



Management of Cesarean Scar Pregnancies: A Review of 20 Cases

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Abstract

Introduction: The aim of this study is to present the epidemiologic and clinical characteristics of our patients diagnosed with Cesarean Scar Pregnancy (CSP) and its management in our maternity.

Methods: Descriptive, retrospective, monocentric study, in the maternity of the University Hospital Farhat Hached Sousse, Tunisia, from January 01st, 2010 to December 31st, 2019 (10 years), including 20 CSP cases.

Results: The mean age was 34.85 years [23-43] and the mean number of previous cesarean sections was 2 [1-3]. The main reason for consultation was metrorrhagia in 40% of cases, pelvic pain in 10%, and 45% of cases were asymptomatic. The mean gestational age at diagnosis was 7.1 weeks [4.6-12]. Mean anterior myometrial thinning was 3.81 mm [1.5-7.1]. First-line treatment was medical management with Intramuscular Methotrexate (IM MTX) in 9 cases (45%), a combination of IM MTX and in situ MTX in 9 cases (45%), ultrasound-guided curettage in 1 case (5%), and therapeutic abstinence in 1 case (5%). Second-line treatment included surgical management with Hysteroscopic Curettage (HSC), ultrasound-guided curettage, or a combination of HSC and curettage. Three patients who received medical treatment with IM MTX required second-line curettage. Eight patients who received a combination of IM MTX and in situ MTX required secondary treatment: 3 cases by curettage, 2 by operative HSC, and 3 by HSC and curettage. We had one case of death due to an allergic reaction to MTX presenting as severe toxidermia. Hemorrhagic complications occurred in five cases: 3 after curettage, 1 after IM MTX, and 1 after in situ MTX. No hysterectomy was required.

Conclusion: Curettage treatment showed the highest rate of hemorrhagic complications (30%) due to perforation. Medical treatment only showed the longest recovery time (67 days), medical treatment followed by HSC and curettage was the safest group with no complications. Early diagnosis is essential to consider appropriate treatment. Several therapeutic algorithms have been proposed, but there is no real consensus.

Keywords: Methotrexate; Ectopic pregnancy; Aspiration; Cesarean scar pregnancy

Introduction

Cesarean scar pregnancy is a type of ectopic pregnancy in which a gestational sac implants in the scar of a previous Cesarean Section (CS). The incidence of CSP ranges from 1/1800 to 1/2500 in pregnancies with previous CS, and it is diagnosed in 6% of all ectopic pregnancies in women who have had at least one previous CS [1]. In the literature, the first case of pregnancy on a cesarean scar was reported in 1978 [1]. Since then and until 2001, only 19 cases of CSP have been reported [2]. During the last two decades, the incidence of CSP seems to be increasing, which could be explained by the increase in the incidence of cesarean section and other procedures that may damage the endometrium, such as aspiration, myomectomy, operative hysteroscopy and artificial delivery of the placenta, but also by the improvement of ultrasound techniques, leading to higher detection rates of CSP [3]. The diagnosis of CSP is often difficult but must be made early because misdiagnosis can lead to serious complications such as dehiscence, uterine rupture, and severe hemorrhage with hypovolemic shock, which can compromise the vital and functional prognosis with loss of fertility in the case of hysterectomy for hemostasis [3]. Although more than 2000 cases of CSP and 30 different treatment modalities have been reported, including watchful waiting, medical and surgical methods, there is no consensus on an optimal treatment model due to its low prevalence [4].

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The objectives of this work, based on the clinical experience of the gynecology and obstetrics department of CHU Farhat Hached in Sousse, were:

- To study the epidemiologic and clinical characteristics of CSP.
- To analyze the different methods of treatment.

Methods

This is a descriptive, retrospective, monocentric study conducted in the maternity unit of the University Hospital Farhat Hached of Sousse, Tunisia, over a period of 10 years from January 01st, 2010 to December 31st, 2019. We included 20 patients diagnosed with Cesarean Scar Pregnancy (CSP) who were treated in our maternity unit during the study period.

The following ultrasound criteria were used to diagnose CSP: An empty uterine cavity, an empty cervical canal, the presence of a Gestational Sac (GS) in the anterior part of the uterine isthmus, and the absence or thinning of the myometrium between the bladder and the GS.

We collected data from the medical records of patients hospitalized in our obstetric unit, using an individual sheet for each patient designed for the study. Age, medical and surgical history, gravidity, parity, curettage, history of gynecological surgery, symptoms, time since last CS, β -HCG level, gestational sac diameter/crown-rump length, fetal cardiac activity, type of CSP, treatment model, and complications were recorded. Several types of treatment were used, including.

Therapeutic abstinence: Adopted when the patient's hemodynamic status was stable, embryonic cardiac activity was negative, and pregnancy was quite early with signs suggesting the possibility of spontaneous abortion. The patient was thoroughly counseled by the medical team about the risks and therapeutic options.

Medical treatment with systemic or topical Methotrexate (MTX): MTX was injected at a dose of 1 mg/kg in the absence of contraindications to MTX and provided the patient was hemodynamically stable. A control assay of β HCG was performed on day 4 and day 7 after MTX injection.

Systemic MTX: Intramuscular injection of methotrexate.

In situ MTX: Methotrexate was injected directly into the gestational sac through the vagina under anesthesia using an oocyte retrieval needle attached to a device attached to the vaginal ultrasound probe. The procedure consisted of marking the gestational sac, introducing the puncture needle through the endovaginal route to the gestational sac, puncturing the sac and aspirating its contents until it collapsed, followed by injection of methotrexate at a dose of 1 mg/kg. In case of stagnation or increase in β HCG levels, a second injection of methotrexate at a dose of 1 mg/kg was administered.

Curettage of trophoblastic tissue: Performed under ultrasound guidance using a vacurette, the size of which depended on the size of the gestational sac, connected to a general suction system with negative pressure. In case of bleeding, a 16-gauge balloon Foley catheter was used for intrauterine tamponade for 24 h. Decreases in plasma β HCG levels were monitored until negative.

Hysteroscopy (HSC): Performed under spinal anesthesia using

a 5-millimeter hysteroscope to clearly visualize the pregnancy on the scar and dissect the sac by hydro-dissection under visual control, thus facilitating its curettage or operative hysteroscopy using electrocoagulation and diathermic loop section.

The study was approved by the Ethical Committee.

Results

The mean age of our patients was 34.85 ± 5.42 years. Descriptive analysis showed that mean gravidity and parity were 4.2 ± 1.9 and 2.2 ± 1 , respectively. Nine cases had one or more previous abortions (48%). The mean number of total previous cesarean sections was 2 ± 0.80 .

Nine patients (45%) were asymptomatic (incidental discovery on ultrasound), 8 patients had isolated abnormal vaginal bleeding (40%), 2 patients had isolated pelvic pain (10%), only 1 patient had abnormal vaginal bleeding associated with pelvic pain (5%).

Sixty percentage (60%) of our patients were diagnosed between 6 and 9 WA, the mean initial β HCG level on admission was 18306.65 mIU/mL (± 22349.02) with extremes of 675 and 98240.

All cases were diagnosed by transvaginal and transabdominal ultrasonography according to the criteria already mentioned in the previous chapter. The mean thinning of the anterior myometrium was $3.81 \text{ mm} \pm 1.5$. The mean cranio-caudal length was $7.98 \text{ mm} \pm 8.01$. Fetal heart tones were present in 13 cases (65.5%).

In our study, we divided the patients into four groups based on the first-line treatment according to the ultrasound and biological data (Figure 1):

First group: 9 cases received medical treatment with Intramuscular Methotrexate (IM MTX) (45%).

Second group: 9 cases received a combination of IM MTX and *in situ* MTX (45%).

Third group: 1 patient underwent ultrasound-guided curettage (5%).

Fourth group: 1 case of therapeutic abstinence (5%).

The first group was successful in 5 of 9 patients (55.6%). Only one patient (16%) in this group required 2 doses of IM MTX due to persistent BHCG levels, while all others required a single dose. Only one patient had a complication related to MTX in the form of an allergic reaction as severe toxidermia leading to death after a minimal dose with nephrologist's advice, the patient was already suffering from diabetes complicated by dialysis-stage chronic renal failure.

The last 3 patients from this group underwent second-line treatment, two of them because of the increase in BHCG rate and one for vaginal bleeding, by ultrasound-guided curettage with success.

Table 1: Complications according the type of treatment.

	Total n	Complication	Number (n)	%	p
IM MTX	18	Hemorrhage with Hemodynamic instability	1	5.60%	
		Allergic reaction as severe toxidermia	1	5.60%	
Curettage	10	Hemorrhage with Hemodynamic instability	3	30%	
IN SITU MTX	9	Hemorrhage	1	11.1%	
Abstention	1	0	0	0	

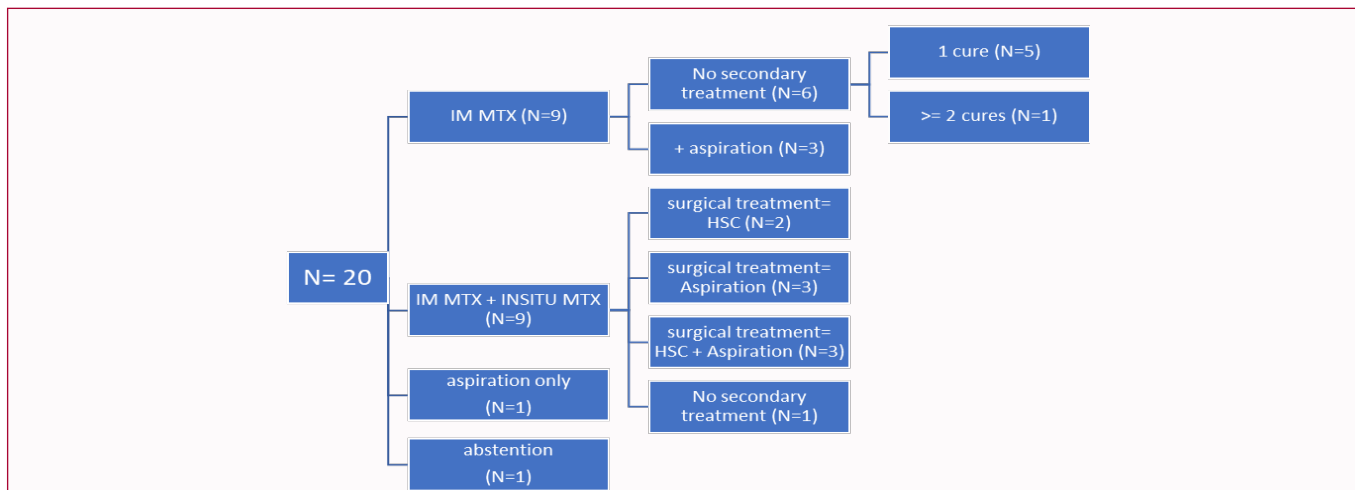


Figure 1: Flow diagram of first and second line treatment in our study population.

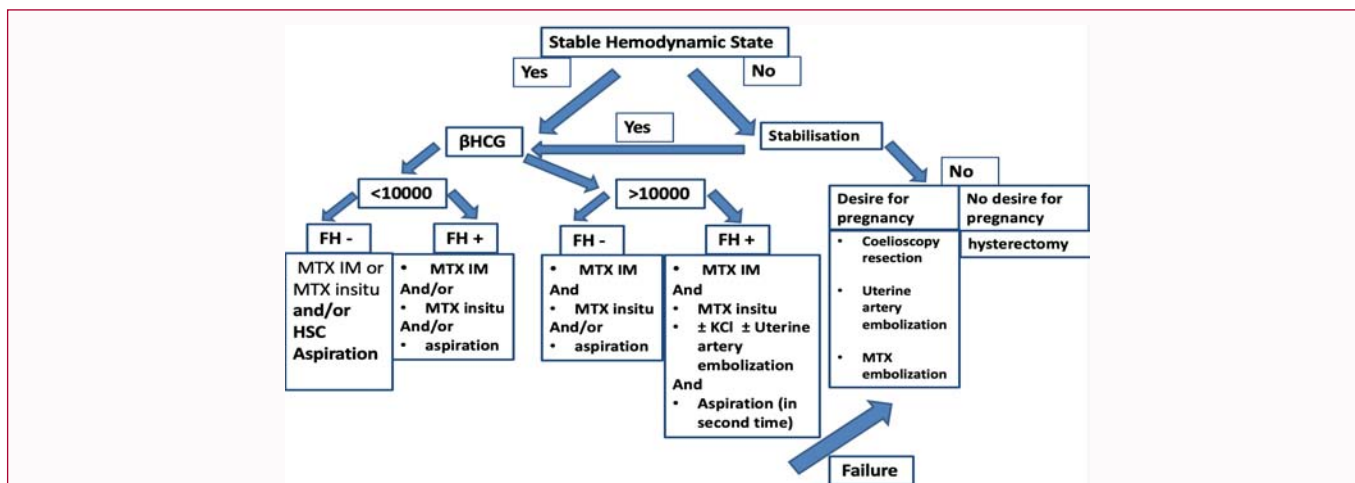


Figure 2: Decisional algorithm for the management of a cesarean scar pregnancy.

The mean gestational age of these last 3 patients was 8.13 weeks (± 1.21). Embryonic cardiac activity was present in 100% of cases. All these patients had myometrial thinning adjacent to the scar greater than 2 mm.

In the second group, the procedure was successful in only one case, the other 8 patients received second-line treatment, two of them underwent operative hysteroscopy, three of them underwent diagnostic hysteroscopy and ultrasound-guided curettage. Only one patient had a complication of the type of bleeding during her hospitalization, which was controlled by embolization of the two uterine arteries. And three of them had surgical aspiration. All patients who underwent surgical aspiration under ultrasound guidance had an immediate complication such as bleeding during aspiration controlled by an intrauterine tamponade probe, only one of which required laparotomy and repair of the uterine rupture.

Other treatment modalities were used, surgical aspiration in one patient, combination MTX INSITU and systemic in one patient and abstinence in one patient without complications (Figure 1).

Discussion

The incidence of cesarean scar pregnancies is estimated to range from 1/1800 to 1/2250 pregnancies, representing 6.1% of all

Table 2: Time to negate the rate of BhCG according to the type of treatment.

	Time to negate the rate of β HCG (days)	n	p
IM MTX only	32.8 (ET= 20.50)	5	-
Curettage only	34	1	-
IM MTX + IN SITU	67	1	-
IM MTX + IN SITU + Aspiration	47 (ET= 14.8)	3	-
IM MTX + IN SITU + HSC	26 (ET= 1.41)	2	-
IM MTX + IN SITU + HSC + curettage	37.67 (ET= 10.97)	9	-
Abstention	35	1	-

ectopic pregnancies [1]. Initially rare, this type of ectopic pregnancy is increasing in frequency due to the increase in cesarean deliveries in recent years [2], as well as improved ultrasound detection facilitated by the endovaginal route [3]. Diagnosis is typically made by visualization of an empty uterine cavity and cervical canal with a gestational sac at the cesarean scar on endovaginal ultrasound. Two types of CSP have been described:

Type I (endogenous type): Characterized by progression of the pregnancy toward the cervico-isthmic space or uterine cavity.

Type II (exogenous type): Characterized by progression of

Table 3: Mean of the length of hospital stay by the type of treatment.

	Mean of the length of hospital stay (days)	n	p
MTX IM only	6.4 (ET=6.88)	5	-
Aspiration only	3	1	-
IM MTX + IN SITU	7	1	
IM MTX + IN SITU + Aspiration	14 (ET= 9)	3	
IM MTX + IN SITU + HSC	20.5 (ET=7.78)	2	<0.05
IM MTX + IN SITU + HSC + aspiration	26 (ET= 14.73)	9	-
Abstention	7	1	-

the pregnancy within the depth of the cicatricial defect toward the bladder and abdominal cavity [5].

The pathophysiological mechanism of pregnancy implantation in the cesarean scar remains poorly understood. The most likely hypothesis is invasion of the myometrium by the blastocyst due to a microdefect at the level of the hysterotomy scar [2], similar to placenta accreta. However, in placenta accreta, myometrial invasion by trophoblastic tissue is variable and pregnancy typically develops within the uterine cavity. In contrast, in CSP, myometrial invasion occurs from the beginning of pregnancy, during a stage characterized by intense lytic activity of the syncytiotrophoblast, which may explain why the entire gestational sac is located within the thickness of the myometrium.

Maternal age over 35 years has been identified as a risk factor for ectopic pregnancy in some studies published in the literature [6]. Accurate diagnosis is essential for appropriate treatment and improved prognosis. Although pelvic MRI is not routinely performed, it may be used when endovaginal pelvic ultrasound is inconclusive in the diagnosis of ectopic pregnancy. Pelvic MRI allows determination of the exact location of the gestational sac, the depth of trophoblast invasion into the myometrium, and identification of any damage to the serosa or bladder [5]. Hysteroscopy, although rarely used for diagnostic purposes in the literature, can also provide valuable information.

In our study of 20 patients, expectant management showed a high failure rate and risk of rupture [4]. Among scar pregnancies with negative cardiac activity, 67% resolved by spontaneous abortion, while the remaining 33% were complicated by massive hemorrhage requiring surgery. Treatment with a single dose of Methotrexate INSITU was reported to be effective in 70% of cases [6]. However, the remaining patients required one or more additional doses of Intramuscular Methotrexate (IM) [6], often in combination with methotrexate in situ. In our study, all patients treated with MTX INSITU received at least one additional dose of intramuscular methotrexate. Maheux-Lacroix et al. [7] and Peterson et al. [8] reported that the combination of local and systemic methotrexate improved the probability of success by 62% to 77% and 65% to 75%, respectively.

Some authors have reported a success rate approaching 100% with echo-guided aspiration [9], but only in gestations less than 7 weeks and in type 1 scar pregnancies with negative embryonic cardiac activity [9]. Other studies [10,11] have identified certain predictive factors for aspiration failure, including: Gestational age greater than 8 weeks, high β -HCG levels greater than 97,000 mIU/mL, rich peritrophoblastic vascularization with low Doppler resistance index (less than 0.4) and thin myometrium adjacent to the scar measuring

less than 3 mm [11].

In the literature, successful aspiration curettage has been achieved with varying thicknesses of myometrium adjacent to the scar, ranging from 1.6 mm to 6.9 mm. However, according to a study by Jiang et al. [12], treatment with MTX followed by aspiration curettage resulted in a faster decrease in β -HCG levels and resorption of the trophoblastic mass than treatment with MTX alone. In a 46-patient study by Dior, 22% of patients initially eligible for medical treatment ultimately required surgery due to complications or persistent β -HCG levels [13].

The technique of operative hysteroscopy requires an experienced operator but is not recommended due to the risk of uterine perforation, bleeding, or bladder injury [8]. Simultaneous laparoscopic control may sometimes be necessary to reduce these complications [14]. Rotas et al. advocated the CCG wedge resection technique and repair of the defect *via* laparoscopy or laparotomy as a safe approach [1]. Laparoscopy is indicated for complications such as uterine rupture and hemorrhage, especially in pregnancies with type 2 scars with deep implantation toward the bladder and abdominal cavity [15]. In a cohort of 40 patients, Huanxiao et al. [16] used the vaginal resection technique and achieved 100% success with few adverse effects.

In our study, one patient underwent embolization of both uterine arteries. She was a 30-year-old woman with a tri-scar uterus and a history of aspiration. She was asymptomatic at the time of pregnancy diagnosis at the scar, which was a 6-week gestation with positive cardiac activity and a myometrial thickness of 2.4 mm, along with an initial β -HCG level of 34,462 mIU/mL. She received an intramuscular injection of MTX (1 mg/kg), followed by MTX *in situ* when severe bleeding occurred, resulting in a 2 g drop in hemoglobin. She then underwent embolization of both uterine arteries, followed by ultrasound-guided aspiration, with β -HCG negativity achieved at 34 days.

Based on our experience and literature review, we propose the following therapeutic algorithm (Figure 2), which takes into account the hemodynamic status, the initial β -HCG level, and the presence or absence of fetal cardiac activity, and offers several therapeutic protocols.

Conclusion

At the conclusion of this study, we can state that cesarean scar pregnancy is a potentially serious pathology with life-threatening implications for the mother. Early diagnosis is essential to initiate appropriate care, ideally in a tertiary maternity unit staffed by an experienced medical team. Management approaches may vary among different medical teams, and although numerous therapeutic algorithms have been proposed, a definitive consensus has yet to be reached.

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