

Prophylactic uterine artery embolization in first-trimester cervical pregnancy termination with placenta accreta: A case report

Niki Shahrrava^{a,*}, Jade Lerner^b, Neil Patel^c, Zachary Sandman^c, Juana Cuevas^c, Michael Moretti^c, Sumeet Bahl^c

^a St. George's University School of Medicine, St. George's, Grenada, West Indies

^b Rutgers New Jersey Medical School, 185 S Orange Ave, Newark, NJ 07103, United States

^c The Brooklyn Hospital Center, 121 Dekalb Ave, Brooklyn, NY 11201, United States

ARTICLE INFO

Keywords:

Uterine artery embolization
Cervical pregnancy
Placenta accreta
Spontaneous abortion
Postpartum hemorrhage

ABSTRACT

The current standard treatment for placenta accreta is a hysterectomy, which carries a significant risk of hemorrhage. Although prophylactic uterine artery embolization (UAE) is established as an effective means of minimizing perioperative bleeding, there are few reports of its use early in pregnancy with invasive placenta.

A 45-year-old woman, gravida 6, para 1, at 11 weeks of gestation presented with heavy, painless uterine bleeding and was diagnosed with a spontaneous abortion complicated by cervical pregnancy and placenta accreta. The patient underwent bilateral UAE followed by gravid hysterectomy.

This case report encourages prophylactic UAE prior to abdominal hysterectomy in patients with early gestational cervical pregnancy and placenta accreta to minimize blood loss during surgery.

1. Introduction

Uterine artery embolization (UAE) is a minimally invasive procedure that was first introduced in 1979 to treat vaginal bleeding secondary to postpartum hemorrhage. It later proved effective in treating conditions such as uterine fibroids and adenomyosis [1,2]. The procedure involves navigating a catheter through the arterial system using fluoroscopy to target the uterine arteries. Small embolic particles or foam are injected into the target vessel to obstruct blood flow to the uterus. This uterus-sparing technique provides a valuable treatment option to the alternative invasive intervention of hysterectomy.

Prophylactic UAE has been demonstrated to be a safe and effective treatment prior to large obstetric procedures with placenta accreta [3]. However, few reports exist on its application in early gestational hysterectomy with invasive placenta. This case report describes using UAE as a prophylactic strategy preceding a gravid hysterectomy in a patient presenting with a non-viable first-trimester cervical pregnancy complicated by placenta accreta.

2. Case Presentation

A 45-year-old woman, gravida 6, para 1, at 11 weeks of gestation presented to the emergency department with one day of heavy, painless uterine bleeding and passage of large clots. She had had one previous uncomplicated term pregnancy that had ended via c-section and four previous inevitable spontaneous abortions that required dilation and curettage (D&C).

Three days prior, the patient had received medical attention at another facility for vaginal spotting. Sonogram findings were consistent with an inevitable spontaneous abortion, for which a D&C was scheduled the following week. However, due to progressive bleeding, the patient presented emergently to the hospital for further evaluation.

On presentation, an initial transvaginal ultrasound scan revealed a single viable cervical pregnancy with a gestational age of 10 weeks and 4 days. The patient was kept for overnight observation, with a second diagnostic ultrasound scan planned for the morning to provide a comprehensive assessment of the pregnancy. The follow-up ultrasound confirmed a single cervical pregnancy with a gestational age of 11 weeks and 2 days with no cardiac activity observed. Additionally, the placenta was invaginating into the uterine wall inferiorly, close to the bladder

* Corresponding author at: St. George's University School of Medicine, Grenada, West Indies.

E-mail addresses: nshahrra@sgu.edu (N. Shahrrava), jadelerner@gmail.com (J. Lerner), neipatel@tbh.org (N. Patel), zsandman@tbh.org (Z. Sandman), jcuevas@tbh.org (J. Cuevas), mmoretti@tbh.org (M. Moretti), sbahl@tbh.org (S. Bahl).

<https://doi.org/10.1016/j.crwh.2023.e00554>

Received 25 August 2023; Received in revised form 3 October 2023; Accepted 4 October 2023

Available online 11 October 2023

2214-9112/© 2023 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

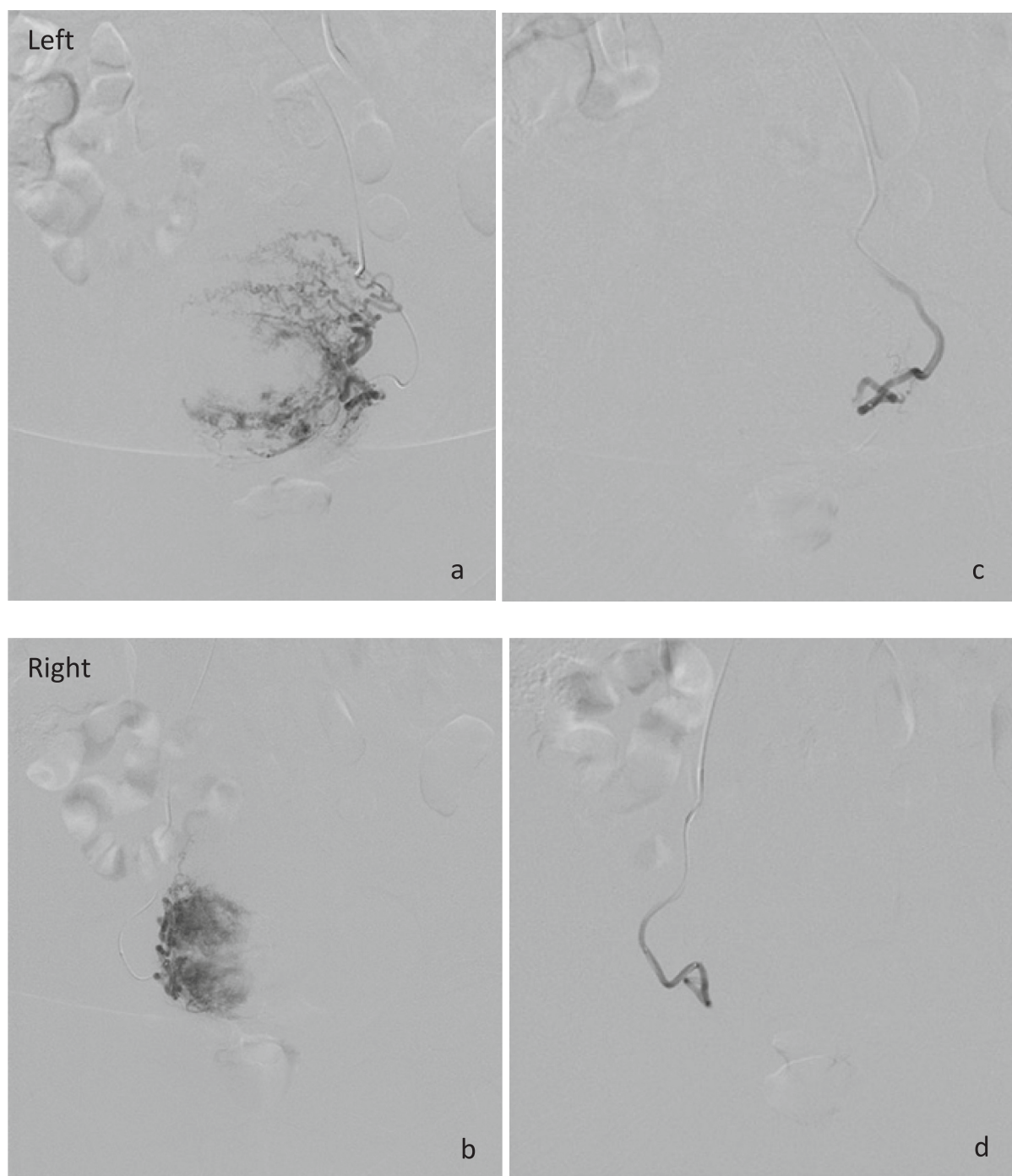


Fig. 1. Preoperative angiogram of the left (a) and right (b) uterine artery. Postembolization angiogram of the left (c) and right (d) uterine artery illustrating stasis achieved.

serosa, indicating a case of placenta accreta with probable percreta.

Following a thorough discussion of treatment options involving an interdisciplinary approach, the patient consented to bilateral uterine artery embolization (UAE) and a total abdominal hysterectomy. Given the patient's age, no desire for future pregnancy, significant uterine wall invasion and the risk of severe hemorrhage, this course of action was determined to be in her best interest.

Interventional radiology was consulted for preoperative bilateral UAE to minimize perioperative blood loss. Radial artery access was obtained with a 5-French sheath (Glidesheath Slender, Terumo, Somerset, NJ) under moderate conscious sedation. The internal iliac arteries were cannulated, and angiography demonstrated conventional bilateral

pelvic vasculature (Fig. 1). Bilateral uterine artery microcatheter (Progreat Alpha, Terumo, Somerset, NJ) embolization was performed with 2.5 mm gelatin foam (EmboCube, Merit Medical, South Jordan, UT) to complete stasis (Fig. 1). Three vials of 2 mL of particle embolic were administered into the left uterine artery and one into the right uterine artery. Hemostasis was achieved at the radial artery access site using a radial compression device (TR Band, Terumo, Somerset, NJ).

The following day, the patient underwent a gravid hysterectomy, bilateral salpingectomy, prophylactic bilateral ureteral stent placement and bowel serosal repair caused by blunt dissection of dense adhesions. Intraoperative estimated blood loss was 750 mL. A gross examination of the resected specimen showed placental tissue attached to the posterior

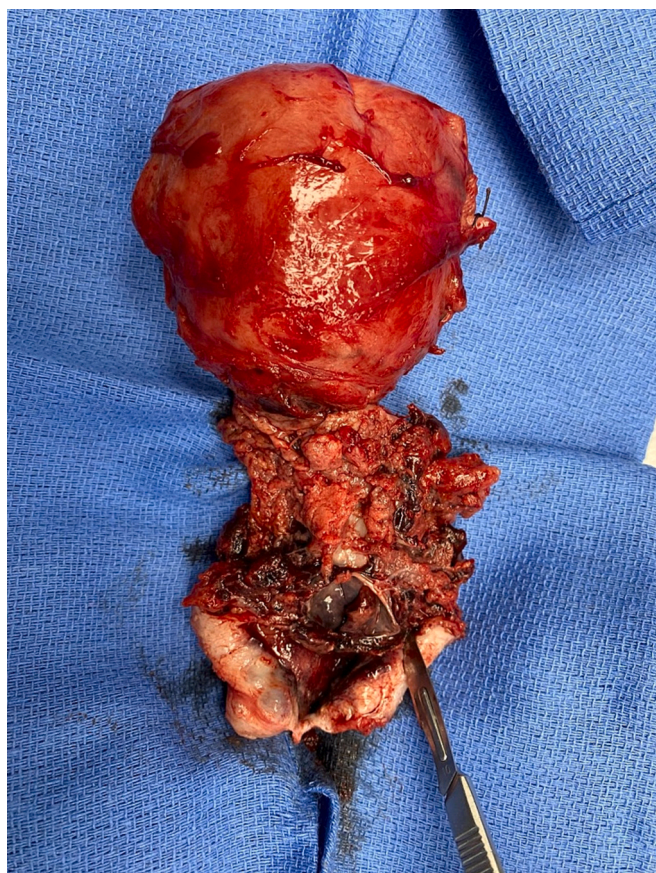


Fig. 2. Gross specimen of uterus and cervix post hysterectomy showing placental tissue.

uterine wall and the cervix (Fig. 2). The final pathological report revealed that the placenta villi was implanted on the myometrial surface without intervening decidua, consistent with placenta accreta.

3. Discussion

Placenta accreta spectrum (PAS) is a serious pregnancy complication characterized by abnormal placental attachment to the uterine wall. There are 3 subtypes of PAS, each distinguished by the depth of chorionic villi invasion. Placenta accreta is limited to the myometrial surface, placenta increta invades into the myometrium, and placenta percreta extends through the myometrium into the uterine serosa and may involve extrauterine tissues [4]. The most notable complication of PAS is maternal mortality due to severe hemorrhage during placental delivery, often requiring large-volume blood transfusions [5].

PAS may sometimes present in unique scenarios, in this case, occurring concurrently with cervical pregnancy. Cervical pregnancy is a rare form of ectopic pregnancy that involves implantation of the fertilized egg within the cervix rather than the uterine cavity, occurring in approximately 1:9000 pregnancies [6]. This condition is also associated with a high risk of severe hemorrhage and complications. Considering the severity of these risks, early detection and timely medical management are crucial in ensuring the well-being of the patient.

Treatment of PAS typically involves a planned total cesarian hysterectomy. Adjuvant options such as preoperative catheter placement or internal artery balloon occlusion have been used in conjunction with hysterectomy to reduce the risks associated with surgery [7]. UAE remains the standard treatment option with the highest effectiveness for postpartum hemorrhage [8]. However, there are few studies on the use of prophylactic UAE for PAS early in gestation. A retrospective study by

Wang et al. showed that 7 patients with PAS who received UAE after cesarian delivery but prior to hysterectomy had significantly decreased estimated blood loss (1500 mL) compared with those in the control group who underwent hysterectomy alone (2000 mL) [9].

This is a unique case where prophylactic UAE was used prior to gravid hysterectomy in a first-trimester non-viable cervical pregnancy with placenta accreta. Given the patient's history of recurrent miscarriages, no desire for future pregnancies, hemodynamic stability, and absence of immediate contraindications such as infection, she was considered a suitable candidate for UAE. The amount of blood loss intraoperatively was significantly reduced compared with similar cases when UAE was not performed.

In conclusion, UAE is a highly effective preoperative procedure that can improve outcomes in patients with complicated obstetric complications such as cervical pregnancy with placenta accreta. Prophylactic UAE prior to hysterectomy can decrease the need for transfusions and improve postoperative recovery, leading to shorter hospital stays [10]. The benefits of UAE should be considered on a case-to-case basis with the close collaboration of an interdisciplinary team of interventional radiologists, obstetricians, urologists, and anesthesiologists to help ensure that the patient receives the most effective and safe management.

Contributors

Niki Shahrrava contributed to conception of the case report, drafting the manuscript, undertaking the literature review, and revising the article critically for intellectual content.

Jade Lerner contributed to conception of the case report, drafting the manuscript, undertaking the literature review, and revising the article critically for intellectual content.

Neil Patel contributed to patient care, and revising the article critically for intellectual content.

Zachary Sandman contributed to patient care, and revising the article critically for intellectual content.

Juana Cuevas contributed to patient care, and revising the article critically for intellectual content.

Michael Moretti contributed to patient care, and revising the article critically for intellectual content.

Sumeet Bahl contributed to conception of the case report, contributed to patient care and revised the article critically for important intellectual content.

All authors approved the final manuscript submitted.

Funding

No funding or financial support was received for publication of this case report.

Patient consent

Written informed consent was obtained from the patient.

Provenance and peer review

This article was not commissioned and was peer reviewed. Peer review was directed by Professor Margaret Rees, Editor in Chief, and Professor Nancy Philips, an editor of *Case Reports in Women's Health* and member of the same institution as one of the authors, was blinded to the process.

Conflict of interest statement

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

References

- [1] B.J. Brown, D.K. Heaston, A.M. Poulson, H.A. Gabert, D.E. Mineau, F.J. Miller Jr., Uncontrollable postpartum bleeding: a new approach to hemostasis through angiographic arterial embolization, *Obstet. Gynecol.* 54 (3) (1979) 361–365.
- [2] J.H. Ravina, N. Ciraru-Vigneron, J.M. Bouret, D. Herbreteau, E. Houdart, A. Aymard, J.J. Merland, Arterial embolisation to treat uterine myomata, *Lancet* 346 (8976) (1995) 671–672.
- [3] G. Izbizky, C. Meller, M. Grasso, A. Velazco, O. Peralta, L. Otaño, R. Garcia-Monaco, Feasibility and safety of prophylactic uterine artery catheterization and embolization in the management of placenta accreta, *J. Vasc. Interv. Radiol.* 26 (2) (2015) 162–169.
- [4] E. Jauniaux, S. Collins, G.J. Burton, Placenta accreta spectrum: pathophysiology and evidence-based anatomy for prenatal ultrasound imaging, *Am. J. Obstet. Gynecol.* 218 (1) (2018) 75–87.
- [5] I.M. Usta, E.M. Hobeika, A.A.A. Musa, G.E. Gabriel, A.H. Nassar, Placenta previa-accreta: risk factors and complications, *Am. J. Obstet. Gynecol.* 193 (3) (2005) 1045–1049.
- [6] G. Vela, T. Tulandi, Cervical pregnancy: the importance of early diagnosis and treatment, *J. Minim. Invasive Gynecol.* 14 (4) (2007) 481–484.
- [7] D.A. Petrov, B. Karlberg, K. Singh, M. Hartman, P.K. Mittal, Perioperative internal iliac artery balloon occlusion, in the setting of placenta accreta and its variants: the role of the interventional radiologist, *Curr. Probl. Diagn. Radiol.* 47 (6) (2018) 445–451.
- [8] S. Ganguli, M.S. Stecker, D. Pyne, R.A. Baum, C.M. Fan, Uterine artery embolization in the treatment of postpartum uterine hemorrhage, *J. Vasc. Interv. Radiol.* 22 (2) (2011) 169–176.
- [9] M. Wang, D. Ballah, A. Wade, A.G. Taylor, G. Rizzuto, B. Li, M.P. Kohi, Uterine artery embolization following cesarean delivery but prior to hysterectomy in the management of patients with invasive placenta, *J. Vasc. Interv. Radiol.* 30 (5) (2019) 687–691.
- [10] R. Niola, F. Giurazza, G. Nazzaro, M. Silvestre, G. Nasti, M.A. Di Pasquale, F. Maglione, Uterine artery embolization before delivery to prevent postpartum hemorrhage, *J. Vasc. Interv. Radiol.* 27 (3) (2016) 376–382.