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Caesarean scar pregnancy presenting at 17 weeks with a journey involving an exploratory laparotomy, continuing pregnancy and delivery at 34 weeks: A case report

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ABSTRACT

Caesarean scar pregnancy (CSP) occurs when the gestational sac implants in the region of a scar from a previous caesarean delivery. CSP can lead to life-threatening complications, including severe haemorrhage, uterine rupture, placenta accreta spectrum (PAS) and hysterectomy.

A 40-year-old woman with one previous caesarean was referred to the specialist centre at 17^{+1} weeks of gestation with concerns about CSP. At 19 weeks, she was admitted with abdominal pain. Due to raised body habitus, accurate ultrasound assessment was challenging, necessitating reliance on magnetic resonance imaging (MRI). The patient desired to continue the pregnancy, but due to pain and concerns about uterine rupture she consented to a laparotomy to potentially terminate the pregnancy. Findings during the laparotomy were reassuring, leading to the decision not to terminate the pregnancy. The patient remained hospitalised until delivery by caesarean-hysterectomy at 33^{+6} weeks. Histopathology confirmed the PAS diagnosis.

This case highlights the importance of achieving early diagnosis and obtaining clear sonographic findings. It emphasises the pitfalls of relying on MRI due to its tendency to over-diagnose severity. It emphasises the urgency for improved training in this domain. Early sonographic diagnosis allows safer performance of termination of pregnancy. It also provides women who continue with the pregnancy useful prognostic signs to facilitate decisions on the optimal gestation for delivery.

Determining optimal conservative management for CSP remains an ongoing challenge. This case emphasises the importance of multidisciplinary discussion, comprehensive patient counselling and involving patients in their care planning, to create an individualised and adaptable treatment plan.

1. Introduction

Caesarean scar pregnancy (CSP) occurs when the gestational sac implants in the region of a scar from a previous caesarean delivery [1]. CSP can lead to life-threatening complications, including severe haemorrhage, uterine rupture, placenta accreta spectrum (PAS) and hysterectomy [1,2].

The estimated incidence of CSP ranges from 1 in 1800 to 1 in 2216 pregnancies [2,3]. However, the increasing prevalence of caesarean deliveries suggests there will be a rise in CSP cases and associated complications [4,5].

Ultrasound is the primary imaging modality for diagnosis but achieving a correct and timely diagnosis can be difficult [6]. The optimal time for CSP diagnosis is before 9 weeks of gestation [1,5]. As gestation advances, the upper pole of the gestational sac grows towards the uterine fundus, rendering the identification of CSP more intricate [1]. Approximately one-third of women with CSP are asymptomatic. Therefore, many go undetected, leading to the development of PAS and

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other maternal morbidity later in pregnancy [5].

Upon CSP diagnosis, individuals should receive counselling about the risk of severe morbidity and be presented with options for terminating the pregnancy, ideally performed in the first trimester [6]. However, for those who choose not to terminate, significant uncertainty surrounds the optimal course of treatment [4].

This case report sets out a clinical scenario of CSP, the challenges in diagnosis, various management strategies, and potential outcomes for patients.

2. Case Presentation

A 40-year-old woman with one previous caesarean had a private scan at 6^{+6} weeks of gestation that led to concerns about scar implantation. Ultrasound assessment was challenging due to the patient's body mass index (BMI) of 50. Therefore, she underwent magnetic resonance imaging (MRI) at 12^{+2}, the findings of which were in keeping with a CSP, with thin myometrium overlying the gestational sac. The gestational sac was in the lower uterine cavity with placental tissue completely covering the internal os (Fig. 1).

The patient desired to continue the pregnancy, delaying referral to a specialist centre until 17^{+1} weeks. Ultrasound revealed a normally grown fetus with complete placenta praevia extending around the right anterior wall involving the caesarean scar. There was thin overlying myometrium and loss of the sub-placental clear zone. Repeat MRI indicated a suspected thin layer of serosa holding the gestation sac in situ, with no identifiable myometrium (Fig. 1). After counselling, including the option for termination of pregnancy (TOP), the patient desired to continue the pregnancy and follow-up was arranged.

At 19 weeks she presented to hospital with abdominal pain. The patient desired to continue the pregnancy but due to the pain and concerns from the MRI having indicated risk for spontaneous uterine dehiscence, she consented to a laparotomy to potentially terminate the pregnancy. A laparoscopy was considered but deemed inappropriate given the surgical complexities, advanced gestation and lack of evidence.

A laparotomy (through a low-transverse incision) was performed under general anaesthesia (GA) for TOP. The bladder was adherent to the uterus, which had to be dissected down to reveal the lower uterine segment. The findings were not in keeping with the MRI. There was a lower uterine bulge with thin overlying myometrium, but no signs of

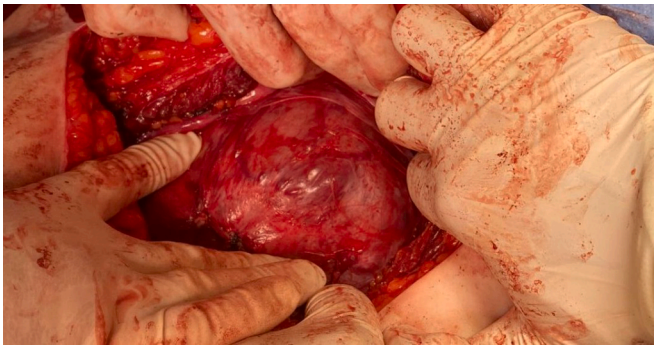

Fig. 2. Photo taken at the time of the laparotomy at 19 weeks of gestation. The primary survey revealed a lower uterine bulge with thin overlying myometrium, but no signs of tension, defects or impending rupture.

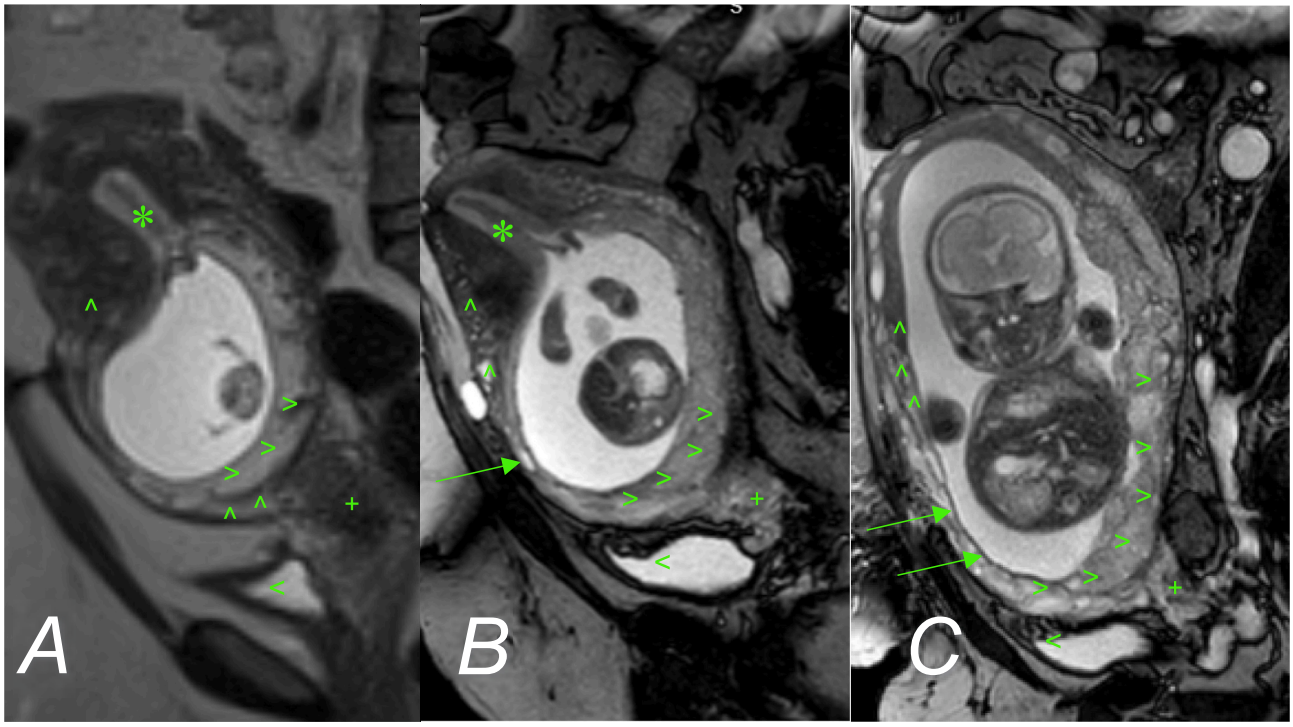

Fig. 1. Magnetic resonance imaging (MRI) at different gestational ages.
A: MRI at 12^{+2}: thin myometrium overlying the gestational sac (3 mm at points), but no definite myometrial breach. The gestational sac is in the lower uterine cavity with placental tissue completely covering the internal os.
B: MRI at 17^{+1}: gestational sac lying entirely within the lower uterine cavity. The placenta completely covers the internal os. Unable to identify any myometrium at the site of the gestational sac. Suspect only thin layer of uterine serosa holding the gestation sac in situ. Therefore, this is interpreted as high risk for spontaneous uterine dehiscence.
C: MRI at 25^{+2}: absent myometrium throughout the anterior uterine wall with a 7 cm area of serosal irregularity involving the right lateral wall of the uterus.
* Upper part of uterine cavity not occupied by gestational sac. Absent Myometrium.
> Placenta. ^ Myometrium. < Bladder. + Cervix.

defects, tension, or impending rupture (Fig. 2). A decision by four experienced consultants was made not to proceed with hysterotomy due to the absence of impending rupture and the patient's original preferences to continue the pregnancy. The patient remained hospitalised under close surveillance until delivery. (See Fig. 3.)

Extensive multidisciplinary team (MDT) meetings with obstetricians, gynaecologists, neonatologists, radiologist, and anaesthetists were held with a plan for delivery at 30 weeks if she remained well. The patient was concerned about the risks of prematurity, especially the increased risk of neurodiversity. As she remained asymptomatic, she requested to delay the birth until 34 weeks. This decision was made following thorough counselling as this was contrary to the MDT decision. The patient was made aware of the risk of uterine rupture requiring emergency delivery with likely worse outcome.

Fortunately, the patient remained asymptomatic and had a planned caesarean-hysterectomy under GA at 33^{+6} weeks. Skin incision was through the previous low-transverse scar with a Cherney muscle incision due to challenging entry. Primary survey revealed a large lower uterine bulge with focal absence of myometrium on the right. There were extensive bridging vessels and neovascularisation in the utero-vesical fold. The baby was delivered through a vertical uterine incision. Blood loss was 6500 ml with 1771 ml packed red cells returned by abdominal cell salvage. No blood products were transfused. She received 2 g tranexamic acid and bedside clotting capacity tests were normal throughout.

The baby weighed 2572 g and was admitted for transitional care. The patient had an uneventful postnatal recovery with hospital discharge on day 5 with Hb of 104 g/L and normal renal function. Histology confirmed PAS stage 2 by the International Federation of Gynaecology and Obstetrics classification.

3. Discussion

It is unusual to have performed a laparotomy at 19 weeks of gestation for TOP. The patient complexities of a raised BMI reduced the accuracy of ultrasound, leading to more reliance on MRI. At laparotomy the operative findings were reassuring, not in keeping with the MRI and considering the patient's original preferences to continue the pregnancy, the decision was made to not go ahead with a TOP. This introduced complexity in the decision-making process and implications for correct timing for delivery.

There are no definitive guidelines regarding the recommended gestational age for delivery with CSP. Some suggest opting for delivery between 34 and 35^{+6} weeks of gestation if the patient remains asymptomatic [6]. This recommendation is primarily rooted in the goal of optimising fetal lung maturation and improved neurodiversity [7], whilst attempting to avoid pre-term labour or uterine rupture requiring an emergency caesarean with the risks of long-term developmental delay due to hypoxic ischaemic encephalopathy or fetal death. A case report by Kutlesic et al. (2020) presented a case of CSP under expectant management, with a caesarean delivery at 38 weeks [8]. There was evidence of PAS at delivery and the patient had a hysterectomy due to heavy bleeding from the placenta site [8].

A cohort study examining 407,503 schoolchildren revealed that the risk of special educational needs (SEN) steadily decreased with increasing gestational age up to 40–41 weeks, but then increased among those delivered postdates [9]. Even though this risk is small (5.3% SEN cases attributed to preterm delivery <37 weeks), these findings do have implications for clinical practice regarding the timing of elective deliveries [9].

3.1. Sonographic Markers That May Facilitate Management

MRI has been shown to over-diagnose the severity of placenta accreta [10,11]. This case demonstrates this, and perhaps if MRI had not been relied upon and better sonographic markers were utilised, a laparotomy could have been prevented.

This patient received a timely potential diagnosis of CSP during a private scan at 6^{+6} weeks. However, she did not access specialised care until 17^{+1} weeks, missing the window for predicting outcomes related to CSP. Had she been promptly referred following her initial scan, it is conceivable that more accurate sonographic predictors could have been identified.

Early first-trimester ultrasound images, from 5 to 7 weeks of gestation, are best to predict the evolution of CSP [12,13]. Specific ultrasound markers have been proposed as potential predictors for the outcome in CSP. These include type of CSP, the crossover sign and myometrial thickness.

3.1.1. Type of CSP

There are two types described in the literature based on imaging findings and pregnancy progression: Type 1, or endogenic CSP, when implantation occurs "on the scar" site and the gestational sac grows towards the uterine fundus; Type 2, or exogenic CSP, when the gestational sac is deeply embedded in the scar, or "in the niche" and grows towards the urinary bladder [14].

3.1.2. The Crossover Sign (COS)

The COS is calculated by drawing a straight line, in the sagittal view of the uterus, connecting the internal cervical os and the uterine fundus through the endometrium (endometrial line). Then perpendicularly, the superior-inferior (S—I) diameter of the gestational sac is traced [15,16]. In COS-1, the gestational sac is implanted within the caesarean scar, and at least two-thirds of the S—I diameter of the gestational sac is above the endometrial line, towards the anterior uterine wall, and in COS-2 less than two-thirds of the S—I diameter is above the endometrial line [4,15].

3.1.3. Myometrial Thickness

Myometrial thickness has been proven to be a prognostic marker

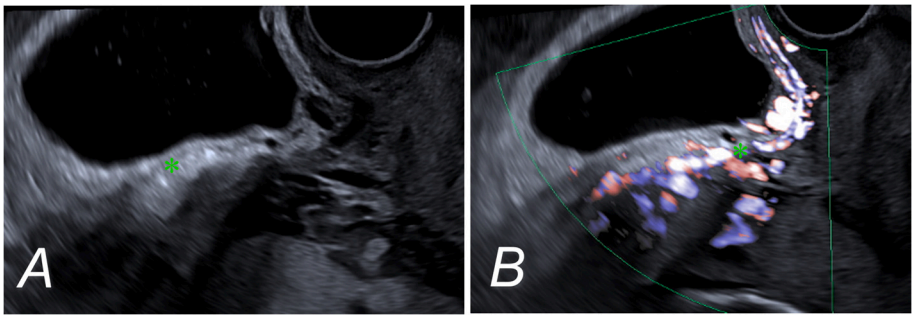

Fig. 3. Transvaginal ultrasound scan at 20^{+6} weeks. Image A shows the thin myometrium and loss of the subplacental clear zone (*). Image B shows the utero-vesical hypervascularity on colour doppler (*).

[17]. A study by Fu et al. (2022) showed that in the first-trimester scan, the optimal cut-off for myometrial thickness was 3.3 mm, being associated with severe forms of PAS in patients with CSP [18].

A systematic review by Silva et al. (2023) concludes Type 1 CSP has a significantly better outcome than Type 2, namely in gestational age at delivery, PAS diagnosis, requirement for hysterectomy and risk of uterine rupture [4]. The same correlation also verifies for COS-1 and COS-2 classifications. The risk of severe forms of PAS is higher in pregnancies with COS-1 than COS-2 [16]. Additionally, patients with better outcomes had a myometrial thickness $>$ 4 mm in their first-trimester scan [4]. These sonographic findings suggest expectant management may be a reasonable option when better prognostic markers are present, as they may progress to milder grades or no PAS at all [4].

4. Conclusion

This case highlights the importance of achieving early diagnosis and obtaining clear sonographic findings. It emphasises the pitfalls of relying on MRI due to its tendency to over-diagnose severity. It prompts reflection on whether the current standard of care for women in the UK is optimal. It emphasises the urgency for improved training in this domain, particularly given the escalating rates of caesarean births. The early sonographic diagnosis not only allows safer performance of TOP, but it also provides women who continue the pregnancy with useful prognostic signs that could help facilitate decisions on the optimal gestation for delivery [12].

Implementing early first-trimester ultrasound scans and providing comprehensive training for clinicians in sonographic skills for accurate diagnosis would undoubtedly place a significant burden on early-pregnancy units. However, it begs the question: should we prioritise these measures to enhance patient care? Ultimately, improving patient outcomes involves not only managing them effectively upon presentation but also addressing the root causes and mitigating the long-term consequences of CSP and PAS.

Determining optimal conservative management for CSP post-diagnosis remains an ongoing challenge. This case emphasises the importance of multidisciplinary discussion, comprehensive patient counselling and involving patients in their care planning, to create an individualised and adaptable treatment plan.

Contributors

Sarah Walker contributed to patient care, drafted the manuscript and undertook the literature review.

Simon Grant contributed to patient care and revised the article for important intellectual content.

Stephen O'Brien contributed to patient care and revised the article for important intellectual content.

Nicola Weale contributed to patient care and revised the article for important intellectual content.

Joanna Crofts contributed to patient care and revised the article for important intellectual content.

Daniela Vieten-Kay contributed to patient care and revised the article for important intellectual content.

Karen Pereira contributed to patient care and revised the article for important intellectual content.

Mohamed Elhodaiby contributed to patient care and revised the article for important intellectual content.

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Patient consent

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Provenance and peer review

This article was not commissioned and was peer reviewed.

Conflict of interest statement

The authors declare that they have no conflict of interest regarding the publication of this case report.

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