

## Case Report

# Ectopic Pregnancy within a Cesarean Scar Resulting In Live Birth: A Case Report

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## Abstract

Implantation of an embryo within the scar of a previous cesarean delivery is one of the rare forms of ectopic pregnancy (EP). There are two types of such pregnancies: type 1, in which the embryo starts to progress towards the uterine cavity and may result in live birth despite the high risk of a hemorrhage occurring during birth, and type 2, which consists of pregnancies in which the embryo is embedded deep within the cesarean scar (CS) and grows towards the bladder and abdominal cavity, which is very dangerous and needs to be terminated immediately.

There are very few cases in the literature reporting live birth as a result of such pregnancies. Here, we present a 41-year-old single gravid woman who had been treated for infertility at our institute and had eventually conceived through embryonic transfer freezing. At six weeks, a transvaginal scan showed the presence of an EP within the CS but despite this finding the pregnancy was continued to term.

**Keywords:** Ectopic pregnancy, cesarean scar, cesarean section

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## Introduction

Cesarean scar ectopic pregnancy (CSEP) is one of the rare forms of EP, which occurs when the fertilized ovum is implanted outside the uterus and within the fibrous tissue of a previous CS.<sup>1,2</sup> It is considered as one of the serious complications of early pregnancy with a risk of hemorrhage and serious maternal morbidity. A great deal of emphasis has been placed on its early detection and appropriate management. Early diagnosis can lead to prompt treatment thus decreasing the likelihood of uterine rupture or hemorrhage allowing the preservation of the uterus and subsequent fertility.<sup>1,2</sup> There are no universal guidelines for treatment of CSEP due to limited experience of CS pregnancies (CSP) in the first trimester.<sup>2</sup>

There are two types of CSP. One is implantation of the embryo on the previous CS with progression towards the uterine cavity, which may result in a live birth although it has a very high risk of a life-threatening hemorrhage. The second type of CSP occurs when the embryo is implanted deep within the CS and is growing towards the bladder and abdominal cavity. This is very dangerous and needs to be terminated immediately as it will probably result in a rupture which is life-threatening to the mother.<sup>3</sup>

The first case of CSEP was reported by Larsen and Solomon in 1978.<sup>4</sup> Until 2001, only 19 cases of CSEP were reported, but since then there has been a substantial increase in the number of CSP published in the English language literature.<sup>5,6,7</sup> The worldwide rise of repeat cesarean deliveries has been associated with increased placentation complications in subsequent pregnancies,

e.g., placenta accreta and its subtypes as well as CSEP.<sup>3</sup> More recently a case series reported an incidence rate of 1 : 1800 to 1 : 2226 of total pregnancies.<sup>8</sup> This constitutes 6.1 % of all EPs with a history of at least one CS.<sup>6</sup> Women with a history of either EP, placental pathologies, multiple cesarean sections, or breech delivery by a cesarean section may be at a higher risk for pregnancy in the scar.<sup>7</sup>

Many theories have been previously proposed to explain the occurrence of such a phenomenon. The most plausible of which suggests a microscopic dehiscent tract may have been created as a result of a trauma during a previous uterine surgery in particular a cesarean delivery, curettage, myomectomy, hysteroscopy,<sup>1,9</sup> or following the manual removal of the placenta<sup>6</sup> and in vitro fertilisation (IVF).<sup>10,11,12</sup> The blastocyst uses this tract to enter into the wall of the myometrium and settles itself in the fibrous tissue.<sup>9,13</sup>

It is still not clear whether the risk of CSEP is associated with the number of previous cesarean sections. Recent review articles have shown no association between the number of previous cesarean deliveries and subsequent CSEP.<sup>5</sup> But, some reported that multiple cesarean sections are a risk factor for CSEP because of increased scar surface area.<sup>14</sup> We could not find any reference in the literature regarding whether time interval between cesarean delivery and CSEP, surgical technique, or indication might have any role on the causation of CSEP.

A delayed diagnosis and treatment of a CSEP can cause catastrophic complications including uterine rupture leading to uncontrollable bleeding and hemorrhage, leaving the physician with no option but to perform a life-saving hysterectomy causing maternal infertility.<sup>5</sup>

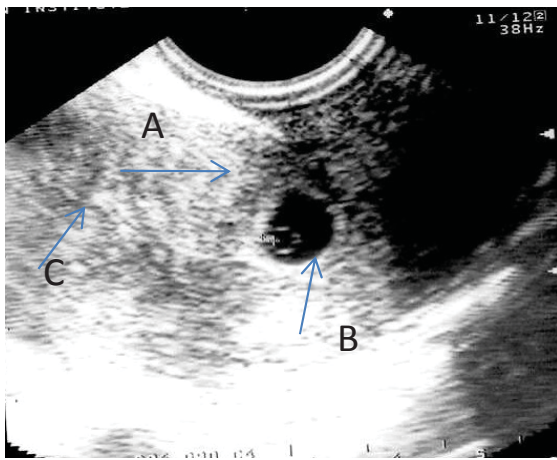
## Case Report

A 41-year-old female, gravida 1, para 2 (with one previous cesarean section), was referred to our institute after three years of secondary infertility. During 2010, she entered a micro-injection cycle twice, both ending unsuccessfully. Eventually during 2011,

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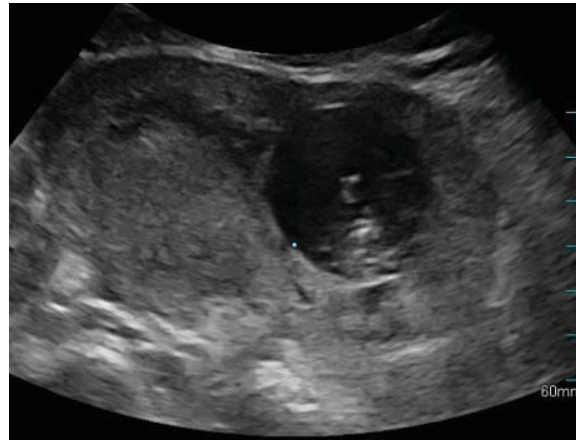
**Figure 1.** Ultrasonographic image taken at six weeks' gestation shows the gestational sac to be located beneath the uterine cavity, in the cesarean scar. Arrow A illustrates the cesarean scar, B represents the gestational sac, and C illustrates the uterine cavity.



**Figure 2.** Ultrasonographic image taken at eight weeks' gestation shows the gestational sac has moved further towards the uterine cavity and seems to be invading the cavity space.



**Figure 3.** Ultrasonographic image taken at 25 weeks' gestation shows placenta previa and furthermore, the thinning of the myometrium between the placenta and bladder could be suggestive of placenta accreta.



**Figure 4.** Ultrasonographic image taken at 12 weeks' gestation shows the gestational sac to be embedded within the anterior lower segment of the cesarean scar.

she became pregnant via embryo transfer freezing. Initially, a transvaginal ultrasonography was performed at six weeks' gestation which revealed a gestational sac beneath the uterine cavity, predicting the possibility of an EP within the cesarean section scar (Figure 1).

The mother did not complain of any symptoms associated with CSEP such as pain or vaginal bleeding. At this time, the beta human chorionic gonadotropin ( $\beta$ HCG) level was recorded at 12026 milli-international units per millilitre (mIU / mL). A second ultrasonography was performed at eight weeks' gestation which showed the embryo had moved further towards the uterine cavity to an extent that part of the sac could be detected within the cavity (Figure 2).

During an ultrasonography at 11.5 weeks, the sac was seen behind the bladder and the thickness of the myometrium was 6 mm which suggested the thinning of the myometrium. Due to the risks associated with such a pregnancy, termination was suggested but the mother refused and wished to continue with the pregnancy. Therefore, the line of expectant management was followed whereby the patient's condition was monitored through regular

ultrasonographies. The third and fourth ultrasonographies were respectively performed at 12 and 16 weeks which showed the sac to be detected within the lower segment of the uterine cavity and the thickness of the myometrium to be 6 mm. At this point, based on the ultrasonographic findings of the placental position, the possibility of placenta accreta was suggested (Figure 3). Because of the advanced maternal age, an amniocentesis was performed which gave normal results. At 25 weeks, due to the high possibility of placenta accreta, the clinician asked the patient for a magnetic resonance imaging (MRI).

The MRI performed at 32 weeks ruled out the possibility of placenta accreta and suggested the occurrence of placenta previa.

At 38 weeks, the baby was safely delivered during a three-hour long cesarean section operation. A placenta previa and 30% placenta accrete was observed. After delivery, the placenta was stuck to the lower segment which caused bleeding. Despite the efforts made to control the bleeding, a hysterectomy was performed. The fully extracted placenta was transferred to the pathology laboratory for further study. The patient had an uneventful postoperative recovery and was discharged from the hospital on postoperative day 3.

## Discussion

Various techniques can be used to detect an EP such as: ultrasonographic imaging either transvaginal or abdominal, color flow Doppler, three-dimensional (3D) ultrasonography, MRI, hysteroscopy, and laparoscopy. Ultrasonography is the first line of diagnosis for CSEP. In particular, transvaginal scans have been used together with Doppler flow imaging as a reliable tool for the detection of majority of cases.<sup>7</sup> Color flow Doppler has the advantage of allowing the physician to distinguish between a viable and nonviable pregnancy which in turn allows the most appropriate treatment option to be taken accordingly.<sup>14</sup>

A study conducted by Shih refers to the ability of the 3D power Doppler to assist the diagnosis by producing multiplanar views and 3D images as well as fully illustrating the peritrophoblastic flow surrounding the trophoblastic shell.<sup>15-16</sup> Patients with a CSEP can be asymptomatic, or they can suffer from mild to moderate abdominal pain solely or together with vaginal bleeding. In order to accurately detect a CSEP during an ultrasonography, the following criteria have been designed.<sup>17</sup>

1. Empty uterine cavity and cervical canal,<sup>5</sup>
2. The gestational sac must be detected in the anterior part of the uterine wall at the isthmus,<sup>11</sup>
3. An absence of or a reduction in the thickness of the myometrial wall between the bladder and the sac, allowing the differentiation from cervico-isthmic implantation<sup>5,11</sup>
4. Evidence of functional trophoblastic circulation on Doppler examination.<sup>2</sup>

The case reported in this paper was type 1 CSEP, where the sac was growing towards the cavity. However, despite our efforts to explain to the mother the dangers associated with such a pregnancy especially at her age, she insisted on continuing with the pregnancy and we were left with no choice but to assist her by closely monitoring the pregnancy and being completely prepared for the birth and the procedures that were required during the labor.

Previously, two other cases of CSEP were presented to our institute. The latest was a 34-year-old woman, gravida 3, para 2 who was found to have a CSEP at six weeks' gestation. She returned a week later with signs of vaginal bleeding. An ultrasonography was performed which showed a hemorrhagic mass around the sac within the CS and a lack of fetal growth.<sup>16</sup>

In another case, a 25-year-old woman, gravida 2, para 1, was referred to our institute at 12 weeks' gestation showing symptoms of abdominal pain and bleeding. She presented to us an ultrasonography report done elsewhere which failed to show any signs of CSEP. A second ultrasonography was performed at 12 gestational weeks which showed the gestational sac to be completely embedded within the anterior lower segment of the CS (Figure 4).

The thickness of the myometrium between the bladder and the sac was very thin to an immeasurable extent. At that stage, a surgery was performed in order to remove the sac which was successful.

In a case reported by Herman, et al. in 1995, a 28-year-old woman with one previous cesarean section presented with vaginal bleeding at seven weeks' gestation.<sup>18</sup> After ultrasonographic examination, a sac was identified within the isthmic region (displaced anteriorly) which suggested a CSEP.<sup>18</sup> There was a high probability that because of the position of the sac, it would eventually coalesce with the uterine cavity and continue as a nor-

mal pregnancy. After careful consideration, the patient decided on continuing with the pregnancy.<sup>18</sup> The patient was monitored throughout the pregnancy and another ultrasonographic examination showed the tip of the sac bulging towards the uterine cavity. However, several weeks later the sac still remained outside the uterine cavity. At 35 weeks, a cesarean section was performed due to acute abdominal pain and a healthy male infant was delivered. Despite many efforts to conserve the uterus, hysterectomy was performed due to uncontrollable bleeding.<sup>18</sup>

The most suitable management for CSP is not clear, although after its detection, most literature reviews suggest the termination of such a pregnancy.<sup>8</sup> However, as previously mentioned, there are two types of CSP. If the CSP is of type 1, which is growing towards the uterine cavity, there is a chance that the fetus will grow to term and be delivered healthy. In this case the line of expectant management can be followed. However, in such a situation the mother needs to be made fully aware of the situation and the consequences and risks of such a pregnancy and, ultimately, it will be her decision whether or not to continue with the pregnancy. If so, the case needs to be under control and followed throughout the pregnancy. However, if type 2 CSP is detected or if the mother having been made aware of the risks associated with such a pregnancy wishes to terminate, the most suitable termination method needs to be tailored to each case.

There are various management options available for the termination of a CSP. Ultrasonographic-guided methotrexate injection, administered either systemically or combined, is the most recommended method,<sup>11,17</sup> although other surgical methods such as curettage, hysterotomy, and hysterectomy have also been reported in the literature.<sup>5,19</sup>

Overall, CSEP is one of the rarest forms of EP and there are very few reported cases in the literature. Various risks have been associated with continuing such a pregnancy including maternal morbidity and hemorrhage. It is because of such risks that most CSEP cases result in termination. Because of the dangers associated with CSEP, a lot of importance has been placed on its early detection and appropriate management. A set of criteria has been designed for the accurate detection of a CSEP during an ultrasonography. No universal guidelines have been set for the management of such pregnancies; the physician has to consult the patient and the most suitable line of management should be followed according to each case.

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