Ultrasound-Guided Vacuum Aspiration of Cesarean Scar Ectopic Pregnancy: A prospective interventional study

Ahmed Tawfik Ahmed[1], Mesbah. Y. M[1], Mohamed Taman[1], Ahmed R Mashaly[2], Ahmed El-Zayadi[1]

*[1]Department of Obstetrics and Gynecology, Faculty of medicine Mansoura University

*[2]Obstetrics and Gynecology Department, Damanhour National Medical Institute, Egypt.

Abstract

Objective: This study aimed to describe cases of caesarean scar pregnancies (CSP) that were successfully treated with ultrasound (US)-guided manual vacuum aspiration (USG-MVA) and their outcome.

Methods: This prospective interventional study was performed on 26 patients diagnosed with caesarean scar ectopic pregnancy in Department of Obstetrics and Gynecology, Faculty of medicine, Mansoura University, Mansoura, Egypt from 1/10/2023 to 1/10/2024. The patients' sociodemographic and clinical data were collected. The patients were treated with suction curettage guided-US.

Results: The complications were reported in 2 patients. As regard the postoperative ultrasound findings, scar hematoma was detected in 18 patients (69.2%). The median preoperative B-hCG titre was 7903 and this level showed high statistically significant decrease postoperatively [2385 (6 – 6825)] ($P < 0.001$). There was no significant difference between the cases underwent MVA + methotrexate (MTX) or who treated with MVA alone regarding the preoperative ($p= 0.086$) and postoperative B-hCG titre ($p= 0.075$).

Conclusion: Cesarean scar ectopic pregnancy (CSEP) is a critical and complicated disorder with an increasing frequency nowadays. Precise early diagnosis and efficient management are of great importance to decrease maternal morbimortality of this type of pregnancy.

Synopsis: Vasoprectively.

Keywords: Scar ectopic pregnancy, cesarean section, fetal viability, ultrasonography, methotrexate.

Introduction

Cesarean scar pregnancy (CSP) has been considered an extensive complication of cesarean delivery (CD) and is defined as gestational sac implantation into the hysterotomy area of a previous CD (1). It is thought to be the most uncommon type of ectopic pregnancy, and Larsen and Solomon recorded the first case of CSP in 1978. With the increasing rate of cesarean section (C/S), there has been a

Corresponding author:
Ahmed Tawfik Ahmed
Email: Matrixay2010@gmail.con
Tel: +20 10 91718001

considerable increase in CSP. The incidence of CSP in cases with previous C/S and all cases of ectopic pregnancies was 0.15% and 6.1%, respectively (2).

CSP is still to be a critical state as it could be associated with uterine rupture, haemorrhage, and could be accompanied by hypovolemic shock with consequent maternal morbimortality. Due to its uncommon occurrence, there is no standard on the therapeutic option of CSP, and each case have to be assessed separately (3). Rapid diagnosis and clinical suspicious are essential to evade extensive hemorrhage, uterine rupture, consumptive coagulopathy and death as CSEP is frequently confused with cervical pregnancy or miscarriage. No general therapies have been approved for CSP; however, the aim is to evade maternal adverse events and to preserve fertility (4).

There are several therapeutic modalities for CSP which include expectant management and medical and surgical approaches that are based on numerous factors, such as the CSP type, gestational age (GA), viability of the pregnancy, gravidity of symptoms, physician skills, and patient preference (5). Surgical management could be provided to hemodynamically unstable cases, including hysteroscopy, which is an essential mini-invasive strategy for managing this type of pregnancy, together with laparoscopy, laparotomy, and uterine artery embolization (6).

This study aimed to assess the feasibility, efficacy, and reliability of the intraoperative USG-MVA method as an efficient therapeutic approach for CSP.

Methods

Our study was prospective interventional study conducted over a period of one year from 1/10/2023 to 1/10/2024 at Department of Obstetrics and Gynecology, Faculty of medicine, Mansoura University, Mansoura, Egypt after obtaining the approval form Ethics Committee. CSP diagnosis was based on patient's history, clinical examination, elevated values of serum beta-human chorionic gonadotropin (B-hCG), and US features. The presurgical diagnosis was conducted based on transvaginal US using US devices (Toshiba Aplio 500 Platinun, Japan) and (Ge LOGIQ F6,GE medical systems (China)) using transabdominal and transvaginal ultrasound with multiple frequency transabdominal 2-5 MHZ and high-resolution transvaginal probe 5-9 MHZ, visualising an enlarged hysterotomy scar with an embedded mass, which might bulge beyond the anterior uterine contour (6). In addition, the existence of trophoblasts between the bladder and the anterior uterine wall, the absence of foetal fragments within the uterus, the perfusion of the peritrophoblastic vasculature, and the discontinuity of the anterior uterine wall in the sagittal plane could also be detected (7).

Inclusion criteria included:

- Hemodynamically stable pregnant females.
- Pregnant females with GA less than eight weeks.
- Pregnant females with B-hCG level less than 10,000 mIU/Ml.
- Pregnant females with CSP (Endogenic type).
- Pregnant females without sign of rupture of uterus (acute pain and profuse bleeding).

We excluded the following cases from the study:

- Hemodynamically unstable patients, tachycardia, hypotension and shock.
- Rupture of preceding uterine incision scar with intraperitoneal hemorrhage.
- Pregnant females with B-hCG level more than 10,000 mIU/Ml.
- Pregnant females with gestational age more than 8 weeks gestation.
- Patients who refused to participate.

Data were collected from History taking, General, Abdominal, Local examination, Laboratory investigations and Ultrasound imaging.

All surgeries were conducted in the operative room under general anaesthesia, and the patient was placed in the lithotomy position with the aid of suprapubic guided-US. A vacuum aspirator was attached to the general aspiration system with a maximum pressure generated of –500 Pa or using MVA to aspirate the whole pregnancy material without perforating the preceding uterine CSP. Flexible Karman cannula 4, 5, and 6 mm was utilized with the vacuum aspirator, in association with applicable adaptors. In patients of intractable uterine haemorrhage following vacuum extraction of the CSP, an 18-Fr gauge Foley catheter balloon tamponade (50 cm3) was placed intrauterine and deflated gradually. A graduated volume scale was used to measure the volume of the material which included blood, decidua, and pregnancy tissue that was aspirated from the uterus and collected in suction containers. Follow up was done for all patients in our study postoperatively and one week after the operation as regard general condition, vaginal bleeding, signs of infection, TVS and B-hCG titter.

Statistical analysis

Collected data was tabulated, and introduced to a PC using SPSS (IBM Corp. Released 2017, Version 25.0. Armonk, NY). Data were presented, and proper analysis was conducted according to the data type. The Kolmogorov-Smirnov test was used as a test of normality. Mean ± SD/median were used for numerical data. Frequency and percentage were used for non-numerical data. Wilcoxon signed-rank A test was used to assess the significance of the difference between 2 groups with non-parametric data. The Student's T Test was used to assess the significance of the difference between two independent study groups with parametric data. The P-value associated with test statistics indicated the significance level where P-values < 0.05 are significant.

Ethical Consideration

The research approval of the study was acquired from IRB of Faculty of Medicine at Mansoura University. The researcher clarified the objective of the study to the subjects. We maintained anonymity and confidentiality of the subject's data. Subjects were informed that they have the right to withdraw from the study at any time without giving any reasons. Ethics, values, and beliefs of subjects were respected. A written consent was taken from every case included in this study.

Results

Twenty-six caesarean scar ectopic pregnant women were studied. The mean age of the patients was 31.77 ± 5.55 years. The mean number of gravidities was 4.31 ± 2.09. The mean number of parities was 2.54 ± 1.07. Miscarriage was reported once in 26.9%, twice in 11.5% and seven times in 3.8% (Table 1). The presenting symptoms included bleeding + lower abdominal pain in 6 patients (23.1%) and vaginal bleeding was reported in 20 patients (76.9%) .The preoperative haemoglobin level was 11.92 ± 1.14 gm/dl. The fetal cardiac activity was absent in the feti of 11 (42.3%) of the included patients (Table 2). The mean volume of intraoperative blood loss was 188.35 ± 250.33 ml. The mean residual myometrial thickening was 3.95 ± 0.95 mm. The management was MVA in 26 of the included patients (100%). Further management was required in 15 females (57.7%). There were 10 cases (38.5%) who were treated by MVA + methotrexate and 16 cases (61.5%) who were treated with MVA alone (Table 3).The complications in our study were reported in 2 patients; both complicated with severe bleeding; one managed by insertion of intrauterine catheter balloon and the other managed by laparotomy. There were 7 patients (26.9%) who did not require

blood transfusion (BT) and 19 patients (73.1%) who required blood transfusion (Table 3). As regard Preoperative ultrasound findings, the uterine position was AVF in 24 patients (92.3%) and RVF in 2 patients (7.7%). GS at site of CS scar (endophytic type) was shown in all the included patients, the postoperative ultrasound findings, scar hematoma was detected in 18 patients (69.2%) and the median preoperative B-hCG titre was 7903 and this level showed high statistically significant decrease postoperatively [2385 (6 – 6825)] ($P < 0.001$) (Table 4). There was no statistically significant difference between the cases underwent MVA + methotrexate or who treated with MVA alone regarding the gestational age (p= 0.236), previous CS (p= 0.239), the residual myometrial thickening (p= 0.104), blood loss intraoperative (p= 0.067), fetal cardiac activity (p= 0.530) and requirement of blood transfusion (p= 0.235). Additionally, we found no statistically significant difference between the cases underwent MVA + methotrexate or who treated with MVA alone regarding the preoperative (p= 0.086) and postoperative B-hCG titre (p= 0.075) but the incidence of postoperative hematoma was higher in the MVA only group, but it didn't reach a statistically significant value (p= 0.093) (Table 5).

Table (1): Demographic data and clinical history in the patients of the study.

Variables	Study patients (N = 26)	
	Mean ± SD	**Median (Range)**
Age	31.77 ± 5.55	32 (21 – 45)
Gravidity	4.31 ± 2.09	4 (2 – 12)
Parity	2.54 ± 1.07	2 (1 – 5)
	Number	**Percent**
Previous miscarriage		
No previous miscarriage	15	57.7
1	7	26.9
2	3	11.5
7	1	3.8
Previous CS		
1	4	15.4
2	11	42.3
3	7	26.9
4	4	15.4
Vaginal delivery		
0	25	96.2
3	1	3.8

Table (2): Gestational age and clinical data

Variables	Study patients N = 26	
	Number	**Percent**
Gestational age at presentation		
5 weeks	2	7.7
6 weeks	7	26.9
7 weeks	9	34.6
8 weeks	8	30.8
Presenting symptoms		
Vaginal bleeding + lower abdominal pain	6	23.1
Vaginal bleeding	20	76.9
Fetal cardiac activity		
Absent	11	42.3
Present	15	57.7
	Mean ± SD	**Median (Range)**
Preoperative hemoglobin (gm/dl)	11.92 ± 1.14	11.9 (8.7 – 13.7)

Table (3): Outcome and managment

Variables	Study patients N = 26	
	Mean ± SD	**Median (Range)**
Intraoperative blood loss	188.35 ± 250.33	90 (50 – 1100)
Residual myometrial thickening	3.95 ± 0.95	4 (3 – 7)
	Number	**Percent**
Management		
MVA	26	100
Requirement of further management		
No	11	42.3
Yes	15	57.7
• Methotrexate	10	66.6
• IUB	4	26.7
• Laparotomy	1	6.7
Treatment		
MVA + methotrexate	10	38.5
MVA	16	61.5
Complications of the procedure	**Number**	**Percentage (%)**
No complications	24	92.3
Severe vaginal bleeding	1	3.8
Laparotomy due to severe bleeding	1	3.8
Blood transfusion		
Yes	19	73.1
No	7	26.9

Table (4): Preoperative and postoperative radiology and Labs

Variables	Study patients N = 26		
	Number		Percent
Uterine position			
AVF	24		92.3
RVF	2		7.7
Additional findings			
GS at site of CS scar (endophytic)	26		100
Scar hematoma	18		69.2
No scar hematoma	8		30.8
B-hCG titre (mlU/mL)	**Preoperative (n= 26)**	**Postoperative (1 week)**	**Test of significance**
	7903 (73 – 10027)	**2385 (6 – 6825)**	z = - 4.457 P < 0.001*

Table (5): Preoperative and postoperative clinical, laboratory and radiology of both groups

Variables	Group 1 (MVA+ metho-trexate) (n= 10)	Group 11 (MVA alone) (n= 16)	Test of significance
Gestational age (Weeks)	**6.60 ± 0.97**	**7.06 ± 0.93**	t = -1.217 P= 0.236
Previous CS			
1	**0 (0%)**	**4 (25%)**	MC = 4.217 P= 0.239
2	**6 (60%)**	**5 (31.3%)**	
3	**2 (20%)**	**5 (31.3%)**	
4	**2 (20%)**	**2 (12.5%)**	
Residual myometrial thickening (mm)	**4.34 ± 1.31**	**3.71 ± 0.58**	t = 1.692 P= 0.104
Blood loss intraoperative (ml)	**95 (50 -450)**	**110 (70 - 1100)**	z = - 2.542 P= 0.142
Fetal cardiac activity			
Absent	**5 (50%)**	**6 (37.5%)**	FET = 0.394 P= 0.530
Present	**5 (50%)**	**10 (62.5%)**	
Blood transfusion			
Yes	**6 (60%)**	**13 (81.3%)**	FET = 1.413 P= 0.235
No	**4 (40%)**	**3 (18.7%)**	
Preoperative B-hCG titre (mlU/mL)	**5378.5 (471 – 10027)**	**7960.5 (73 – 9992.12)**	z = - 2.230 P= 0.086
Postoperative B-hCG titre (mlU/mL)	**1108.15 (49 -6325)**	**3227 (6 - 6825)**	z = - 2.347 P= 0.075

Postoperative findings			
Hematoma	**5 (50%)**	**13 (81.3%)**	FET = 2.821
No hematoma	**5 (50%)**	**3 (18.7%)**	P= 0.093

Group I: cases managed by MVA+ methotrexate.
Group II: cases managed by MVA alone.

Discussion

Cesarean scar pregnancy (CSP) is an uncommon form of ectopic pregnancy, defined as embryo implantation in a preceding lower segment C/S scar (8). Mothers with CSP are faced with risks of unpredictable extensive bleeding or more foatal adverse events, such as perforated uterus, haemorrhagic shock, and mortality (9). There is no universal management option for CSP (10). It appears that combining different treatment modalities is more beneficial than single therapy (11). For this, the current study was conducted to evaluate the feasibility, efficiency, and reliability of the intraoperative USG-MVA approach as an efficient therapeutic modality for CSP.

Our study included 26 caesarean scar ectopic pregnant women. The mean age of the cases was 31.77 ± 5.55 years. All included patients had one or more previous C/S; on the other hand, most females (84.6%) had at least two preceding C/S. Within the same context, a high prevalence of previous two or more CS was observed in another study by Datta and Jha, with 66.7% of the patients having formerly had at least two C/S (12). Jurkovic et al. displayed that 72% of their cases had formerly had at least two C/S (13). Based on this, previous C/S scars have to be assessed routinely throughout early pregnancy to help decrease the wrong diagnosis of CSPs as silent miscarriage and to enhance maternal morbimortality.

Presenting symptoms included vaginal bleeding + lower abdominal pain in 6 patients (23.1%) and vaginal bleeding was reported in 20 patients (76.9%). That was similar to Hamed et al. who showed in their study, 17 cases with vaginal spotting (65.4%), 7 cases were asymptomatic (26.9%) and 2 cases presented with pain (7.7%) (14).

In a previous case series of 11 females with CSP, manifestations differed from mild vaginal bleeding and pain to extensive vaginal bleeding and, eventually, silent miscarriage. These cases as a result highlight the possible difficulties in accomplishing a precise diagnosis at presentation (12). However, in another study, the commonest manifestations were missed period (58.8%), followed by vaginal bleeding (29.4%), then abdominal pain (11.8%) (15).

Our results revealed that the foetal heart rate (FHR) was absent in the feti of 11 (42.3%) of the included 26 females. In agreement, only four cases had positive FHR (23.5%) with gestational age ranging from four to ten weeks using U/S evaluation (15).

Our management was MVA in 26 of the included patients (100%). Further management was required in 15 patients (57.7%). There were 10 cases (38.5%) who were treated by MVA + methotrexate and 16 cases (61.5%) who were treated with MVA alone. A previous study by Hamed et al. where the included 26 cases with CSP were divided into two groups, (group 1) included 16 cases who underwent suction using MVA and (group 2) included 10 cases who received intramuscular (MTX) injection (dose of 50 mg/m2) followed by MVA (14). Similar results were reported by Sevket et al. where 25 patients with CSP were recognized and distributed according to the treatment regimen into two groups. Group A patients (n = 11, 44%) were treated with systemic MTX followed by dilatation and suction curettage, while the second group was treated only by a suction curettage

on females of Group B (n = 14, 56%) (16).

In addition, Shen et al. recorded that the majority of cases (70.4%) had been treated by transcervical aspiration (TCA) of the gestational sac, and open surgeries had been utilized to manage 22.2% of the cases, whereas the remainder had been treated either by TCA of the gestational sac and MTX (14.8%) or MTX alone (7.4%) (17). In a systematic review of 176 studies (13431 women with CSP undergoing treatment) were included. Successful treatment after primary intervention was achieved in 86.2% (95% CI 82.3–89.7) of women with CSP undergoing treatment with ultrasound guided suction curettage, 72.4% (95% CI 64.8-79.3) with systemic MTX, 81.6% (95% CI 72.3–89.3) with local MTX, 83.9% (95% CI 66.7–95.6) with interventional radiology, 90.42% (95% CI 82.9–96.0) with hysteroscopy, 96.1% (95% CI (92.3–98.6) with laparoscopy and 92.6 with high intensity focused ultrasound (95% CI 78.2–99.6) (8). Levin et al. reported that 80.6% of patients were treated by systemic infusion of MTX, whereas 19.4% had combined systemic and local MTX treatment (18). Therefore, MTX is a safe and efficient plan for CSP management, with promising consequent reproductive outcomes and a low conversion rate to surgery. In addition, Jurkovic et al. displayed that MTX therapy was efficient in 75% of cases, with 6.0% of female needing a hysterectomy (13).

The median preoperative B-hCG titre was 7903 (73 – 10027) and this level showed high statistically significant decrease postoperatively [2385 (6 – 6825)] ($P < 0.001$). A study by Attay et al. who included total of forty cases managed with dilatation and MVA. The beta-hCG values of 21 cases (52.5%) diminished below 10 mIU/mL after the first 15 days, and the rest diminished below 10 mIU/mL after 21 days following MVA (9).

The complications in our study were reported in 2 patients; both complicated with severe bleeding; one managed by insertion of intrauterine catheter balloon and the other managed by laparotomy. Of the included patients, there were 7 cases (26.9%) who didn't require blood transfusion and 19 cases (73.1%) who required blood transfusion. Complications which include extensive haemorrhage, persistence of CSP, and any need of extra intervention weren't noticed by Altay et al. (9). In another study that included 33 cases with CSP, there were no recorded cases of perforated uterus, hysterectomy or failed therapy in the current analysed CSP cases. Four patients, two in each group, needed BT (19). Arslan et al. recorded ineffective or complicated uterine curettage in 88.8% of their studied cases (20), while Wang et al. recorded a failure rate of seventy per cent following curettage. This may be due to the absence of capability for ectopic tissue evacuation and the increase in the incidence of uterine rupture and extensive hemorrhage (21).

There was no significant difference between the cases underwent MVA + methotrexate or who treated with MVA alone regarding the gestational age (p= 0.236), previous CS

(p= 0.239), the residual myometrial thickening (p= 0.104), blood loss intraoperative

(p= 0.067), fetal cardiac activity (p= 0.530), requirement of blood transfusion (p= 0.235) and preoperative uterine position as detected by ultrasound

(p= 0.727). Hamed et al. showed that both groups were comparable in age, obstetric history, positive foetal heart beat, GA at diagnosis, thickness of anterior lower uterine wall on US, type of CSP, initial HCG levels and number of previous caesarean sections (14). This may reflect that there are no specific indications for each treatment regimen.

The incidence of postoperative hematoma was greater in the MVA only group without significant difference (p= 0.093). This was in agreement with Sevket and associates who reported the clinical results and safety of suction curettage with or without MTX administration before curettage for treatment of CSP.

The estimated blood loss and major complication rate were similar. They found that 'suction curettage only' group required less treatment time and came to the conclusion that suction curettage is an efficient management for CSP (16). Also, in a recent study by Hamed et al, among (group 1, MVA alone), two cases were complicated with hematoma which resolved spontaneously and one case was complicated with severe bleeding and needed urgent laparotomy and hysterectomy. While in (group 2), all of them were successfully treated without any detected complications or need for additional treatment (14).

Combined local injection-guided US and systemic MTX were demonstrated to be efficient in a series of twenty-six patients of CSP. MTX therapy only may be utilized in surgically difficult and risky uterine components that involve cornual pregnancy; on the other hand, for CSP, MTX only isn't sufficient (22).

The current study has some limitations as it is a single center study and the duration of follow up was relatively short. The sample size included was relatively small, but based on comparison with other studies, the sample size appears to be reasonable for this type of cases.

Conclusions

Our study included that USG-MVA was shown as an efficient technique in evacuation of CSEP. Adding of methotrexate tends to give better results with fewer complications and needs no any other interventions.

Conflict of interest: Nil.

Fund: Nil.

References

1. Hameed MSS, Wright A, Chern BSM. Cesarean scar pregnancy: current understanding and treatment including role of minimally invasive surgical techniques. Gynecology and Minimally Invasive Therapy. 2023; 12: (2): 64–71.
2. Gull B, Klerelid V, Jormeus A, Strandell A. Potential risk factors for caesarean scar pregnancy: a retrospective case–control study. Human Reproduction Open. 2021; 2021: (2): 1- 8.
3. Al Farsi AR. Cesarean scar pregnancy: Time to initiate universal screening. Oman Medical Journal. 2023; 38: (6): e564 – e566.
4. Zalduegui MM. Cesarean scar ectopic pregnancy, a life-threatening condition: a case report. Clinical & Experimental Obstetrics & Gynecology. 2019; 46: (2): 313–316.
5. Nijjar S, Jauniaux E, Jurkovic D. Surgical evacuation of cesarean scar ectopic pregnancies. Best Practice & Research Clinical Obstetrics & Gynaecology. 2023; 89: 102361.
6. Armstrong V, Hansen WF, Van Voorhis BJ, Syrop CH. Detection of cesarean scars by transvaginal ultrasound. Obstetrics & Gynecology. 2003; 101: (1): 61–65.
7. Lee SR, Park SY, Park MH. Cesarean scar pregnancy associated with an impending uterine rupture diagnosed with 3-dimensional ultrasonography. American Journal of Obstetrics & Gynecology. 2017; 216: (5): 531.e1- 531.e2.
8. Alameddine S, Lucidi A, Jurkovic D, Tritsch IT, Coutinho CM, Ranucci L, et al. Treatments for cesarean scar pregnancy: a systematic review and meta-analysis. The Journal of Maternal-Fetal & Neonatal Medicine. 2024; 37: (1): 1–23.
9. Altay MM, Mert SA, Gemici A, Kaplan M, Gelisen O. Successful technique of manual vacuum aspiration for treatment of type 2 cesarean scar pregnancies: evaluation of 40 cases. The Journal of Maternal-Fetal & Neonatal Medicine. 2021; 34: (16): 2693–2700

10. Hanáček J, Heřman H, Křepelka P, Hašlík L, Brandejsová A, Krofta L. Cesarean scar pregnancy. Ceska gynekologie. 2022; 87: (3): 193–197.

11. Petersen KB, Hoffmann E, Larsen CR, Nielsen HS. Cesarean scar pregnancy: a systematic review of treatment studies. Fertility and Sterility. 2016; 105: (4): 958–967

12. Datta S, Jha C. Suction evacuation with methotrexate as a successful treatment modality for caesarean scar pregnancies: Case series. Sultan Qaboos University Medical Journal. 2015; 15: (4): e539–e545.

13. Jurkovic D, Hillaby K, Woelfer B, Lawrence E A, Salim R, Elson CJ. First-trimester diagnosis and management of pregnancies implanted into the lower uterine segment Cesarean section scar. Ultrasound in Obstetrics and Gynecology: The Official Journal of the International Society of Ultrasound in Obstetrics and Gynecology. 2003; 21: (3): 220–227.

14. Hamed IY, Abdelrazik MM, El-Zayadi AAS. Manual Vacuum Aspiration Alone Versus Manual Vacuum Aspiration Preceded by Methotrexate in Management of Caesarean Scar Pregnancy. Evidence Based Women's Health Journal. 2024; 14: (2): 215–219.

15. Abdullah NA. Outcome and treatment of caesarean scar ectopic pregnancy under ultrasound-guided vacuum aspiration. Journal of International Medical Research. 2024; 52: (10): 1–7.

16. Sevket O, Keskin S, Ates S, Molla T, Dansuk R, Yazicioglu HF, et al. Is methotrexate administration needed for the treatment of caesarean section scar pregnancy in addition to suction curettage? The European Journal of Contraception & Reproductive Health Care. 2014; 19: (2): 128–133

17. Shen L, Tan A, Zhu H, Guo C, Lio D, Haung W. Bilateral uterine artery chemoembolization with methotrexate for cesarean scar pregnancy. American Journal of Obstetrics and Gynecology. 2012; 207: (5): 386.e1–386.e6

18. Levin G, Zigron R, Dior UP, Gilad R, Shushan A, Benshushan A, et al. Conservative management of Caesarean scar pregnancies with systemic multidose methotrexate: predictors of treatment failure and reproductive outcomes. Reproductive BioMedicine Online. 2019; 39: (5): 827–834.

19. Özdamar Ö, Doğer E, Arlıer S, Çakıroğlu Y, Ergin RN, Köpük ŞY, et al. Exogenous cesarean scar pregnancies managed by suction curettage alone or in combination with other therapeutic procedures: A series of 33 cases and analysis of complication profile. Journal of Obstetrics and Gynaecology Research. 2016; 42: (8): 927–935.

20. Arslan M, Pata O, Dilek TUK, Aktas A, Aban M, Dilek S. Treatment of viable cesarean scar ectopic pregnancy with suction curettage. International Journal of Gynecology & Obstetrics. 2005; 89: (2): 163–166.

21. Wang CB, Tseng CJ. Primary evacuation therapy for Cesarean scar pregnancy: three new cases and review. Ultrasound in Obstetrics and Gynecology: The Official Journal of the International Society of Ultrasound in Obstetrics and Gynecology. 2006; 27: (2): 222–226.

22. Sel G, Harma MI, Harma M, Barut A, Arıkan İ İ, Hastanesi BD, et al. Case report of a successful treatment of interstitial pregnancy with systemic methotrexate. Abant Medical Journal. 2017; 6: (3): 120–122.