Case Report

Perioperative pelvic hemorrhage management in prosthetic sacrospinous ligament fixation for pelvic organ prolapse

DAVIDE DE VITA[1], SALVATORE GIORDANO[2], ERMENEGILDA COPPOLA[3], FRANCESCO ARACO[4], EMILIO PICCIONE[4]

[1]*Department of Obstetrics and Gynaecology, S. Francesco D'Assisi, Oliveto Citra, SA, Italy;*
[2]*Department of Surgery, Vaasa Central Hospital, Vaasa, Finland.*
[3]*Department of Mental Health, Cava de' Tirreni, SA, Italy*
[4]*Section of Gynecology and Obstetrics, Department of Surgery, School of Medicine,"Tor Vergata" University Hospital of Rome, Rome, Italy.*

Abstract: Acute hemorrhage following pelvic reconstructive surgery is a complication requiring immediate evaluation and treatment. Many articles describe the perioperative morbidity associated with sacrospinous ligament fixation repair of pelvic organ prolapse; few studies on management of the perioperatve acute hemorrhage can be found. We report two cases of acute bleeding during prosthetic sacrospinous ligament fixation of uterus and vaginal vault, resolved with two different medical approaches. The current clinical problem of life-threatening hemorrhage during sacrospinous uterus and vaginal vault suspension is examined, and a management solution is defined.

Key words: Hemorrhage management; Pelvic floor reconstruction; Prolapse repair complication.

INTRODUCTION

Several mesh augmentation systems for pelvic reconstructive surgery have been recently introduced into the market using a variety of biomaterials with variable success rate. Initial reports from the manufacturer have included a 2.5% risk of postoperative complications, including a 1.75% of hematoma.[1] It is plausible that inherently weak or damages tissues in the pelvic floor need to be reinforced by a permanent support to avoid the high rates of recurrences commonly described using traditional suture techniques.[2] The potential for life-threatening pelvic hemorrhage exists during the transobturator technique and sacrospinous ligament (SSL) fixation procedure if the vessels posterior to the ligament are injured including the obturator vessels (and nerves) and the venous plexus within the endopelvic fascia.[3,4] Venous oozing can be controlled by pressure better than arterious bleeding. The problem is that this procedure is done blindly with finger-guide throughout each trocar's path in a zone (around the buttock hip) in which the vascular network is very rich and any movement risky.[5]

We report two cases of bleeding that occurred during a central-posterior mesh augmentation procedure, with SSL fixation,[6] which were successfully managed conservatively.

Case 1

A 44-years old women with symptomatic stage 3 uterus-vaginal prolapse, using the Pelvic Organ Prolapse Quantification staging (POP-Q score). The uterus and posterior vaginal wall prolapse at its greatest extent was 3 cm beyond the hymenal ring. General conditions of patients were good, preoperative examinations excluding haematologic and coagulative alterations. A light venous insufficiency of the legs was investigated with color Doppler. Preoperative preparation were: elastic stockings and low molecular weight heparin (4000 UI sc) for thromboembolic prophylaxis within 6 hours; bowel preparation consisted in 2 preoperative enemas. Metronidazole 500 mg i.v. was administered within 1 hour from the operation. The patient signed informed consent after a thorough discussion of potential risks of this conservative prosthetic surgery, including hemorrhage requiring blood transfusions, mesh erosion, and failure of the procedure. The patient underwent loco-regional anaesthesia. A Foley catheter was introduced into the bladder.

Surgical Technique

Central-posterior repair was performed with uterine sparing technique (Figure 1).[6] The posterior vaginal wall was infiltrated with 0.5% lidocaine and 0.25% epinephrine to assist with hydrodissection and hemostasis. A midline vertical posterior vaginal incision was made, the rectum dissected with fingers and the pararectal spaces reached. Identified by blunt dissection the ischiatic spine, the SSL and the levator ani, the prosthesis was inserted and fixed to the SSL with poliester suture 1/0 using an endostitch device (Tyco Healthcare, USA). Two small skin incisions were made 3 cm posterior and lateral to the anus, and a tunneller was introduced passing through the ischiatic fossa up to the para-rectal space to bring outside the 2 slings. The uterus was suspended to the sacrospinosus ligaments. The posterior colpotomy was closed with 3/0 continuous absorbable suture. Polypropylene prostheses (Gynemesh-Soft PS, 10x15cm-GyneMesh, Gynecare Ethicon) were used to reconstruct the recto-vaginal fascia, irrigated with antibiotic solution. The vagina was packed the gauze being removed on 2nd postoperative day. Intravenous antibiotics were continued for 48 hours. A significant blood loss (>500) was due to bleeding in the pararectal space that caused a 90 minutes operating time. Postoperatively a severe rectal pain was treated with ev infusion of ketorolac without relief. The hematocrit decreased from 25.2 in the first postoperative day to 20.2% in the third when a 5x7cm left pararectal hematoma was seen at transvaginal ultrasonography (Figure 2). Urine output remained satisfactory with intravenous fluid and no blood transfusion were considered necessary. The patient was discharged after 7 days with a bladder catheter, the micturition becoming spontaneous 20 days after the operation.

Case 2

A 64-year-old woman, with symptomatic POP-Q stage 4 vaginal prolapse (vault, cistocele and rectocele), and stress incontinence having had abdominal hysterectomy and bilateral annessectomy 16 years before, in good general conditions, excluded haematologic and coagulative alterations, signed informed consent, underwent total vaginal reconstruction and fixation to sacrospinous ligament, with loco-regional anaesthesia.

Surgical Technique

A Foley catheter in the bladder.

For an antero-central and central-posterior repair, two polypropylene prostheses (Gynemesh-Soft PS, 10x15cm -

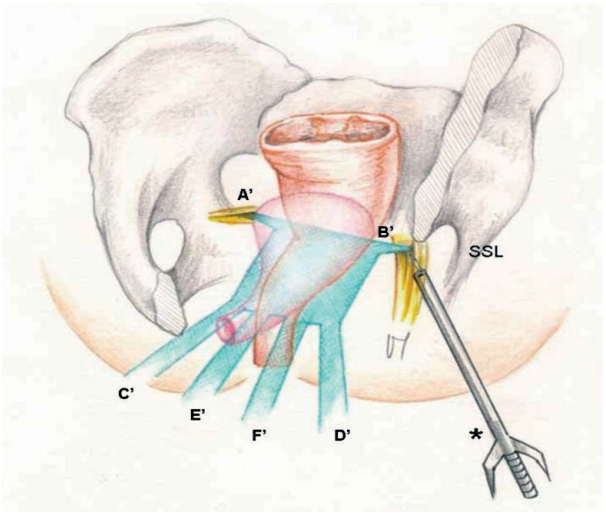

Figure 1. – Central-posterior repair: "uterine sparing techniques with Gynemesh-Soft PS and Endostitch".
Schematic representation of the posterior compartment repair. Red: uterus, brown: rectum, blue: prosthesis. *: endostitch device. SSL: Sacro Spinous Ligament. A', B': Points of fixation with the sacro-spinous ligament. C'-F': Arms used to insert the prosthesis during the transgluteal passages with the tunneller.

GyneMesh, Gynecare Ethicon) prepared cutting two "arms" from the initial mesh were used to reconstruct the pubo-cervix and the recto-vaginal fascia. The anterior vaginal wall was infiltrated with 0.5% lidocaine and 0.25% epinephrine. Trough a midline vertical incision 2 cm below the urethral meatus the bladder was dissected from the vagina and the paravescical spaces were reached. The tendineous arch of the pelvic fascia (ATFP), the ischiatic spine and the sacrospinosus ligament (SSL) were identified and the prosthesis was fixed to the SSL with poliester 1/0 suture using an endostitch device (Tyco Healthcare, USA) as a first level suspension for the vaginal apex.[7] Two small skin incisions were made in the genital-femoralis plica at the himenal level and 2 others 2 cm caudally and laterally for a tunneller that reached the vagina through the obturator foramen, membrane and internal muscle where the end of the sling was anchored. An opposite passage distended the leg of the prostheses, the procedure being repeated for all 4 arms and the cervix being brought into his natural position by the mesh. The bladder was therefore sustained by the four sling in a tension free fashion. The anterior vaginal incision was closed with a 3/0 continuous absorbable suture.[8,9]

In the central-posterior repair as described in the first case (Figs 1 and 2), a significant hemorrhage occurred during the sacrospinous ligament fixation of the vaginal vault, with a 1000 ml blood loss in the right pararectal space. Postoperatively the patient was shoked with a 19.2 haematocrit value, requiring 3 blood units. A 15 x 17 cm pelvic haematoma was visualized by CT scan. Two more blood units were transfused and an angiography confirmed the bleeding from the inferior gluteal artery injured during the sacrospinous fixation. Selective embolization stopped the hemorrhage (Fig. 4-5.) and the patient was discharged after 21 days.

DISCUSSION

Any surgical innovation requires caution in the interest of patient safety and to verify that the product is more efficacious and less invasive compared with other current methods. Despite limited evidence-based medicine concerning these procedures, they are being marketed widely, sometimes to surgeons not familiar with the pertinent anatomy. A Medline search on the English literature from 1996 to 2006 using the terms extraperitoneal, colpopexy, hematoma, mesh, Prolift failed to find reports of pelvic hematomas and bleeding resulting from mesh augmentation systems.

Two cases out of 82 patients undergone this innovative procedure are reported with a severe pelvic hemorrhage during and after a prosthetic sacrospinous ligament fixation.

In case of significant blood loss (> 500 ml) it is important to identify bleeding sites, arterial (obturator vessels, obturator-dorsal artery of clitoris, deep branches of internal pudendal, inferior haemorrhoidal artery) or venous (lateral attachment of pubocervical fascia, entering pararectal space, sacrospinous placement). The procedure is done blindly with finger-guidance throughout each trocar passage in an area very rich of vascular network.[5] The inferior gluteal artery is the vessel most likely to be injured during sacrospinous fixation, because of its location.[10] It commonly has six branches, two of which with important anastomoses around the sacrospinous ligament (main branch and coccygeal branch).[11] In the 25% of the women it arises from the posterior instead of the anterior branch of the internal iliac artery: in these cases the binding of the hypogastric artery to control of pelvic hemorrhage is useless as the posterior branch of the internal iliac artery is not involved.[10-12]

When the pudendal artery is damaged, the haemorrhage can be treated by surgical ligature of the hypogastric artery, because the pudendal vessels are rarely associated with a

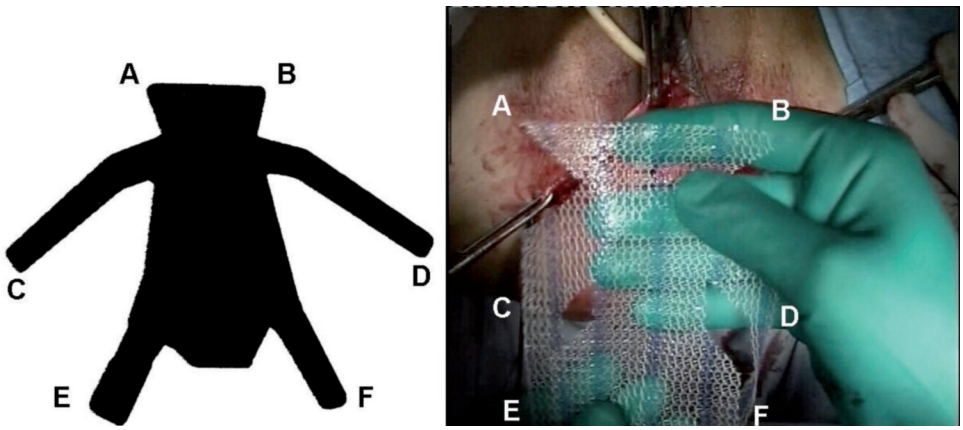

Figure 2. – Prosthesis shape: schematic representation and manual confectioning during surgery. A, B: Points of fixation with the sacrospinous ligament. C-F: Arms used to insert the prosthesis during the transgluteal (posterior compartment reconstruction) or transobturator (anterior compartment reconstruction) passages with the tunneller. E-F arms to insert the prostheses for third level reconstruction (perineal body), these arms are left tension-free.

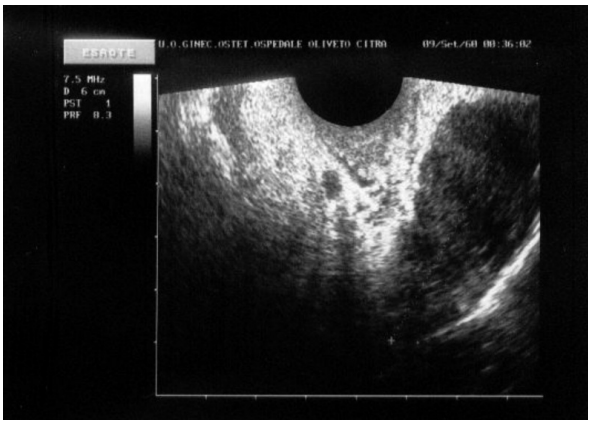

Figure 3. – Transvaginal ultrasonography: left pelvic pararectal haematoma 5 x 7 cm with a moderate mass effect on the bladder.

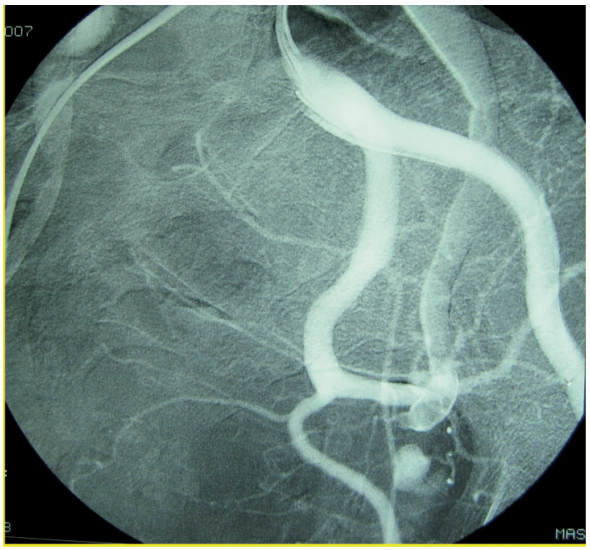

Figure 4. – Right transfemoral approach was gained using a 4 Fr introducer sheath (Radiofocus Introducer II, Terumo, Tokyo - Japan), and a 4 Fr Simmons 1 angiographic catheter (Radiofocus Glidecath, Terumo, Tokyo - Japan) was advanced over a 0.035" J tipped 180 cm long hydrophilic guidewire (Radiofocus Glidewire, Terumo, Tokyo - Japan).

collateral circulation. In all other circumstances the resulting haemorrhages are particularly difficult to control due to anastomoses between the hypogastric, vertebral and circumflex femoral arteries. In these cases, prolonged compressions with dressing gauzes and direct clipping of injured vessels is the first-choice treatment, while arterial embolization is an alternative treatment. In some cases surgical packing and clippings are not sufficient to stop the bleeding and different operations can be necessary. Management of important bleeding during pelvic surgery are: anticipating the entity of bleeding with blood transfusion preparation and support, minimise operating time and tissue trauma. If general conditions are restored with fluid replacement and blood transfusion, it means that bleeding sites are certainly venous, otherwise it is extremely important early intervention with angiography, as described in our two cases.[13]

No commercial associations or disclosures may pose, or create any conflict of interest with the information presented in this article.

REFERENCES

1. La Sala CA, Schimpf MO. Occurrence of postoperative hematomas after prolapse repair using a mesh augmentation system. Obstet Gynecol. 2007; 109: 569-572.

Figure 5. – The left internal iliac artery was selectively catheterized and a preliminary Digital Subtraction Angiography (DSA) confirmed the presence of contrast media extravasation at the distal tract of what appeared being an anatomical variant of the superior vescical artery originating from the common trunk of the hypogastric artery.

2. Farnsworth B, De Vita D. A new approach of vaginal surgery for pelvic prolapse. Pelviperineology RICP, 2005; 24: 44-46.
3. Cruikshank SH, Stoelk EM. Surgical control of pelvic hemorrhage: bilateral hypogastric artery ligation and method of ovarian artery ligation. South Med J 1985; 78:539-543.
4. Keith LG, Vogelzang RL, Croteau DL. Surgical management of intractable pelvic hemorrhage. In: Sciarra JJ, ed. Gynecology and Obstetrics. Philadelphia. Lippincott-Raven, 1996. [2].
5. Collinet P, Belot F, Debodinance P, Ha Duc E, Lucot J, Cosson M. Transvaginal mesh technique for pelvic organ prolapse repair: mesh exposure management and risk factors. Int Urogynecol J Pelvic Floor Dysfunct 2006; 17: 315-320.
6. De Vita D, Araco F, Gravante G, Sesti F, Piccione E. Vaginal reconstructive surgery for severe pelvic organ prolapses: A 'uterine-sparing' technique using polypropylene prostheses. Eur J Obstet Gynecol Reprod Biol. 2008; 139 (2): 245-51.
7. Nichols DH ed. Gynecologic and obstetric surgery. St. Louis, Missouri: Mosby-Year Book, 1993.
8. Randall C, Nichols DH. Surgical Treatment of vaginal eversion. Obstet Gynecol 1971; 38: 327-332.
9. Zweifel P. Vorlesungen uber kilnische gynaecologic. Berlin: Hirschwald, 1892; 407-415.
10. Barksdale PA, Elkins TE, Sanders CK, Jaramillo FE, Gasser RF. An anatomic approach to pelvic hemorrhage during sacrospinous ligament fixation of the vaginal vault. Obstet Gynecol 1998; 91: 715-718.
11. Braithwaite JL. Variations in origin of the parietal branches of the internal iliac artery. J Anat 1952; 86: 423-430.
12. Evans S, McShane P. The efficacy of internal iliac artery ligation in obstetric hemorrhage. Surg Gynecol Obstet 1985; 160: 250-253.
13. Araco F, Gravante G, Konda D, Fabiano S, Simonetti G, Piccione E. Selective embolization of the superior vesical artery for the treatment of a severe retroperitoneal pelvic haemorrhage following Endo-Stitch sacrospinous colpopexy. Int Urogynecol J Pelvic Floor Dysfunct. 2008; 19: 873-875.

Correspondence to:

DAVIDE DE VITA
Gynecologist and Urologist
Department of Obstetrics and
Gynaecology, S. Francesco D'Assisi,
Oliveto Citra, SA, Italy.
e-mail: davidedevita@tiscali.it