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Original Article

Hysteroscopic management of cervical pregnancy: Case series and review of the literature

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ABSTRACT

Purpose. – To evaluate the hysteroscopic management on cervical pregnancy.
Materials and methods. – A case series report and literature review on patients with early first trimester cervical pregnancy (CP) treated by hysteroscopy. The symptoms upon admission, β-hCG levels, hysteroscopy technique, blood loss and operation outcomes were presented.
Results. – Four patients with early CP between 5 and 7 weeks were successfully managed with operative hysteroscopy. Three out of four patients had at least one risk factor for cervical ectopic pregnancy. Two patients were diagnosed on routine examinations and the other two presented with vaginal spotting and pelvic pain. Mechanical hysteroscopy was used in three patients while one case was managed by a 10 mm resectoscope. Three women discharged home on the same day and one patient 24 h after the operation. Literature review revealed 16 publications of cervical pregnancy managed with operative hysteroscopy. 14 articles demonstrated single case reports and two papers were CP case series. Hysteroscopic surgery was successfully reported in 12 cases as a sole treatment, in seven cases after failure of methotrexate treatment and in eight cases as a combined treatment with uterine artery embolization.
Conclusions. – Our case series demonstrated that operative hysteroscopy can be used as a sole treatment in early, less than 8-week CPs with safety. Literature review demonstrated that most of the early first trimester CP cases were treated by hysteroscopy and the rest after failure of methotrexate treatment or in combination with uterine artery embolization.

Introduction

Cervical pregnancy (CP) is one of the rarest ectopic pregnancies in which the embryo implants and grows inside the endocervical canal. The incidence varies between 1 in 2500 and 1 in 12,422 pregnancies [1], which accounts for less than 1% of all ectopic pregnancies, however its incidence tends to increase due to increased number of fertility treatments and in vitro fertilization (IVF) [2–4]. The exact pathology of CP is not clear; however, prior uterine interventions such as curettage and cesarean section are well known risk factors for CP apart from fertility treatments [1,5,6]. Patients with CP are considered as a high-risk group for severe and potentially life-threatening hemorrhage, which may lead to hysterectomy and loss of fertility [1,7–9]. Broad use of transvaginal ultrasound allows CP diagnosis at very early gestation; hence conservative management has become the standard approach in recent decades. Nevertheless, due to its rarity, there is no consensus regarding the best therapeutic approach for CP [10].

Conservative approaches vary including; systemic and/or local methotrexate or potassium chloride (KCl) injection, and balloon tamponade methods. More invasive procedures such as evacuation with suction and/or curettage, vaginal or laparoscopic uterine artery ligation, uterine artery embolization techniques, and hysteroscopic resection of CP have also been reported [9]. Medical and surgical techniques are frequently used in combination in order to reassure successful treatment of the CP and preserve fertility [9].

We present a case series of 4 early gestation CPs, managed solely by diagnostic and operative hysteroscopy and literature review on hysteroscopic management of CP.

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Materials and methods

Women diagnosed with CP and treated by diagnostic and operative hysteroscopy (VT and SEA) between 2011 and 2017 in Aretaeio Hospital, Cyprus and OMAM Hospital, Cairo, Egypt were included in this case series report. Written informed consent was obtained from all individual participants before procedures and permission for the publication was also taken in accordance with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The demographic features of the patients, obstetrical history, symptoms upon admission, β-hCG levels, operative hysteroscopy technique, instruments used and duration of hysteroscopy, estimated blood loss, and outcomes are reviewed.

Diagnosis of CP was made following transvaginal ultrasound scan criteria as defined by Hofmann [11]; absence of intrauterine pregnancy in the endometrial cavity and presence of gestational sac, or gestational sac with embryo within the cervix below the internal os, while also looking for the 'sliding sign' to exclude ongoing intrauterine pregnancy abortion as described by Jurkovic [12]. Conservative treatment options including methotrexate therapy and hysteroscopic removal of the CP were discussed with the patients. The possibility of profuse hemorrhage during hysteroscopy and warranting the need for emergency hysterectomy was also explained, written and signed in a consent form.

All patients underwent diagnostic and operative hysteroscopy in one session in an operating room setting. Hysteroscopy was performed using a 2.8 mm hysteroscope with a 5 Fr working channel (Bettochi system 30° optic by Karl Storz, Tuttlingen, Germany). Normal saline (NS) solution was used as a distending medium, at 50–70 mmHg automated constant intrauterine pressure regulated by Endomat (STORZ).

The lumen of the cervical canal was dilated by using normal saline and through the amniotic membrane the sac and its contents were visualized.

In two of the cases there was direct visualization of the embryos due to spontaneous disruption or impaired development of the amniotic membranes. The heartbeat was evident in three of the cases while the embryos were squeezed in between the narrow cervical lumen (Fig. 1). By manipulation of the fluid flow and rotational movements of the 30° optic tip, the implantation area was detected. In two cases diluted antidiuretic hormone (ADH)/vasopressin and in one case diluted adrenaline was injected around the implantation site in a selected avascular region. A 5 Fr or 17 G needle used in IVF for oocyte pickup (OPU) was inserted via the working channel and under our supervision the vasoconstrictor substance was injected. In two cases coagulation of the implantation site, using 5 Fr bipolar probe was used to prevent any bleeding and facilitating the excision of the embryo from its attachments. In the other two cases, one with absent pulse, hydrodissection enabled complete detachment of the pregnancy sac while bipolar coagulation was used to reassure hemostasis.

A review of the English literature was performed using the electronic databases MEDLINE and PubMed, using key words CERVICAL PREGNANCY and HYSTEROSCOPY. All case reports and case series reported on hysteroscopic management of cervical pregnancy as a primary treatment or operative hysteroscopy in combination with other conservative treatment modalities were included in this review.

Results

Four patients with early CP up to 7 weeks and 4 days of gestational age were successfully treated with operative hysteroscopy. Patients' clinical and sonographic findings, laboratory, and treatment results are presented in Table 1. Two patients conceived spontaneously and the other two conceived after IVF-ET. One of the patients had a history of multiple curettages for termination of pregnancy twice, and another one had a history of tubal ectopic pregnancy. Two of the patients received general anesthesia with laryngeal mask and the other 2 were sedated intravenously. Three of the cases were treated by mechanical hysteroscopy, 5 Fr bipolar probe and scissors, and were discharged home the same day.

Case 1: Diagnostic hysteroscopy enabled the diagnosis of the CP sac, attached between 5 and 11 h of the cervical lumen. An avascular area around the sac was selected, initially 1.5 ml, and

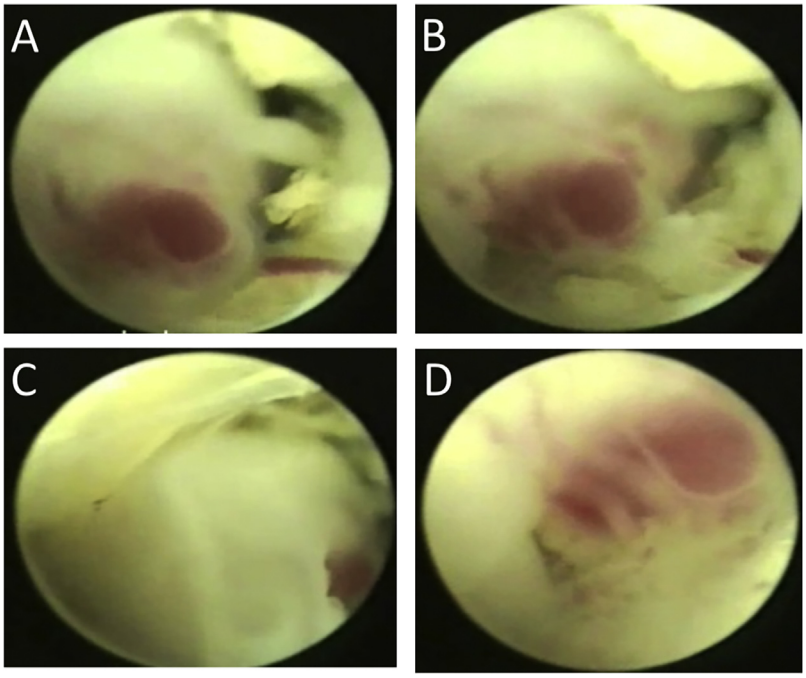

Fig. 1. Hysteroembryoscopy images from a 5 w + 4 days cervical pregnancy. (A and B) Hysteroscopic view of an embryo attached to the cervical canal. (C) The spine of the embryo is entrapped within the cervical walls. (D) Close-up view of the malformed embryo including thorax and heart.

Table 1
Case series of cervical pregnancies, history, symptomatology, hysteroscopic management and outcome.

Case	Age (years)	Obstetric history	Symptom upon admission	Risk factors	Gestational age (FCA)	β-hCG (IU/dl)	Hysteroscopic approach	Duration of operation (min)	Blood loss during operation (ml)	Hospital stay (h)
1	30	G4 A3	No symptom	Previous multiple curettage	7 w (+)	13,790	Hydrodissection 5 Fr scissors and bipolar	12	<10	12
2	35	G1P0	No symptom	None	6 w (+)	3500	5 Fr bipolar and needle	20	200	24
3	29	G1P0	Vaginal spotting Pelvic pain	Hyst & Lap. 3 IUI 2 IVF OHSS	6 w (−)	930	Hydrodissection 5 Fr bipolar	14	<10	8
4	37	G2 P1 Ec1	Painless vaginal bleeding	IVF ×6 S/P	5 w + 4 days (+)	1650	5 Fr bipolar needle and resectoscope	30	<10	10

Ec, ectopic pregnancy; Fr, French; IUI, intrauterine insemination; IVF, in vitro fertilization; S/P, Salpingectomy; OHSS, ovarian hyperstimulation syndrome; Hys, hysteroscopy; Lap., laparoscopy.

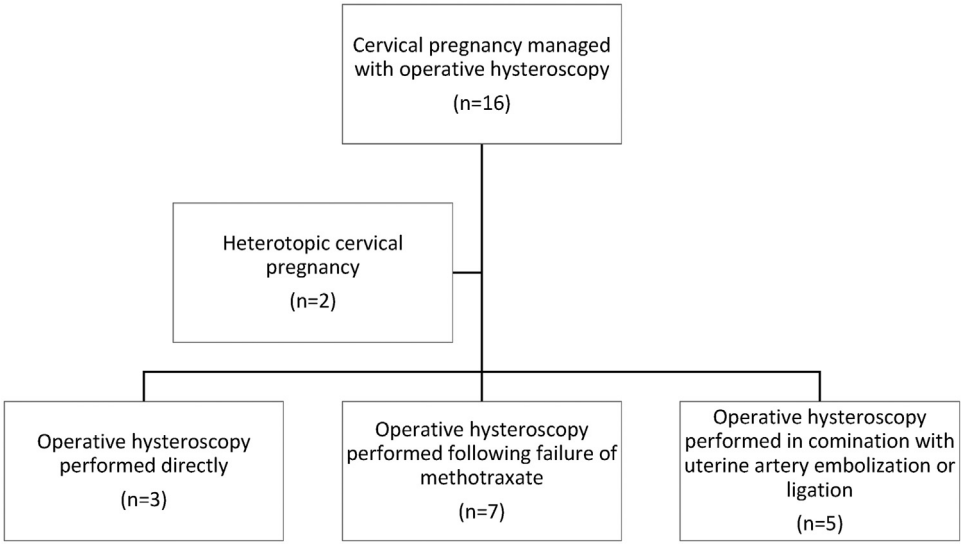

Fig. 2. Distribution of cervical pregnancy publications which were managed with hysteroscopy.

immediately after another 2 portions of 2 ml, diluted 1:20 vasopressin was injected with 18 G needle, adjacent to the first injection in both sides, 5–7 mm in depth. By using 5 Fr scissors and hydro-dissection it enabled the detachment of the 7 w pregnancy sac. Hemostasis was achieved using 5 Fr bipolar probe coagulating the minor hemorrhages at the implantation side.

Case 2: Diagnostic and operative hysteroscopy was very similar to case 1. However, diluted 1:40 adrenalin was injected with 5 Fr needle, instead of vasopressin. Hemostasis in this patient was not efficient and bipolar needle was used to coagulate the deeper tissue layers. During the exchange between the bipolar probe and needle and re-localization of the hemorrhage, blood loss of 200 ml was estimated.

Case 3: A collapsed pregnancy sac and long standing missed pregnancy of about 10 days, was evident. Using hydro-dissection the fragile conceptus was detached and floating necrotic tissue was noted. Diluted adrenalin 1:40 was injected with 17 G OPU needle in the implantation side, and 5 Fr bipolar probe was used for hemostasis.

Case 4: The gestational sac was only partially detached by mechanical hysteroscopy and hydro-dissection. A 10 mm resectoscope was then used with a bipolar loop to resect the remains of the conceptus. Although diluted vasopressin was injected by 5 Fr needle prior to surgery, there was an impression of minor hemorrhages. Hence the loop was used to coagulate further the oozing points. Gash of mild to moderate bleeding was noted 15 min after the operation, which was controlled by local application of Surgicel® absorbable hemostat and packing. The patient was discharged home after 24 h.

Nor suction neither curettage was performed in any cases for evacuation of gestational products, before or after hysteroscopic detachment of the sac. No significant bleeding was encountered in any of the cases.

Literature review revealed 16 publications of cervical pregnancy managed with operative hysteroscopy (Fig. 2). 14 articles demonstrated single case reports and two papers were CP case series. In two out of 16 publications, intrauterine pregnancy was accompanied by heterotopic cervical pregnancy. In three articles, direct hysteroscopic management of CP was presented; in seven articles, hysteroscopic management followed after failure of methotrexate treatment (Table 2); and in five cases hysteroscopic surgery was performed in combination with radiological uterine artery embolization (UAE) (Table 3) or uterine artery ligation. All CPs were successfully treated by hysteroscopy, thus preserving patients' fertility. Successful pregnancy following hysteroscopic treatment of CP alone or in combination with other treatment modalities was reported in 5/16 of the publications.

Discussion

In our cases, all four women with CP were successfully treated using solely diagnostic and operative hysteroscopy. The early age of CP below 8 weeks, the small diameter of the hysteroscopic instruments, 5 Fr bipolar tip, automated constant fluid pressure,

Table 2
Patients' characteristics and hysteroscopic surgery results after Methotrexate treatment.

Author (year)	Age (year)	Obstetric history	Symptom upon admission	Risk factors	Gestation (FCA)	β-hCG (IU/dl)	Methotrexate treatment	Hysteroscopic approach	Duration of operation (min)	Blood loss (ml)	Hospital stay (days)	Comments
Matteo et al. (2006)	38	G2P2	Vaginal spotting	None	6 w (+)	42,141	1st systemic single dose 2nd systemic multiple dose	Bipolar electroexcision	35	60	Nm	
Lin et al. (2008)	34	G4P2A1	Vaginal spotting Pelvic pain Vasopressin inj.	D&C CS	7 w (+)	14,988	Systemic single dose	Loop resection	30	<10	Nm	Cervical sutures
Kofinas et al. (2012)	34	G1P0	Vaginal spotting Pelvic pain	None	6 w (+)	>1500	1st systemic single dose 2nd systemic single dose + intra-sac injection	Bipolar 26 Fr resectoscope	Nm	30–50	<1	Successful pregnancy with IUI following three months of the procedure, resulted with term delivery
Mangino et al. (2014)	40	G1P0	Pelvic pain	IVF Salpingectomy	6 w (+)	1100	Intra-sac injection 1st systemic single dose 2nd systemic single dose	5 mm bipolar	Nm	Nm	Nm	Residual POC removed after two months by office hysteroscopy
Sijanović et al. (2014)	34	G4P0A3	No symptom	D&C	6 w (+)	16,553	Intra-sac injection	Monopolar rollerball	Nm	Nm	3	Profuse bleeding 37 days after MTX, tamponade with Foley's catheter
Masuda et al. (2016)	44	G2P0	No symptom	IVF	6 w (−)	15,519	1st systemic single dose 2nd systemic single dose	5 mm bipolar	Nm	<5	1	Successful pregnancy with ET two months following the procedure
Sardo et al. (2017)	36	G2P0A1	No symptom	D&C	5 w+5 (+)	19,352	1st systemic single dose and hysteroscopic injection 2nd systemic single dose	27 Fr bipolar resectoscope via 4 mm loop	Nm	Nm	Nm	MTX induced leukopenia and stomatitis

CS, cesarean section; D&C, dilatation and curettage; ET, embryo transfer; FCA, fetal cardiac activity; IUI, intrauterine insemination; MTX, methotrexate; POC, Products of Conception; Nm, not mentioned; w, week.

and injection of vasoconstrictors (ADH) are the most important elements of surgical success. Of course, the depth and extent of embryo implantation on the cervical wall is unpredictable but it seems that the earlier the gestation occurring, in regard to being less than 8 weeks, offers the hysteroscopic management to be easier and free of complications. The aim of our first operation in 2011 was to perform hysteroembryoscopy and inject methotrexate directly into the embryo heart. The diagnostic precision and implantation location facilitated the direct detachment of the CP using both hydrodissection and 5 Fr instruments and reassuring hemostasis with bipolar energy. In one case, Surgicel® hemostatic gauze was used to pack the cervical canal to control mild to moderate bleeding after operation.

In 1992 [13] hysteroscopy was primarily used to evaluate CP following methotrexate therapy. Hysteroscopic treatment of CP was first published by Ash and Farrel several years later in 1996 [7]. A 6-week CP with a live embryo was successfully resected without bleeding following ligation of the left cervical branch of the uterine artery vaginally and vasopressin injection. Hardy [14] treated directly by hysteroscopic resection, excising and evacuating a CP of 6-weeks with absent heartbeat and active bleeding. Hemoglobin dropped from 12.2 to 8.5 g/dl and bleeding vessels were coagulated using roller-ball without need of additional therapy. It was demonstrated that operative hysteroscopy is feasible as a sole treatment in early 6-week gestational age CP.

In a retrospective study, Kim et al. [15] reported 10 cases of early 4- to 6-week CPs, managed with operative hysteroscopy using resectoscope following irrigation of uterine cavity with 3.5% H_2O_2 and intracervical vasopressin injection. All cases were successfully operated with blood loss estimated to be less than 50 ml. H_2O_2 irrigation of the endometrial cavity and cervical lumen was used to avoid bleeding during the hysteroscopic operation. Since oxygen free radicals cause vasoconstriction and is toxic to

Table 3
Patients' characteristics and hysteroscopic surgery results after uterine artery embolization treatment.

Author (year)	Cases #	Age (year)	Obstetric history	Symptom upon admission	Risk factors	Gestation weeks (FCA)	β-hCG (IU/dl)	UAE mode[a]	Hysteroscopic approach	Duration of operation (min)	Blood loss (ml)	Hospital stay (days)	Comment
Vilos et al. (2004)	1	36	G3P1A1	Vaginal bleeding	D&C, CS	10w+5 day (+)	97,000	Single dose MTX + UAE	Resectoscope 26 Fr, 8 mm loop + suction	12	<10	1	
Yang et al. (2007)	1	37	G1P0	Active profuse vaginal bleeding	IVF, Polyp removal	7 w twin (+)/(−)	27,529	Foley catheter tamponade 1st UAE, D&C 2nd UAE					Resectoscope + grasping forceps + roller ball
80	400	6	Twin CP 4 units of blood transfusion										
Scutieroet al. (2012)	5	34.6 (30–38)	G3P0A2 up to G13P4A8	Vaginal spotting 3 out of 5 Pelvic pain in all	D&C (3/5) CS (3/5)	7 w (range 6–9) FCA all (+)	15,482–74,684	UAE	5 mm scope 5 Fr bipolar	9.8 (range 8–12)	0	4	
Subedi et al. (2016)	1	33	G1P0	Heavy vaginal bleeding	IVF	6 w (+) heterotopic pregnancy	9000	UAE	7 Fr forceps following suction curettage of both pregnancies	Nm	Nm	Nm	Heterotopic pregnancy

CP, cervical pregnancy; CS, cesarean section; D&C, dilatation and curettage; FCA, fetal cardiac activity; IVF, in vitro fertilization; MTX, methotrexate; Nm, not mentioned; UAE, uterine artery embolization.
[a] In the UAE mode column, medical and surgical treatments are given respectively.

gestational sac and embryo, it has been expected to increase patient's safety during CP resection. However, the technique description was poor and the long-term effects of H_2O_2 and the possibility of intrauterine adhesion formation were not addressed.

Hysteroscopic management of CP following failure of methotrexate treatment

Review of the literature shows that methotrexate is the preferable option of CP treatment due to fear of severe bleeding during suction evacuation and/or sharp curettage, which may end with hysterectomy. It is of great interest that most of the reported CP cases underwent operative hysteroscopy after failure of local and/or systemic methotrexate therapy [16–21] (Table 2).

Matteo et al. [16] used operative hysteroscopy following two cycles of systemic multiple dosage methotrexate of a viable 7-week ectopic CP. Despite the absence of the embryo's heartbeat following methotrexate treatment the increasing levels of β-hCG indicated to perform operative hysteroscopy. Operative hysteroscopy has also been shown to successfully manage two cases of early 6-week and 5-week + 5 days of viable CP with 5 mm bipolar hysteroscopy and 27 Fr bipolar resectoscope due to persistent embryo cardiac activity after systemic and local methotrexate treatment failure [19,22]. In other cases, CP was treated using bipolar coagulation and resectoscope due to unchanged size of gestation following systemic methotrexate treatment despite administration of second dosage of systemic methotrexate or local methotrexate injection [17,18,21]. Masuda selected the hysteroscopic removal of CP due to concern with future bleeding 2 weeks after initial methotrexate treatment and a delay for the next IVF cycle [21]. Moreover, Masuda et al. [21] suggested that hysteroscopic management of CP should be advised not only after failure of methotrexate treatment but also for successful methotrexate treatment so as to reduce hospitalization and avoid delay on next pregnancy treatment. Sijanović et al. [20] controlled hemorrhage with hysteroscopic monopolar roller ball due to profuse bleeding 5 weeks after methotrexate injection in the sac of a 6-week viable CP.

Methotrexate treatment has become the first line treatment in almost all early tubal or non-tubal ectopic pregnancies [23]. However, methotrexate carries the risk of side effects such as; nausea, upset stomach, diarrhea, stomatitis, fever, headache, fatigue, hepatotoxicity, and myelosuppression and in approximately one third of cases additional surgical procedures are needed to reassure and/or complete the treatment of a CP [24,25]. In addition, long hCG resolution (mean 53 ± 42 days), late return of menstrual cycle [24] and long hospital stay [25] are also an issue regarding the methotrexate therapeutic protocols in CPs. Kung et al. [24] reported that at least one additional surgical procedure [such as curettage, intracervical tamponade, or uterine artery embolization] was needed in combination with methotrexate administration in 43% of patients with viable and 13% with nonviable CP. Additionally, persistent bleeding has been frequently observed even after the reduction of β-hCG levels following methotrexate treatment [17]. Unpredictable, sudden and severe hemorrhage following administration of methotrexate [9,26] leading to hysterectomy [27] was also reported.

Hysteroscopic management of CP in combination with uterine artery embolization

Uterine artery embolization (UAE) has been also applied in reducing CP blood flow and extensive neovascularization of the cervical wall. Uterine artery embolization for the management of CP was first described in 1990 [28]. Recent articles reported UAE techniques used to control acute hemorrhage in patients undergoing unsuccessful CP treatment [29,30]. UAE has also been used as a preventive measure to bleeding prior to hysteroscopic excision of CP [31–35] (Table 3) and rarely as a sole management of CP [36,37].

Vilos et al. [34] successfully managed a 10-week + 5 days viable CP — performing UAE two days before hysteroscopic removal — followed by single dose systemic methotrexate. A 26 Fr resectoscope was used, taking 12 min to evacuate the embryo from the cervical lumen; minimal bleeding (<10 ml) was noted with the patient being discharged within 24 h of the procedure. Yang [30] reported a 7-week twin CP with profuse vaginal bleeding which was initially managed with Foley catheter tamponade, and two subsequent UAE followed by curettage. Persistent bleeding led to preforming temporary intraoperative balloon occlusion of common iliac arteries using interventional radiology. Concomitant hysteroscopic resection was successfully performed to remove the twin CP. The procedure lasted 80 min and estimated blood loss was 400 ml. Foley catheter tamponade was used again to prevent bleeding and a single dose of 50 mg methotrexate was injected postoperatively. The patient received 4 units of packed RBC and was discharged next day.

Scutiero et al. [35] managed 5 cases of early gestation of CPs between 6 and 9 weeks with operative hysteroscopy following UAE. All cases were successfully managed with office hysteroscopy using 5 Fr electrosurgery without anesthesia. The mean duration of the operations was 9.8 min (range 8–12 min.), blood loss was negligible and the patients stay in the hospital was four days. Similarly, all CPs in our cases were below 8-weeks and were solely managed by hysteroscopy, with minimal bleeding and no intra- or post-operative complications. All patients were discharged on the same day, except one who was discharged after 24 h. In contrast to Scutiero et al. [35], no UAE or other additional treatment was used.

The main disadvantage of UAE is the need of interventional radiology department and experienced staff which is not easily accessible. However, UAE allows reduction of blood supply to the CP and can reduce bleeding in active bleeding cases before hysteroscopic removal [30,38].

Potential complications after UAE are intrauterine adhesions and amenorrhea from endometrial ischemia and premature ovarian failure affecting fertility [39–41]. Martinelli et al. [2] demonstrated three CPs treated with dilatation and curettage (D&C) following bilateral UAE, one of whom developed ischemic degeneration 2 weeks after the procedure, thus necessitating hysterectomy.

Apart from UAE, uterine artery ligation can reduce the vascularization before hysteroscopy. In a prospective study, hysteroscopic resection was used immediately after laparoscopic-assisted uterine artery ligation to treat 6 cases of early 6- to 9-week CPs [42]. At the end of the operations the cervical canal and endometrial cavity were reviewed as clear and hemostasis was reassured. However, half of the patients experienced persistent pain, local soreness, and numbness on the thighs for 2–4 weeks following the procedures. The combination of laparoscopic uterine artery ligation and operative hysteroscopy has been criticized as too invasive while advanced laparoscopic skills are necessary [16].

Operative hysteroscopy in heterotopic pregnancy

Hysteroscopic treatment of a 5-week + 4-day live CP and a heterotopic pregnancy after IVF is also reported by Jozwiak et al. [43]. Rollerball electrocautery was used to remove the CP without entering the endometrial cavity preserving fetal wellbeing with a subsequent live birth [43]. In another IVF case with CP and 6-week live embryo heterotopic pregnancy removal of both pregnancies was decided following UAE, suction, and hysteroscopy due to heavy bleeding [38].

In contrast to tubal pregnancy where laparoscopy and general anesthesia are needed to approach the ectopic sac, CP is easily accessible by a small diameter hysteroscope of 4.8 mm with a working 5 Fr channel. Accurate diagnosis of the implantation site within the cervical canal and evaluation of the gestational sac size enables direct operative hysteroscopic management or direct intracardiac injection of KCl or methotrexate. Blind CP suction evacuation and/or sharp curettage increase the risk of hemorrhage; hence, they should not be selected as the primary treatment option. There has been no case reported with any intractable hemorrhage or emergency hysterectomy during or after hysteroscopic removal of CP. Moreover, primary hysteroscopic management of CP allows short hospital stay (in most cases discharge on the same day), reduced multiple hospital visits which are common with methotrexate treatments, and fast recovery and fast return of menstrual periods accelerating near future pregnancy.

Cesarean scar pregnancy (CSP) presents an ectopic pregnancy implanted to the previous cesarean scar just above the cervicouterine junction. Diagnosis of the CSP is made with ultrasound by seeing the gestational sac inside the enlarged previous cesarean scar with empty uterus and cervical canal [44]. CSP shares similar characteristics with CP. Both are rare locations of ectopic pregnancy, their incidence is increasing, carry risk of severe bleeding and uterine rupture and the risk of hysterectomy due to these complications [45–47]. Conservative management options are also very similar, including systemic methotrexate, local injection of cytotoxic agents, uterine artery embolization, hysteroscopic or laparoscopic or open surgery for the excision of scar pregnancy [47,48]. There are no guidelines neither a standard treatment protocol in CSP [47,48]. The disadvantages of each conservative method have been discussed in the above paragraphs, particularly the long resolution of β-hCG with systemic methotrexate and risk of severe hemorrhage or uterine rupture with blind D&C [48]. Recently, various publication reported the use of operative hysteroscopy alone or in combination with other techniques for the successful management of CSP [49–52], a very similar trend noted in the management of CP. Despite the myometrial margin to serosa is thinner in CSP comparing with CP, no uterine perforation is reported in a series of 44 CSP, which were managed by hysteroscopy [52]. Operative hysteroscopy is a promising method in the conservative management of both CSP and CP.

Limitations of our case series and the review of the literature reports

The reported number of CP cases treated by hysteroscopy is limited for extracting firm conclusive remarks; mainly due to the rarity of the disease. The high demand in surgical skills, experience, tools and equipment might also reflect the low number of literature reports on hysteroscopic management of CPs.

Conclusion

Hysteroscopy provides direct visualization of the CP enabling the assessment of the implantation site and treatment modality. Hysteroscopic surgery allows prevention of bleeding by injecting vasoconstrictors and hemostasis control by direct vessel coagulation. Preservation of fertilization potential and short hospitalization facilitate fast return of menstrual period and future conception. Operative hysteroscopy can be used as a sole treatment option in early less than 8-week CPs safely.

Conflict of interest

No potential conflict of interest was reported by the authors.

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