



Case series

The use of QuikClot combat gauze in cervical and vaginal hemorrhage



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ARTICLE INFO

Keywords:

Cervical hemorrhage
 Combat gauze
 Vaginal hemorrhage
 Vaginal packing

ABSTRACT

QuikClot combat gauze is a synthetic hemostatic dressing used for hemorrhage control. There is a paucity of data describing the clinical use and hemostatic results of combat gauze in the obstetric and gynecologic setting. This case series demonstrates the use of combat gauze as an effective hemostatic agent when used as vaginal packing in cervical and vaginal hemorrhage. Hemostasis was achieved rapidly in all cases and further interventions were avoided. The combat gauze remained in place for a mean time of 15 h with no adverse side effects observed. The use of combat gauze as vaginal packing may provide an alternative option in the treatment of cervical and vaginal hemorrhage when other traditional conservative and surgical interventions fail or are unavailable.

1. Introduction

Hemorrhage related to a traumatic event is a leading cause of morbidity and mortality (Gegel et al., 2013; Champion et al., 2003). Synthetic hemostatic dressings were developed as an easy, low-cost and effective method of treating hemorrhage (Kheirabadi et al., 2010; Alam et al., 2005; MacIntyre et al., 2011; Mueller et al., 2012). QuikClot combat gauze is a hemostatic dressing that is FDA approved for external use to stop moderate to severe bleeding (Fig. 1). A newer, similar product, QuikClot Control+, has been approved for internal organ space use in severely bleeding patients. QuikClot contains kaolin, an adsorbent that promotes coagulation by creating a hemo-concentration effect, thus increasing the number of platelets and clotting factors near the wound (Granville-Chapman et al., 2011). In the military and combat setting, QuikClot combat gauze is recommended as first line treatment for life threatening hemorrhage not amenable to tourniquet placement (Bennett and Littlejohn, 2014).

Obstetric and gynecologic hemorrhage can also lead to severe morbidity and postpartum hemorrhage remains a leading cause of maternal death (American College of Obstetricians and Gynecologists, 2006). Cervical and vaginal lacerations in particular can cause large volume blood loss and traditional management includes hemostatic suturing and vaginal gauze packing (Ghirardini et al., 2012; Martin-Hirsch et al., 2010). Occasionally, cervical and vaginal hemorrhage may be difficult to control with conventional interventions due to friable tissue, multiple mucosal lacerations or coagulopathies (Patel et al., 2012). Literature describing the use of combat gauze as an alternative approach to achieve rapid hemostasis in the field of obstetrics and gynecology and the associated subspecialties (i.e. Gynecologic

Oncology) is limited (Schmid et al., 2012; Schmid et al., 2013; Patel et al., 2012). This case series demonstrates the use of QuikClot combat gauze as an effective and safe hemostatic agent for cervical and vaginal hemorrhage when used as vaginal packing.

2. Cases

Case 1. Vaginal cuff hemorrhage in the setting of therapeutic anticoagulation.

A 69 year-old postmenopausal female with a medical history significant for hypertension and BRCA+ breast cancer, status post lumpectomy, radiation and tamoxifen therapy, presented with abnormal uterine bleeding. She was found to have complex atypical hyperplasia on endometrial curettage specimen. She underwent a robotic-assisted total laparoscopic hysterectomy, bilateral salpingo-oophorectomy and cystoscopy.

Her surgery was uncomplicated, notable only for adhesive disease in the right upper quadrant, which was lysed. Pathology showed complex atypical hyperplasia, fibroids, adenomyosis and normal ovaries and fallopian tubes.

She presented five days postoperatively with lower abdominal pain and was diagnosed with a port site hernia in the left lower quadrant, which was closed in the operating room. She recovered well and was discharged to a short-term rehabilitation center.

After discharge, she was noted to have episodes of hypoxia and was subsequently diagnosed with multiple pulmonary emboli. She was hemodynamically stable and started on enoxaparin with transition to warfarin for therapeutic anticoagulation.

Five days later, she had an increase in vaginal bleeding with

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Fig. 1. QuikClot hemostatic dressing.

increasing saturation of perineal pads. Her vagina was packed with gauze and the patient was transferred to the hospital. On arrival, the gauze pads were fully saturated and examination showed the vaginal cuff was intact with granulation tissue. There was oozing and active bleeding visualized from the posterior cuff and bilateral side walls which did not resolve with placement of Monsel's solution. Total blood loss was approximately 700 cm³. The vagina was then packed with QuikClot, which resulted in quick resolution of vaginal bleeding. Packing was removed after approximately 20 h with no additional active bleeding noted. She was successfully restarted on therapeutic anticoagulation and had no further episodes of vaginal bleeding.

She was discharged to short-term rehabilitation and subsequent outpatient follow up was uneventful. At physical exam two weeks after hospital discharge, there was no evidence of tissue necrosis or any adverse reactions secondary to the use of QuikClot.

Case 2. Delayed hemorrhage from a cervical cone bed.

A 25 year old with a history of high grade dysplasia on pap smear and cervical intraepithelial neoplasia (CIN) 2–3 on colposcopy underwent a CO₂ laser cone biopsy. Regarding her history, she was initially found to have atypical squamous cells, cannot rule out high grade intraepithelial lesions, in early pregnancy. She underwent colposcopy, which showed a vascular lesion at six o'clock that was biopsied and read by pathology as CIN 2–3. She was followed conservatively throughout pregnancy with serial pap smears that remained unchanged. Postpartum, a pap smear was repeated and again showed atypical squamous cells, cannot rule out high grade squamous intraepithelial lesion. She was referred to Gynecologic Oncology for a cone biopsy.

CO₂ laser cone biopsy was uncomplicated. Extensive lesions were noted on colposcopic exam. Vasopressin was given circumferentially prior to ablation and the entire lesion was ablated. Monsel's solution was applied at the end of the procedure and excellent hemostasis was noted. The patient was discharged home later that day after an uneventful postoperative course.

Approximately 12 h later, the patient presented to the emergency department with heavy vaginal bleeding. On exam, bleeding from the surgical bed was noted. Surgicel was placed and her vagina was packed with standard gauze. On re-examination 2 h later, she had ongoing heavy vaginal bleeding, saturating the vaginal packing. Total blood loss was approximately 800 cm³. At this time, QuikClot packing was placed over previously applied Surgicel. She was observed for 12 h and had no

additional episodes of vaginal bleeding at which time the QuikClot was removed. She was discharged to home and subsequent outpatient follow up was uneventful.

At physical examination two weeks after hospital discharge, there was no evidence of tissue necrosis or any adverse reaction secondary to the use of QuikClot.

Case 3. Obstetric hemorrhage in the setting of DIC after cesarean hysterectomy.

A 27 year-old female (gravida 1, para 0) with no significant medical history was admitted in early labor at 39 weeks gestation and progressed to fully dilated. A primary low transverse cesarean section was performed for a non-reassuring fetal heart tracing during the second stage of labor.

After closure of the hysterotomy, bleeding was noted from the left uterine vein and hemostasis was achieved with hemoclips and ligation of the uterine vein. Severe uterine atony subsequently developed. Multiple interventions to reverse the atony were attempted, including IV pitocin (110 units), IM methergine (0.4 mg IM), rectal misoprostol (1000 mcg), B Lynch suture and Bakri balloon placement. Despite these attempts, a large blood loss was noted and the patient became hemodynamically unstable. A 'massive transfusion protocol' was initiated and the decision was made to proceed with a hysterectomy. The patient developed disseminated intravascular coagulation (DIC) and a second 'massive transfusion protocol' was initiated.

A hysterectomy was performed expeditiously. After closure of the vaginal cuff, steady brisk bleeding was noted from anterior and posterior vaginal extensions and several other vaginal lacerations. Multiple attempts were made to close the vaginal extension from below, however due to DIC and highly friable tissue this was unsuccessful. Standard vaginal packing was used two times with continued bleed through.

At this point, the vagina was packed with QuikClot Combat Gauze. The vaginal bleeding quickly resolved and the patient did not require further blood transfusions. The patient remained hemodynamically stable throughout the remainder of the case.

In total, estimated blood loss was 8 l and the patient required 11 units of packed red cells, 3 units of platelets, 6 units of plasma and 4 units of cryoprecipitate intraoperatively. The Combat Gauze remained in place vaginally for 12 h postoperatively. The vaginal packing was removed without incident and no vaginal bleeding was noted during the patient's postoperative course. The patient recovered quite well and was discharged home on postoperative day number six.

On postpartum examination 4 weeks after delivery, there was no evidence of tissue necrosis or any adverse reactions secondary to the use of QuikClot.

3. Discussion

QuikClot combat gauze has predominantly been used in trauma surgery and combat settings (Gegel et al., 2013; Motamedi and Sagafinia, 2011), and its use in the field of obstetrics and gynecology and associated specialties is limited (Patel et al., 2012). While there are many conventional ways to control hemorrhage in the ambulatory and surgical setting, these interventions have certain limitations and in some clinical settings creative approaches to hemostasis are required in an effort to attain rapid hemostasis and/or avoid additional surgical procedures, which may be associated with higher morbidity.

We describe three separate cases in which we have found QuikClot to be of significant clinical utility. In all three of these cases, it was used with excellent hemostatic effect and without any identifiable side effects as was the case with earlier iterations of QuikClot (Kheirabadi et al., 2010). In two of the cases, an additional surgical intervention to control bleeding was avoided and in the third case hemostasis was obtained in a patient with DIC when all other means of achieving hemostasis had failed.

Given the effective use in these acute settings, in the setting of uncontrolled hemorrhage in the field of Gynecologic Oncology, QuikClot, or an alternative combat gauze, should be considered as a measure to control hemorrhage when conventional strategies have been exhausted or a surgical intervention is not readily available or contraindicated.

Conflicts of interest

The authors have no conflicts of interest to disclose.

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