The Egyptian Journal of Radiology and Nuclear Medicine (2016) 47, 817–823

Egyptian Society of Radiology and Nuclear Medicine

The Egyptian Journal of Radiology and Nuclear Medicine

www.elsevier.com/locate/ejrnm
www.sciencedirect.com

ORIGINAL ARTICLE

Uterine artery embolization versus surgical management in primary atonic postpartum hemorrhage: A randomized clinical trial

Omar Farouk [a,*], **Walid Elbasuony** [b], **Ahmed Elbohouty** [b]

[a] *Department of Radiology, Ain Shams University, Cairo, Egypt*
[b] *Department of Obstetrics and Gynecology, Ain Shams University, Cairo, Egypt*

Received 15 March 2016; accepted 15 June 2016
Available online 1 July 2016

KEYWORDS

Atony;
Postpartum hemorrhage;
Uterine artery embolization;
Stepwise devascularization
B-lynch.

Abstract *Background:* Postpartum hemorrhage is the leading cause of severe maternal morbidity and death. A prompt management of uterine atony is life saving. Surgery can be needed in many cases. Uterine artery embolization (UAE) is a safe procedure and can be tried to be alternative to surgical approach.
Objective: To evaluate the clinical effectiveness and safety of uterine artery embolization (UAE) in comparison with stepwise devascularization and compression sutures in the treatment of postpartum hemorrhage (PPH).
Methods: Randomized controlled parallel-group trial included twenty-three women with postpartum hemorrhage who were treated with either selective embolization of the uterine arteries or stepwise devascularization and compression sutures after failure of conservative measures.
Results: Technical success was achieved in 9 patients (81.8%) of cases with complete cessation of the bleeding, while 2 cases (18.2%) suffered DIC and needed hysterectomy in the UAE group, while the other group (12 patients) had stepwise devascularization and compression sutures done after failure of the conservative measures, with 3 cases who needed hysterectomy after failure of these methods.
Conclusions: Uterine artery embolization is a safe, minimally invasive and effective method for treatment of postpartum hemorrhage and is alternative to surgical management.

1. Introduction

Obstetric hemorrhage continues to be the single most important cause of maternal mortality worldwide, accounting for 25–30% of all maternal deaths, and it represents the most common maternal morbidity in the developed world (1).

Abbreviations: PPH, postpartum hemorrhage; UAE, uterine artery embolization.

* Corresponding author.

Peer review under responsibility of The Egyptian Society of Radiology and Nuclear Medicine.

http://dx.doi.org/10.1016/j.ejrnm.2016.06.012

Postpartum hemorrhage (PPH), defined as blood loss exceeding 500 ml, is a common entity that complicates as many as 18% of all deliveries (2).

Uterine atony is the commonest cause of postpartum hemorrhage (3). Placenta accreta, lower genital tract tears, retained placental products, rupture uterus and coagulopathy are less common causes (4).

Conservative treatment consists of vaginal packing, intake of uterotonic drugs, and surgical repair of genital tract tears. If the bleeding persists despite conservative measures, surgical ligation of uterine vessels or hysterectomy is done (5).

UAE has been shown to be associated with high technical success rates and good clinical outcomes for the treatment of primary and secondary PPH (6).

Uterine artery embolization has several advantages, including easy identification of the bleeding site, preservation of the uterus and fertility, and decreased recurrent bleeding from collaterals with more distal occlusion of the bleeding vessels (7).

The purpose of this study was to evaluate the efficacy and safety of management of PPH by UAE versus selective devascularization and compression sutures.

2. Patients and methods

This prospective randomized trial was conducted at Ain-Shams University Maternity Hospital. Participants were recruited from the labor suit who developed 1ry postpartum in the 1st 2 h after birth and no satisfactory response to medical management. Exclusion criteria were as follows: history of coagulopathy, thrombocytopenia or anticoagulant therapy, women with HELLP syndrome or eclampsia, impaired serum creatinine and mental conditions rendering the patient unable to understand the nature, scope and possible consequences of the study.

Women participating in the study were recruited during the period between may 2011 till may 2013. The patients were randomized using computer generated list (MedCalc Version 13.2.2, Acacialaan 22, Ostend, Belgium) in a 1:1 ratio into 2 groups. The randomization protocol was also concealed using closed envelops so that each envelope contained the name of one of the 2 options.

Approval was obtained from the ethical committee of the department of Obstetrics and Gynecology, Ain-Shams University. An oral consent was obtained from each participant before proceeding to either of the options.

Twenty-four women with atonic postpartum hemorrhage were included after failure to respond to uterotonics.

The age range of the women included was 26–35 years with mean age 29.5 years.

The patients were divided into two groups: Group I included 11 patients (as one of the women refused to have UAE) who underwent UAE while group II underwent emergency laparotomy for stepwise devascularization and compression sutures after failure of conservative management. Group one had 9 patients who delivered vaginally and 2 by cesarean section, group 2 had 8 patients who delivered by the vaginal route while 4 others delivered by cesarean section. The patients were encountered in the delivery room where they were diagnosed as primary postpartum hemorrhage, with excessive blood loss (more than 1000 ml) with affection of the general condition of the patients. Vital data were recorded and conservative measures were started in the following sequence, giving ecbolics (10 units oxytocin IV bolus and 30 units oxytocin on 500 ml saline infusion drip), uterine massage, and bimanual compression of the uterus. If these measures failed to control the bleeding after 15 min (blood loss still above the average), the patients were allocated to one of the groups (group I the UAE or group II the stepwise devascularization and compression sutures).

If the patient was to perform a stepwise devascularization and compression sutures, the obstetric team proceeded to a laparotomy via a low transverse incision, and bilateral uterine artery ligation was done using vicryl 1.0 sutures at a lower level after downward dissection of the bladder, and if this did not control the bleeding, compression of the uterus by B-lynch sutures was done using vicryl 1.0 sutures. If these maneuvers failed to control the bleeding, bilateral internal iliac artery ligation was done. As a final resort if the bleeding did not stop a hysterectomy was done. If the patient was to be randomized to the UAE group the patient was transferred immediately to the radiology department and the following procedure done.

2.1. Technique of uterine artery embolization

The procedures were done under fluoroscopic control using monoplane cath-laboratory unit (Toshiba-Japan) with a 5F sheath (TERUMO) and a 5F Cobra2 catheter (Cordis) with a 0.35F hydrophilic guide wire (TERUMO).

In this technique the cobra catheter was advanced with the guide wire toward the level of the aortic bifurcation then the guide wire was withdrawn and contrast injection was done to identify the contralateral internal iliac artery origin and then through a road mapping; the origin of the left uterine artery was identified and catheterized and embolization was completed by injection of gel foam pledges till stagnation of contrast in the main stem of the uterine artery was achieved. After that the catheter was withdrawn after proper aspiration and flushing was done and then the ipsilateral internal iliac and uterine arteries were catheterized by formation of a Waltman loop (which is a long reversed loop obtained with the cobra catheter) and then withdrawal of the catheter to select the ipsilateral (right) uterine artery and the process of embolization started by gel foam pledges (Fig. 1) to obtain the same stagnation of contrast along the right uterine artery and then control aortogram was done to rule out any extra arterial supply and to ensure proper embolization (Figs. 2 and 3).

The sheaths were left in place for 24 h and the patients were transferred to the ICU.

3. Results

Among 30 women interviewed, 24 were enrolled in the study. One patient was subsequently excluded as she withdrew her approval to have UAE (Fig. 4).

So the two groups of women were as follows: group I ($n = 11$), including women who underwent uterine artery embolization (UAE); and group II ($n = 12$), including women who underwent stepwise devascularization and compression sutures. There were no significant differences between women of both groups regarding initial characteristics (Table 1). Most of the cases in both groups had primary atonic PPH (72.7% and 75%, respectively); the remainder had either extensive