



Conservative Management of Caesarean Scar Ectopic Pregnancy With Preservation of Fertility: A Review of the Literature

Ethan Milosevic^{1*}, Khalid Okafor², Nurlan Tadesse³

¹Department of Medical Sciences, Carpathian Graduate Institute of Medical Sciences, Kenya

²Department of Medical Sciences, Pannonian Research Institute of Medical Sciences, India

³Department of Medical Sciences, Tamiraparani Research Institute of Medical Sciences, Jamaica

Article Info

Volume 1, Issue 1, 2026

doi: [10.62715/ijogs.2026.v1.i1.pp14-19](https://doi.org/10.62715/ijogs.2026.v1.i1.pp14-19)

Received: 21 September 2025

Accepted: 28 November 2025

Published: 24 January 2026

Abstract

Caesarean scar pregnancy, in which the gestational sac implants in or on the myometrial defect left by a previous caesarean section, was first described in 1978 and has been reported with increasing frequency as caesarean birth has become more common. Left to continue, it carries a risk of severe haemorrhage, uterine rupture and placenta accreta spectrum; treated late or badly, it can cost the woman her uterus. This narrative review of the published literature examines conservative, uterus-preserving management and what is known about fertility afterwards. It covers the sonographic criteria for diagnosis, the distinction between implantation on the scar and in the niche, and the evidence for expectant, medical and surgical approaches and their adjuncts. The literature consists almost entirely of case series and systematic reviews of such series, with no adequately sized randomised comparison. Within those limits, the reviews agree that systemic methotrexate alone and blind curettage alone have high failure and complication rates, that approaches which remove the pregnancy under imaging or direct vision perform better, and that most women who keep their uterus and try again conceive within the uterus, though recurrence and placenta accreta spectrum are recognised risks. Gaps in the evidence, especially on long-term reproductive outcome, are set out.

Keywords: *Caesarean scar pregnancy, Ectopic pregnancy, Fertility preservation, Uterine niche, Methotrexate, Placenta accreta spectrum*

© 2026 Ethan Milosevic et al. This is an open access article under the CC BY license (<https://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made.

1. Introduction

The first description of a pregnancy developing within a caesarean scar is credited to [Larsen and Solomon \(1978\)](#), who reported a scar sacculus as an unusual cause of haemorrhage after abortion. For two decades the condition was regarded as a rarity. Reports multiplied from the late 1990s, helped by the spread of transvaginal ultrasound in early pregnancy units and by the worldwide rise in caesarean section rates documented by [Betrán et al. \(2016\)](#). Reviews published in the following decade assembled the growing body of case reports and established the entity in the literature ([Rotas et al., 2006](#); [Ash et al., 2007](#)).

* Corresponding author: Ethan Milosevic, Department of Medical Sciences, Carpathian Graduate Institute of Medical Sciences, Kenya. E-mail: ethan.milosevic@carpathian.edu

© 2026 Ethan Milosevic et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

The condition is dangerous in two directions. If the pregnancy continues, the placenta may invade the scar and beyond it, and a shared histology with early placenta accreta has been demonstrated (Timor-Tritsch *et al.*, 2014). If it is interrupted without adequate planning, the thin and poorly contractile lower segment may bleed heavily. Many of the women affected want further children, and an emergency hysterectomy is the outcome that treatment aims above all to avoid.

This article reviews what the published literature says about conservative management of caesarean scar pregnancy, taking conservative to mean any approach that retains the uterus, and about fertility after such management. It reports no case of its own.

2. Approach to the Literature

The review is narrative. It is built on the professional guidance issued by the Royal College of Obstetricians and Gynaecologists and the Society for Maternal-Fetal Medicine, on the systematic reviews of treatment that have appeared since 2012, and on the primary case series most often cited in them. No formal search with screening counts was carried out. Because the underlying studies are mostly retrospective series with differing definitions of success, the review reports the direction of findings and the degree of agreement between sources instead of pooled success rates.

3. Definition, Mechanism and Diagnosis

Caesarean scar pregnancy is usually explained by implantation of the blastocyst into a microscopic or macroscopic defect in the scar, where the decidua is deficient. The defect visible on ultrasound in the non-pregnant uterus is termed a niche, and a consensus definition and measurement method have been agreed by a modified Delphi procedure (Jordans *et al.*, 2019). Although the condition is commonly called an ectopic pregnancy, the sac lies within the uterine outline, and some authors prefer to regard it as a pathological form of intrauterine implantation that sits on a continuum with placenta accreta spectrum (Timor-Tritsch and Monteagudo, 2012; Jauniaux *et al.*, 2018).

Diagnosis rests on transvaginal ultrasound in the first trimester. The criteria in common use derive from early series: an empty uterine cavity and cervical canal, a gestational sac or placental tissue embedded at the site of the scar in the anterior lower segment, thin or absent myometrium between the sac and the bladder, and prominent peritrophoblastic flow on colour Doppler (Vial *et al.*, 2000; Jurkovic *et al.*, 2003). The main differential diagnoses are a miscarriage in transit through the cervix and a cervical pregnancy. Misdiagnosis in either direction has consequences, and an international expert group has proposed a standard definition and reporting system for early gestation to reduce it (Jordans *et al.*, 2022).

Two descriptive classifications bear on prognosis. Vial *et al.* (2000) distinguished pregnancies that grow towards the uterine cavity from those that grow deep into the scar towards the bladder and serosa. Kaelin Agten *et al.* (2017) separated implantation on a well-healed scar from implantation in a niche and found that the latter, with thinner residual myometrium, had the worse outcomes when pregnancy continued. Both observations suggest that the depth of implantation and the thickness of myometrium remaining should inform the choice of treatment.

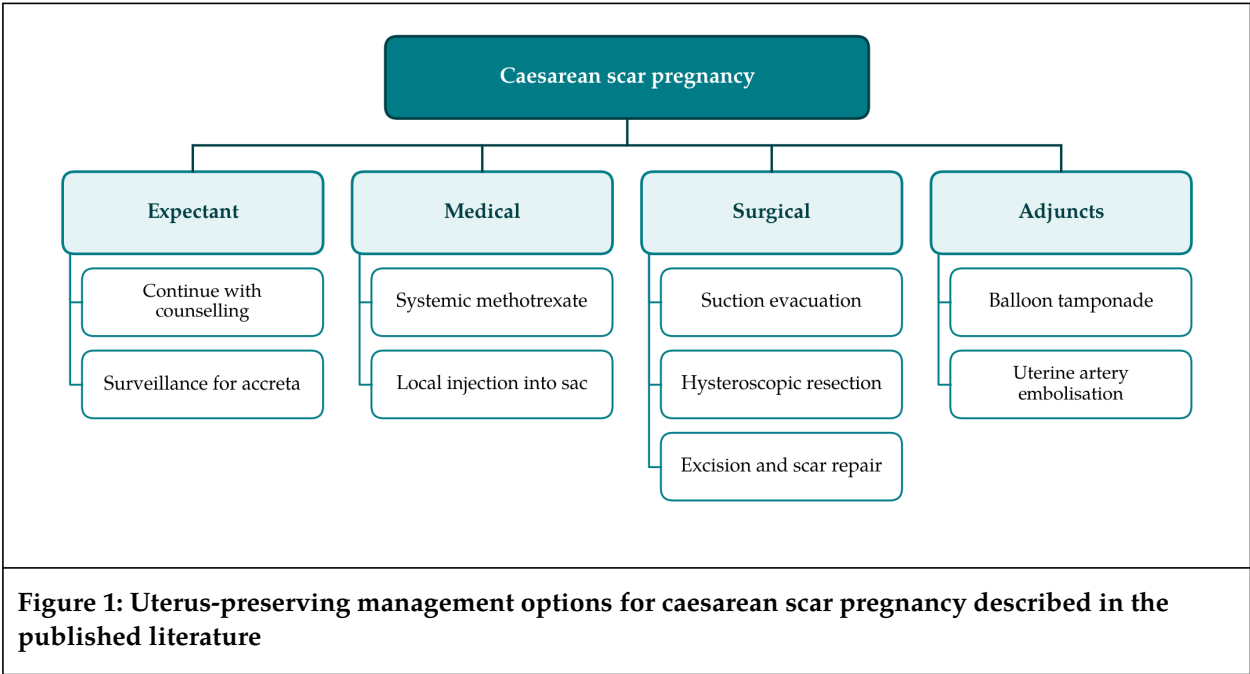
4. Management Options That Preserve the Uterus

More than thirty treatment regimens, alone and in combination, have been counted in the literature (Timor-Tritsch and Monteagudo, 2012). They fall into the groups shown in Figure 1. No randomised trial of adequate size compares them, and professional bodies state that the evidence does not allow one method to be recommended over all others (Elson *et al.*, 2016; SMFM, 2020).

4.1. Expectant management

Some women, fully informed, choose to continue the pregnancy. A systematic review and meta-analysis of expectantly managed cases found that, where fetal cardiac activity was present, a substantial proportion went on to severe morbidity including placenta accreta spectrum and hysterectomy, although live births were also achieved; outcomes were more favourable where no cardiac activity was detected

([Calì et al., 2018](#)). The Society for Maternal-Fetal Medicine recommends against expectant management of a viable scar pregnancy on this basis, while acknowledging the woman's right to decide ([SMFM, 2020](#)). Expectant management preserves the uterus only in the short term if it ends in caesarean hysterectomy, and counselling needs to make that plain.



4.2. Medical treatment

Methotrexate has been given systemically, by injection into the gestational sac under ultrasound guidance, or by both routes. Systemic methotrexate as sole treatment has performed poorly in the collected series. In a widely cited review of several hundred published cases, it was among the options with the highest complication rates, alongside curettage alone and uterine artery embolisation alone ([Timor-Tritsch and Monteagudo, 2012](#)). Slow resolution is a further drawback, since the trophoblast may take months to resorb and bleeding can occur in the interval. Local injection delivers the drug directly, can be combined with an embryocidal agent where cardiac activity is present, and was associated with fewer complications in the same authors' own series ([Timor-Tritsch et al., 2012](#)). Guidance from professional bodies describes medical treatment as an option in selected cases and does not endorse systemic methotrexate alone ([SMFM, 2020](#)).

4.3. Surgical treatment

Blind sharp curettage is discouraged because the sac lies outside the cavity proper and the curette may perforate the thinned scar or open large vessels ([Rotas et al., 2006](#)). Suction evacuation under continuous ultrasound guidance is a different procedure. A large single-centre series reported it to be effective, with haemorrhage controlled in most cases by a cervical suture or balloon ([Jurkovic et al., 2016](#)). Hysteroscopic resection allows the pregnancy to be removed under direct vision and bleeding points to be coagulated, and suits pregnancies that bulge towards the cavity. Excision of the pregnancy with repair of the scar, by a laparoscopic, transvaginal or open route, removes the niche as well as the pregnancy and is generally reserved for deeply implanted pregnancies with very thin overlying myometrium ([Seow et al., 2004](#); [Ash et al., 2007](#)).

Three systematic reviews have compared these approaches across the published series. [Birch Petersen et al. \(2016\)](#) graded the evidence and concluded that interventional approaches, including hysteroscopy, transvaginal resection, laparoscopy and curettage combined with embolisation, were preferable to methotrexate alone. [Maheux-Lacroix et al. \(2017\)](#) found the highest success with surgical excision and with combined treatments. [Gonzalez and Tulandi \(2017\)](#) reached broadly similar conclusions. Table 1

summarises the options and the reviewers' assessments. All three reviews caution that selection bias is unavoidable in such data, because clinicians choose the method to suit the case.

Table 1: Uterus-preserving approaches to caesarean scar pregnancy and their assessment in published reviews

Approach	Principle	Assessment in reviews	Main concern
Expectant	Pregnancy continues under surveillance	High morbidity when cardiac activity present Cali et al., 2018	Accreta spectrum, hysterectomy
Systemic methotrexate alone	Drug arrests trophoblast growth	Frequent failure and complications Timor-Tritsch and Monteagudo, 2012	Slow resolution, delayed bleeding
Local injection	Agent delivered into the sac under ultrasound	Fewer complications in series Timor-Tritsch et al., 2012	Needs operator skill; slow resorption
Guided suction evacuation	Sac aspirated under ultrasound view	Effective in a large series Jurkovic et al., 2016	Haemorrhage needing tamponade
Hysteroscopic resection	Removal under direct vision	Favoured for cavity-directed sacs Birch Petersen et al., 2016	Unsuitable with very thin myometrium
Excision with scar repair	Pregnancy and niche removed, defect closed	High success Maheux-Lacroix et al., 2017	More invasive; surgical expertise
Embolisation as adjunct	Uterine blood flow reduced before evacuation	Useful in combination, poor alone	Possible effect on later fertility

4.4. Adjuncts for haemorrhage control

Several measures are used alongside the primary treatment to prevent or control bleeding. Balloon catheters placed in the lower segment after evacuation tamponade the implantation site, and a cervical suture has been used for the same purpose ([Jurkovic et al., 2016](#)). Uterine artery embolisation reduces flow before surgical evacuation or rescues a bleeding patient. The reviews regard it as helpful in combination and unsatisfactory as sole therapy, and they note uncertainty about its effect on later ovarian and uterine function in women who wish to conceive ([Birch Petersen et al., 2016](#); [SMFM, 2020](#)).

5. Fertility and Later Pregnancy

The evidence on reproductive outcome after uterus-preserving treatment is thinner than the evidence on immediate success. The most informative early study followed women treated for scar pregnancy in one London unit and found that the majority of those who tried to conceive again did so, most with a normally sited intrauterine pregnancy, while a minority had a recurrent scar implantation ([Ben Nagi et al., 2007](#)). Later series give a similar general picture: subsequent intrauterine pregnancy is the usual outcome, recurrence is uncommon but well documented, and placenta accreta spectrum and uterine rupture have been reported in subsequent pregnancies ([Timor-Tritsch et al., 2012](#); [Maheux-Lacroix et al., 2017](#)).

Whether the method of treatment influences later fertility is not established. It has been suggested that excising and repairing the niche might lower the chance of recurrence by restoring myometrial thickness, and that embolisation might impair fertility, but the published follow-up is too short and too incomplete to confirm or refute either idea. Guidance is accordingly cautious. Women are advised of the risk of recurrence, offered an early transvaginal scan in any future pregnancy to locate the sac, and told that delivery in a later pregnancy will be by caesarean section ([Elson et al., 2016](#); [SMFM, 2020](#)). Advice on how long to wait before conceiving again rests on expert opinion.

6. Gaps in the Evidence

Four gaps stand out. The first is the absence of comparative trials, which the rarity of the condition makes difficult but which multicentre collaboration and registries could address. The second is inconsistent

terminology. Series differ in how they define the condition, how they describe depth of implantation, and what they count as treatment success, so that pooled figures conceal as much as they show; the reporting system proposed by Jordans *et al.* (2022) offers a common language if it is adopted. The third is follow-up. Few series trace women long enough, or completely enough, to describe subsequent conceptions, and those lost to follow-up may differ from those retained.

The fourth gap concerns the published record itself. Single case reports of successful conservative treatment are numerous, and they are selected for publication in a way that unsuccessful attempts are not. A further report of that kind adds little unless it documents the features that would let it be pooled with others: gestational age, sac position, residual myometrial thickness, cardiac activity, the sequence of treatments and the reproductive outcome. Prospective registries that record consecutive cases with standard definitions would serve patients better than the accumulation of favourable anecdotes (Gonzalez and Tulandi, 2017).

7. Conclusion

Caesarean scar pregnancy can usually be treated with preservation of the uterus when it is recognised early. The published reviews agree on which approaches to avoid as sole treatment, namely systemic methotrexate, blind curettage and embolisation, and they favour removal of the pregnancy under imaging or direct vision, with the technique fitted to the depth of implantation and to local expertise. Most women who retain the uterus and wish to conceive appear able to do so, with a real but modest risk of recurrence and of abnormal placentation. These conclusions rest on observational series, and they should be held with the caution that such evidence deserves.

Conflict of interest

To be declared by the author(s) before publication.

Funding

To be declared by the author(s) before publication.

References

- Ash, A., Smith, A. and Maxwell, D. (2007). [Caesarean scar pregnancy. BJOG: An International Journal of Obstetrics and Gynaecology](https://doi.org/10.1111/j.1471-0528.2006.01237.x), 114(3): 253-263. <https://doi.org/10.1111/j.1471-0528.2006.01237.x>
- Ben Nagi, J., Helmy, S., Ofili-Yebovi, D., Yazbek, J., Sawyer, E. and Jurkovic, D. (2007). [Reproductive outcomes of women with a previous history of Caesarean scar ectopic pregnancies. Human Reproduction](https://doi.org/10.1093/humrep/dem078), 22(7): 2012-2015. <https://doi.org/10.1093/humrep/dem078>
- Betrán, A.P., Ye, J., Moller, A.-B., Zhang, J., Gülmezoglu, A.M. and Torloni, M.R. (2016). [The increasing trend in caesarean section rates: Global, regional and national estimates: 1990-2014. PLoS ONE](https://doi.org/10.1371/journal.pone.0148343), 11(2): e0148343. <https://doi.org/10.1371/journal.pone.0148343>
- Birch Petersen, K., Hoffmann, E., Rífbjerg Larsen, C. and Svarre Nielsen, H. (2016). [Cesarean scar pregnancy: A systematic review of treatment studies. Fertility and Sterility](https://doi.org/10.1016/j.fertnstert.2015.12.130), 105(4): 958-967. <https://doi.org/10.1016/j.fertnstert.2015.12.130>
- Calì, G., Timor-Tritsch, I.E., Palacios-Jaraquemada, J., et al. (2018). [Outcome of Cesarean scar pregnancy managed expectantly: Systematic review and meta-analysis. Ultrasound in Obstetrics and Gynecology](https://doi.org/10.1002/uog.17568), 51(2): 169-175. <https://doi.org/10.1002/uog.17568>
- Elson, C.J., Salim, R., Potdar, N., Chetty, M., Ross, J.A. and Kirk, E.J. (2016). [Diagnosis and management of ectopic pregnancy: Green-top Guideline No. 21. BJOG: An International Journal of Obstetrics and Gynaecology](https://doi.org/10.1111/1471-0528.14189), 123(13): e15-e55. <https://doi.org/10.1111/1471-0528.14189>
- Gonzalez, N. and Tulandi, T. (2017). [Cesarean scar pregnancy: A systematic review. Journal of Minimally Invasive Gynecology](https://doi.org/10.1016/j.jmig.2017.02.020), 24(5): 731-738. <https://doi.org/10.1016/j.jmig.2017.02.020>
- Jauniaux, E., Collins, S. and Burton, G.J. (2018). [Placenta accreta spectrum: Pathophysiology and](#)

- evidence-based anatomy for prenatal ultrasound imaging. *American Journal of Obstetrics and Gynecology*, 218(1): 75-87. <https://doi.org/10.1016/j.ajog.2017.05.067>
- Jordans, I.P.M., de Leeuw, R.A., Stegwee, S.I., et al. (2019). Sonographic examination of uterine niche in non-pregnant women: A modified Delphi procedure. *Ultrasound in Obstetrics and Gynecology*, 53(1): 107-115. <https://doi.org/10.1002/uog.19049>
- Jordans, I.P.M., Verberkt, C., De Leeuw, R.A., et al. (2022). Definition and sonographic reporting system for Cesarean scar pregnancy in early gestation: Modified Delphi method. *Ultrasound in Obstetrics and Gynecology*, 59(4): 437-449. <https://doi.org/10.1002/uog.24815>
- Jurkovic, D., Hillaby, K., Woelfer, B., Lawrence, A., Salim, R. and Elson, C.J. (2003). First-trimester diagnosis and management of pregnancies implanted into the lower uterine segment Cesarean section scar. *Ultrasound in Obstetrics and Gynecology*, 21(3): 220-227. <https://doi.org/10.1002/uog.56>
- Jurkovic, D., Knez, J., Appiah, A., Farahani, L., Mavrellos, D. and Ross, J.A. (2016). Surgical treatment of Cesarean scar ectopic pregnancy: Efficacy and safety of ultrasound-guided suction curettage. *Ultrasound in Obstetrics and Gynecology*, 47(4): 511-517. <https://doi.org/10.1002/uog.15857>
- Kaelin Agten, A., Cali, G., Monteagudo, A., Oviedo, J., Ramos, J. and Timor-Tritsch, I. (2017). The clinical outcome of cesarean scar pregnancies implanted "on the scar" versus "in the niche". *American Journal of Obstetrics and Gynecology*, 216(5): 510.e1-510.e6. <https://doi.org/10.1016/j.ajog.2017.01.019>
- Larsen, J.V. and Solomon, M.H. (1978). Pregnancy in a uterine scar sacculus: An unusual cause of postabortal haemorrhage. A case report. *South African Medical Journal*, 53(4): 142-143.
- Maheux-Lacroix, S., Li, F., Bujold, E., Nesbitt-Hawes, E., Deans, R. and Abbott, J. (2017). Cesarean scar pregnancies: A systematic review of treatment options. *Journal of Minimally Invasive Gynecology*, 24(6): 915-925. <https://doi.org/10.1016/j.jmig.2017.05.019>
- Rotas, M.A., Haberman, S. and Levгур, M. (2006). Cesarean scar ectopic pregnancies: Etiology, diagnosis, and management. *Obstetrics and Gynecology*, 107(6): 1373-1381. <https://doi.org/10.1097/01.AOG.0000218690.24494.ce>
- Seow, K.-M., Huang, L.-W., Lin, Y.-H., Lin, M.Y.-S., Tsai, Y.-L. and Hwang, J.-L. (2004). Cesarean scar pregnancy: Issues in management. *Ultrasound in Obstetrics and Gynecology*, 23(3): 247-253. <https://doi.org/10.1002/uog.974>
- Society for Maternal-Fetal Medicine (SMFM), Miller, R., Timor-Tritsch, I.E. and Gyamfi-Bannerman, C. (2020). Society for Maternal-Fetal Medicine (SMFM) Consult Series #49: Cesarean scar pregnancy. *American Journal of Obstetrics and Gynecology*, 222(5): B2-B14.
- Timor-Tritsch, I.E. and Monteagudo, A. (2012). Unforeseen consequences of the increasing rate of cesarean deliveries: Early placenta accreta and cesarean scar pregnancy. A review. *American Journal of Obstetrics and Gynecology*, 207(1): 14-29. <https://doi.org/10.1016/j.ajog.2012.03.007>
- Timor-Tritsch, I.E., Monteagudo, A., Cali, G., et al. (2014). Cesarean scar pregnancy and early placenta accreta share common histology. *Ultrasound in Obstetrics and Gynecology*, 43(4): 383-395. <https://doi.org/10.1002/uog.13282>
- Timor-Tritsch, I.E., Monteagudo, A., Santos, R., Tsymbal, T., Pineda, G. and Arslan, A.A. (2012). The diagnosis, treatment, and follow-up of cesarean scar pregnancy. *American Journal of Obstetrics and Gynecology*, 207(1): 44.e1-44.e13. <https://doi.org/10.1016/j.ajog.2012.04.018>
- Vial, Y., Petignat, P. and Hohlfield, P. (2000). Pregnancy in a cesarean scar. *Ultrasound in Obstetrics and Gynecology*, 16(6): 592-593.