

## Current Trends in Management of Caesarean Scar Pregnancy

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### Abstract

There is a global rise in number of caesarean scar ectopic pregnancies parallel with increasing trend towards operative deliveries. There is a diagnostic as well as management dilemma in these cases. There is no consensus yet on optimal management. Current trends with their pros and cons are discussed.

**Keywords:** Caesarean Scar Ectopic; Methotrexate; KCL; Uterine Artery Embolization; Hysteroscopy; Laparoscopy; Evacuation

### Abbreviations

KCL: Potassium Chloride; hCG: Human Chorionic Gonadotrophin

### Introduction

The rate of caesarean delivery is increasing worldwide. Overall ectopic pregnancy number has also multiplied six-fold in last 2 decades [1]. Caesarean scar pregnancy is one of the rarest forms of ectopic pregnancy. However, the proportion is gradually rising, in parallel with increasing incidence of caesarean section [2]. Approximately 1 in 2000 pregnancies are implanted over a previous cesarean scar. Studies have shown that currently upto 6% of ectopic pregnancies occur in women with a prior caesarean delivery. The risk does not increase with increasing number of caesareans in a woman [3,4]. Pregnancies implanted in previous myomectomy scars have also been reported in literature [5].

To label a pregnancy as scar pregnancy, the pregnancy has to be located in the scar surrounded by myometrium and connective tissue. It may occur either by the embryo directly implanting on a defect in the lower segment scar or the embryo migrating through a microscopic fistula within the scar [6,7].

### Risk factors

A wedge defect of the Cesarean scar may favour implantation over the scar [8]. Besides having a scarred uterus, associated adeno-myosis, previous dilation and curettage, manual removal of the placenta and history of *in vitro* fertilization may contribute [6,9]. There are no reliable scientific data on the risk of recurrence of scar ectopic in future pregnancy or on role of the interval between the previous caesarean delivery and occurrence of scar pregnancy, as well as the effect of caesarean wound closure technique.

**Clinical presentations**

Most women will miss a period and may start with vaginal bleeding or cramping. Rarely a woman may present with rupture and shock of sudden onset [7,10]. Sometimes it is misdiagnosed as spontaneous abortion [11]. However, up to 40 percent of women are asymptomatic, and the diagnosis is made during routine sonographic examination [4]. Rarely, early rupture can lead to an abdominal pregnancy.

**Diagnosis**

In the past the diagnosis was made late in the first trimester, and was mostly established after hysterectomy for uncontrollable, even life-threatening, hemorrhage from the eroded blood vessels within the myometrial tissue [12]. A high index of suspicion is necessary to diagnose before rupture.

All women of reproductive age with abdominal pain, uterine bleeding, or menstrual abnormalities should be tested for pregnancy. Once  $\beta$ hCG assay is positive, a high resolution transvaginal ultrasound examination is done to establish the location of pregnancy. Transvaginal ultrasound and color flow Doppler provide a high diagnostic accuracy with very few false positives, but false negative rate is high unless there is a high index of suspicion. Quite often diagnosis is missed and women are treated as having abortion with intrauterine pregnancy and diagnosis is suspected only after evacuation of an incomplete abortion with persistent bleeding and pain.

Imaging criteria for diagnosis include: empty uterus, empty cervical canal, a bulge in the scar with pregnancy embedded in the mass between the bladder and the anterior uterine wall, and thinning or complete absence of healthy myometrium between the bladder and the sac [12-14]. Ultrasound imaging with 3D is useful [15]. Adding color Doppler shows perfusion in the periphery of sac with discontinuity of the anterior uterine wall in the sagittal plane [16]. Magnetic resonance imaging and hysteroscopy may sometimes be required to confirm the diagnosis. It is important to differentiate scar ectopic from cervical ectopic pregnancy and placenta accreta [10].

To differentiate intrauterine from scar ectopic pregnancy an easy technique has been described: to measure the location of the center of the gestational sac relative to the midpoint axis of the uterus. Most scar pregnancies are located proximal to the midpoint axis of the uterus. This has a high sensitivity (93.0%) and specificity (98.9%) [17]. Scar pregnancy may be endogenic (growing towards uterine cavity) or exogenic (growing towards bladder).

**Management**

Prompt diagnosis and optimal treatment is essential for a cesarean scar pregnancy. A delay in diagnosis and/or treatment can lead to uterine rupture, major hemorrhage, hysterectomy and serious maternal morbidity. Early diagnosis can help in preserving the uterus and future fertility. Management plan is individually tailored according to clinical presentation (Table 1).

Patient factors	<ul style="list-style-type: none"> <li>• Symptoms and haemodynamic stability</li> <li>• Desire for future fertility</li> <li>• Acceptability of prolonged follow up</li> <li>• Associated medical and surgical risk factors</li> <li>• Response to initial treatment</li> </ul>
Pregnancy factors	<ul style="list-style-type: none"> <li>• Gestational age of ectopic</li> <li>• Human chorionic gonadotropin (hCG) levels</li> <li>• Size of ectopic mass and viability</li> <li>• Type of scar ectopic</li> <li>• Myometrial thickness surrounding the sac/scar integrity</li> </ul>
Facility factors	<ul style="list-style-type: none"> <li>• Availability of interventional radiology</li> <li>• Surgical and endoscopic expertise</li> <li>• Follow-up and monitoring</li> </ul>

**Table 1:** Factors influencing management

Earlier, surgery was the first option as soon as diagnosis was suspected. Currently several options have been explored for management. No universal treatment guidelines have been established, and options have ranged from systemic or local injection of methotrexate [18,19], local injection of 5 mEq potassium chloride (KCL) into the sac [20], suction curettage under transabdominal ultrasound guidance [21,22], hysteroscopy guided excision [23], uterine artery embolization [24,25], surgical wedge resection of the ectopic pregnancy on laparoscopy or laparotomy [26,27], and rarely hysterectomy. Various management options are listed in table 2. There are several case reports using these management strategies. Several modalities have also been used in combination like systemic methotrexate with local KCL [28,29]. Methotrexate has also been used as preoperative treatment followed by curettage [30], in combination with uterine artery embolization [31,32], for recurrence [33] and post operatively [22]. Disadvantages of pure medical management include a slow resolution of pregnancy and a risk of rupture and bleeding any time resulting in an emergency.

Expectant management	<ul style="list-style-type: none"> <li>Used very rarely in selected cases, high failure</li> </ul>
Medical management	<ul style="list-style-type: none"> <li>Systemic methotrexate</li> </ul>
Local injection and embolisation	<ul style="list-style-type: none"> <li>Local injection of methotrexate with sac aspiration</li> <li>Local injection of KCL</li> <li>Uterine artery embolisation</li> </ul>
Combined local and systemic	<ul style="list-style-type: none"> <li>Methotrexate injection plus local KCL</li> <li>Uterine artery embolisation and methotrexate</li> </ul>
Surgical management	<ul style="list-style-type: none"> <li>Dilatation and evacuation</li> <li>Hysteroscopic resection</li> <li>Vaginal excision and resuturing</li> <li>Laparoscopic /open excision and resuturing</li> <li>Hysterectomy</li> </ul>
Combined or sequential management	<ul style="list-style-type: none"> <li>Combined laparoscopic and hysteroscopic procedure</li> <li>Combined abdominal and vaginal procedure</li> <li>Uterine artery embolisation followed by dilatation and evacuation/resection after 24 - 48 hours</li> <li>Methotrexate followed by surgical evacuation/resection after 24-48 hours</li> <li>Surgery followed by methotrexate</li> </ul>

**Table 2: Methods of management**

Surgical management includes vaginal evacuation under ultrasound or hysteroscopy guidance or simultaneous hysteroscopy and laparoscopy [34-36] with removal of products and repair of scar depending on the operative findings. Sometimes if uterine bleeding is more, intra-uterine balloon catheter insertion is required for tamponade [37]. Surgical management is more controlled under endoscopic vision

and gives an opportunity to close the defect at the same time if future fertility is desired. It can be carried out when medical management has failed.

Currently evidence is insufficient to suggest superiority of one approach over other in terms of efficacy and complication risk, however current trend is to individualize the treatment and combine both medical and surgical management. This could be pre-operative methotrexate or uterine artery embolization to reduce intraoperative blood loss [26] followed by hysteroscopy and/or laparoscopy or ultrasound guided evacuation. Hysteroscopic removal of conceptus implanted in a cesarean section scar is considered a safe and feasible procedure and helps preserving future fertility. We have successfully managed 5 cases with this approach with minimum blood loss (Mittal S, unpublished data). Expectant management is no longer used because of the risk of rupture and maternal death [38].

In a stable patient, the most appropriate current management is systemic methotrexate followed by hysteroscopy guided evacuation of products of conception under laparoscopic supervision. Sometimes products may need abdominal removal through laparoscope including wedge resection of ectopic sac and resuturing of scar. A patient who is showing signs of hemorrhage or hemodynamic instability may require laparotomy and sometimes hysterectomy.

If a patient has completed her family, option of hysterectomy or tubal ligation should be offered as in subsequent pregnancy, implantation may again take place on the scar [39]. Even if subsequent pregnancy is intrauterine, there is always a risk of serious complications like placenta accreta, uterine rupture or antepartum haemorrhage [40]. An early ultrasound needs to be done in the subsequent pregnancy [41]. If everything is normal, she should be closely monitored and delivered by an early caesarean between 34 - 36 weeks of gestation and cesarean hysterectomy may be considered if appropriate [42].

### Conclusion

With modern technology in expert hands, caesarean scar pregnancy can be diagnosed early and judiciously managed with preop methotrexate and hysteroscopic removal of products under laparoscopic guidance.

### Conflict of Interest

None.

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