International Journal of Chemical and Biochemical Sciences
(ISSN 2226-9614)

Journal Home page: www.iscientific.org/Journal.html

Cesarean scar defect, prevalence and impact on patient's quality of life

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Abstract

The increase in caesarean sections (CS) has resulted in an increase in women with a uterine niche. The exact aetiology of niche development has yet to be elucidated but is likely multifactorial. This study aimed to give a systematic overview of the available literature on histopathological features, risk factors and results of preventive strategies on niche development to gain more insight into the underlying mechanisms. Based on current published data histopathological findings associated with niche development were necrosis, fibrosis, inflammation, adenomyosis and insufficient approximation. Patient-related risk factors included multiple CS, BMI and smoking. Labour-related factors were CS before onset of labour, extended cervical dilatation, premature rupture of membranes and presenting part of the fetus at CS below the pelvic inlet. Preventive strategies should focus on the optimal level of incision, training of surgeons and full-thickness closure of the myometrium (single or double-layer) using non-locking sutures. Conflicting data exist concerning the effect of endometrial inclusion. Future studies without heterogeneity in population, using standardized performance of the CS after proper training and using standardized niche evaluation with a relevant core outcome set are required to allow meta-analyses and to develop evidence-based preventive strategies. These studies are needed to reduce the prevalence of niches and prevent complications in subsequent pregnancies such as caesarean scar pregnancies.

Keywords: Niche, defect, caesarean section.

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1. Introduction

Caesarean section (CS) is a critical life- saving operation for both mother and child, and its use has increased dramatically over the last decade [1]. Caesarean section rates continue to rise, particularly in middle- and high-income countries without evidence for maternal and perinatal benefits from the increase. According to data from 150 countries, the worldwide CS rate increased from 7% in 1990 to 19% in 2014. Latin America and the Caribbean region reported the highest CS rate, 42%, followed by North America, 32%, Oceania, 31%, Europe, 25%, Asia, 19%, and Africa, 7**%** [2]**.** Mirroring global trends, CS rates in Egypt have steadily increased, reaching 52% of all deliveries according to the most recent 2014 Egypt Demographic and Health Survey (EDHS) and representing more than a 100% increase in the CS rate since 2005 [2]. Understanding the risks and benefits of a cesarean section will allow a clinician to counsel a pregnant patient appropriately. Having a clear understanding of evidence-based medicine will enable clinicians to provide the best care and best possible outcomes. Patients sometimes request a cesarean delivery without other indications, and clinicians should be equipped to provide the significant education needed in these cases to ensure the patient is making an informed decision.

There is growing pressure to decrease cesarean section rates, so a proper understanding of the indications will assist clinicians in decision-making [3]**.** Uterine niche is an iatrogenic pouch-like defect at the site of previous Caesarean scar due to defective tissue healing. Other terms used are uterine niche, Caesarean Scar defect, uterine dehiscence and diverticulum. The niche defined radiologically as a triangular, hypoechoic or anechoic area at scar site [4]. It has also been described as indentations at least 2 mm deep in the myometrium. There is recent surge in the literature including reviews addressing various aspects of niche [5]. Uterine niche occurs in up to 70% women with previous Cesarean Section of whom 30% are symptomatic. Reported prevalence varies 24–70% with transvaginal sonography (TVS) and 56–84% with gel/saline instillation sonohysterography (SIS). This may be an underestimation because many women are asymptomatic and because clinicians may not recognize niche as a cause of symptoms due to unawareness. Prevalence of 45.6% was reported in a prospective observational study (n = 371) where sonohysterography was done six months post-Cesarean. Prevalence increases with increasing number of previous Cesareans [6].

1.1. Gynecological Symptoms induced by CS niche

- Asymptomatic in most of the cases
- Symptoms, which include:

1. Abnormal uterine bleeding (63.8%)

2. Pelvic pain (39.6%)
3. Dyspareunia (18.3%)
4. Dysmenorrhea (53.1%)
5. Infertility
6. Scar ectopic pregnancy

The clinical significance of scar niche is most often benign, as its presence has been implicated as an under recognized cause of abnormal uterine bleeding and chronic pelvic pain, a common gynecologic complaint, in premenopausal women. Therefore, awareness of the presence of uterine niche may help referring clinicians with diagnostic information that can elucidate the cause of abnormal uterine bleeding or chronic pelvic pain in fertile patients, as both complaints are often associated with functional disorders of the menstrual cycle or intrauterine abnormalities. Moreover, recent findings have demonstrated a clear association between the presence of niche and secondary infertility that surgical treatment of Cesarean Scar Defect may be able to restore fertility and resolve symptoms [7]. Different modalities, from hysterography to ultrasonographic evaluation, have been used assess the integrity of the anterior uterine wall.

1.2. Long-Term Complications Of Caesarean Scar niche

- ***Non-pregnant***

Symptoms related to niche may affect QOL, abstinence from work. As well as a potentially higher risk of complications and difficulties during gynecologic procedures: such as uterine evacuation, hysterectomy, endometrial ablation, and insertion of an intrauterine device. Though most women may remain asymptomatic, post-cesarean niche has been linked to following symptoms:

a) Post-menstrual Spotting

It defined as ≥ 2 days of intermenstrual spotting, or ≥2 days of brownish discharge after the end of menstruation if bleeding duration exceeds 7 days (discharge considered normal if bleeding duration is < 7 days). Since not yet specified, it may be described as AUB-N as per FIGO-PALMCOEIN nomenclature of abnormal uterine bleeding (AUB) [8]. This is the most predominant symptom seen in 30–55% women at 6–12 months post-Cesarean due to collected menstrual blood. The anterior edge of niche obstructs flow of menstrual blood, besides, poor contractility of surrounding fibrosed muscle retains it, which is then discharged gradually [9]. When observed prospectively after 1 year of Cesarean, post-menstrual spotting was found in 20% women with niche compared to 8.3% women without niche, with 3.34 OR for large defects [6].

b) Intermittent Spotting

In situ blood formation in the niche, evidenced by free erythrocytes in scar, leads to intermenstrual spotting.

c) Midcycle Intrauterine Fluid Accumulation

It may be due to excess mucus formation by retained blood in approximately 45% women [10].

d) Pain

Women with niche may present with dysmenorrhea (40–50%), chronic pelvic pain (35%), dyspareunia (18%) or suprapubic pain [11]. The etiology of niche related postmenstrual spotting and pain has not fully elucidated. They are thought to be caused by retention of menstrual blood in a niche, which is intermittently expelled after the majority of the menstruation has ceased [12]. Blood can also accumulate, if fibrotic tissue in the myometrium at the site of the Cesarean scar may impair normal contractions and as a consequence the drainage of menstrual flow [13]. Additionally, newly formed fragile vessels in the niche may also attribute to the accumulation of blood or fluid in the niche or uterine cavity due to a constant low production of in situ leakage of blood and fluid. This supported by the presence of free blood cells in the endometrial stroma, suggesting recent haemorrhage and hysteroscopic evaluations where small vessels in the majority of patients are seen [14].

e) Cesarean Scar Ectopic Pregnancy

Pregnancy may implant in the niche with risk of rupture [15].

f) Secondary Infertility

Probable mechanisms might be chronic inflammation by residual blood or peri-ovulatory fluid accumulation interfering with sperm penetration, fertilization and implantation. A large niche may interfere with conception similar to hydrosalpinx [16].

g) Problems in IVF

Difficult embryo transfer encountered in 20% women with niche undergoing IVF, due to a distorted anatomy, especially in a retroflexed uterus. In addition, chances of unsuccessful IVF are higher in presence of uterine niche [17]**.**

h) Bladder Dysfunction

Local accumulation of fluid and scarring were postulated to cause dysfunction due to proximity of niche to the bladder; however, prospective studies did not support this [18].

i) Obstetric Complications in Future Pregnancy

There is increased risk of scar ectopic, placenta accreta, scar dehiscence and uterine rupture [19].

j) Scar Abscess

Though rare, it has reported even up to 6 years after Cesarean, due to residual blood and mucus that is infected.

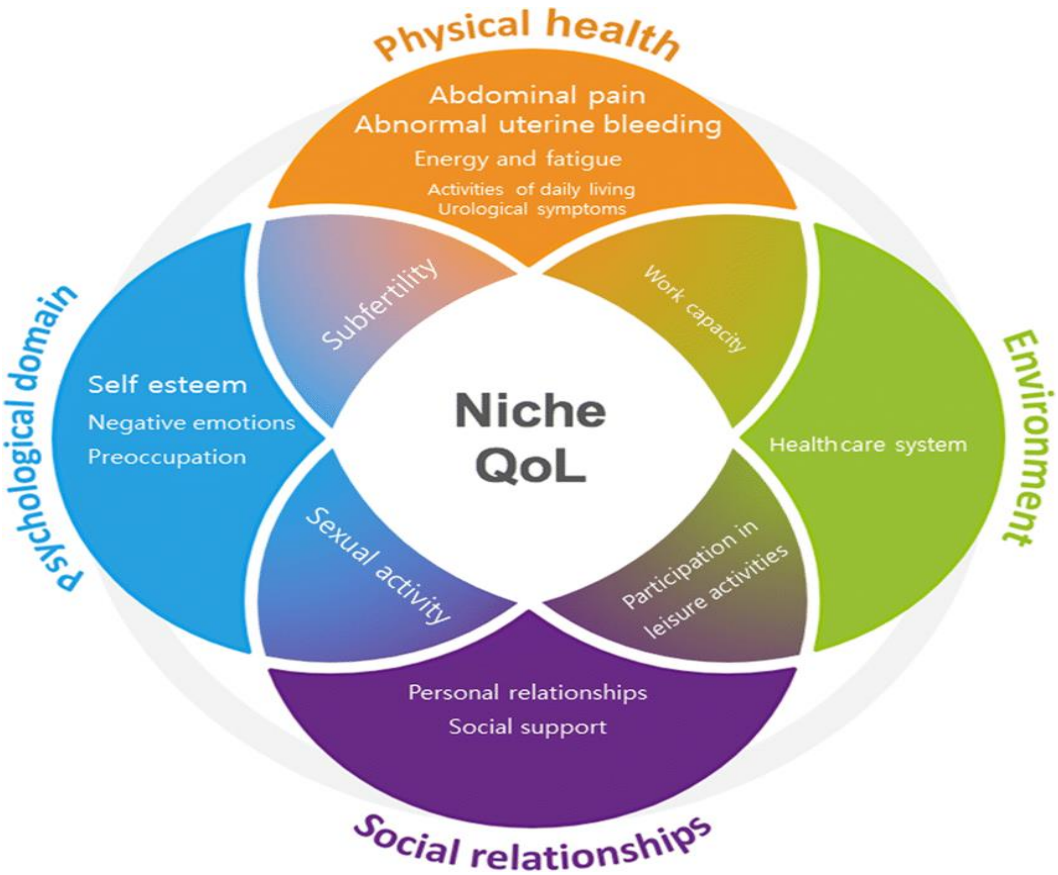

Figure (1): Connection of domains and themes reported by niche patients. Size indicates relevance of the theme for Quality of Life, with larger themes being reported more frequently prioritized in the focus groups [19]

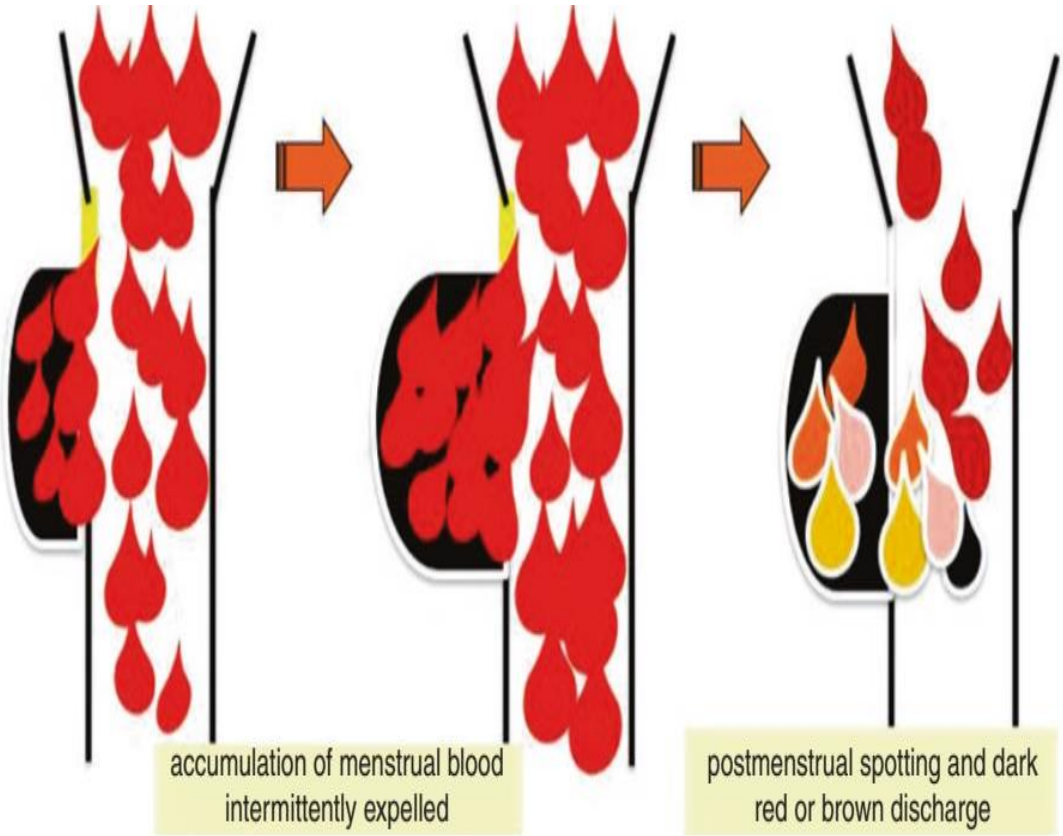

Figure (2): Persistence and accumulation of menstrual blood in niche [20]

References

[1] A.P. Betrán, J. Ye, A.-B. Moller, J. Zhang, A.M. Gülmezoglu, M.R. Torloni. (2016). The increasing trend in caesarean section rates: global, regional and national estimates: 1990-2014. PLoS One. 11(2): e0148343.

[2] A.P. Betran, J. Ye, A.B. Moller, J. Zhang, A.M. Gulmezoglu, M.R. Torloni. (2016). The Increasing Trend in Caesarean Section Rates: Global, Regional and National Estimates: 1990-2014. PLoS One. 11(2): e0148343.

[3] S. Sung, H. Mahdy. (2021). Cesarean section. StatPearls [Internet].

[4] A.J.M. Bij De Vaate, H.A.M. Brölmann, L.F. Van Der Voet, J.W. Van Der Slikke, S. Veersema, J.A.F. Huirne. (2011). Ultrasound evaluation of the Cesarean scar: Relation between a niche and postmenstrual spotting. Ultrasound in Obstetrics and Gynecology. 37(1): 93-99.

[5] T.G. Kremer, I.B. Ghiorzi, R.P. Dibi. (2019). Isthmocele: An overview of diagnosis and treatment. Revista da Associacao Medica Brasileira. 65(5): 714-721.

[6] R. Antila-Långsjö, J.U. Mäenpää, H. Huhtala, E. Tomás, S. Staff. (2018). Comparison of transvaginal ultrasound and saline contrast sonohysterography in evaluation of cesarean scar defect: a prospective cohort study. Acta Obstetricia et Gynecologica Scandinavica. 97(9): 1130-1136.

[7] A. Torre, E. Verspyck, S. Hamamah, I. Thomassin, J. Thornton, A. Fauconnier, P. Crochet. (2021). Cesarean scare niche: Definition, diagnosis, risk factors, prevention, symptoms, adverse effects, and treatments. Gynecologie Obstetrique Fertilite et Senologie. 49(11): 858-868.

[8] L.F. Van Der Voet, A.M. Bij De Vaate, S. Veersema, H.A.M. Brölmann, J.A.F. Huirne. (2014). Long-term complications of caesarean section. the niche in the scar: A prospective cohort study on niche prevalence and its relation to abnormal uterine bleeding. BJOG: An International Journal of Obstetrics and Gynaecology. 121(2): 236-244.

[9] A.J.M.W. Vervoort, J. Vissers, W.J.K. Hehenkamp, H.A.M. Brölmann, J.A.F. Huirne. (2018). The effect of laparoscopic resection of large niches in the uterine caesarean scar on symptoms, ultrasound findings and quality of life: a prospective cohort study. BJOG: An International Journal of Obstetrics and Gynaecology. 125(3): 317-325.

[10] V. Kulshrestha, N. Agarwal, G. Kachhawa. (2020). Post-caesarean Niche (Isthmocele) in Uterine Scar: An Update. Journal of Obstetrics and Gynecology of India. 70(6): 440-446.

[11] A.J.M. Bij De Vaate, L.F. Van Der Voet, O. Naji, M. Witmer, S. Veersema, H.A.M. Brölmann, T. Bourne, J.A.F. Huirne. (2014). Prevalence, potential risk factors for development and symptoms related to the presence of uterine niches following Cesarean section: Systematic review. Ultrasound in Obstetrics and Gynecology. 43(4): 372-382.

[12] J. Sandall, R.M. Tribe, L. Avery, G. Mola, G.H.A. Visser, C.S.E. Homer, D. Gibbons, N.M. Kelly, H.P. Kennedy, H. Kidanto, P. Taylor, M. Temmerman. (2018). Short-term and long-term effects of caesarean section on the health of women and children. The Lancet. 392(10155): 1349-1357.

[13] A. Setubal, J. Alves, F. Osorio, A. Guerra, R. Fernandes, J. Albornoz, Z. Sidiroupoulou. (2018). Treatment for Uterine Isthmocele, A Pouchlike Defect at the Site of a Cesarean Section Scar. J Minim Invasive Gynecol. 25(1): 38-46.

[14] P. Iannone, G. Nencini, G. Bonaccorsi, R. Martinello, G. Pontrelli, M. Scioscia, L. Nappi, P. Greco, G. Scutiero. (2019). Isthmocele: From Risk Factors to Management. Revista Brasileira de Ginecologia e Obstetricia. 41(1): 44-52.

[15] A. Wozniak, K. Pyra, H.R. Tinto, S. Wozniak. (2018). Ultrasonographic criteria of cesarean scar defect evaluation. J Ultrason. 18(73): 162-165.

[16] I. Hsu, L. Hsu, S. Dorjee, C.C. Hsu. (2022). Bacterial colonization at caesarean section defects in women of secondary infertility: an observational study. BMC Pregnancy and Childbirth. 22(1).

[17] J. Vissers, W. Hehenkamp, C.B. Lambalk, J.A. Huirne. (2020). Post-Caesarean section niche-related impaired fertility: Hypothetical mechanisms. Human Reproduction. 35(7): 1484-1494.

[18] A.D. Nguyen, H.T.T. Nguyen, G.T.T. Duong, T.T.H. Phan, D.T. Do, D.A. Tran, T.K. Nguyen, T.B. Nguyen, Y. Ville. (2022). Improvement of symptoms after hysteroscopic isthmoplasty in women with abnormal uterine bleeding and expected pregnancy: A prospective study. Journal of Gynecology Obstetrics and Human Reproduction. 51(3).

[19] S.I. Stegwee, A. Beij, R.A. de Leeuw, L.B. Mokkink, L.F. van der Voet, J.A.F. Huirne. (2020). Niche-related outcomes after caesarean section and quality of life: a focus group study and review of literature. Quality of Life Research. 29(4): 1013-1025.

[20] M. Franchini, P. Casadio, P. Florio, G. Gubbini, Isthmocele. In *Atlas of Hysteroscopy*, Springer: 2020; pp 89-94.