Pelvic packing with vaginal traction for the management of intractable hemorrhage

Leonardo A. Naranjo-Gutiérrez a, Joaquín Oliva-Cristerna a, Martha L. Ramírez-Montiel a, Mario I. Ortiz b,*

a Servicio de Ginecología y Obstetricia, Hospital de la Mujer, Secretaría de Salud, Mexico D.F., Mexico
b Área Académica de Medicina, Instituto de Ciencias de la Salud, Universidad Autónoma del Estado de Hidalgo, Pachuca, Mexico

Abstract

Objective: To present clinical cases examining the effectiveness and safety of pelvic packing with vaginal traction for inhibiting obstetric hemorrhage among women receiving treatment at a public obstetrics and gynecology tertiary care hospital in Mexico. Methods: In a retrospective observational descriptive study, eight cases of obstetric hemorrhage treated by pelvic packing with vaginal traction between January 2012 and December 2013 at Hospital de la Mujer, Mexico City, Mexico, were reviewed. Results: The mean patient age was 28.8 ± 6.8 years. The average blood loss was 4535 ± 897 mL. Uterine atony was the cause of bleeding among six patients; histopathologic examination revealed two cases of placenta accreta, one case of placenta percreta, two cases of uteroplacental apoplexy, and one case of myomatosis. For two patients, placental separation was difficult and required surgical management. The packing technique was effective for all patients. No patients presented with infection or required re-operation for bleeding management. No deaths occurred. Conclusion: For management of bleeding among patients with underlying coagulation disorders, pelvic packing can be useful when standard techniques such as hysterectomy, tubal ligation, and/or pharmacologic therapy are unsuccessful.

1. Introduction

The World Health Organization reports that, among 536000 maternal deaths annually worldwide, 25% are caused by obstetric hemorrhage and 50% occur in the first few hours postpartum [1]. In Mexico, obstetric hemorrhage and its complications are a leading cause of maternal death and irreversible organ sequelae, second only to pre-eclampsia or eclampsia [1–3]. Obstetric hemorrhage is still the greatest cause of maternal death in the USA, and reported mortality rates from this disorder range from 1.6%–4% in high-income countries to 13.6% in low-income countries such as Mexico [1–3]. Maternal death is an indicator of social injustice, gender inequality, poverty, and preventable tragedy. For this reason, further tools are needed to increase the chance of survival for these patients.

In the past 20 years, "damage control surgery" has been developed to manage hemorrhage and is performed in three stages: the initial laparotomy, the resuscitation phase, and the definitive surgery. Pelvic packing is typically used as part of the surgery phase and is a clinical option after hysterectomy and in the presence of a coagulopathy [1–3]. Pelvic packing compresses the low-pressure veins and capillaries in the vaginal vault to decrease or stop the bleeding. In an actively bleeding patient, disseminated intravascular coagulation can be accompanied by hypothermia, acidosis, and hypovolemic shock. Because all of these signs are secondary to other pathologies that complicate pregnancy, the patient must be stabilized in the intensive care unit to correct these problems [3]. Pelvic packing is widely applicable in gynecology and two packing techniques exist. First, in the "Mikulicz" technique, compresses are placed within the abdominal cavity to control bleeding. Second, in a technique first described by Logothetopoulos [4] in 1926, a sterile bag (e.g., X-ray cassette drape) filled with sterile gauze rolls is placed in the pelvic cavity. Traction is then applied to the sterile bag by tying intravenous tubing and suspending an intravenous fluid bag from the foot of the bed [1,4–14]. The Logothetopoulos technique, however, has an infection rate of 81.8%, and thus is not optimal for patient outcomes [1,4–14].

The aim of the present study was to describe the use of a new technique for the management of obstetric hemorrhage that has been applied in eight cases where both pharmacologic and surgical methods were insufficient to manage the bleeding.

2. Materials and methods

The present retrospective, observational, and descriptive study was conducted to document eight women with refractory pelvic bleeding who underwent damage control surgery between January 1, 2012, and December 31, 2013, at Hospital de la Mujer, Mexico City, Mexico, a public obstetrics and gynecology tertiary care hospital located in an urban area that provides care for patients of lower and middle socioeconomic status. In all cases, the patient’s relatives gave consent for the emergency procedure due to the severity of the...
patient's condition. The Ethics and Investigation Committees of the hospital approved the study protocol, and the study was performed according to the guidelines delineated by the Declaration of Helsinki.

The packing technique was performed for patients with refractory bleeding that was difficult to control, particularly for patients with coagulation disorders. Such cases are commonly associated with impaired placental implantation, such as placental abruption, placenta accreta, or fetal death. The packing technique used by the hospital team was an innovative technique created by two of the authors (LN-G and JO-C), and was performed in the following steps.

After completion of a hysterectomy, continuous interlocking sutures were used in the vaginal vault instead of a vaginal seal. Once hemostasis was maximized, two compresses were attached and folded (Fig. 1). A hole was made through the center of the pack (i.e. the two compresses together), and was traversed by the terminal ends of 5–6 Foley catheters (Fig. 2). The ends of each Foley catheter were passed through and externalized via the vagina (Fig. 3). The pack was placed on the surgical field, and the catheter balloons were inflated with sterile water and then placed above the pack (Fig. 4). These catheters had two functions: to compress the surgical field and to drain any abdominal cavity bleeding that might be present. The abdominal wall was closed and a 1-kg counterweight (2500 mL solution) was placed at the end of all catheters (Fig. 5). The pelvic packing was maintained for 36–48 hours, after which the catheters and the pelvic packing were removed.

For the present descriptive study, the medical records of the eight patients were reviewed and the clinical data were collected including patient age, blood loss, and histopathologic diagnosis. The data were summarized by descriptive statistics (mean ± SD, range).

3. Results

All eight patients presented with more than 1500 mL of bleeding, and pharmacologic and surgical (e.g. B-Lynch suture, hypogastric ligation, or hysterectomy) maneuvers failed to control the bleeding, risking the lives of the patients. The mean patient age was 28.8 ± 6.8 years (range, 23–38 years). The average blood loss was 4535 ± 897 mL (range, 1900–10000 mL). Hematologic component transfusion was required in all cases. The average whole blood volume transfused was 2937.6± 1912.8mL (range, 1450–7314mL). The average blood plasma volume transfused was 1563.0 ± 777.6 mL (range, 560.0–2686.0 mL). Uterine atony was the cause of bleeding in six patients. The
histopathologic study revealed two cases of placenta accreta, one case of placenta percreta, two cases of uteroplacental apoplexy, and one case of myomatosis. For two patients, surgical management was initiated to manage problems relating to separation of the placenta. The characteristics of the study patients are given in Table 1.

All eight patients were stabilized in the intensive care unit and then underwent packing for damage control surgery, which facilitated hemorrhage control without the need for re-application of the packing in 100% of cases. Notably, in three cases the patient had undergone two previous laparotomies for management of bleeding. In addition, in one case a hematoma in the broad ligament was reported. For this patient, after hypogastric ligation and hysterectomy failed to control the bleeding, traction vaginal pelvic packing definitively controlled the bleeding and facilitated hemodynamic stabilization.

In terms of hospital stay, all women required treatment in the intensive care unit, lasting on average 9.6 ± 3.2 days (range, 5–12 days). There were no reports of infection or re-operation for management of bleeding. No deaths occurred. One patient presented with a superior sagittal sinus thrombosis on her second postoperative day; she was diagnosed promptly and treated accordingly with no neurologic sequelae. All of the patients were discharged from the hospital without incident. Table 1 summarizes characteristics of the eight cases for which the pelvic packing with vaginal traction proved useful.

4. Discussion

Obstetric hemorrhage is considered severe when the patient has lost 25% of blood volume or 1500 mL of blood. The term exsanguination is used in trauma surgery to define a 40% loss of blood volume, which is associated with injuries to the heart, liver, and major arterial trunks; however, such cases have been rarely reported among obstetric patients.

In the present series of pregnant women, pharmacologic and surgical treatments failed, and the bleeding became life-threatening, necessitating the use of pelvic packing with vaginal traction. Given the patient characteristics, this procedure is considered to be damage control surgery applied to obstetrics. Because the hemorrhage led to clinical deterioration manifested by acidosis, hypothermia, coagulopathy, hypovolemic shock, and sometimes the presence of pre-eclampsia or eclampsia, 24–48 hours of pelvic packing with vaginal traction and primary skin closure was proposed to control the microvascular venous bleeding. Stabilization of the hemorrhage gave the clinical team the opportunity to correct metabolic issues and achieve hemostasis. In the present case series, no patient required repacking, and thus the strategy was successful as a damage control surgery.

After 24–48 hours, the packaging was removed, achieving hemorrhage control in 100% of cases without requiring re-operation. The present results are not concordant with the findings of Escobar et al. [3], who reported 10 deaths and several re-operations after removal of the pelvic packing in their series. In the current study, no patients presented with infection, which is inconsistent with the infection rates reported for the Logothetopulos technique (81.5%) [1,4,10]. One patient developed a superior sagittal sinus thrombosis, but was diagnosed and managed promptly, had a full recovery without sequelae, and was discharged without complications.

The consequences of postpartum hemorrhage include anemia, lactation failure, hypovolemic shock and hypotension, coma, and need for surgery. These can be risk factors for both emotional sequelae (including depression, anxiety, fatigue, and post-traumatic stress disorder) and poor physical health outcomes [15]. The present study patients achieved a full recovery and were discharged with follow-up scheduled at their normal clinic. Thus, a limitation of the study is the lack of long-term follow-up.

Table 1
Clinical characteristics of the study patients.

<table>
<thead>
<tr>
<th>Case</th>
<th>Patient age, y</th>
<th>Case summary</th>
<th>Blood loss, mL</th>
<th>Hospital stay, d</th>
<th>Histopathologic diagnosis</th>
<th>Infection/death</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>26</td>
<td>Postpartum uterine atony</td>
<td>1900</td>
<td>5</td>
<td>Endomyometritis, fragmented segment with acute inflammation and extensive bleeding</td>
<td>No/no</td>
</tr>
<tr>
<td>2</td>
<td>29</td>
<td>Placenta previa bleeding, history of myomectomy, eclampsia, uterine atony; hysterectomy was performed; posterior packing due to uterine layer bleeding</td>
<td>3000</td>
<td>8</td>
<td>Uterus with myomas and adenomyosis, chronic nonspecific cervicitis, puerperal uterus, endometriotic ovarian cyst</td>
<td>No/no</td>
</tr>
<tr>
<td>3</td>
<td>38</td>
<td>Postoperative hysterectomy with two laparotomies for acute abdomen; posterior vaginal traction packing</td>
<td>10000</td>
<td>12</td>
<td>Endomyometritis, uteroplacental apoplexy</td>
<td>No/no</td>
</tr>
<tr>
<td>4</td>
<td>33</td>
<td>Uterine atony and broad ligament hematoma</td>
<td>6500</td>
<td>9</td>
<td>80% uteroplacental apoplexy, chronic nonspecific endomyometritis</td>
<td>No/no</td>
</tr>
<tr>
<td>5</td>
<td>31</td>
<td>Uterine atony; post-hysterectomy bleeding continued in the vaginal vault layer</td>
<td>3450</td>
<td>11</td>
<td>Multiple intramural leiomyoma, chronic nonspecific endometritis</td>
<td>No/no</td>
</tr>
<tr>
<td>6</td>
<td>23</td>
<td>Placenta accreta; post-hysterectomy presented with coagulopathy and retroperitoneal hematoma; underwent packing</td>
<td>3200</td>
<td>11</td>
<td>Placenta accreta in segment and endocervix, acute chorioamnionitis placenta</td>
<td>No/no</td>
</tr>
<tr>
<td>7</td>
<td>28</td>
<td>Uterine atony; post-hysterectomy, exploratory laparotomy for acute abdomen with bleeding in the vaginal vault and subsequent packing</td>
<td>2900</td>
<td>9</td>
<td>Placenta percreta lower segment level</td>
<td>No/no</td>
</tr>
<tr>
<td>8</td>
<td>23</td>
<td>Uterine atony; post-hysterectomy bleeding in the uterine layers led to decision to perform packing</td>
<td>3800</td>
<td>10</td>
<td>Placenta accreta</td>
<td>No/no</td>
</tr>
</tbody>
</table>
In summary, the present results demonstrate the utility of pelvic packing with vaginal traction—a low-cost method based on affordable materials that are available in most hospitals. This method provides the surgical team with an important treatment alternative and patients with a life-preserving opportunity when other surgical and pharmacologic treatments have been exhausted.

Conflict of interest

The authors have no conflicts of interest.

References