A change in the management of intractable obstetrical hemorrhage over 15 years in a tertiary care center

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Abstract

Context: Peripartum hysterectomy was the gold standard to save a woman with persistent obstetrical bleeding, but compromised the menstrual and reproductive functions. Bilateral internal iliac artery ligation (BIAL) is a potentially effective, fertility preserving means of controlling pelvic hemorrhage, but with surgical and anesthetic risks and low success. Angiographic embolization has the potential to arrest severe pelvic hemorrhage without removing the uterus and without hazarding general anesthesia in a hemodynamically unstable patient. Aims: The aim of this study is to discuss change in the management of intractable obstetrical hemorrhage from removing to conserving the uterus over 15 years. Settings and Design: A retrospective analysis of 122 cases of intractable obstetrical hemorrhage over a period of 15 years (January 1997 to December 2011) was done. We started uterine artery embolization (UAE) in 2007 for obstetrical hemorrhage. The patients were analyzed for maternal characteristics, indications, treatment modality, maternal morbidity, and mortality. Statistical Analysis Used: Descriptive. Results: We analyzed 12,055 deliveries, (6029 cesarean sections; 6026 vaginal deliveries). One hundred and twenty-two cases of intractable obstetrical hemorrhage were managed with obstetrical hysterectomies in 63, UAE in 53 cases and BIAL in six cases. During the period between 1997 and 2006 intractable obstetrical hemorrhage was managed by hysterectomy/internal iliac artery ligation. The last 5 years of the study period had 80 patients with intractable obstetrical hemorrhage, 53 patients underwent arterial embolization and 35 had a hysterectomy and two had internal artery ligation. There was no mortality and significantly less morbidity in embolization group in our study. Conclusions: Embolization should be tried in patients with intractable obstetrical hemorrhage before proceeding for surgical intervention.

Key words: Bilateral internal iliac artery ligation, obstetrical hemorrhage, uterine artery embolization

Introduction

Obstetrical hemorrhage causes 30% of all maternal mortality. Management options available to treat intractable pelvic hemorrhage include: Hysterectomy, bilateral internal artery ligation (BIAL), and uterine artery embolization (UAE).[1] Hysterectomy although has been advocated as the definitive method of controlling pelvic hemorrhage, the obvious disadvantages include the loss of fertility, high surgical, and anesthetic risk in an already compromised patient. BIAL has been investigated as a potentially effective, fertility preserving means of controlling pelvic hemorrhage, but has a low success rate. Angiographic embolization has been successfully used to control intractable pelvic hemorrhage when routine medical and conservative methods of bleeding control have been tried and not found effective. We studied 122 cases of intractable obstetrical hemorrhage managed by surgical intervention (hysterectomy/internal iliac artery ligation) and/or selective arterial embolization over a period of 15 years. We intend to discuss the change in management of intractable obstetrical hemorrhage from removing to conserving the uterus over the last 15 years.

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Subjects and Methods

A retrospective analysis of patients with intractable obstetrical hemorrhage (122) over a period of 15 years from January 1997 to December 2011 was done.

During the period between 1997 and 2006 intractable obstetrical hemorrhage was managed by surgical intervention (hysterectomy/internal iliac artery ligation). In the year 2007, UAE was started for obstetrical hemorrhage in our institution. The patients were analyzed for maternal characteristics, indications, maternal morbidity, and mortality by dividing them on the basis of treatment modality.

Observations and Results

In 15 years, there were 12,055 deliveries out of which 6026 were vaginal deliveries and 6029 were cesarean sections. There were 122 (1.01%) cases of intractable obstetrical hemorrhage out of which 63 (51.64%) patients underwent obstetrical hysterectomies (OH) giving overall incidence of 0.52% (rate of 5.23/1000 deliveries). The incidence of OH following a vaginal delivery was 0.24%. The incidence of OH following caesarean sections was 0.79%. During the period between 1997 and 2006, there were 8269 deliveries and 42 cases of intractable obstetrical hemorrhage were managed by surgical intervention hysterectomy (38) and internal iliac artery ligation (4) with the rate of OH was 4.6/1000 deliveries. In the year 2007, UAE was started for obstetrical hemorrhage in our institution. Over the last 5 years of the study period, there were 3786 deliveries and 80 patients with intractable obstetrical hemorrhage out of which 53 patients with hemodynamic instability underwent UAE (rate of 13.99/1000 deliveries). Number of UAE following a vaginal delivery was 33 (1.9%) and following cesarean sections was 20 (0.98%). 25 patients underwent OH (rate of 6.60/1000 deliveries) and two patients had internal artery ligation.

Six patients (0.049%) had BIAL in the study period of 15 years. Among the patients, 21.31% were in the age group of 26-30 years in OH, 31.25% patients were in the age group of 21-25 years in UAE [Table 1]. OH and BIAL was performed more in multiparous patients while UAE was more common in primipara, atonic postpartum hemorrhage (PPH) being the most common indication. In our study, 31.97% were unbooked in OH group, and 46.25% were unbooked in UAE group indicating that most of the patients did not have antenatal supervision. Majority of cases (43.44%) with obstetrical hemorrhage had placenta previa/accreta and (26.23%) had previous lower segment cesarean section as significant high-risk factors [Table 2]. Atonic PPH was an indication for OH in 39/63 (61.9%) and for UAE in 29/53 (54.72%) and all the patients undergoing BIAL [Table 2]. In the study, maternal morbidity was seen in (76.19%) 48/63 cases in OH group, (25%) 04/06 in BIAL group, while it was (39.62%) 21/53 in UAE group. There were seven maternal deaths in OH group and none in UAE group [Table 3]. Average hospital stay was 13.7 days in OH group and was 6.6 days in UAE group.

Discussion

Postpartum hemorrhage is a potentially serious obstetric complication and its management represents an issue of critical concern to an obstetrician. The most common indication for emergency procedures is severe uterine hemorrhage that cannot be controlled by conservative measures. Such hemorrhage may be due to abnormal placentation (e.g. placenta accreta), uterine atony, uterine

| Table 1: Groupwise demographic profile of the subjects | OH (n) | UAE (n) | BIAL (n) |
|---|---|---|---|
| Age in years | | | |
| 21-25 | 17 (13.93) | 25 (31.25) | 2 (1.64) |
| 26-30 | 26 (21.31) | 20 (25) | 3 (2.26) |
| 31-35 | 12 (9.84) | 6 (7.5) | 1 (0.82) |
| 36-40 | 8 (6.56) | 2 (2.5) | 0 |
| Parity | | | |
| 1 | 13 (10.6) | 21 (26.25) | 1 (0.82) |
| 2 | 8 (6.56) | 9 (11.25) | 2 (1.64) |
| 3 | 24 (19.68) | 15 (18.75) | 3 (2.26) |
| 4 | 12 (9.84) | 5 (6.25) | 0 |
| 5/>5 | 6 (4.92) | 3 (3.75) | 0 |

*aOver 15 years; **Over 5 years; Majority of the patients in all three groups were between 21 and 30 years of age; OH: Obstetrical hysterectomy; UAE: Uterine artery embolization; BIAL: Bilateral internal artery ligation

| Table 2: Indication for OH/UAE/BIAL |
|---|---|---|---|
| Indications | OH (n) | UAE (n) | BIAL (n) |
| Uterine atony | 39 | 29 | 6 |
| Placenta previa | 20 | 18 | 4 |
| Prolonged labor | 7 | 7 | 1 |
| Multiple pregnancy | 5 | 1 | 1 |
| Grand multipara | 6 | 3 | 0 |
| Transverse lie | 1 | 0 | 0 |
| Rupture uterus | 15 | 0 | 0 |
| Previous LSCS | 11 | 0 | 0 |
| Oxytocin abuse | 2 | 0 | 0 |
| Prolonged labor | 2 | 0 | 0 |
| Morbidly adherent placenta | 9 | 24 | 0 |
| Previous LSCS | 5 | 16 | 0 |
| Placenta previa | 2 | 6 | 0 |
| Retained placenta due to placenta accreta | 1 | 2 | 0 |
| Inversion uterus | 1 | 0 | 0 |
| Total | 63 | 53 | 6 |
rupture, leiomyomas, coagulopathy, or laceration of a uterine vessel not treatable by more conservative measures. The relative frequency of these conditions varies among series and is dependent upon the patient population and practice patterns.\[^{1‑9}\] In our study, of 122 patients with intractable obstetrical hemorrhage 42 (34.43%) were with placenta previa, 33 (27.05%) with morbidly adherent placenta and 15 (12.3%) were with ruptured uterus. Peripartum hysterectomy/hypogastric artery ligation may be performed as an emergency to save the life of a woman with persistent bleeding. Disadvantages of surgical treatment include significant failure rates for hypogastric artery ligation, the need for general anesthesia, and surgical complications including infection, bleeding, and ureteric injury.\[^{10}\] Other disadvantages of hypogastric artery ligation include expertise required to work in retroperitoneal area, presence of abscess/hematoma may preclude access to hypogastric arteries. Hysterectomy on the other hand results in a permanent loss of future childbearing opportunities. Its relative frequency of these conditions varies among series and is dependent upon the patient population and practice patterns.\[^{1‑9}\] In our study, of 122 patients with intractable obstetrical hemorrhage 42 (34.43%) were with placenta previa, 33 (27.05%) with morbidly adherent placenta and 15 (12.3%) were with ruptured uterus. Peripartum hysterectomy/hypogastric artery ligation may be performed as an emergency to save the life of a woman with persistent bleeding. Disadvantages of surgical treatment include significant failure rates for hypogastric artery ligation, the need for general anesthesia, and surgical complications including infection, bleeding, and ureteric injury.\[^{10}\] Other disadvantages of hypogastric artery ligation include expertise required to work in retroperitoneal area, presence of abscess/hematoma may preclude access to hypogastric arteries. Hysterectomy on the other hand results in a permanent loss of future childbearing opportunities. Its reported rate varies from 0.24/1000 deliveries to 5.09/1000 deliveries.\[^{10,11}\] Peripartum hysterectomy rate of 5.23/1000 deliveries was found in our study. Embolization under angiographic guidance has the potential to arrest severe pelvic hemorrhage without removing the uterus and without hazarding general anesthesia in a hemodynamically unstable patient.\[^{12‑14}\] Successful pregnancies after angiographic embolization have been reported by many studies.\[^{15,16}\]

Among our patients 11 were able to have subsequent successful pregnancies with a favorable outcome. Hence, UAE in patients with severe life-threatening obstetrical hemorrhage proves to be a safe, effective, and dependable method to control the bleeding and save the uterus as well as future fertility. Our study shows lesser complications with UAE as compared with OH and BIAL; therefore, we suggest UAE as the first line of treatment in intractable obstetrical hemorrhage. In future a prospective randomized study to compare UAE, OH and BIAL can be performed to establish evidence.

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**Table 3: Postoperative morbidity and mortality data**

| Type of complication     | OH  | UAE | BIAL |
|--------------------------|-----|-----|------|
| Fever                    | 22  | 21  | 1    |
| Acute renal failure      | 7   | 0   | 0    |
| DIC                      | 4   | 0   | 0    |
| UTI                      | 9   | 0   | 1    |
| ARDS                     | 1   | 0   | 0    |
| Surgical complications   |     |     |      |
| Ureteric injury          | 2   | 0   | 0    |
| Bladder injury           | 3   | 0   | 0    |
| Paralytic ileus          | 14  | 0   | 0    |
| Wound infection          | 5   | 0   | 2    |
| Hematoma                 | 1   | 2   | 0    |
| Post embolization syndrome | NA  | 21  | 0    |
| Failure of procedure     | NA  | None| 0    |
| Mortality                | 7   | 0   | 0    |

There was no mortality and lesser morbidity in UAE group; OH: Obstetrical hysterectomy; UAE: Uterine artery embolization; BIAL: Bilateral internal artery ligation; DIC: Disseminated intravascular coagulation; UTI: Urinary tract infection; ARDS: Adult respiratory distress syndrome.