

UTERINE ARTERY OCCLUSION AND EMBOLIZATION

David Lagrew, MD, Saddleback Memorial Medical Center; Andrew Hull, MD, University of California, San Diego

BACKGROUND AND LITERATURE REVIEW

Many authors have written on their experience with arterial balloon occlusion and embolization as an alternative to other conservative measures or hysterectomy for controlling postpartum hemorrhage. (1-3) Temporary balloon occlusion is typically used as a prophylactic measure when conditions such as placenta accreta are diagnosed in the antenatal period. The occlusive balloons are placed preoperatively while the patient is stable. Embolization is typically used in patients with persistent postpartum postoperative bleeding who are hemodynamically stable enough to tolerate transport to the interventional radiology suite. These procedures are to be performed by experienced interventional radiologists given the critical state of postpartum hemorrhage patients and the potential for complications.

The literature describing the efficacy and safety of these techniques is limited to several case reports and small series. A review article of 46 studies of conservative measures found that they were effective but fell behind balloon catheters and hemostatic uterine sutures in efficacy (4). The success rates for controlling obstetrical hemorrhage were as follows: 90.7% (95% confidence interval [CI], 85.7%-94.0%) for arterial embolization, 84.0% (95% CI, 77.5%-88.8%) for balloon tamponade, 91.7% (95% CI, 84.9%-95.5%) for uterine compression sutures, and 84.6% (81.2%-87.5%) for iliac artery ligation or uterine devascularization. (4) The major limitation in these studies was the difficulty in assessing operator experience across various studies, and, unfortunately, the results have not always demonstrated clear-cut efficacy. (5)

There is the possibility of severe complications from arterial balloon occlusion and embolization. One complication is uterine necrosis. (6) In one case-control study the authors found that 3 out of 19 subjects (15.8%) had complications from catheter placement and two required stent placement and/or arterial bypass. (7) Other serious complications such as thromboembolic events or fistulae have been reported. (8) Given the severity of these reports, one should use these techniques only when sufficient expertise is available and after full review of the risks and benefits with the patient or surrogate decision maker.

RECOMMENDATIONS

1. Vaso-occlusive balloons and embolization techniques appear to be another option in centers with adequate interventional radiology expertise.
 2. The indications, potential complications and effectiveness of these techniques are not well established and therefore must be approached with caution.
-

3. If utilized the patient must be in stable condition for transport to the interventional radiology suite and should be accompanied by a nurse skilled in the assessment and treatment of obstetrical hemorrhage should the patient's status suddenly decline.
4. Obstetrical staff should keep abreast of further research developments as to the most effective technique and indications for these procedures.

EVIDENCE GRADING

Level of Evidence: II-2. Evidence obtained from well-designed cohort or case-control analytic studies, preferably from more than one center or research group.

REFERENCES

1. Hansch E, Chitkara U, McAlpine J, El-Sayed Y, Dake MD, Razavi MK. Pelvic arterial embolization for control of obstetric hemorrhage: a five-year experience. *Am J Obstet Gynecol* 1999 Jun;180(6 Pt 1):1454-60.
 2. Vendantham S, Goodwin SC, McLucas B, Mohr G. Uterine artery embolization: an underused method of controlling pelvic hemorrhage. *Am J Obstet Gynecol* 1997 Apr;176(4):938-48.
 3. Dubois J, Garel L, Grignon A, Lemay M, Leduc L. Placenta percreta: balloon occlusion and embolization of the internal iliac arteries to reduce intraoperative blood losses. *Am J Obstet Gynecol* 1997 Mar;176(3):723-6.
 4. Doumouchtsis S, Papageorghiou A, S A. Systematic review of conservative management of postpartum hemorrhage: what to do when medical treatment fails. *Obstet Gynecol Surv* 2007;62(8):540-7.
 5. Bodner LJ, Noshier JL, Gribbin C, Siegel RL, Beale S, Scorza W. Balloon-assisted occlusion of the internal iliac arteries in patients with placenta accreta/percreta. *Cardiovasc Intervent Radiol* 2006 May-Jun;29(3):354-61.
 6. Coulange L, Butori N, Loffroy R, Filipuzzi L, Cercueil J, Douvier S, et al. Uterine necrosis following selective embolization for postpartum hemorrhage using absorbable material. *Acta Obstet Gynecol Scand* 2009;88(2):238-40.
 7. Shrivastava V, Nageotte M, Major C, Haydon M, Wing D. Case-control comparison of cesarean hysterectomy with and without prophylactic placement of intravascular balloon catheters for placenta accreta. *Am J Obstet Gynecol* 2007;197(4):402.e1-5.
 8. Maassen MS, Lambers MD, Tutein Nolthenius RP, van der Valk PH, Elgersma OE. Complications and failure of uterine artery embolisation for intractable postpartum haemorrhage. *BJOG* 2009 Jan;116(1):55-61.
-