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Original Research Article

# Associated Risk Factors for Developing Post-Caesarean Section Scar Defects: a Prospective Study

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**Abstract:**

**Objective:** To find out assoiated risk factor for development of post casesarean scar defect.

**Methods:** This was hospital based prospective study conducted in the Department of Obstetrics & Gynaecology, at DMCH Laheriasarai, Darbhanga. 100 women were recruited either before caesarean delivery in case of elective surgery or within 3 days after the operation in case of emergency caesarean delivery. Women age more than 18 yrs, post caesarean section and giving consent were included in the study. All data were analyzed by Epi-info software.

**Results:** Mean age of women who had niche was 27.84 ± 51 yrs and those without niche was 26.55 ± 2.72 yrs ($p=0.04$) i.e. increasing age was associated with increased chance of development of niche, while gestational age was not associated with niche formation. GDM ($p=0.04$) and higher birth weight ($p<0.01$) is associated with niche formation while emergency LSCS,induction of labour, PROM, multiple pregnancy was not associated risk factors in our study. Increasing number of previous LSCS were significantly ($p<0.001$) associated with niche formation.

**Conclusion**: History of previous caesarean delivery was main independent risk factor for niche formation. Other risk factors identified were GDM, before caesarean delivery, increasing age of mother and high birth weight of baby.

**Keywords:** Risk Factor, Caesarean, Niche Formation.



## Introduction

Cesarean section is by far the commonest major operation worldwide. [1] Every year, millions of women undergo this operation. Cesarean delivery is potentially a life-saving procedure for both mother and newborn when some complications come up during pregnancy or labor. [1] The cesarean scar defect (CSD), which is only present after a CS, is defined as myometrial discontinuity at the CS scar site with a sonographically visible indentation in the myometrium of at least 2 mm (also called a "niche" by many researchers). [2] CSD is associated with abnormal uterine bleeding (75%-82%), postmenstrual spotting (29%-34%), cesarean scar ectopic pregnancies (1: 1800-1: 2216) and infertility (32/92). [3,4] Uterine dehiscence, uterine rupture, cesar- ean scar pregnancy, and morbidly adherent placenta are also asso- ciated with CSD. [5,6]

A history of multiple caesarean delivery is generally considered to be major potential risk factor for caesarean scar defect. Additionally, advanced stage of labor and uterine retroflexion have also been associated with it.[7] The present work was aimed at studying the risk factors of isthmocele prospectively in an unselected population. Identifying the risk factors of isthmocele would be helpful in developing preventive strategies for reducing these risks, thus overcoming possible adverse outcomes.

## Material & Methods

This prospective observational study was conducted on 100 women who were delivered by caesarean delivery in the Department of Obstetrics and Gynecology, at Darbhanga medical college and Hospital Laheriasarai, Darbhanga. They were recruited either before caesarean delivery in case of elective surgery or with in 3 days after the operation in case of emergency caesarean delivery. Women age more than 18 yrs, Post caesarean section and giving consent were include in the study

All participants give written informed consent before enrollment. Exclusion criteria were applied. Detailed history, relevant investigations, general examination, details of labor, indication for caesarean section and stage of labor when caesarean sec-

tion was done were noted in the proforma. Current contraceptive use, menstrual cycle status, possible amenorrhea or breastfeeding and BMI were recorded. Six weeks after the caesarean delivery participants were called for follow up and ultrasound examination. Transvaginal ultrasonography was performed by USGmachine ALOKA PROSOUND α6. Women not using contraception were examined in follicular phase of menstrual cycle to avoid an eventual early pregnancy. Otherwise, random phase of menstruation is acceptable. Women who were found pregnant at the time of examination were excluded. Data so collected was compiled statistical analysis was done. The data were presented as means + standard deviation. For categorical data chi-square test or fisher exact test was used. For comparison of mean data between two groups unpaired 't' test or Mann Whitney U test was used. p-value less than 0.05 was taken as significant.

**Observations**

The mean age in study group was 27.13± 3.15 yrs. 86 (86.00%) were Hindus and 14 (14.00%) were Muslims. 30 (30.00%) women from rural area and 70 (70.00%) belongedto urban area.

**Table 1: Association of Age of Subjects and Gestational AgeWith Development of Niche After LSCS (n = 100*)***

| | Niche Absent(n = 55) | Niche Present(n = 45) | p-value |
|---|---|---|---|
| Age (in yrs) | 26.55 ± 2.72 | 27.84 ± 3.51 | 0.04 |
| Gestational Age (in wks) | 38.17 ± 1.78 | 38.13 ± 2.56 | 0.39 |

The table shows that mean age of women who had Niche was 27.84 ± 51 year and those women without Niche was 26.55 ± 2.72 year (p-value =0.04). p-value was significant so it represents that increasing age is associated with niche formation.

**Table 2: Association of Different Risk Factors With Development of Niche**

| Risk Factors | Niche Absent (n = 55) | Niche Present (n = 45) | p-value |
|---|---|---|---|
| GDM (n=10) | 2 (3.60%) | 8 (17.80%) | 0.04 |
| Emergency LSCS (n=30) | 16 (29.10%) | 14 (31.10%) | 0.82 |
| Induction of Labour (n=22) | 14 (25.50%) | 8 (17.80%) | 0.35 |
| PROM (n=17) | 10 (18.20%) | 7 (15.60%) | 0.72 |
| Multiple Pregnancy (n=2) | 0 (0.00%) | 2 (4.40%) | 0.20 |
| Birth Weight (in kgs) | 2.63 ± 0.44 | 2.86 ± 0.48 | <0.01 |
| Mean ± SD BMI (in kg/$m^2$) | 23.21 ± 1.67 | 25.09 ± 3.24 | <0.01 |

Women with GDM were more likely to develop an isthmocele. As total incidence of GDM in our study group was 10. Among 10, 8 cases (17.80%) were associated with Niche formation which was statistically significant (p= 0.04). The birth weight was difference in both groups was found statistically significant.(p-value<0.001)

**Table 4: Association of Number of LSCS With Development of Niche**

| Number of LSCS | Niche Absent ( n=55) | | Niche Present (n=45) | |
|---|---|---|---|---|
| | No. | % | No. | % |
| 1 (n=46) | 37 | 80.50 | 9 | 19.50 |
| 2 (n=41) | 17 | 41.47 | 24 | 58.53 |
| 3 (n=11) | 1 | 9.10 | 10 | 90.90 |
| 4 (n=2) | 0 | 0.0 | 2 | 100.00 |
| Total (n=100) | 55 | 55.00 | 45 | 45.00 |
| Mean ± SD | 1.35 ± 0.52 | | 2.11 ± 0.77 | |

The number of LSCS is significantly associated with increase in Niche formation. In our study in case of 1st LSCS prevalence of Niche formation was 19.5.00%, 24 (58.58%) in 2nd LSCS, 10 (90.90%) in 3rd LSCS and 2 (100.00%) in 4th LSCS. After 2nd LSCS 58.33% developed niche while 90.00% developed after 3rd, 100.00% developed after 4thLSCS.

Mean number of LSCS in case of Niche was 2.11 ± 0.77. p- value <0.001 which was statistically significant.

**Table 5: Distribution of Subjects According to Position of Uterus in TVS Findings**

| Position of Uterus | Niche Absent | | Niche Present | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Anteverted (n=68) | 43 | 78.20 | 25 | 55.60 |
| Retroverted (n=32) | 12 | 21.80 | 20 | 44.40 |
| Total (n=100) | 55 | 100.00 | 45 | 100.00 |

p = 0.01

The table shows out of 100 cases, 68 (68.00%) cases showed anteverted uterus in TVS, among these 25 (55.60%) had presence of niche while 43 (78.20%) showed absence of niche. Among 100 cases, 32 (32.00%) cases were retroverted, among these 20 (44.40%) showed presence of niche and 12 (21.80%) had absence of niche.

## Discussion

In our study mean age of women who had Niche was 27.84 ± 51 year and those women without Niche was26.55 ± 2.72year (p-value =0.04). p-value was significant so it represents that increasing age is associated with niche formation. Vikhareva Osser O et al (2010) also found that increasing age of women was associated with increase prevalence of niche formation [8]. Mean Gestational age in presence and absence of Niche was 38.17 ± 1.78 and 38.13 ± 2.56 respectively (p-value=0.39) which was not significant. So gestational age was not associated with Niche formation. Similar results were also found by Yazicioglu F et al (2006) [9], Ofili-Yebovi D et al (2008) [10]. Women with GDM were more likely to develop an isthmocele. As total incidence of GDM in our study groupwas 10. Among 10, 8 cases (17.80%) were associated with Niche formation which was statistically significant (p= 0.04). The birth weight was difference in both groups was found statistically significant.(p-value<0.001) healing in general are not surprising. GDM is known to worsen the complex pathway of wound healing (Guo S et al,2010) [11], chronic low-grade inflammation, hyperglycemia and insulin-resistance are the suggested mechanisms (Baltzis D et al, 2014 [12]; Pantham P et al, 2015 [13]). In India, there is an inclusive and complementary population wide maternity healthcare system. Clear indications for glucose tolerance testing during pregnancy ensure that the majority of cases of GDM are diagnosed. Consequently, the incidence of GDM was high (10%) in the study cohort, which is not surprising, as GDM increases the risk of delivering by CD. The incidence of GDM in north India was 13.9% in 2019. [14] Antila-Langsjo RM et al (2018) also found significant association between GDM and niche. [15] The proportion of emergency caesarean delivery was 14 (31.10%) and 16 (29.10%) respectively in presence and absence of Niche. However, there was no significant difference in the presence of isthmocele between the groups of elective and emergency caesarean delivery (p- value=0.82). Our study shows Emergency LSCS is not an associated risk factor for niche formation. Similar results were also found in many other studies in different parts of world. Park I et al (2018) [16] and Antila-Langsjo RM et al (2018) [15] also found that emergency LSCS is not associated with niche formation. PROM was not a risk factor for niche formation in our study (p=0.72). Similar results were found in the study of Antila- Langsjo RM et al (2018)15 but Park I et al (2018) [16] found that PROM is significantly associated with niche formation. Induction of labour was not associated with niche formation in our study (p=0.35). Multiple pregnancies was not associated with niche formation in our study (p=0.20). Similar results were also found in Antila-Langsjo RM et al (2018) [15] also found that multiple pregnancies are not associated with niche formation. Mean Birth weight of baby was 2.86 ± 0.48 kg and 2.63 ± 0.44 kg among group of presence and absence of Niche respectively and p-value is < 0.01 which was statistically significant. It represent higher birth weight was associated with more chances of development of Niche.

The number of LSCS is significantly associated with increase in Niche formation. In our study in case of 1st LSCS prevalence of Niche formation was 19.5.00%, 24 (58.58%) in 2nd LSCS, 10 (90.90%) in 3rd LSCS and 2 (100.00%) in 4th LSCS. After 2nd LSCS 58.33% developed niche while 90.00% developed after 3rd, 100.00% developed after 4thLSCS. Mean number of LSCS in case of Niche was 2.11 ± 0.77. p- value <0.001 which was statistically significant.

A relationship between multiple CDs and niche formation has been reported in previous studies. Ofili-Yebovi D et al (2008)[10] and Antila-Langsjo RM et al (2018)[15] also found similar results. A preexisting CD scar has been shown to negatively influence the healing of a new ceasarean uterine incision. The result from our study support these data. The risk for niche increased considerably with the number of previously performed LSCS.

The proposed pathophysiology is that repeated trauma to the isthmic wall disrupts the normal healing process. Additionally, vascular perfusion may be reduced in scar tissue.

## Conclusion

History of previous caesarean delivery was main independent risk factor for niche formation. Other risk factors identified were GDM, before caesarean delivery, increasing age of mother and high birth weight of baby.

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