Surgical management of isthmocele symptom relief and fertility

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Surgical management of isthmocele: symptom relief and fertility.

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Précis: Isthmocele surgery is effective for relieving abnormal uterine bleeding and pain regardless of the surgical route.

ABSTRACT:

Objective: To describe the effect of isthmocele surgery by hysteroscopy, the vaginal approach and laparotomy on symptoms, fertility and quality of life.

Study design: We conducted a retrospective study of all patients who underwent surgery for symptomatic isthmocele from January 2012 to December 2017 in two tertiary referral centers in Rennes (France). The following data were collected: surgical procedure, symptoms and fertility before and after surgery, patient satisfaction about the surgery, and quality of life after surgery.

Results: Eighteen patients were included. The mean duration of follow-up was 15 months. Surgical procedures consisted of hysteroscopy (n=5/18, 27.8%), vaginal surgery (n=8/18, 44.4%) and laparotomy (n=5/18, 27.8%). Surgical indications were: secondary infertility (n=10/18, 55 %), pelvic pain (n=5/18, 28%) and abnormal uterine bleeding (n=3/18, 17%). Among patients with abnormal uterine bleeding, improvement was obtained after hysteroscopy, laparotomy and vaginal surgery for 83.3%, 75% and 50%, respectively. Among those with pelvic pain, improvement was obtained after hysteroscopy, laparotomy and vaginal surgery for 80%, 81% and 66%, respectively. One patient (1/18, 5.5%) experienced a post-operative complication. Of the 12 patients who wished to conceive 11 pregnancies were obtained (91.7%). Of the 10 patients with secondary infertility, six became pregnant (60%). Five pregnancies (5/11 ,45.4%) were carried to full term, including four in patients whose surgical indication was infertility. Among these, one patient had a vaginal delivery (after vaginal surgery) without obstetric complication. All patients who underwent hysteroscopy would recommend this surgery versus 75% of patients with vaginal surgery and 60% of patients with laparotomy. Pain and quality-of-life scores were comparable between the three groups.

Conclusion: Isthmocele surgery is effective for abnormal uterine bleeding and pain regardless of the surgical route.

Introduction

The rate of cesareans has been gradually increasing in western countries over the last 30 years and has resulted in an increased prevalence of caesarean scar defect (or isthmocele) and cesarean scar pregnancy. Isthmocele was first described by Morris in 1995 [1]. On ultrasound, it is defined as a triangular anechoic structure of 2mm at the site of a previous cesarean section [2]. It may be responsible for symptoms such as pelvic pain, abnormal uterine bleeding and infertility and have an impact of quality of life. The reported prevalence of isthmocele varies from 19.4% to 88% depending on the study [3–5].

Surgical procedures for isthmocele include hysteroscopy, vaginal surgery, laparoscopy and laparotomy. In the absence of recommendations, the choice of the optimal surgery route depends mainly on the measurement of the isthmocele and future desire of pregnancy. Overall though, to date, few studies have reported objective outcomes of isthmocele surgery, especially concerning fertility and quality of life.

Here, we report a series of patients who underwent surgical isthmocele management. The aim of the study was to assess symptoms, post-surgical fertility outcome and quality of life.

Material and Methods

Study design

We performed a retrospective study at two tertiary referral centers in Rennes (France): the University Hospital of Rennes and La Sagesse Medical Centre. All included patients gave their consent. The Ethics Committee of the National College of the French Gynecologists and Obstetricians approved the study (reference number: CEROG 2018-OBS-0801).

Patients

All patients aged over 18 years who underwent surgical management for isthmocele between 1st January 2012 to 31st December 2017 were included and asked to complete a written questionnaire.

Diagnosis

Symptoms related to isthmocele were: chronic pelvic pain, dyspareunia, abnormal uterine bleeding and secondary infertility. All clinical diagnoses were confirmed by ultrasound imaging. The following measurements of the isthmocele were reported: depth, width and residual myometrial thickness.

Surgery

All the surgical procedures were performed by one of three surgical routes – hysteroscopy, vaginal surgery or laparotomy – according to the surgeon's choice. The surgical procedures are summarized below.

Hysteroscopy: The uterine cavity is distended using NaCl solution. Positive pressure is ensured with an automatic pressure infusor. The inferior and superior edges of the defect are resected using a cutting loop and coagulation is performed on the thinnest part of the scar [6].

Vaginal surgery: After sterile preparation and bladder catheterization, a vaginal retractor is inserted to visualize the cervix uteri, and the anterior lip of the cervix held with grasping forceps.

At a distance of 0.5cm below the reflexed vesico-cervical area, an anterior incision is made from the 3 to 9 o'clock position. The bladder is then dissected away from the uterus. After entering the abdominal cavity and completely exposing the cervical and lower uterine segments, a uterine probe is placed into the uterine cavity through the cervix and slid down from the bottom of the uterus to the cervix. The surgeon then evaluates the thickness of the lower uterine segment of the isthmocele with the index finger. The isthmocele tissue is cut to the normal healthy muscle using a knife and dissecting scissors. The probe remains in place as a marker, and the incision closed with a double layer of 1-0 absorbable interrupted sutures. The peritoneum is sutured followed by the incision in the cervical vaginal area [7,8].

Laparotomy: Laparotomy surgery is performed by a low transverse Pfannenstiel incision. The first step consists of dissecting the isthmocele below the site of the reflexed vesico-cervical area. The fibrous fascia is then opened to access the scar defect. All the pathological tissue is cut to the normal healthy muscle and the incision closed in two layers [9].

Data collection

The following patient characteristics were retrospectively collected from medical records: age, body mass index (BMI), history of pelvic surgery and cesarean section, number of pregnancies and deliveries, cesarean defect size and residual myometrial thickness on imaging, details of the surgical procedure performed, pre-operative pain (chronic pelvic pain, dyspareunia) by means of a validated visual analogue scale (VAS), abnormal uterine bleeding and desire to conceive after surgery. At the beginning of the study, the patients were asked to complete a questionnaire including information about obstetric history, post-operative pain (chronic pelvic pain, dyspareunia) by means of a validated visual analogue scale (VAS), abnormal uterine bleeding and desire to conceive after surgery.

The Clavien-Dindo classification system was used to classify post-operative complications.

All the women had at least 6 months of post-surgical follow-up. We used World Health Organization criteria to define infertility: absence of a pregnancy for at least 12 months among the women wishing to conceive.

Patient satisfaction about their surgery was evaluated by the questions: “Are you satisfied with your surgery?” “Would you recommend this surgery to your friend?” Patient quality of life and general health status was evaluated by two questionnaires: the EQ-5D-5L and EQ-VAS (EuroQol Visual Analogue Scales).

Results

Population (Table 1)

Among the 23 patients who underwent surgical treatment for an isthmocele during the study period, three declined to participate and two were lost to follow-up. The study population was thus composed of 18 patients (Figure 1). Five (27.8%) patients were operated on by hysteroscopy, eight (44.4%) by vaginal surgery, and five (27.8%) by laparotomy.

The median duration of follow up was 15 months (8-85 months).

Table 1 summarized the characteristics of the study population. Four patients had a history of primary infertility. The median number of cesarean sections was two (1-3).

The main indications for surgery were infertility (n=10, 55%), pelvic pain (n=5, 28%) and abnormal uterine bleeding (n=3, 17%).

Chronic pelvic pain was the most frequent symptom (11 patients, 61.1%), followed by metrorrhagia (9 patients, 50%), menorrhagia (8 patients, 44.4%), dysmenorrhea (8 patients, 44.4%) and dyspareunia (6 patients, 33.3%). Pain intensity was evaluated as 3.5 for chronic pelvic pain, 2.9 for dysmenorrhea, and 2.9 for dyspareunia by VAS. The median depth of the isthmocele was 13mm, the median width was 11mm, and the median residual myometrial thickness was 2mm.

Surgery (Table 2)

Isthmocele size and residual myometrial thickness were comparable regardless of the surgical procedure.

The median hospital stay was 3 days for both laparotomy and vaginal surgery. All the hysteroscopies were outpatient procedures.

One intraoperative complication occurred: a bladder injury during vaginal surgery, which was immediately sutured and required bladder catheterization for 15 days.

One Clavien-Dindo Grade I complication occurred: a scar hematoma that resolved spontaneously after laparotomy.

Among the patients who presented with abnormal uterine bleeding, improvement was obtained after hysteroscopy, laparotomy and vaginal surgery for 83.3%, 75% and 50%, respectively. Among those with pelvic pain, improvement was obtained after hysteroscopy, laparotomy and vaginal surgery for 80%, 81% and 66%, respectively. There was no difference in total improvement after surgery according to the surgical route.

Surgery was unsuccessful for three patients who required additional surgery (two after vaginal surgery and one after laparotomy).

Fertility (Table 3)

Twelve patients (12/18, 66.7%) wished to conceive: four underwent hysteroscopy, five vaginal surgery and three laparotomy. Among the patients operated on for infertility (n=10), six conceived (6/10, 60%) resulting in five miscarriages and three live births. Overall, 11 (11/12, 92%) pregnancies were obtained without any difference between surgery procedures. The average time to conception was 14 months.

All the patients who underwent hysteroscopy and who wished to conceive were successful with an average time to conception of 13.3 months (three pregnancies after *in vitro* fertilization and one spontaneous pregnancy).

After vaginal surgery, four of the five patients who wished to conceive were successful (two spontaneous pregnancies and two after fertility treatment).

After laparotomy, two of the three patients who wished to conceive were successful (one spontaneous pregnancy and one after fertility treatment).

Obstetric outcomes

Among the 11 pregnancies obtained after surgery, six terminated in a miscarriage and the remaining five (5/11, 45.5%) were carried to full term. Four patients (4/5, 80%) delivered

by cesarean section and one (1/5, 20%) by vaginal delivery (spontaneous pregnancy after vaginal surgery). There appeared to be no difference in time to conception, type of conception (spontaneous or fertility treatment), or mode of delivery between the three surgical procedures.

Patient satisfaction

All the patients who underwent hysteroscopy (n=5) reported they would recommend this surgery versus 75% operated on by vaginal surgery (n=6) and 60% by laparotomy (n=3). The average EQ-VAS score was 87 after hysteroscopy, and 84 after vaginal surgery and laparotomy. No mobility, autonomy deficit or dependence in carrying out activities of daily living were noted with the EQ5D-5L score.

Discussion

This retrospective study suggests that isthmocele repair surgery is effective for treating pelvic pain and abnormal uterine bleeding regardless of the surgical route – hysteroscopy, vaginal surgery or laparotomy – but obstetric outcomes are poor with over 50% of miscarriages.

It is somewhat difficult to compare our results with those reported in the literature because of differences in inclusion criteria between studies and the lack of a consensual threshold to define isthmocele and classification of its severity. For some authors isthmocele was considered to be severe when residual myometrial thickness was 2.2 mm [10]. In our study, the median residual myometrium thickness was 2 mm.

In our series, 94% of the patients suffered from abnormal uterine bleeding, and improvement was reported for 70% of them. This result is in agreement with the findings by Zhang et al. [11] .

Three-quarters of the patients who suffered from pelvic pain in the present study reported an improvement. Only three patients require additional surgery. In the literature, authors report that as many as 97% of the patients obtain pain relief [12]. The seemingly poorer result in our study could be because we used an objective VAS to quantify pain, or because of differences in the definition of isthmocele.

Overall, we observed a 92% pregnancy rate among our patients wishing to conceive, and a 60% pregnancy rate for patients with secondary infertility. Nevertheless, we report a miscarriage rate of around 55%, with particularly poor results after hysteroscopy (3/4 patients miscarried). This last result is surprising and deserves to be confirmed by an additional study. Donnez et al. noted a pregnancy rate of 44% among patients with infertility [13], all of which were carried to full term. In Jeremy et al.'s study [9], 14 symptomatic patients with a pregnancy project were operated on by laparotomy, laparoscopy or vaginal surgery. Among them, 10 became pregnant, representing a pregnancy rate of 71% (six spontaneous pregnancies and

four after medical treatment), of whom one aborted and nine delivered: eight cesarean sections and one vaginal delivery. No cases of placenta accreta or uterine rupture were described. Other studies support the high pregnancy rate with few complications after laparotomy [14], hysteroscopy and laparoscopy [15].

Although there is no consensus about surgical management of isthmocele, most studies suggest laparoscopy for symptomatic patients who wish to conceive and who have a median residual myometrium thickness of less than 3 mm [13]. After laparoscopic treatment, Donnez et al. observed an improvement for 91% of patients [13]. Moreover, this study demonstrated that repair via laparoscopy could increase the residual myometrial wall even when the preoperative thickness was less than 2.5 mm. Furthermore, the pregnancy rate was 44% among infertile patients. Zhang et al. conducted a retrospective study with 124 patients to assess the impact of the surgical route (vaginal surgery compared with laparoscopy) on post-operative results [11]. They concluded that the surgical results were similar but that the operation time and duration of hospital stay were shorter with vaginal surgery. They also observed that hospital stay was shorter after hysteroscopy than after laparoscopy and vaginal surgery. Xie et al. found that surgical duration and blood loss were greater after vaginal surgery than hysteroscopy [8]. In our study, surgical outcomes were similar for the three surgical routes. However, hospital stay was longer after laparotomy and vaginal surgery than after hysteroscopy which is an outpatient procedure. In Van der Voet et al.'s review, the surgical results were also comparable regardless of the surgical procedure [16].

In our study, the only hysteroscopy performed on a patient for pelvic pain, failed to provide relief. However, Raimondo et al. noted an improvement in pelvic pain in 80% of cases after hysteroscopy (8). In contrast, all the patients in our study who had hysteroscopy because of menorrhagia (n=3) had normal menses after surgery versus 80% in Raimondo et al.'s study [6]. However, in Raimondo et al.'s population, the severity of the isthmocele and the residual myometrial thickness were not reported. In our study, median residual myometrial thickness was 2 mm which corresponds to severe isthmocele. Literature reports that 80% to 89% of

patients had normal menses after vaginal surgery [7,11] in contrast to only 50% in our study. These surgical differences may be explained by our small sample size (five patients had hysteroscopy and eight vaginal surgery). Finally, no differences are reported in literature about fertility results according to the surgical route. Xie et al. noted a 25% pregnancy rate (2/8 patients) after vaginal surgery versus 33% (2/6) after hysteroscopy. Reported pregnancy rates after laparotomy are also high [9,14].

The only intra-operative complication observed in our series was one bladder injury during vaginal surgery. Similar low rates of complications are found in the literature. In 2014, Xie et al. described one case of sepsis in 46 women who underwent vaginal surgery [8]. Zhang et al. found no complications among 65 patients [17] and Zhou et al. [7] observed three hematomas in the vesicouterine flexion among 121 women undergoing vaginal surgery. No peroperative complications have been described during hysteroscopy surgery for isthmocele [8,18]. However, Aas-eng et al. reported a rate of complications after hysteroscopy between 1% and 2.7% with uterine perforation, bleeding, infection, fluid overload and intrauterine adhesions with pregnancy loss risk [19]. In our study, one patient had a subcutaneous hematoma after laparotomy and did not require further surgery. The vaginal route would seem to be an interesting option to treat isthmocele in terms of fertility outcome and due to its minimally invasive nature.

In the present study, post-operative patient quality of life as evaluated by the EQ-VAS and EQ-5D-5L scores was satisfactory supporting the management of isthmocele by surgery.

The study we report here suggests that the three surgical routes – hysteroscopy, vaginal surgery and laparotomy – are equally effective for the repair of symptomatic isthmocele. Hysteroscopy and vaginal surgery may be preferred options for most women as they are minimally invasive. Laparotomy should be reserved for patients with severe isthmocele and a desire for pregnancy as the procedure can strengthen the myometrial wall [20]. Nevertheless, women should be advised of the risk of miscarriage for future pregnancies

regardless the procedure. Larger, randomized studies reporting post-operative thickness of the myometrium are required to further assist the surgeon in his/her choice of route.

Nevertheless, some limitations to our study deserve to be mentioned. The first is due to the retrospective nature of the design which cannot rule out the risk of bias. However, out of the 23 patients eligible for inclusion, we captured data for 18. Furthermore, although the sample size was small, as is the case for most publications to date [3,9,14,21–23]. We assume that the power of our study is poor. However, we included all patients who underwent isthmocele surgery in two surgical centers over a 6-year period. Second, none of the patients underwent laparoscopic management which could be interesting to compare with the three routes we report here. Finally, our results would have been enhanced with post-operative imaging including post-operative thickness of the myometrium. Nevertheless, we provide quantitative evaluation of post-operative chronic pelvic pain, dysmenorrhea, and dyspareunia with VAS scores and patient satisfaction, which has been lacking to date. Furthermore, our study is one of the few to describe post-operative fertility analysis.

Conclusion

This study supports the interest of surgery for symptomatic women with isthmocele and shows that the three surgical routes are safe and effective in relieving symptoms leading to an improvement in quality of life. Larger, randomized studies reporting post-operative thickness of the myometrium are required to further assist the surgeon in his/her choice of route.

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