

Title

Placenta accreta after postpartum tubal sterilisation and Novasure® endometrial ablation

Authors

Nnadozie Igbokwe (MBBS, MMedSci, MRCPI, MRCOG) **corresponding author**

ST5 Trainee Registrar in Obstetrics and Gynaecology, Royal Jubilee Maternity Hospital

Postgraduate student in Clinical Education, Queens University Belfast, UK

Email: dozzybarry4@gmail.com

Kevin Glackin (BaO MB ChB, MRCOG, DipMedEd)

Consultant Obstetrician and Gynaecologist

Altnagelvin Area Hospital, UK

Email: kevin.glackin@westerntrust.hscni.net

Harpreet Kaur (MBChB, MSc)

FY2 Doctor, Watford General Hospital, UK

Harpreet.kaur20@nhs.net

Abstract

A case of a 42-year-old woman, Para 3 who had an unplanned pregnancy despite bilateral tubal ligation for contraception, and Novasure® endometrial ablation for persistent Heavy Menstrual Bleeding (HMB). The pregnancy was complicated by missed miscarriage at 14 weeks and placenta accreta. This is an uncommon event.

Key Message

Although rare, pregnancy can still occur after both tubal sterilisation and endometrial ablation. The resulting pregnancy is often complicated by ectopic pregnancy, miscarriage and adherent placenta. Endometrial ablation is not a contraceptive.

Introduction

This is an uncommon case with a poorly described incidence of pregnancy after both tubal sterilisation and endometrial ablation in general in the literature. Search of PubMed, Embase and other online database showed very few case reports such as ours. Amongst these is the case of pregnancy after hydrothermal endometrial ablation (not Novasure®) and laparoscopic sterilisation (not postpartum). This resulted in miscarriage at 10 weeks with no adherent placenta recorded. The patient assumed she could not have been pregnant until the 14 weeks of gestation.

Pregnancy should be considered in any woman of reproductive age with irregular bleeding or amenorrhea even after tubal sterilisation and endometrial ablation. Women must be counselled that endometrial ablation itself is not a contraceptive procedure. Tubal sterilisation

is sometimes carried out before or around the same time as endometrial ablation, but women must be counselled that like all other methods of contraception, it may fail.

Postpartum sterilisation using the modified Pomeroy technique is an effective method of contraception but with a cumulative failure rate of 7.5/1000 procedures at 10 years.¹ There are multiple reasons for this failure rate, and effort should be made to reduce operator-dependent factors. Novasure® is an effective second-generation endometrial ablation technique for managing HMB but not without risks should subsequent pregnancy occur. Known complications include spontaneous miscarriage, ectopic pregnancy, preterm birth, PAS and fetomaternal deaths.^{2,3}

Case History/Examination

A 42-year-old Para 3, who had all her deliveries by Caesarean section. Her last childbirth (LCB) was 7 years prior, during which she underwent bilateral tubal sterilisation by modified Pomeroy's technique. The plan for sterilisation was made during her antenatal care after counselling and discussion of alternative options. Histology of the specimens confirmed normal Fallopian tubes segments.

Six months later, she suffered HMB which did not respond well to medical treatment including Tranexamic acid, Mefenamic acid and oral hormonal treatment. Options, risks, and benefits of further management were discussed with her including Mirena® coil insertion, endometrial ablation, and hysterectomy, with the woman opting for endometrial ablation. One year after her LCB, she underwent Novasure® endometrial ablation. Histological examination of the endometrium revealed no abnormality.

She was amenorrhoeic for one year following the ablation, but then developed menometrorrhagia. A planned hysteroscopy to consider Mirena® coil insertion 4 years after endometrial ablation revealed the uterine cavity was obliterated with adhesions. She was not keen on hysterectomy and opted to manage the bleeding irregularity conservatively. There was no evidence of uterine fibroid or adenomyosis from out-patient pelvic ultrasound. She had no other significant medical or surgical history of note. Her cervical smear screening was up to date and normal. She presented to our EPC 7 years after tubal sterilisation, and 3 years after endometrial ablation with a positive pregnancy test and uncertain of exact period of amenorrhea.

Her haemoglobin (HB) level from blood test was normal (129 g/L: reference range 115-165), and blood group B Rhesus D positive.

Transabdominal ultrasound scan showed singleton intrauterine pregnancy with crown-rump length (CRL) of 81.9 mm corresponding to 14 weeks gestation, with no fetal heartbeat activity. There was Spalding's sign consistent with early fetal demise. The adnexae were normal bilaterally, and a diagnosis of missed miscarriage was made.

Options of management were discussed with her including expectant, medical, and surgical treatment supported with written information. She considered options and decided on medical management. She had two failed cycles of medical treatment of miscarriage with oral mifepristone and misoprostol. SMM was going to be the next management option, and risks and benefits were discussed with her. However, she raised the thought if she could get

hysterectomy which has been offered before now for her persistent HMB before she got pregnant. This was discussed at the team level and agreement reached, coupled with the fact that she had completed her family size.

She underwent uncomplicated subtotal hysterectomy with an estimated blood loss of 400 millilitres. This procedure was not offered as one of the management options of miscarriage but in view of her peculiar background history and request. Intra-operatively, the Fallopian tubes were noted to be grossly normal-looking bilaterally, suggesting recanalization of the tubes. She had a good post-operative recovery and was discharged home two days after the procedure. Histological examination of the uterus confirmed placenta accreta (**figure 1**). She had no concerns at 12 weeks post-operative follow-up.

Discussion

Tubal sterilisation is an effective method of contraception in women. Access to the fallopian tube may be via transcervical, laparoscopic, mini-laparotomy, or during caesarean section (postpartum).¹ In the United Kingdom (UK), laparoscopic tubal sterilisation using clips or rings is the preferred method. Many factors affect sterilisation failure, including the experience of the operator, the method and technique used, and characteristics of the patient. These could largely be divided into direct and indirect factors.⁴ A classic example of direct factor would be the timing of the procedure, as in this case the patient had postpartum sterilisation which is associated with a higher failure rate and regret.⁵ At 10 years, the failure rate of postpartum partial salpingectomy is 7.5/1000, similar to 8.8/1000 failure rate for postpartum Filshie clip occlusion. Generally, the lifetime failure rate for tubal sterilisation is 1/200, while it is 2-3/1000 procedures at 10 years for laparoscopic tubal occlusion using the Filshie clip.¹ Patients should be counselled regarding failure rates depending on the timing of the procedure and the method used. The following are some of the documented reasons for tubal sterilisation failure:

- Spontaneous recanalisation
- Formation of tubo-peritoneal fistula
- Selection of wrong anatomical structure (e.g. round ligament, peritoneal folds)- This is an example of an operator's error
- Incomplete occlusion of the tube
- Slippage of occlusive device
- Pre-existing gynaecological diseases.^{4,6}

It is particularly important for the surgeon to properly identify the tube before and after the procedure to ensure the right structure has been occluded. With partial salpingectomy (Pomeroy's method), histological examination is recommended to confirm complete transection of the tubes, but this does not preclude failure.⁷ We believe tubal sterilisation failed in our patient possibly due to spontaneous recanalisation as seen during her hysterectomy procedure.

With regards to Novasure® endometrial ablation, it is an effective minimally invasive second-generation device that uses radiofrequency energy to treat HMB, with success rate of 81-90%.⁸ It works by destroying the functional layer of the endometrium; however, because this

layer can regenerate, pregnancy is possible afterwards. The following are known statistically significant independent risk factors for long-term Novasure® endometrial ablation failure:⁸

- Younger age group < 40 years
- Presence of dysmenorrhea
- Intramural fibroid
- Previous sterilisation

It should be noted that these are mainly retrospective studies with conflicting results, especially with sterilisation and age group. These studies also showed that previous caesarean section(s) is not associated with an increased rate of Novasure® ablation failure.^{8,9}

Generally, the pregnancy rate after ablation is 0.25-5.2% depending on the ablative procedure used.¹⁰ In all, 85% of such pregnancies end as ectopic pregnancy, miscarriage, or termination.¹¹ Other complications include preterm labour, intrauterine growth restriction (IUGR), PAS, and perinatal & maternal mortality.^{12,13} Only a few pregnancies, about 1.71% will be uncomplicated, resulting in term delivery.¹⁴ These complications are in keeping with our case report where the patient had both spontaneous miscarriage and PAS. Given the destructive nature of the endometrium following radiofrequency ablation, PAS, as seen in our patient, remains a concern and becoming more prevalent. Every post-ablation pregnancy should be considered to have PAS until proven otherwise, and this was considered in our decision making following unsuccessful medical management of miscarriage.^{10,13} One large multi-institutional cohort study found a PAS rate of 1/13.9 pregnancies after endometrial ablation, in contrast to 1/838 pregnancies in the unexposed group.^[14] Another review article quoted a PAS rate of 26% after endometrial ablation.²

The rate of amenorrhea at 12 months after Novasure® ablation is 48% to 56%. This does not preclude pregnancy or re-intervention later. Our patient had one-year amenorrhea post-ablation but still became pregnant later subsequently. This emphasises the point that Novasure® is not a contraceptive in itself. This must be highlighted to patients, and ongoing effective contraception strongly advised in women considering endometrial ablation.¹⁵ It is reported that as much as 80-90% of women do not use effective contraception after endometrial ablation.¹³ Our patient already had effective contraceptive in place (tubal sterilisation), and assumed she was having early menopause after about 4 months of amenorrhea.

Conclusion

Our case has shown that pregnancy can still happen even after effective contraception following Novasure® endometrial ablation. Endometrial ablation is not suitable for women who are considering pregnancy, or not willing or able to rely on effective contraception after the procedure.^{16,17} Alternative options for management of HMB, including use of Mirena® intra-uterine system should be discussed before any ablative procedure. However, even when all these steps have been taken, pregnancy with notable complications can still occur after endometrial ablation with effective contraception.¹⁶

Author contribution

Dr Nnadozie Igbokwe, the lead author wrote the manuscript, did literature review, got patient perspective and did final editing.

Dr Kevin Glackin as the Consultant suggested the case, did multiple proof reading, and approved the final manuscript.

Dr Harpreet Kaur did structural arrangement of the work and grammatical corrections with Grammarly software.

Conflict of interest

No conflict of interest declared

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References

1. FSRH Clinical Guideline: Male and Female Sterilisation (September 2014) - Faculty of Sexual and Reproductive Healthcare [Internet]. [cited 2020 Jul 5]. Available from: <https://www.fsrh.org/standards-and-guidance/documents/cec-ceu-guidance-sterilisation-cpd-sep-2014/>
2. Hare AA, Olah KS. Pregnancy following endometrial ablation: a review article. *J Obstet Gynaecol* 2005;25(2):108–14.
3. Laberge P-Y. Serious and deadly complications from pregnancy after endometrial ablation: Two case reports and review of the literature. *J Gynécologie Obstétrique Biol Reprod* 2008;37(6):609–13.
4. Varma R, Gupta JK. Failed sterilisation: evidence-based review and medico-legal ramifications. *BJOG* 2004;111(12):1322–32.
5. Royal College of Obstetricians and Gynaecologists. Female sterilisation (Consent Advice No. 3) 2016 [Internet]. Royal College of Obstetricians and Gynaecologists. 2016 [cited 2020 Jul 5]. Available from: <https://www.rcog.org.uk/en/guidelines-research-services/guidelines/consent-advice-3/>
6. Date SV, Rokade J, Mule V, et al. Female sterilisation failure: Review over a decade and its clinicopathological correlation. *Int J Appl Basic Med Res* 2014;4(2):81–5.
7. Rathod S, Samal SK. Clinical analysis of post sterilisation failure cases in a tertiary hospital. *Int J Reprod Contracept Obstet Gynecol* 2017;6(8):3294.
8. Lybol C, van der Coelen S, Hamelink A, et al. Predictors of Long-Term NovaSure Endometrial Ablation Failure. *J Minim Invasive Gynecol* 2018;25(7):1255–9.
9. Peeters JAH, Penninx JPM, Mol BW, et al. Prognostic factors for the success of endometrial ablation in the treatment of menorrhagia with special reference to previous cesarean section. *Eur J Obstet Gynecol Reprod Biol* 2013;167(1):100–3.
10. Kohn JR, Popek E, Diaz-Arrastia CR, et al. Placenta Percreta and Incomplete Uterine Rupture after Endometrial Ablation and Tubal Occlusion. *AJP Rep* 2016;6(4):e445–50.

11. Kohn JR, Shamshirsaz AA, Popek E, *et al.* Pregnancy after endometrial ablation: a systematic review. *BJOG* 2018;125(1):43–53.
12. Mark N, ter Haar JF, Jma P, *et al.* Pregnancy after Novasure® Endometrial Ablation: Two Cases and a Literature Survey. *J Case Rep Stud* 2015;3(3):303.
13. Kohn JR, Shamshirsaz AA, Popek E, *et al.* Pregnancy after endometrial ablation: a systematic review. *BJOG* 2018;125(1):43–53.
14. Bauer AM, Hackney DN, El-Nashar S, *et al.* Pregnancy Outcomes after Endometrial Ablation in a Multi-institutional Cohort. *Am J Perinatol* 2018;35(10):931–5.
15. Gimpelson RJ. Ten-year literature review of global endometrial ablation with the NovaSure® device. *Int J Womens Health* 2014;6:269–80.
16. El-Toukhy T, Hefni M. Pregnancy after hydrothermal endometrial ablation and laparoscopic sterilisation. *Eur J Obstet Gynecol Reprod Biol* 2003;106(2):222–4.
17. Sharp HT. Can anything be done to prevent pregnancy after endometrial ablation? *BJOG* 2018;125(1):54–54.