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# Management Strategies of Cesarean Section Ectopic Pregnancy: A Case Report

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[Background](#)  
[Case Report](#)  
[Discussion](#)  
[Conclusion](#)  
[References](#)

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## ABSTRACT:

**INTRODUCTION:** Cesarean scar ectopic pregnancy is a rare form of pregnancy with potential life-threatening complications such as severe hemorrhage, uterine rupture, and emergency hysterectomy. Currently, there is no consensus regarding a standardized treatment algorithm for this specific variant of ectopic pregnancies.

**CASE DESCRIPTION:** This case describes a 28-year-old female with history of two prior cesarean sections who was diagnosed with cesarean section scar ectopic pregnancy. Initial management with intramuscular methotrexate was unsuccessful in the setting of inadequate decrease in  $\beta$ -hCG level. The patient ultimately underwent surgical management with dilation and suction evacuation under ultrasound guidance for removal of the ectopic pregnancy. Following surgery, the patient continued to have an appropriate downward trend of  $\beta$ -hCG, indicating a successful result of the procedure.

**DISCUSSION:** The objective of this case report is to review this case of cesarean scar ectopic pregnancy, identify various treatment modalities for this condition, and analyze their success rates and possible reasons for failure based on literature review. We conclude that the wide use of methotrexate for cesarean section ectopic pregnancies should be reconsidered and minimally invasive techniques such as the double-balloon catheter procedure be further researched.

**KEY WORDS:** cesarean section, cesarean scar ectopic pregnancy, methotrexate, balloon therapy, case report

## BACKGROUND

Cesarean scar ectopic pregnancy (CSEP) is the implantation of pregnancy in the portion of myometrial tissue where a previous hysterotomy was performed. CSEP is the rarest form of ectopic pregnancy but poses a significant health risk for the mother with outcomes such as severe hemorrhage, uterine rupture, and emergency hysterectomy possible.<sup>1</sup> As a result, it is generally not recommended to carry these pregnancies to term.<sup>2</sup> The incidence of CSEP is estimated to be 1/3000 for the general obstetric population, between 1/1800-1/2500 for all cesarean deliveries, and 1/531 for women with at least one prior cesarean section.<sup>1</sup> The most common approaches to treating this condition have varying success rates, including oral methotrexate and intramuscular methotrexate (8.7%), intragestational methotrexate (11.6%), uterine artery embolization (18.3%), dilatation and curettage (D&C) (61.6%), hysterotomy (92.1%), and hysteroscopy (39.1%).<sup>1</sup> Though there are no standardized guidelines for treatment of CSEP, the Society for Maternal Fetal Medicine does not recommend systemic methotrexate treatment alone, however systemic methotrexate is still widely used despite these recommendations.<sup>1, 2, 3</sup> Therefore, a standardized approach to the treatment of this condition should be developed. In this case report, we discuss a patient with CSEP who was initially managed unsuccessfully with conservative intramuscular methotrexate therapy who then received curative surgical dilation and curettage.

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## CASE REPORT

The patient is a 28-year-old gravida 3, para 2 with two previous cesarean sections who presented to the hospital for evaluation of pelvic pain and vaginal bleeding after having a positive home pregnancy test the day prior. The physical exam showed scant brown blood from the cervical os on speculum examination. On ultrasound, the patient was found to have a gestational sac along the cesarean section scar with thickened endometrium in the lower uterine segment and yolk sac measuring 5 weeks and 2 days with thickened endometrium, and thus was diagnosed with CSEP (*Figure 1*). No fetal pole or cardiac activity was detected at that time. The patient's  $\beta$ -hCG was 5,494 (mIU/ml) during this initial visit.

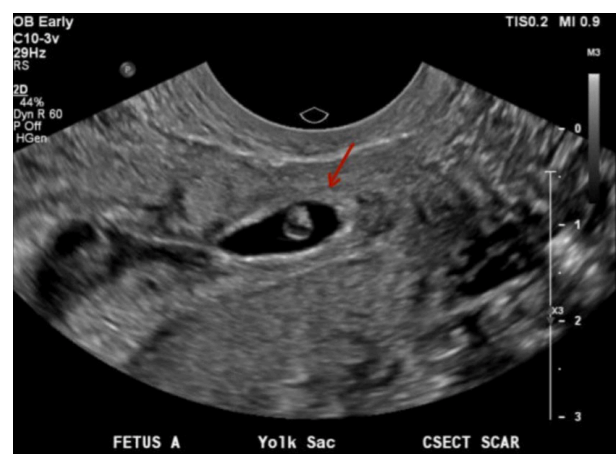
The patient opted for conservative management with intramuscular methotrexate to avoid surgery if possible. The plan was to administer up to 3 doses of intramuscular methotrexate on three-day intervals, while tracking  $\beta$ -hCG values on each injection day. If the  $\beta$ -hCG did not decrease by 15% in 7 days following initial methotrexate treatment, surgical management to terminate the pregnancy would be necessary. This patient desired future fertility, which was a priority throughout treatment.

Two days following the initial encounter, the patient returned to begin methotrexate treatment (day one of treatment). She was given a 75 mg intramuscular methotrexate injection. On the first day of methotrexate treatment, the  $\beta$ -hCG was 8,012.

On day four of treatment, the  $\beta$ -hCG was 11,290. The patient was given a second dose of 75 mg of intramuscular methotrexate with plans to return on day seven of treatment to repeat labs and receive either a third methotrexate dose or consider proceeding with surgical management.

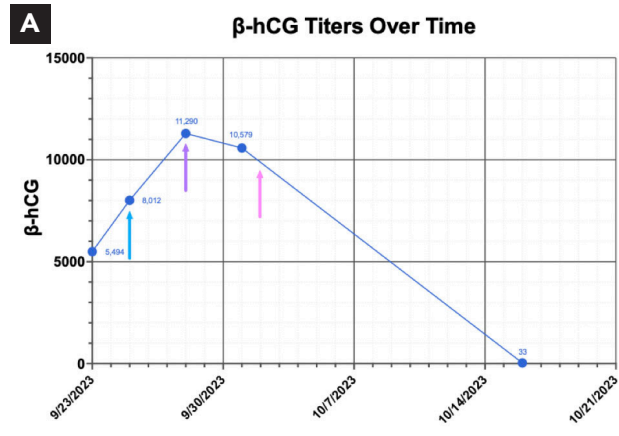
When the patient returned on day seven of treatment, her  $\beta$ -hCG level had only decreased by 6.5% (10,579), so the patient agreed to proceed with surgical management after shared decision making due to not achieving a 15% reduction in  $\beta$ -hCG. The patient returned to the hospital the following day for suction dilation and curettage under ultrasound guidance. Following the procedure, serial bloodwork showed that the patient continued to have appropriately down-trending  $\beta$ -hCG levels, confirming its success (*Figure 2*). The patient was seen for a post-operative visit 2 weeks after the procedure and was doing well without complications.

**FIGURE 1.** Transvaginal ultrasound images obtained upon the patient's initial hospital presentation. Gestational and yolk sac visualized within the cesarean section scar of the uterus, indicating a cesarean scar ectopic pregnancy. The arrow indicates the area of the myometrium where the cesarean scar is located.



**TABLE 1.** Trend of  $\beta$ -hCG levels throughout the duration of the patient’s clinical course.

**A.**  $\beta$ -hCG Titers Over Time. Blue and purple arrows indicate the dates the patient received the first and second doses of 75 mg of intramuscular methotrexate (9/25 and 9/28 respectively). Pink arrow indicates the date (10/2) that surgical dilation and suction evacuation was performed. Patient shows appropriate decrease in  $\beta$ -hCG following the surgery. **B.** Table of Recorded  $\beta$ -hCG Values Represented in Graph. Numerical representation of available  $\beta$ -hCG titers with the corresponding date shown in the graph.



Date (2023)	Beta-hCG value (mIU/mL)
9/23/2023	5,494
9/25/2023	8,012
9/28/2023	11,290
10/1/2023	10,579
10/16/2023	33

**DISCUSSION**

Management of cesarean section ectopic pregnancy is necessary given the possible life-threatening complications such as severe hemorrhage, uterine rupture, and emergency hysterectomy, thus causing loss of future fertility. Therefore, it is imperative that physicians suspect this condition in the setting of a pregnant patient with previous cesarean section. However, there is still much debate regarding the best way to manage this disease. This case study reports on a patient with CSEP who was initially managed with multi-dose intramuscular methotrexate therapy, but ultimately required surgical dilation and suction curettage.

There are mixed results regarding methotrexate monotherapy for CSEP with more recent studies showing low success rates. A meta-analysis by Kanat-Pektas et al. reported that systemic methotrexate had only an 8.7% success rate.<sup>1</sup> Another study from Mater Mothers’ Hospital in Brisbane, Australia reported that 45% of their 11 patients initially treated with systemic methotrexate required subsequent therapy.<sup>4</sup> This study also noted that 100% of the 6 women who failed initial treatment had a fetal pole present on ultrasound.<sup>4</sup> Additionally, one study states that if the  $\beta$ -hCG is greater than 5,000, the patient is more likely to need subsequent treatment such as intragestational methotrexate, dilation and curettage, or uterine artery embolization.<sup>5</sup> These studies call into question the appropriateness of recommending methotrexate therapy as first line therapy for CSEP given certain clinical findings. Although our patient did not have evidence of fetal pole or cardiac activity on initial ultrasound, by the

time she started methotrexate therapy after initial diagnosis, it is possible they had developed. The fetal pole usually develops at about week 6 of pregnancy,<sup>6</sup> so it is feasible that the patient may have developed an embryo by the time therapy was initiated and thus could be a plausible reason for methotrexate failure. Additionally, the patient’s  $\beta$ -hCG was 8,012 on the first day of methotrexate treatment, making it more likely that she would need subsequent treatment according to the studies previously stated.<sup>5</sup>

It is possible that the guidelines for using methotrexate therapy should vary depending on the type of ectopic pregnancy. The consensus treatment for tubal and cervical ectopic pregnancies is systemic methotrexate, which is recommended when the gestational age is less than 9 weeks, embryo smaller than 2 mm, and  $\beta$ -hCG less than 10,000.<sup>7</sup> However, it has been recognized that in cesarean scar ectopic pregnancies specifically, methotrexate is more likely to fail when the  $\beta$ -hCG is greater than 5,000.<sup>5</sup> Therefore, when a patient has a cesarean section ectopic pregnancy with a  $\beta$ -hCG between 5,000 and 10,000, methotrexate therapy should not be considered to have the same effectiveness as it does with a tubal or cervical ectopic pregnancy. Thus,  $\beta$ -hCG guidelines for using methotrexate therapy in CSEP may have to be reconsidered. Regardless of which initial therapy

is selected, patients need to be informed that initial management attempts may be unsuccessful, and that follow up  $\beta$ -hCG trending is imperative.

Another theorized reason for why systemic methotrexate therapy can fail with CSEP more frequently is that the cesarean scar is poorly vascularized due to fibrous tissue in the scar, making delivery of the drug less effective.<sup>7</sup> Additionally, methotrexate has a short half-life, thus making it difficult for an appropriate dose to reach the gestational sac.<sup>7</sup> For these reasons, some providers opt to administer the drug locally to the gestational sac under ultrasound guidance. Some studies suggest that injecting methotrexate into the gestational sac is more effective in terminating the pregnancy, especially if embryonic heart activity is present.<sup>7</sup> Another study comparing the injection routes reported that local injection is favorable in terms of recovery time, side effects, and treatment costs.<sup>8</sup>

One surgical approach considered in this patient was a minimally invasive double-balloon procedure described by Timor-Tritsch et al.<sup>9</sup> The philosophy behind this outpatient procedure is to use a cervical ripening double-balloon catheter to compress the blood supply of the gestational sac, which would simultaneously terminate the pregnancy and prevent bleeding. It has major advantages such as being minimally invasive, preventing hemorrhage and emergent hysterectomy that can occur with other treatments, and usually does not require any secondary interventions such as methotrexate or surgery.<sup>9</sup> This technique also has support from a multi-center study from 2018, with 37 out of 38 patients successfully treated.<sup>10</sup> This study also showed success with treating CSEP up to 10 weeks gestation, when  $\beta$ -hCG values exceed levels typically responsive to methotrexate monotherapy.<sup>10</sup> These results are extremely promising, thus larger scale studies should be conducted to determine whether it should be more broadly applied to CSEP.

Patients who experience CSEP have an increased risk of recurrence of CSEP, which studies estimate is between 5 and 40%.<sup>11</sup> Thus, it is recommended that both patients with a history of cesarean section delivery and patients with history of CSEP undergo transvaginal ultrasound at as early as 5 to 7 weeks gestation to rule out CSEP.<sup>12</sup>

## CONCLUSION

There is no standardized treatment algorithm for cesarean section ectopic pregnancy. Rates of cesarean sections in the developed world are increasing, so the risk for CSEP is increasing too. Physicians

should be well equipped to diagnose and treat this condition, given the life-threatening complications that can arise. This case study reports on a patient with CSEP who failed initial systemic methotrexate treatment, requiring surgical dilation and curettage which was ultimately successful. One minimally invasive outpatient technique, the double-balloon catheter procedure, has shown great promise and should be further investigated on a larger scale. It is vital that consistent guidelines for the treatment of this condition are outlined, given its expected rise in prevalence, and catastrophic outcomes if inadequately managed.

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