometrial stroma of the scar (suggesting recent hemorrhage), fragmentation and breakdown of the endometrium of the scar and adenomyosis confined to the scar.

Occurrence of niche may be prevented by using the correct surgical technique during caesarean. Currently, the treatment options include conservative medical treatment based on estrogen and progesterone therapy or surgical repair like laparoscopic excision, resectoscopic treatment by hysteroscopy, vaginal revision, endometrial ablation, laparotomy and hysterectomy.

METHODS

A prospective observational case control study was done at tertiary care hospital (Seth GS Medical College and King Edward Memorial Hospital) over two years (December 2018 to December 2020). We had done universal sampling and enrolled all consenting eligible patients. After hysterectomy histopathological study of the specimens was carried out.

Total cases: 16 hysterectomy samples with history of previous caesarean section were taken.

Total controls: 40 hysterectomy samples with history of no previous caesarean section were taken.

Selection of patients was done on the basis of inclusion criteria which were history of abdominal, laparoscopic or vaginal hysterectomy for any gynaecological indication. Malignant conditions, obstetric hysterectomies, trauma like perforation and cases of subtotal hysterectomy were excluded.

The data in the form of menstrual and obstetric history, complaints, investigations and treatment was recorded in case and control record form. The data was compiled, and analyzed using EPI info (version 7.2). The qualitative variables were expressed in terms of percentages. The quantitative variables were both categorized and expressed in terms of percentages or in terms of mean and standard deviations. The difference between the two proportions was analyzed using the Chi square or Fisher exact test. All analysis was 2 tailed and the significance level was set at 0.05.

RESULTS

Based on complaints

Among the cases 70% had heavy menstrual bleeding which was more compared to controls in which 52.5% had heavy menstrual bleeding.

Among the cases 80% had irregular menstrual cycles and among the controls 55% had irregular menstrual cycles.

For menorrhagia, among cases all patients took treatment, whereas among controls 42.86% patients took treatment.

Among the cases, 25% had painful menstrual cycles and among controls 15% had painful menstrual cycles.

Based on USG findings

The median size of uterus among cases was 410 cm^3 and among controls it was 144 cm^3 and this difference was statistically significant (Figure 1).

The mean endometrial thickness among cases was 6.95±3.73 mm and among controls was 3.83±2.00 mm and this difference was statistically significant.

Among the cases, 35% had 0 fibroids, 45% had less than 2 fibroids, 10% had 2 to 5 fibroids and 10% had more than 5 fibroids. Among the controls, 52.50% had 0 fibroids, 35% had less than 2 fibroids, 12.50% had 2 to 5 fibroids, 0% had more than 5 fibroids. The difference in the proportion among the two groups did not yield any statistical significance.

Among the cases, 10% had adenomyosis, 10% had cysts and 5% had polyps. Among the controls, 10% had adenomyosis, 15% had cyst and 5% had polyp. The difference between the proportions was not significant.

Based on indication of hysterectomy

AUB was the cause of hysterectomy in 80% cases versus 62.5% in controls.

Fibroids was the cause of hysterectomy in 65% cases versus 45% in controls.

Dysmenorrhoea was the cause of hysterectomy in 10% cases versus 5% in controls.

Prolapse was the cause of hysterectomy in 10% cases versus 27.5% in controls.

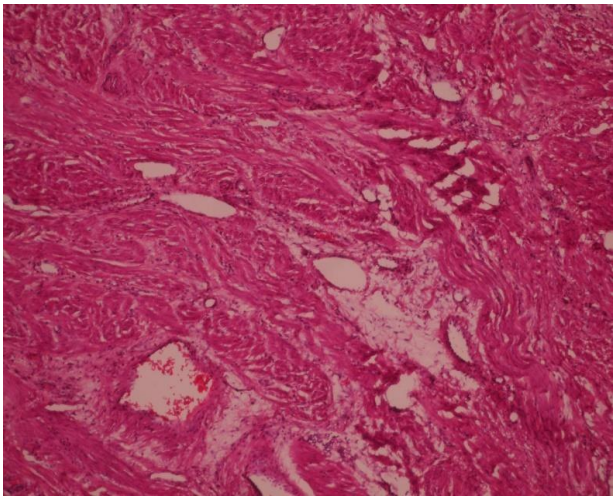

Figure 1: Dilated capillaries.

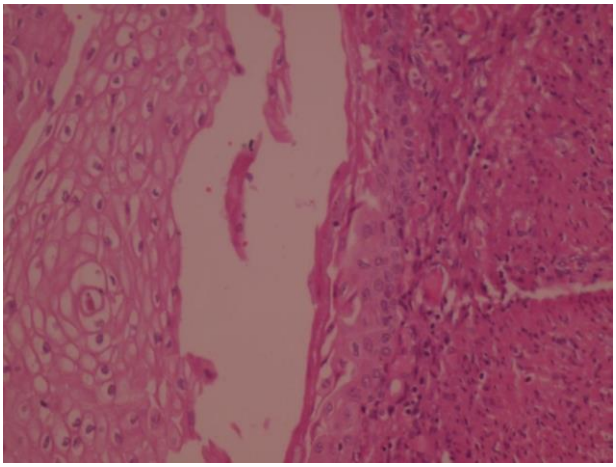

Figure 2: Lymphocytes seen around scar niche.

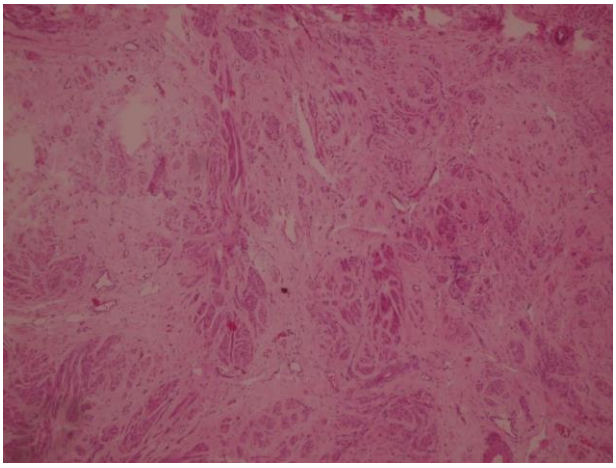

Figure 3: Disarray due to intervening fibrosis.

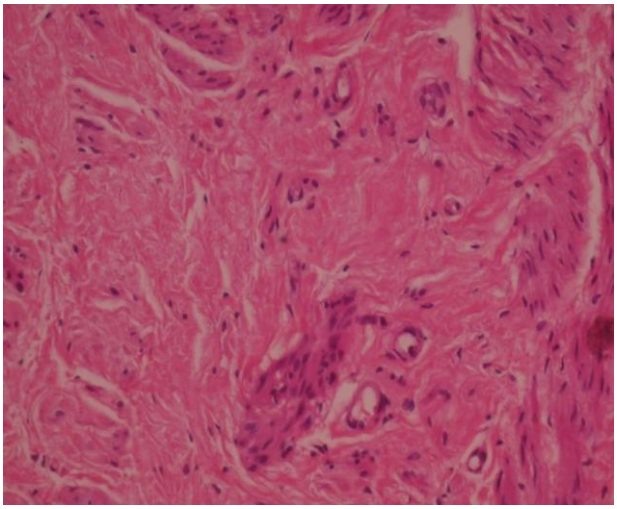

Figure 4: Entire field fibrosis with few preserved smooth muscle bundles.

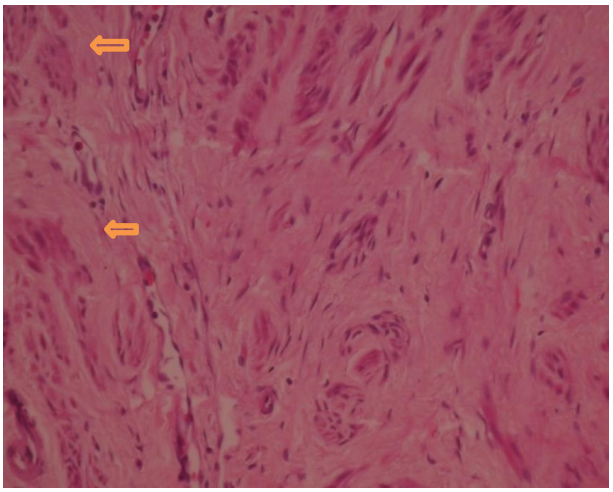

Figure 5: Extensive fibrosis causing disarray of smooth muscle bundles; few dilated capillaries also seen as shown by arrow head.

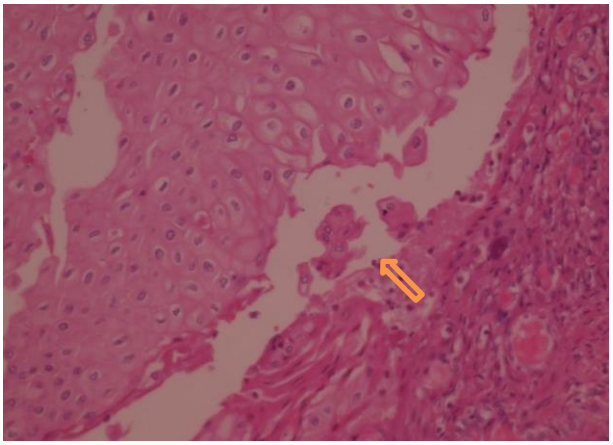

Figure 6: Scar niche with surrounding squamous metaplasia; few multinucleate giant cells seen in the niche as shown by arrow head.

Table 1: Demographic data.

Demographics	Cases	Controls
Mean age	43.8	47.8
Parity	Multiparous	Multiparous
Postmenopausal (%)	5	15
Mean interval between C section and changed menstrual pattern (years)	18.58±7.33	Not applicable
Anemia (%)	65	45

Ovarian cyst was the cause of hysterectomy in 0% cases versus 2.5% in controls.

Cyst adenocarcinoma was the cause of hysterectomy in 0% cases versus 2.5% in controls.

PMB was the cause of hysterectomy in 5% cases versus 0% in controls.

CPP was the cause of hysterectomy in 5% cases versus 2.5% in controls.

Based on histopathological findings

Based on gross pathological examination, the median size of uterus among cases was 425 cm^3 and among controls it was 112.50 cm^3 and this difference was statistically significant.

Among cases, 20% had atropic, 45% had proliferative and 35% had secretory endometrium. Among controls, 30% had atrophic, 42.50% had proliferative and 27.50% had secretory endometrium. The difference in the proportion among the two groups did not yield any statistical significance.

Associated morbidity of endometriod adenocarcinoma grade 2 was seen in one case, another case had associated steroid cell tumor NOS of left ovary.

On histopathological examination of scar site amongst cases (total 16) the following could be seen: congested vessels/ capillary wall dilatation, cases 4 (25%), controls 0 (0%) (Figure 2); lymphocytic infiltration/chronic inflammation, cases 6 (37.5%), controls (5%) (Figure 3); edema: cases 3 (18.75%), controls (2.5%); fibrosis/prominent scaring, cases 8 (50%), controls 0 (Figure 4-6); hyalinisation: cases 2 (16%), controls 0 (0%); disorganized muscle fibres/disarray of muscle fibres, cases 8 (50%), controls 5%; scar niche, case 1 (6.25%), controls 0 (0%); multinucleate giant cell reaction case 1 (6.25%), controls 0 (Figure 9); eosinophils: case 1 (6.25%), controls 0 (0%); macrophages: case 1 (6.25%), controls 0 (0%); no significant finding on histopathology: cases 5 (31.25%) and controls (90%).

Table 2: Comparative table.

Name of the author	Mean age at hysterectomy in cases (years)	Incidence of AUB in cases (%)	Incidence of CPP (%) in cases	Incidence of PMB (%) in cases	History of number of scars (%) in cases		
					1	2	3
Our study	43.80	80	5	5	55.0	45.0	0.0
Refaat et al[6]	46.95	75	50	38.6	31.8	22.7	45.4
Wang et al[9]	29.07						
Vaate et al[5]				33.6			

Table 3: Comparative table of various histopathological studies.

Findings	Our study (%)	Refaat et al[6] (%)	Morris et al[4] (%)	Roeder et al[11] (%)	Tanimura et al[12] (%)	Tohya et al[13] (%)
Congested vessels/capillary wall dilatation	25					
Disarray/Disorganisation of muscle fibres	50	52.3		100		100
Eosinophils	6.25					
Fibrosis/ prominent scaring	50					
Lymphocytic infiltration/chronic inflammation	37.5	54.5	65	50		
Suture material and multi nucleated giant cell	6.25		92			
Edema	18.75					

Continued.

Findings	Our study (%)	Refaat et al[6] (%)	Morris et al[4] (%)	Roeder et al[11] (%)	Tanimura et al[12] (%)	Tohya et al[13] (%)
Scar niche/defect	20					
Myometrial hyperplasia				14.3		
Elastosis				42.8(50)		
Congested endometrial fold		29.5	61			
Polyps in scar region		13.6	16			
Distortion of lower uterine segment		25	75			
Localized adenomyosis		40.9	28		27.2	
Hyalinization	12.5	61.3				
Breakdown of endometrium			37			
Free red blood cells			59			

DISCUSSION

The mean age of cases in our study was 43.80 years in cases and 47.80 years in controls. About 5% cases were post-menopausal whereas 95% cases were pre-menopausal, indicating that CS cases have earlier propensity to undergo hysterectomy as corrective method for their gynaecological complaints.

We noticed that AUB was found in 80% cases versus 62.5% in controls. Among the cases 80% had irregular menstrual cycles and among the controls 55% had irregular menstrual cycles. Among the cases 70% had heavy bleeding which was more compared to 52.25% in controls. Among cases all patients took treatment for menorrhagia, whereas among controls only 42.86% patients took treatment.

Number of caesarean sections done

According to Amanda et al and Refaat et al higher the number of CS the higher the prevalence of deficient scars.[2,6] This seemed logical because healing conditions were likely to be poorer in tissue where there was already a scar. They also established relation between clinical symptoms and number of CS. It was found that there was statistically significant increase of postmenstrual spotting, dyspareunia and chronic pelvic pain with increased number of previous CS. These results were in agreement with Osser et al, Alshiemy, Wang et al and Ofili-Yebovi et al.[7-10] However we could not establish any such relation.

Associated pathologies and indication for hysterectomy

The most common cause for hysterectomy was AUB. As regard to the associated pathology necessitating hysterectomy, most common was fibroid, which was similar to a study done by Reefat et al.[6]

Anemia and need for transfusions

There were no comparable western studies available. In India there was higher prevalence of anemia and majority patients presented only when body's compensatory mechanism failed.

Dysmenorrhoea

Vaate et al reported that the pain experienced during menstruation, was similar for women with and without a niche.[5] In our study dysmenorrhea was noted in 10% cases and 5% controls.

Duration since last caesarean section

In the current study the duration since the last CS, was ranged from 11 to 25 years with a mean of 18.58±7.33 years which was in accordance to the study done by Refaat et al.[6] According to that study the range was 2 to 22 years with a mean of 11.58±4.79 years in cases with CS without other associated pathologies and 14.50±3.56 years in cases with associated pathology like fibroid.

Effect of curettage

We noticed among controls, 62.50% had history of curettage and 37.50% had no history of curettage. This shows that curettage lead to an increased risk for hysterectomy even in absence of CS scar which may be due to areas of injuries due to curettage. These results were in agreement with the study of Osser et al.[7]

Size of uterus (based on USG and gross histopathology)

Our study concluded that subjects with caesarean scar had bulkier uterus due to more association with other pathologies like fibroids, adenomyosis.

Endometrial thickness

The endometrium of cases as compared to controls was found to be thicker.

Scar site was identified in 11 out of 16 cases. The probable reason for an imperceptible scar in 5 cases was good healing making differentiation of scar site from surrounding tissue difficult.

Microscopic histopathological finding

We found a significant increase in histopathological findings in cases as compared to controls.

Table 3 correlates various findings of our study with that of other authors. It also sheds light on the findings which are peculiar to each study.

Limitation

Radiological assessment of scar defect, details in terms of size (depth and size) and location (distance from cervix), were not done and hence its clinical implications and effect on histopathological findings could not be studied. As the world was facing COVID-19 pandemic, there was suspension of elective gynaecological operative procedures, thus restricting the number of available cases. The present study was conducted with a relatively small sample size and hence the findings cannot be generalised to the entire population.

CONCLUSION

In brief, the present study compared caesarean cases and no caesarean controls and sheds light on the role of histopathology in detection of caesarean scar site changes. It helped in comparison of various factors affected due to the presence of caesarean scar and its long-term complications. It also helped in understanding the pathogenesis of associated gynaecological morbidity leading to hysterectomy.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Tulandi T, Cohen A. Emerging manifestations of caesarean scar defect in reproductive-aged women. J Minim Invasive Gynecol. 2016;23(6):893-902.
2. Tower AM, Frishman GN. Caesarean scar defects: an underrecognized cause of abnormal uterine bleeding and other gynecologic complications. J Minim Invasive Gynecol. 2013;20(5):562-72.
3. Morris H. Surgical pathology of the lower uterine segment caesarean section scar: is the scar a source of clinical symptoms? Int J Gynecol Pathol. 1995;14(1):16-20.
4. Tower AM, Frishman GN. Caesarean scar defects: an under recognized cause of abnormal uterine bleeding and other gynecologic complications. J Minim Invasive Gynecol. 2013;20(5):562-72.
5. Vaate AJ, Voet LF, Naji O, Witmer M, Veersema S, Brölmann HA, et al. Prevalence, potential risk factors for development and symptoms related to the presence of uterine niches following caesarean section: systematic review. Ultrasound Obstet Gynecol. 2014;43(4):372-82.
6. Alsheemy RI, Eid SM, Karef AAE. Caesarean section niche assessment histopathologically after hysterectomy in symptomatic patients. Life Sci J. 2014;11(10):163-71.
7. Osser OV, Jokubkiene L, Valentin L. High prevalence of defects in caesarean section scars at transvaginal ultrasound examination. Ultrasound Obstet Gynecol. 2009;34(1):90-7.
8. Alshiemy RI. Correlation between caesarean section scar pattern and gynecological symptoms ain shams 17th annual international conference of obstetrics and gynaecology, Cairo, Egypt; 2013.
9. Wang CB, Chiu WW, Lee CY, Sun YL, Lin YH, Tseng CJ. Caesarean scar defect: correlation between caesarean section number, defect size, clinical symptoms and uterine position. Ultrasound Obstet Gynecol. 2009;34(1):85-9.
10. Ofili-Yebovi D, Ben-Nagi J, Sawyer E, Yazbek J, Lee C, Gonzalez J, et al. Deficient lower-segment caesarean section scars: prevalence and risk factors. Ultrasound Obstet Gynecol. 2008;31(1):72-7.
11. Roeder HA, Cramer SF, Leppert PC. A look at uterine wound healing through a histopathological study of uterine scars. J Reproduct Sci. 2012;19(5):463-473.
12. Tanimura S, Funamoto H, Hosono T, Shitano Y, Nakashima M, Ametani Y, et al. New diagnostic criteria and operative strategy for caesarean scar syndrome: Endoscopic repair for secondary infertility caused by caesarean scar defect. J Obstet Gynaecol Res. 2015;41:1363-9.
13. Tohya T, Imamura Y, Motooka C, Kuwahara S, Matsuo Y. Cesarean scar syndrome: diagnostic imaging and histopathological findings from two women who underwent hysterectomy. Ann Clin Case Rep. 2016;1:1117.

Cite this article as: Agrawal PA, Samant PY, Fernandes G. Caesarean scar defect: a histopathological comparative study. Int J Reprod Contracept Obstet Gynecol 2022;11:3165-70.