



Setting Clinical and Professional Excellence

Different Treatment Modalities for Cesarean Scar Pregnancies in Sulaimani Maternity Teaching Hospital

Shadia Ahmed Faydhulla* **Srwa Jamal Murad**** **Chro Najmadeen Fattah*****

Abstract

Background and objectives: Cesarean scar ectopic pregnancy is one of the most severe complications of cesarean delivery. Thus, we aimed to evaluate the cesarean scar ectopic pregnancy and treatment modalities.

Methods: A cross-sectional study was conducted on 30 cesarean scar ectopic pregnant women who attended the Sulaimani Maternity Teaching Hospital, from May 2022 to May 2023. The cesarean scar ectopic pregnancy among studied women was diagnosed with ultrasound, and then a validated questionnaire was used to collect their sociodemographic and clinical data. Blood samples were collected to estimate the Beta-Human Chorionic Gonadotrophin hormone level.

Results: Most women (83.3%) were aged 20-40 years, overweight (46.7%), had bleeding (56.7%), endogenous scar (83.3%), and two caesarean section histories (33%). Moreover, most women (60%) had surgical treatment, and had a Beta-Human Chorionic Gonadotrophin level of $>10,000$ mIU/mL. The fetal heart rate was negative in most women (77.78%) who needed surgical treatments, while it was positive in 58.33% of women who required systemic methotrexate with suction curettage ($p=0.044$). Furthermore, most patients in both groups (83.33%) had endogenous scars ($p=1.0$). Bleeding was the most prevalent complaint in both groups ($p=0.369$). Suction curettage was the most practiced modality in a group of surgical therapy (55.56%), while systemic methotrexate with suction curettage was the most practiced in another treatment modality group (58.33%).

Conclusions: Surgery alone or combination therapy are effective and safe treatment methods for cesarean scar ectopic pregnancy that were not affected by maternal sociodemographic and clinical features.

Keywords: Cesarean scar, Cross-sectional study, Ectopic pregnancy, Treatment modality

*MBChB, KHCMS/Obstetrics and Gynecology Trainee, Sulaimani Maternity Teaching Hospital, Sulaimani Directorate of Health, Sulaimaniyah, Iraq. E-mail: dr.shadiaaa@gmail.com (Corresponding author)

**MBChB, KSGE, KEL, FIBMS, OBGYN, MRCOG, Assistant Professor of Obstetrics and Gynecology at Department of Clinical Sciences, College of Medicine, University of Sulaimani, Sulaimaniyah, Iraq. E-mail: srwa.murad@univsul.edu.iq

***MBChB, DGO, MRCPI, FRCOG, MD, Professor of Obstetrics and Gynecology at Department of Clinical Sciences, College of Medicine, University of Sulaimani, Sulaimaniyah, Iraq. E-mail: chro.fattah@univsul.edu.iq



Introduction

Cesarean scar ectopic pregnancy (CSEP) is defined as the implantation of gestation within the myometrial tissues that parallel the place of the previous cesarean section (C/S).¹ However, CSEP typically arises as a late impediment of a formerly made C/S.² Women with CSEP are at high risk for its recurrence, although vaginal delivery after a CSEP is also probable.³ Cesarean scar ectopic pregnancy is considered the rarest/infrequent condition leads to a serious life-threatening issues.⁴ The incidence of CSEP has been assessed to be one case in 3000 obstetric individuals. CSEP represents 6% of ectopic pregnancies in patients with a history of C/S.^{5,6} Many studies have continuously tried to find the effectiveness and security of various treatment modalities in managing CSEP, including surgical, medical or a combination of both. The former one is usually results in greater success rates but could be associated with serious bleeding more often than medical choices.⁷ Since there is an intense increase in the frequency of C/S, it is noticeable that further women will be detected to have CSEP shortly. Therefore, established principles should be produced for the treatment possibilities.⁸ The diagnosis of CSEP is not easy, and early diagnosis and management of CSEP remain the mainstay for a successful outcome.⁴ A false-negative diagnosis may cause significant complications such as morbidity from severe bleeding, uterine rupture, placenta accreta spectrum, and emergency hysterectomy.⁷ Thus, critical criteria are required for tentative diagnoses, such as empty uterus/cervical canal growth of the gestational sac or placental tissues in the frontal wall of the cervical isthmus.⁹ The suggested methods for treating CSEP are systemic methotrexate (MTX), uterine artery embolization (UAE), suction evacuation and curettage under ultrasound guide,

laparoscopic hysterotomy, suction evacuation using ultrasound (U/S) guide, and hysteroscopy. Although these methods are the commonly accepted first-line approaches, laparoscopic hysterotomy and hysteroscopy are safer and more efficient surgical processes to be adopted as main treatment modalities for CSEP.⁹ Consequently, the management of CSP needs expertise and a multidisciplinary approach to prevent complications since safe outcomes depend on timely diagnosis and interdisciplinary care by skilled clinicians. Cesarean scar ectopic pregnancy can be associated with a livebirth, but currently, good-quality indication to foresee the consequence of CSEP and offer knowledgeable and evidence-based care still needs to be provided. Therefore, we aimed to assess the results of the diverse treatment modalities for CSEP.

Patients and methods

This retrospective cross-sectional study was conducted on 30 cesarean scar ectopic pregnant women who attended the Sulaimani Maternity Teaching Hospital, Sulaimaniyah, Iraq, from May 2022 to May 2023. Currently, there is an increasing number of CSEP because of increased numbers of C/S and our hospital is a tertiary hospital that received patients all around Sulaimaniyah. Patients were divided into two groups. Group 1 (n=18) underwent surgical treatment, while Group 2 (n=12) underwent surgical and medical treatments. Both regional and general anesthesia were used based on the type of therapy. Women with ectopic pregnancy at the site of previous C/S scars in their first trimester were enrolled in this study. Whereas, women with ectopic pregnancies other than the site of previous C/S scar were not enrolled. A validated questionnaire was used to collect participants' sociodemographic (age and body mass index (BMI)) and clinical data, including presented symptoms (bleeding, abdominal pain, or both), type of scar (endogenous/exogenous),





thickness of scar in mm, number of previous C/S, fetal heart rate (FHR), and treatment modality applied. The CSEP among studied women was diagnosed and confirmed with U/S. Then, a questionnaire was filled out for all of them, and blood was collected to determine the level of the β -Human Chorionic Gonadotropin (β -HCG) hormone. The study was approved by the Ethics Committee of Kurdistan Higher Council of Medical Specialties (KHCMS), Sulaimaniyah, Iraq. All parameters were done according to the Declaration of Helsinki. Participants' written informed consent was gained before starting the study, and they felt free to leave the study without giving a reason. The Statistical Package for the Social Sciences (SPSS et al., version 27), including Shapiro-Wilk and Kolmogorov-Smirnov tests, were used to determine the normal distribution of the data. The Chi-square test was used for categorical variables. Independent samples t-test and Mann-Whitney U test was used for parametric and non-parametric variables, respectively. P-value ≤ 0.05 was considered a significant difference.

Results

The maternal mean age was 33.47 ± 6.28 years, and most patients (83.3%) were aged 20-40 years, while the mean BMI was 27.23 ± 4.79 kg/m^2 , and most (46.7%) were overweight. The most abundant complication was bleeding (56.7%), and the prevalent type of scar was endogenous (83.3%). Also, most patients had two C/S histories (33%), followed by one (20%) and three C/S (20%), while the lowest (10%) had five previous C/S. The FHR was negative in most cases (63.3%), the mean gestational age was 6.96 ± 1.62 weeks, and the mean scar thickness was 2.5 ± 1.73 mm. Additionally, most women (60%) underwent only surgery, and the rest (40%) experienced medical/surgical treatments. Most patients (40%) had β -HCG $> 10,000$ mIU/mL , while

23.3% had an $\text{HCG} < 10,000$ mIU/mL , and 36.7% had no record, as shown in Table (1).

Table (1): Sociodemographic characteristics and clinical data of the studied patients.

Variable		Number	Percentage
Age (Years)	<20	1.0	3.3
	20-40	25	83.3
	>41	4.0	13.3
Body mass index (BMI)	Underweight	1.0	3.3
	Healthy weight	7.0	23.3
	Overweight	14	46.7
	Obese	8.0	26.7
Complain	No, complain	7.0	23.3
	Abdominal pain	5.0	16.7
	Bleeding	17	56.7
	Abdominal pain and bleeding	1.0	3.3
Type of Scar	Endogenous	25	83.3
	Exogenous	5.0	16.7
Previous Cesarean delivery	One	6.0	20
	Two	10	33
	Three	6.0	20
	Four	5.0	16
	Five	3.0	10
Fetal Heart Rate (FHR)	Negative	19	63.3
	Positive	11	36.7
Treatment modality	Surgical	18	60
	Medical and Surgical	12	40
Beta Human Chorionic Gonadotropin (β -HCG) hormone (mIU/mL)	No	11	36.7
	<10,000	7.0	23.3
	>10,000	12	40.0
Total		30	100





The FHR of most (77.78%) women who needed only surgery was negative, and most minor (22.2%) were positive, while the FHR of most minor patients (41.67%) who required both therapies were negative, and most (58.33%) were positive. A significant difference was recorded in the fetus's viability between both treatment modalities ($p=0.044$). Most patients in both groups (83.33%) had endogenous, and the least

(16.67%) had exogenous scars ($p=1.0$). The most prevalent complaint in those who needed only surgical treatment was bleeding (66.67%), followed by abdominal pain (11.11%), then combined symptoms (5.56%), while 16.67% had no signs. Whereas 41.67% of those who required both treatments had bleeding, 25% had abdominal pain, and 33.33% had no symptoms ($p=0.369$), as shown in Table (2).

Table (2): Comparison between maternal characteristics and treatment modalities of studied patients.

Variable	Treatment Modality		p-value
	Surgical (n=18)	Medical and Surgical (n=12)	
	Number, %		
Fetal heart rate	Negative	14 (77.78)	0.044*
	Positive	4.0 (22.22)	
Type of Scar	Endogenous	15 (83.33)	1.0
	Exogenous	3.0 (16.67)	
Complain	Abdominal pain	2.0 (11.11)	0.369
	Bleeding	12 (66.67)	
	Both	1.0 (5.56)	
	No	3.0 (16.67)	
		4.0 (33.33)	

*Significant difference using the Chi-square test

Moreover, suction curettage (55.56%) was the most practiced surgical therapy, followed by laparotomy (27.77%), hysteroscopy (11.11%), and laparoscopy (5.56%). Whereas most patients in another group (58.33%)

practiced systemic MTX with suction curettage, and the least (8.33%) practised misoprostol with suction curettage, as shown in Table (3).

Table (3): Treatment modalities of the studied patients.

Treatment Modality			
Surgical	Number, %	Medical and Surgical	Number, %
Hysteroscopy	2.0 (11.11)	Systemic MTX with suction curettage	7.0 (58.33)
Laparotomy	5.0 (27.77)	Intra-sac injection of MTX with suction curettage	2.0 (16.67)
Laparoscopy	1.0 (5.56)	Systemic and intra-sac injection of MTX with suction curettage	2.0 (16.67)
Suction curettage	10 (55.56)	Misoprostol with suction cartage	1.0 (8.33)
Total	18 (100)		12 (100)

MTX: Methotrexate





The age of the women who underwent only surgical modality was 33.39 ± 6.23 years, and for those who practiced both drug and surgical therapies was 33.58 ± 6.644 years ($p=0.936$). The BMI of pregnant women in the surgical modality group was lower (26.17 ± 4.84) than another group who needed both therapies (28.33 ± 4.45) ($p=0.139$). The gestational age of those who needed only surgery was 7.23 ± 1.95 weeks, while those who required both treatments were 6.63 ± 0.84 weeks ($p=0.965$). The mean duration of previous C/S in women who need only surgery was 3.0 ± 2.83 years, which is slightly lower than another group (2.83 ± 1.19 years) ($p=0.647$). The scar thickness of women who practiced only surgery was 2.08 ± 0.99 mm, which was smaller than another group (3.03 ± 1.63 mm) ($p=0.092$), as shown in Table (4).

Table (4): Comparison between patients' data in both treatment modalities.

Variable	Treatment Modality		p-value
	Surgical (n=18)	Medical and Surgical (n=12)	
Age (Years)	33.39 ± 6.23	33.58 ± 6.64	0.936
BMI (Kg/m ²)	26.17 ± 4.84	28.33 ± 4.45	0.139
Gestational age (Weeks)	7.18 ± 1.97	6.63 ± 0.84	0.965
Previous Cesarean (Years)	2.61 ± 1.20	2.83 ± 1.34	0.647
Scar thickness (mm)	2.08 ± 0.99	3.03 ± 1.63	0.092

Discussion

Caesarean scar is a rare form of ectopic pregnancy that accompanying several complications, such as second-trimester termination and pre-term labor.¹⁰ Hence, an abnormally adherent placenta is a major obstacle of scar implantation that might

results in a life-threatening bleeding and requires a prompt hysterectomy.¹¹ Generally, early imaging and diagnosis of CSEP are essential to decrease complications, conserve treatment options, and possibly reserve prospect fertility.¹² In the current study, U/S was used as a diagnostic tool to identify CSEP patients, while in Japan, Yamaguchi et al. 2022 in their 15-year cohort study, used various diagnostic tools for identification of the CSEP cases among pregnant women such as medical history, clinical examination, HCG level, transvaginal ultrasound (TVU), and magnetic resonance imaging (MRI) observation.¹³ These might be related to their long duration of study, complicated issues, facility/device availability, and skilled/experienced clinicians to use the tools. Additionally, in this study, it was realized that most patients were aged 20-40 years, overweight (46.7%), had bleeding (56.7%), endogenous scar (83.3%) with a thickness of 2.5 mm, and a history of two C/S (33%). In this regard, Gerdai et al. reported that most CSEP patients aged 33 - 42 years (mean age = 36.5 years) and most of them experienced a maximum of three previous C/S with no or very few symptoms at the time of diagnosis.¹⁴ On the other hand, Gao et al. stated that CSEP patients' ages at diagnosis were 26 - 41 years, and the gestational age at diagnosis was 5.4 - 12 weeks.¹⁵ These outcomes parallel ours as enrolled patients had 6.96 weeks' gestational age at diagnosis. Also, Kutuk et al. reported the median gestational age of CSEP patients at diagnosis to be 4 - 9 weeks and the mean β -HCG level to be 2,565 - 36,111 IU/L.¹⁶ Simultaneously, Yamaguchi et al. reported that CSEP patients' age at the time of diagnosis was 23 - 42 years, the mean number of previous C/S was 1.9, a gestational age ranged from 5.4 - 12.5 weeks (mean=7.7 weeks), 60% cases had vaginal bleeding, FHR was positive in 57.7%, and β -HCG was 2,307 - 187,898 mIU/ml.¹³ These outcomes were close or





almost similar to the results of this study for most items. The Royal College of Obstetricians and Gynecologists guidelines (2016) stated insufficient confirmation to support one specific intervention over another for CSEP.¹⁷ In this study, most women (60%) experienced only surgical treatment, and the rest underwent both medical and surgical treatments. These findings do not agree with another study that used a single local MTX injection under TVU guidance as a safe and effective treatment choice for CSEP patients, without the need for other concomitant process, UAE, or surgical involvements.¹³ Moreover, in this study, suction curettage was the most practiced modality in a group of surgical therapy (55.56%). In comparison, systemic MTX with suction curettage was the most practiced therapy in another treatment modality group (58.33%). However, these outcomes are aligned with another study, which mentioned that most patients (82.3%) were managed surgically, using U/S-guided suction curettage for the treatment of pregnancies implanted into inferior uterine segment C/S scar. Also, they found that this method had a little danger of blood transfusion/hysterectomy.¹⁸ In this regard, for the first time Godin et al. stated a successful treatment of CSEP by gestational sac injection of MTX in a case with HCG of 62,000 mIU/ML.¹⁹ Additionally, according to a recent study, U/S-guided MTX injection has emerged as the treatment of choice. At the same time, surgical or invasive techniques, including D&C, are not recommended due to high morbidity and poor prognosis.²⁰ On the other hand, Riaz et al. conducted an effective early first-trimester abortion in CSEP patients by a combination of MTX injection, U/S-guided injection of embryocidal agents, and surgery in 75% of their patients.¹² At the same time, transvaginal hysterotomy with the removal of ectopic pregnancy and repair of cesarean scar defect is a promising approach

to manage CSPs, with a short hospital stay, low postoperative pain, blood loss, and cost.²¹ These variations are mainly related to the presented symptoms, gestational age, type of scar with its size/thickness, the previous number of C/S, size of CSEP mass, degree of complicated cases, availability of facility/hospital services, or might be related to the experience of gynecologist based on their view for the future outcome and complications resulted from the treatment modality applied. Repair of the uterine defect, following a CSEP neither guaranteed the healing of the scar nor the ability to ensure a safe pregnancy outcome. Thus, subsequent pregnancies may also be complicated by uterine rupture; therefore, the uterine scar should be evaluated before and during subsequent pregnancies. In this study, the uterine scar in most patients before treatment was 2.5 mm, which agreed with another study that reported the uterine scar thickness as 1.0 - 4.0 mm. However, their study was on patients (n=71) with exogenous scars.²² Appropriate counselling for women desiring fertility with a history of CSEP is essential, and once they conceive, early referral to tertiary centers for follow-up is pertinent. Thus, we hope our patients can imagine without difficulty following surgical evacuation or medical treatment of their cesarean scar ectopic.

Conclusions

CSEP was common among overweight young adult women, especially those with a history of two C/S and bleeding was most commonly found in patients due to CSEP. Treatment modalities did not directly affect the type of scars and bleeding, while fetal vitality was. Suction curettage is safe and effective when commonly practiced in both treatment modalities. Consequently, all patients tolerated treatment well, and all ectopic pregnancies were successfully removed. However, we suggest appropriate





patient selection for therapy for future works to give more optimal results.

Conflict of interest

It is not declared.

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