Diagnosing caesarean scar pregnancy using transvaginal ultrasound

Alex Rourke (Sonographer, Nottingham University Hospitals / University of Derby)

Introduction

Caesarean scar pregnancy (CSP) is the implantation of a gestation sac in the hysterotomy scar. According to the Royal College of Obstetricians and Gynaecologists (RCOG) the prevalence is 1 in 2000 pregnancies[1]. The diagnosis is challenging, with 13% of reported cases incorrectly diagnosed as low intra-uterine (IUP) or cervical pregnancies[2]. Misdiagnosis is significant as untreated CSPs can result in serious complications including hysterectomy[3].

In November 2016 the RCOG published criteria for diagnosing CSP using trans-vaginal ultrasound (TVUS). The criteria are shown in Table 1. However, these criteria were not validated and were derived from descriptive studies[1]. A literature review will therefore be conducted to identify the evidence base for diagnosing CSP. The evidence will be critically assessed and used to evaluate the RCOG's guidelines. This is relevant to current practice as the local departmental guidelines do not include criteria for diagnosing CSP.

Table 1:
RCOG criteria for diagnosing CSP using TVUS[1]

(A)	Empty uterine cavity
(B)	Gestational sac or solid mass of trophoblast embedded at site of caesarean scar
(C)	Empty endocervical canal
(D)	Thin or absent layer of myometrium between gestational sac and bladder / anterior uterine wall.
(E)	Evidence of prominent circulation on Doppler examination

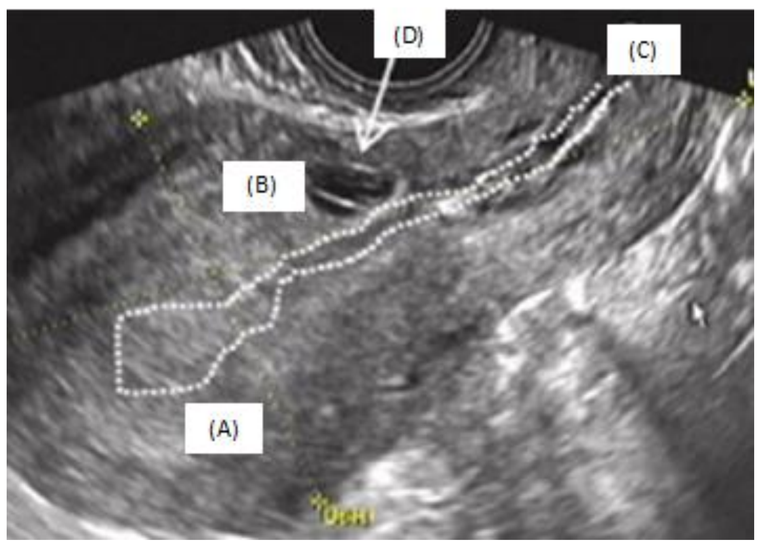

Figure 1:
An example of a CSP[3], annotated with the RCOG diagnostic criteria
(see Table 1)

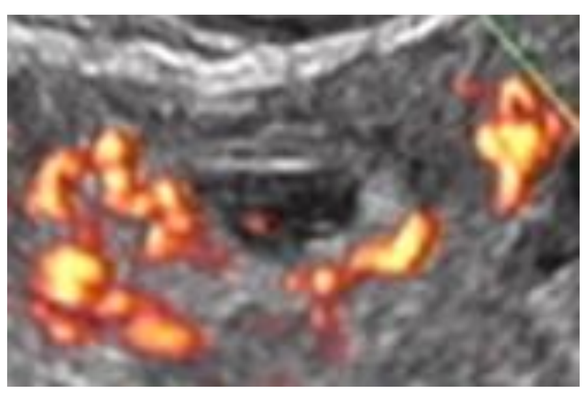

Figure 2:
Example of CSP[3], showing prominent vascularity
(see Table 1)

Method

A literature review was conducted with a carefully considered search strategy. Key words from the title were used as search terms; these were enhanced and adapted to ensure all relevant sources were found.

A number of healthcare databases were searched, including *Cinahl Plus*, *Medline, Science Direct* and the *Cochrane Library*. The material was then assessed against inclusion and exclusion criteria to leave three highly relevant articles for critical appraisal.

Results

Timor-Tritsch et al's[3] study was a retrospective case series of 26 patients with known CSP. They describe seven criteria for diagnosing CSP with TVUS. These support the RCOG's recommendations and include an empty cavity, gestation sac embedded in the scar, thin myometrium layer between the pregnancy and bladder, closed cervical canal and scar vascularity.

However, this research has limitations. As well as a small number of cases, the criteria's sensitivity, specificity or predictive values are not described. This means that the study's diagnostic criteria are not based on tested evidence, rather they come from experience.

Buresch et al[4] describe six ultrasound markers, including an empty fundus, a gestation sac embedded low in uterus, thin layer of myometrium between gestation sac and bladder, and vascularity at implantation site. These support the RCOG's diagnostic criteria[1].

However, these recommendations are based on the experience of the authors and not a trial. Indeed, the research uses three case reports to provide context to, rather than prove, the diagnostic criteria.

Timor-Tritsch et al[2] found an ultrasound method for diagnosing CSP by assessing the location of the gestation sac relative to the midpoint of the uterus. Figure 3 shows how CSPs were located proximal to the midpoint. IUPs were located distal to the uterine midpoint. This method had a sensitivity of 93% and a specificity of 98.9%.

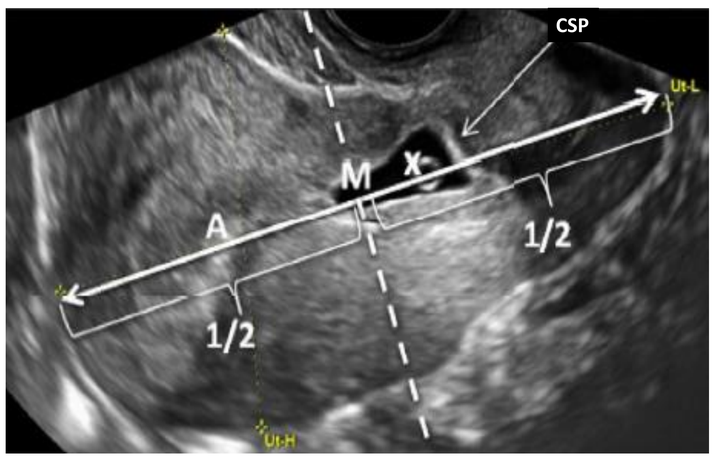

Figure 3:
Assessing the position of a gestation sac relative to the uterus midpoint[2].

CSP (X) is located proximal to midpoint of uterus (M)

However, while a reputable statistical analysis method was used, there are limitations to the research. Of 242 cases, only 57 were CSPs. Indeed, of the 185 IUP cases only 26 had a history of caesarean delivery. This suggests that a larger study is required to test the reliability this research. The authors also acknowledged that their method should only be used in combination with other sonographic and clinical markers to diagnose CSP.

Relevance to Practice

The literature review showed that the RCOG's diagnostic criteria are supported by current research evidence[3,4]. This is particularly relevant to local practice where the departmental guidelines do not include criteria for diagnosing CSP and suggests that the RCOG's criteria can be used in practice to inform CSP diagnosis. The literature review also revealed a method based on evidence for diagnosing CSP using the location of the gestation sac in relation the uterine midpoint[2]. This was not described by RCOG's guidelines but is relevant to local practice.

However, there are limitations to the evidence found in the literature review. Two of the three articles had the same authors and the research was conducted at the same site so cannot necessarily be applied to other populations. Research based on largescale studies of diagnostic accuracy was not found, with the evidence at Level 5 in the traditional hierarchy of evidence. This is in line with the RCOG's criteria which were derived from descriptive studies. This means that while the results of the literature review agree with the RCOG recommendations, there is still a lack of validated evidence for the ultrasound diagnostic criteria of CSP. That said, as CSP is a rare condition, undertaking largescale studies would be extremely challenging.

Conclusion

The literature review supported the RCOG's guidelines, and revealed an ultrasound method for diagnosing CSP not mentioned by the RCOG. It is recommended that this research can be used in local practice to diagnose CSP. However, it is clear that further studies testing the diagnostic accuracy of the RCOG's guidelines are still required.

References

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