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Case Report

Surgical management of uterine niche in a patient with secondary infertility and successful pregnancy outcome

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ABSTRACT

Uterine niche or caesarean scar defect is a known cause of secondary infertility and implantation failure. Surgical repair can restore uterine anatomy and improve fertility outcomes in selected patients. This case report presents a 38-year-old woman with a history of one lower segment caesarean section and two failed *in vitro* fertilization (IVF) cycles presented with secondary infertility. Ultrasound showed a prominent uterine niche. She underwent DHL with niche repair followed by controlled ovarian stimulation and intracytoplasmic sperm injection (ICSI). Frozen embryo transfer of two day 3 embryos resulted in a viable pregnancy. An elective repeat caesarean section was performed at 36 weeks + 4 days, resulting in the birth of a healthy infant. Laparoscopic niche correction may improve fertility outcomes in patients with uterine scar defects contributing to infertility, particularly those with prior IVF failures.

Keywords: Uterine niche, Secondary infertility, Residual myometrial thickness, IVF failure, Laparoscopic niche repair, Reproductive outcome

INTRODUCTION

Uterine niche, also known as caesarean scar defect, is a common iatrogenic entity following lower segment caesarean sections (LSCS).[1] Terminologies such as isthmocele, uterine dehiscence, and post-caesarean scar defect (PCSD) have been used interchangeably to describe this defect.

The niche can cause significant gynaecological symptoms, including prolonged postmenstrual spotting, chronic pelvic pain, dyspareunia and secondary infertility, substantially affecting the quality of life.[2]

CASE REPORT

Mrs. Z, a 38-year-old female, gravida 2 para 1 live 1, presented with secondary infertility of 7 years duration. She had a history of a lower segment caesarean section (LSCS) performed 9 years ago, 4 years after 1st childbirth. She had undergone two prior *in vitro* fertilization (IVF) attempts without success, the indication being non-availability of her husband, as he was working abroad. Initial evaluation included a trans vaginal ultrasound, revealing a caesarean scar niche.

On general examination

Patient was in a healthy status. Cardiovascular system (CVS) and reproductive system (RS) - clinically normal. Blood pressure (BP) was 120/80 mmHg. Abdominal examination showed soft abdomen with a Pfannenstiel scar.

On speculum examination cervix healthy and was seen behind the pubic arch. Per vaginal examination cervix

pointing upwards, uterus retroverted, normal size with restricted mobility and adnexa was free.

Ultrasound report

Trans vaginal ultrasound revealed a defect in the anterior uterine wall at the site of the caesarean scar, consistent with a large uterine niche. The niche measured approximately 5 mm in depth with a residual myometrial thickness of 2.5 mm adjacent to the scar. Endometrial thickness was 7 mm in the proliferative phase. No other adnexal pathology was detected (Figure 1).

Figure 1: Trans vaginal ultrasound image showing uterine niche.

Given the history of failed IVF and presence of the niche, the patient was counselled for surgical intervention. She underwent DHL with niche repair on 22 September 2023. Under hystero-laparoscopic guidance the presence of Niche was confirmed by halloween sign (Figure 2). After separating bladder, excision of fibrotic tissue done and then restoration of uterine contour achieved by suturing uterus in 2 layers using barbed sutures (Figure 3). Intraoperative and postoperative period were uneventful.

Figure 2: Intraoperative laparoscopic image showing uterine niche before repair-halloween sign.

During postoperative recovery period, the patient was supplemented with adjuvants such as vitamin D, (co enzyme Q 10) CoQ10, dehydroepiandrosterone (DHEA) and antioxidants like vitamin E and melatonin.

Following recovery, the patient underwent controlled ovarian stimulation (COS) in view of secondary infertility/poor ovarian reserve/age factor/previous 2 failed IVF cycles. OPU and ICSI done on 05 April 2024. Five day 3 embryos were frozen (2+3 embryos). A frozen embryo transfer (FET) cycle was performed with transfer of two day 3 embryos on 26 September 2024.

Figure 3: Intraoperative laparoscopic image showing uterine niche after repair.

Serum beta hCG on day 14 was positive, and the antenatal course was uneventful. A healthy female baby was delivered via elective repeat LSCS on 23 May 2025 at 36 weeks + 4 days (Figure 4). Intra-operative and post-operative period were uneventful.

Figure 4: Intraoperative picture of repaired niche during elective repeat LSCS.

DISCUSSION

Uterine niche, also known as caesarean scar defect or isthmocele, is a common iatrogenic consequence of lower segment caesarean sections (LSCS), with prevalence rising significantly after multiple caesarean deliveries. Imaging studies indicate niche formation in up to 65% of women after a single LSCS, increasing to nearly 100% after three or more procedures.[3-5]

The development of a niche is influenced by surgical factors such as incision site and closure technique. Single-layer, locked sutures and low uterine incisions involving mucous gland-rich endocervical tissue impair myometrial healing, resulting in a thin residual myometrium and fibrotic scar with poor vascularization.[6-8]

Additionally, prolonged labour and advanced cervical dilation at the time of caesarean increase the risk by promoting imperfect wound healing.

Clinically, niches may be asymptomatic or present with symptoms including prolonged postmenstrual spotting, chronic pelvic pain, dyspareunia, and secondary infertility. The niche creates a hostile uterine environment by allowing retention of menstrual blood, chronic inflammation, altered endometrial receptivity, and mechanical interference with sperm and embryo implantation.[8,9]

Transvaginal ultrasound, especially with gel infusion sono hysterography, remains the gold standard for diagnosis, providing detailed assessment of niche dimensions and residual myometrial thickness (RMT). MRI and hystero-laparoscopy can further delineate the defect when needed.[4,7]

Management strategies depend on symptom severity and RMT. Hormonal treatments may alleviate milder symptoms, but surgical repair is warranted in cases of significant bleeding or infertility. Hysteroscopic niche resection is effective when RMT exceeds 3 mm, whereas laparoscopic repair is preferred for thinner RMT, offering better anatomical restoration and improved fertility outcomes.[10] Adequate surgical technique during caesarean delivery including double-layer, non-locking sutures with peritoneal closure has been shown to reduce niche formation.[6,8]

In the present case, laparoscopic niche repair combined with assisted reproductive techniques resulted in a successful pregnancy, underscoring the importance of addressing uterine scar defects in patients with prior IVF failures. Post-operative counselling advocating a minimum three-month interval before conception and elective caesarean delivery helps minimize obstetric risks associated with the niche.

CONCLUSION

Uterine niche is a significant yet often under recognized complication of caesarean delivery with important implications for women's reproductive health. This case highlights the crucial role of accurate diagnosis and timely surgical intervention to restore uterine integrity and enhance fertility outcomes, especially in patients with previous assisted reproductive failures. As caesarean delivery rates continue to rise globally, increased clinical awareness and adherence to optimal surgical techniques are imperative to prevent niche formation and its associated complications. Multidisciplinary, individualized management offers the best prospects for improved quality of life and reproductive success.

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