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Review article

Technical aspects of the laparoscopic niche resection, a step-by-step tutorial



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ABSTRACT

The technique of a laparoscopic niche resection is described in ten steps and alternative steps for future studies are discussed.

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Abbreviations: RM, residual myometrium; MRI, magnetic resonance imaging.

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Introduction

A laparoscopic niche resection has been developed for women with large niches (residual myometrium (RM) <3 mm) to treat niche related symptoms, such as postmenstrual spotting, dysmenorrhea, intrauterine accumulation of fluid or inaccessibility of the uterus for embryo transfer because of the distorted anatomy and it has also been performed to treat secondary subfertility after caesarean section [1–18]. The number of publications reporting on this issue are limited, and most include case reports or small case series. According to the IDEAL criteria, the level of implementation for the treatment of gynaecological symptoms can be classified to level 2a, thus the exploration phase [19,20]. Its feasibility has been proven, and reported outcomes are promising, but structural follow-up was mostly missing and comparative studies are lacking. Only after completing the learning curve of a laparoscopic niche resection, a fair comparison can be made to other strategies, including expectant management. We recently published the data of our first 101 laparoscopic niche resections, results were promising at a low complication rate. We are still optimizing the technique based on our observations made during structural registration of our findings and structural follow-up in all women. Currently we performed more than 150 cases in our hospital. The aim of the current paper is to share our surgical technique to open the discussion on various technical aspects in order to improve the technique of this novel surgical procedure.

Indications

Not all niches need to be treated and a surgical intervention should only be considered in symptomatic niches in women that are willing to preserve their fertility. In women who do not want to conceive, hormonal treatment may be opted first and if this fails other surgical interventions including a vaginal or laparoscopic hysterectomy can be considered.

In women with spotting symptoms and small niches with a residual myometrium (RM) ≥ 3 mm a hysteroscopic niche resection can be considered, but this will not restore anatomy. A laparoscopic niche resection can be considered in women with a large niche (RM <3 mm) and gynaecological symptoms. Current literature provides insufficient evidence for a laparoscopic niche resection to improve reproductive outcome in asymptomatic women. To study the latter we recently started a randomised trial to compare laparoscopic niche resection versus expectant management in women with a large niche and secondary subfertility or actual wish to conceive (Dutch trial register number NTR 6534). Another exceptional indication for a laparoscopic niche resection can be the treatment of a niche pregnancy (caesarean scar pregnancy) with a very thin RM that is not suitable for a curettage or if Methotrexate failed [21].

The technical aspects of the laparoscopic niche resection in ten steps

Diagnosics and preoperative evaluation

A niche can be observed using transvaginal sonography, sonohysterography or hysteroscopy. However, sonohysterography has been reported as the most optimal way to measure a niche including the RM [22–24]. The latter is not possible during

hysteroscopy. With transvaginal sonography, in the absence of fluid accumulation in the niche or uterine cavity, small niches can be missed but more relevant the RM may be overestimated [22,23]. The introduction of saline or gel unfolds the niche inducing better delineation of the niche and flushes eventual clots out of the niche [24]. The RM should not only be measured in midsagittal plane, since the largest part of the niche, i.e. the thinnest part of the RM is often located at the lateral side of the uterus. Therefore it is essential to assess the uterus in sagittal plane from left to right and in transversal plane from fundal to cervix to identify the location where the niche has the largest diameter and the smallest RM. Another relevant item to be assessed during niche measurement, in particular if surgical intervention is considered, is the location of the niche in the uterus. The level of the niche may affect the results of a laparoscopic niche resection. We experienced that niches in the lower part of the cervix may hamper proper suturing if the distance between the niche and the fornix of the vagina is limited. Additionally we do not know if cervical tissue that contains mucus producing glands impair wound healing [25]. The level of the niche in relation to the vaginal fold can be estimated by transvaginal ultrasonography, by measuring the distance between the contact point of the probe with the fornix and the niche itself. It requires dynamic evaluation by moving the probe slightly in and out and changing the pressure on the probe. Finally the relation of the niche with the uterine arteries can easily be assessed during ultrasound, it may be of help during the laparoscopic identification of the niche and its relation to the uterine arteries.

Trocar placement

Besides the umbilical trocar, we additionally add two side ports in the lower abdomen; one on the left and one on the right side. In order to obtain the optimal angle during suturing of the uterine wound, we place the lateral ports as low as possible. Additionally we place one port para-umbilical, the advantage of this position over the suprapubic midline is the improved ergonomics (Fig. 1) and it facilitates adhesiolysis between the corpus and abdominal wall. If existent, these adhesions hamper midline placement of an eventual suprapubic trocar anyway. For easy suturing one 11 mm trocar is helpful. This can be either on the left lateral side if a 5 mm flexible scope is used or at the umbilicus in case a 10 mm flexible scope is used. Alternatively only 5 mm trocars can be used but it then requires backwards loading to bring the needles into the abdomen.

Hysteroscopic evaluation of the niche during the procedure

A 5 mm hysteroscope is introduced by vaginoscopy for the evaluation of the niche, its location, branches and eventual numbers of niches. The exact location is important to determine the level and extension of adhesiolysis and bladder dissection. The deepest point of the niche in general illuminates the light of the hysteroscopy and can be visualised by laparoscopy after reducing the laparoscopic light (Fig. 2). Finally, after closing the wound the end result can be assessed and an eventual residual niche can be evaluated.

Tips:

- A niche may resemble a uterine cavity, confirm the existence of the tubal ostia.

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