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Inflating hope: Case series on the use of balloon tamponade in obstetrical and gynecologic hemorrhage

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Abstract
Obstetrics and Gynecology the complicated cases with multiple adhesions is a common thing and post-operative control of oozing is quite difficult specially under spinal anesthesia and hypotension. In gynecological conditions like malignancies, endometriosis, frozen pelvis, repeated myomectomies etc. and obstetric conditions like placenta percreta, previous caesarean sections with multiple adhesions and extremely rare but known abdominal pregnancies are challenges to control bleeding. Review of literature on the basis of Dr. Shivkar pack routinely used in Obstetrics is in favor of tamponade effect and they used to keep pack full surgical sheet and close abdomen and remove them later. Presenting here Case series is from DY Patil Hospital Nerul Navi Mumbai from October 2023 to December 2024.

Keywords: Balloon tamponade, obstetric hemorrhage, gynecologic hemorrhage, postpartum hemorrhage, placenta percreta

Introduction

Obstetric and gynaecologic haemorrhage remains a critical contributor to maternal morbidity and mortality worldwide, particularly in complex surgical scenarios where haemostasis is challenging. Conditions such as endometriosis, malignancies, frozen pelvis, repeated myomectomies, placenta percreta, and abdominal pregnancies often present with extensive pelvic adhesions and distorted anatomy. These challenges are exacerbated under spinal anesthesia and hypotension, where traditional methods of bleeding control may be inadequate. Balloon tamponade has emerged as a valuable tool in achieving hemostasis in such cases, offering a mechanical means of compression to control haemorrhage when pharmacologic and surgical interventions fall short. Inspired by historical practices such as the Dr. Shivkar pack, which employed abdominal packing for tamponade, the present case series explores the efficacy of balloon tamponade in both obstetric and gynecologic contexts. Dr. Krishna Shankar Shivkar, then an associate professor at Grant Medical College, introduced a simple yet ingenious intrauterine tamponade known as "Shivkar's Pack" in the mid-1980s. This low-cost deviceconsisting of a condom secured to a Foley catheter and inflated via IV fluid was first trailed at Sir J. J. Hospital, Mumbai, and its use was later disseminated through workshops at diverse teaching institutions across India. A pre-washed condom is tightly fastened onto a size-20 Foley catheter using a latex band, positioned to guard against risk of overexpansion. Following insertion into the uterus, the inlet is attached to a bag of Ringer's lactate hung approximately 60 cm above the abdomen. This height establishes hydrostatic pressure sufficient to counter uterine arterial pressure (~34-66 cm H_2O). After rapid inflation typically 300-400 mL the fluid source gradually lowered to about 20-25 cm, fine-tuning the pressure until bleeding stops and flow reverses, then maintained for 6-8 hours. Dr. Shivkar and his colleagues performed over 100 cases in PPH management, using the pack not only for haemorrhage control but also for correcting uterine inversion. In 1987, it was notably used at St. George's Hospital, Mumbai, for immediate correction of postpartum uterine inversion achieving success in ≤5 minutes without anesthesia. On February 22, 2003, it gained formal recognition at the South Asian Federation of Obstetrics & Gynecology conference, and later featured in the Journal of Obstetrics & Gynaecology of India as "Pressure Balloon Therapy in Uncontrolled Obstetrical Haemorrhage" (July/August 2003 issue). Importantly, Dr. Shivkar chose not to patent the technique to keep it affordable, stating that patenting would defeat its life-saving purpose. The principles behind the Shivkar pack align with current uterine balloon tamponade (UBT) methods. Studies confirm such devices can be up to 85-90% effective in PPH cases, especially

in low-resource settings. Shivkar's pack marked one of the earliest indigenous "condom catheter" approaches developed independently but almost simultaneously with counterparts from Bangladesh, notably the Konsylta/ESM-UBT technique.

Case Series

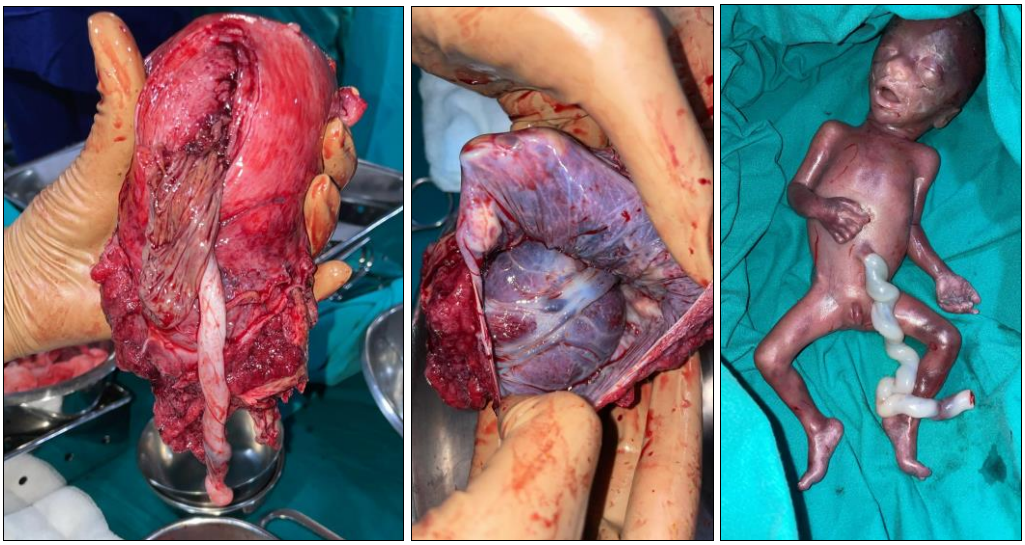
Case 1

A 29 year old married since 11 years G3P1L1A1 (previous LSCS) 22 + 4 weeks BD and 21+6 weeks BS (13+6) with USG reports suggestive of complete placenta previa with percreta involving bladder and cervix and fetal middle cerebral procencephaly with gross hydrocephalus. Decision of Hysterotomy and SOS Obstetric Hysterectomy with uterine artery embolization was taken.

Intra operative findings: Complete placenta previa noted in lower uterine segment extending from anterior wall to covering the internal os completely. Placenta increta noted. Bilateral fallopian tubes and ovaries normal. Baby delivered by breech extraction. Baby did not cry after birth

EBL: 1650 mL

As she was oozing a lot from pelvic cavity Condom catheter balloon tamponade was kept intraperitoneally for 24 hours.



Case 2

39 year old married since 17 years P2L2A1 (previous FTND) non-tubectomised presented with lower abdominal swelling gradually increasing in size since 6 months. USG Pelvis was s/o large 30*23*15cm sized sub-serosal fibroid arising from fundus and extending into upper abdomen.

CECT Abdomen and Pelvis showed large 13.9*27.8*24.7 cm sized multilobulated mass/lesion involving fundus of uterus extending into upper abdomen suggestive of subserosal leiomyoma. Multiple dilated venous channels also noted involving lower abdomen with most prominent venous channel measuring 1.6cm in caliber for a length of 15cm arising inferior to left renal vein extending to left lumbar region ending in multiple dilated channels from omentum that could represent retroperitoneal lymphocele.

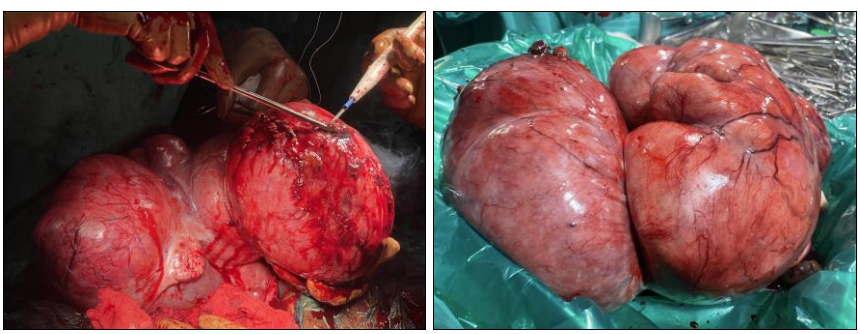
Pre-operative bilateral ureteric catheterization was in view of suspicion of large intraabdominal tumour. CVTS surgeon were also called in view of ? haemangioma.

Intra-operative findings

Uterus ~36 weeks size. Multilobulated irregular enlarged firm mass Right side: maximum of ~20 cm length, 10 cm breadth; Left side: Maximum of ~25 cm length, 15 cm breadth. Left side ovary and fallopian tube completely adherent to mass. Right side ovary is bulky, unhealthy with polycystic picture. Right fallopian tube healthy. Multiple Omental adhesions noted with uterus.10 cm* 5cm lymphocele excised.

EBL: 1850 mL

Condom catheter balloon tamponade was kept intraperitoneally for 24 hours.



Case 3

36 year old married since 6 years nulligravida came with chief complaint of heavy menstrual bleeding (5 pads/day) with passage of clots since 5 months. Known case of hypertension since 9 years on Telma 40 mg OD. History of? Abdominal tuberculosis in 2015 and has taken AKT for 1.5 years. History of open myomectomy done in 2015.

USG was suggestive of bulky uterus with multiple fibroids in anterior, posterior and fundus of uterus largest measuring 6.5 x 6.7 x 8.5cm.

Decision of open myomectomy was taken

Intra-Operative Findings: Uterus bulky with multiple fibroids. Left sided fallopian tube and ovaries bulky filled with fluid and right sided ovary and fallopian tubes couldn't be seen. Adhesions noted between uterus and anterior abdominal wall and bowel and anterior abdominal wall. Multiple intramural fibroids noted.

EBL~600 mL: Condom catheter balloon tamponade was kept intraperitoneally for 24 hours because of oozing from adhesiolysis site and uterus where adhesions were there.

Case 4: 40 year old married since 20 years P1L1A2 (prev LSCS) non-tubectomised came with c/o irregular menses since 3 months 4-5days/40-45 days). History of open myomectomy in 2022. History of pulmonary tuberculosis in 2007 and has taken AKT for 6 months. History of hypothyroidism in 2015 and was on tab. Thyronorm 50 mcg OD stopped after 2 years on medical advice. USG was suggestive of left ovary 7.1 x 4.5x 5.8cm (100cc) sized anechoic lesion with few septae within suggestive of complex ovarian cyst.

Decision of Exploratory Laparotomy with cystectomy was taken.

Intra-operative findings: Uterus grossly normal. Bilateral fallopian tubes grossly normal with multiple ovarian cystic loculi noted in peritoneum. Cystectomy done. Hemostasis achieved and all oozers were taken care by condom pack. Dense adhesions noted in abdomen.

EBL: 450 mL: Condom catheter balloon tamponade was kept intraperitoneally and was removed next morning.

Results: In all cases with condom catheter balloon tamponade, we had good outcome, and patients were discharged on post-operative day 4 or day 5 as a routine. No patient had post-operative infections and no patient required post-operative blood transfusion.

Discussion: Balloon tamponade has revolutionized the management of obstetric and gynecologic hemorrhage, especially in resource-limited settings. The technique offers a simple, cost-effective, and minimally invasive alternative to more aggressive surgical interventions such as hysterectomy. In the present series, use of condom catheter balloon tamponade resulted in successful hemostasis in all cases, with no postoperative complications or need for blood transfusion. This aligns with global reports showing a success rate of 85-95% for balloon tamponade in controlling postpartum and intraoperative hemorrhage (Doumouchtsis *et al*., 2008; Burke *et al*., 2016) [1, 2].

Our findings support prior studies that emphasize the tamponade's mechanical compression effect as a bridge to definitive hemostasis. Importantly, it demonstrates its versatility beyond postpartum hemorrhage extending to intra-abdominal and postoperative oozing control in gynecologic surgeries such as myomectomy, cystectomy, and cases complicated by adhesions. Similar observations were noted by Akhter *et al*. (2013) [3], who reported success in using the condom catheter balloon in diverse hemorrhagic conditions.

Another major advantage of this approach is its cost-effectiveness and accessibility, especially in low- and middle-income countries (LMICs). Devices such as the Bakri balloon or Sengstaken-Blakemore tube, though effective, are often expensive or unavailable. The indigenous "Shivkar pack," conceptualized in India, and similar condom-based tamponades have thus filled a crucial gap by providing an affordable life-saving tool (Sharma *et al*., 2017) [4].

This series further reinforces that the condom catheter balloon can be safely used intraperitoneally for oozing control without adverse sequelae. However, larger multicentric studies with longer follow-up are needed to confirm its safety and to standardize protocols regarding volume, duration, and pressure monitoring.

Conclusion: Balloon tamponade using a condom catheter represents a safe, simple, and effective technique for controlling hemorrhage in complex obstetric and gynecologic cases. Its utility extends beyond uterine applications, showing promise in managing intra-abdominal bleeding where conventional hemostasis is difficult. Given its low cost, ease of use, and reproducibility, it should be considered a valuable adjunct in both emergency obstetric care and challenging gynecologic surgeries. Future research should aim to establish standardized guidelines and explore broader indications for its use.

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