The Urologist, volume 2, number 3, 2014

Three-pieces inflatable penile prosthesis implantation with penoscrotal approach and Scrotal Septum Sparing technique: description and early experience

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KEY WORDS: erectile dysfunction, penile prosthesis, penoscrotal approach, scrotal septum

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ABSTRACT

Objective

Three pieces inflatable penile prosthesis implantation is the gold standard treatment for end-stage erectile dysfunction. The peno-scrotal approach is widely performed. We propose a new transverse peno-scrotal approach avoiding the division of the scrotal septum. We called it Scrotal Septum Sparing technique (SSSt). The aim of the study is to evaluate if a less extensive dissection of scrotal tissue during three-pieces inflatable penile prosthesis implantation is feasible and leads to some benefit.

Methods

SSSt involves few simple modifications to the standard peno-scrotal approach: 1) after the scrotal skin incision the corpora are exposed separately avoiding the division of scrotal septum; 2) a window between the septum and the ventral side of corpus spongiosum is created with blunt dissection; 3) before the insertion into the corpora, one of the cylinders is passed through this window to overlay the connecting tubes with the scrotal septum. The following parameters were recorded: operative time, complications and time elapsed from surgery to the first self activation of the device.

Results

The mean operative time was 90 minutes. Sixty-one patients were implanted with SSSt. One patient had an intraoperative corporal perforation. 58 patients (95%) had a prompt healing of scrotal wound and could easily activate the prosthesis between 10 and 15 days after the procedure. 3 patients had small scrotal hematomas that delayed the device handling.

Conclusions

Our modification of the standard peno-scrotal approach reduces the scrotal tissues dissection. It appears safe and easily reproducible. It could lower postoperative scrotal swelling and pain, moreover provides good hiding of connecting tubes.

INTRODUCTION

Penile prosthesis implantation is recognized as a valid option to obtain an artificial erection satisfactory for sexual intercourse in those patients in whom a pharmacological approach is contraindicated or ineffective [1-3]. Different surgical approaches for three-pieces inflatable penile prosthesis implantation have been described, mainly the peno-scrotal and infra-pubic approaches. The infra-pubic approach does not compromise the integrity of the scrotum and gives a quick recovery and early prosthesis handling. The peno-scrotal approach, that entails a scrotal tissue dissection, has the advantage of a better surgical control of the corpora but may expose the patient to a delayed scrotal wound healing, swelling, hematomas and pain. The scrotal septum is a sagittal thin layer of smooth muscles connected to the dartos in a T fashion, arising from the perineal urethra to the scrotal raphe. The scrotal septum separates the scrotum into two parts and participate to the tonic scrotal contraction. With the transverse peno-scrotal approach, dartos fascia is opened transversely and the scrotal septum is divided. Since the scrotal septum incorporates tiny vascular and nervous branches, the division of such structures involves a greater tissue damage potentially responsible of postoperative prolonged scrotal swelling and pain. We propose a less invasive transverse peno-scrotal approach so called Scrotal Septum Sparing technique (SSSt). The aim of the study is to evaluate if a less extensive dissection of scrotal tissue during three-pieces inflatable penile prosthesis implantation is feasible and leads to some benefit

MATERIAL AND METHODS

Patient selection. Inclusion criteria were: patients with end stage erectile dysfunction not responder or not compliant to medical therapy. Exclusion criteria were: inadequate manual dexterity to manage the scrotal pump and personality disorder according to the DSM-IV. All patients underwent to psychosexual counselling before surgery.

Devices implanted. AMS CX 700, CXR 700, LGX.

Procedure. A full 10-min pre-surgical betadine scrub of the genital area is carried out and a Steri DrapeTM is put on surgical field, leaving exposed the genitals through a fenestration. A Foley catheter is inserted to empty the bladder. A transverse scrotal skin incision at the peno-scrotal junction is made. At first, the reservoir is placed and inflated in the retropubic space through the inguinal ring. For patients with previous cystectomy or inguinal surgery (such as bilateral hernia repair with mesh) a separate suprapubic incision is made to insert the reservoir. The scrotal septum is grasped medially with a Babcock forceps and the ventral side of each corporal body is separately exposed (Figure 1). Then a proximal longitudinal corporotomy is performed bilaterally. The corpora are dilated with Hegar's dilators (or Rossello's cavernotomies if needed). The corporal lengths are measured with the Furlow inserter and the correct size of cylinders is selected. Using a Babcock forceps the scrotal septum is lifted up and a window between the septum and the ventral aspect of corpus spongiosum is created. Before the insertion into the corporal body the left cylinder is passed through this window (Figure 2). Once both cylinders are appropriately implanted the corporotomies are closed with stay sutures. A scrotal subdartos pouch is created where the pre-connected pump is placed, then the connection of tubes is completed. The connecting

tube from the pump to the left cylinder passes through the scrotal septum fenestration (Figure 3). In left-handed patients the elements are inserted in a specular way. The device is cycled to ensure functionality. In case of penile deformity, a Wilson modeling procedure [4] is carried out after a complete inflation of the device and clamping of connecting tubes. The subdartos pouch is closed independently and the dartos layers are accurately sutured to conceal the tubings (Figure 4). The skin incision is closed with re-absorbable stay sutures. The cylinders are left 75% inflated to tamponade any corporal bleeding. At the end a compressive dressing is made (Henry mummy wrapTM) [5] (Figure 5).

Post operative care. Urethral catheter is removed in postoperative day one. Patients are discharged the following day with inflated prosthetic cylinders at 60%. Ten days after the procedure (or as soon as possible) the patients are trained and allowed to self handle the prosthesis pump, in order to stretch the corpora, by maximal inflation for 2 hours a day. Sexual intercourses are allowed after 5 weeks.

RESULTS

From January 2009 to June 2013 we selected 61 patients for penile prosthesis implantation. All patients evaluated were eligible for the study. The age of patients ranged from 40 to 78. The erectile dysfunction was related to radical prostatectomy in 32 patients, induratio penis plastica in 12 patients, diabetes in 5 patients, vascular disease in 7 patients, and other oncological surgery in 3 patients, EBRT for prostate cancer in 1 patient and post ischemic priapism in 1 patient. The mean duration of the procedure was 90 minutes (range 65-110). In 10 cases the reservoir was implanted through an abdominal incision. In 18 cases a contextual Wilson modeling procedure4 was performed. We observed an apical perforation of a corpus cavernosum (intraoperatively recognized and repaired) that did not hamper the prosthesis implantation. All patients had a prompt healing of scrotal wound (Figure 6). In 58 patients (95%) scrotal edema was unappreciable since the first post operative day as the scrotal skin

appeared wrinkly and the pump was easily perceptible. These patients could easily handle the scrotum learning how to squeeze the pump between 10 and 15 days after the procedure. Three patients (5%) had small hematomas surrounding the pump. In these cases, the prosthesis handling was delayed until complete hematoma reabsorption occured (1-3 months).

DISCUSSION

At our knowledge, no paper until now focused the healing problems of the scrotum after peno-scrotal approach for penile prosthesis implantation. We wondered if penile prosthesis implantation could be performed through a minimal scrotal dissection and postulated that the cylinders insertion was feasible by means of a targeted access to the corpora cavernosa saving the midline structure of the scrotum. We performed the SSSt in 61 consecutive patients. The main finding of our study is that our modified approach appears feasible, reproducible and easy to perform. Two surgical approaches, infra-pubic and peno-scrotal, are suitable for implantation of three-pieces inflatable penile prosthesis. The infra-pubic approach, originally described by Kelami for implanting malleable prosthesis, requires an incision between the pubis and the penis6. The advantages are: reservoir placement under direct vision and insertion of the pump into the scrotum with blunt dissection, allowing an earlier and easier postoperative prosthesis handling. However the infra-pubic approach is not suitable for obese patients, furthermore it offers limited corporal exposure, the corporal dilatation is harder to perform if fibrosis is present, it is not possible to fix the pump in its scrotal pouch, and the mobilization of the dorsal neurovascular bundle is needed [6]. The peno-scrotal approach requires a longitudinal or transverse incision at the peno-scrotal junction. This provides an excellent exposure to the corpora cavernosa and the corpus spongiosum. If distal exposure is

needed, the incision can be extended along the penile shaft. Disadvantages of peno-scrotal approach are: blind placement of the retropubic fluid reservoir and proximity of the surgical wound to the prosthetic pump that may delay the device handling [7]. It is well recognized that a meticulous bleeding check and careful reconstruction of all scrotal layers are paramount steps to prevent hematomas and ensure a good and fast wound healing. Scrotal hematoma is an infrequent reason for penile prosthesis revision surgery [8,9] but it is a common finding after the implantation by peno-scrotal approach, although in our opinion under reported. Moreover, patients undergoing penile prosthesis implantation frequently complain about pain in different sites, mainly penis, scrotum and perineum. Pain may be another reason for delaying the activation of penile prosthesis. Although in some patients the scrotal pain seems to depend on foreign body effect of the pump, it is theoretically possible that an extensive scrotal dissection may involve nervous structures causing scrotal bother and pain. Few papers offer a detailed microscopic anatomical description of the scrotal wall layers. The scrotal septum is a thin diaphragm of smooth muscle incorporating tiny vessels and nerves. Branches of perineal arteries run at each side of the scrotal septum. When these septal arteries reach the superficial end of the septum, they turn towards the skin of each hemi-scrotum at the median line where they are distributed [10]. The nervous supply of the scrotum arises from the scrotal branch of the perineal nerve, branch of the pudendal nerve, from the genital branch of the genitofemoral nerve and the anterior cutaneous branches of the iliohypogastric and the ilioinguinal nerves [11-14]. The scrotal branches of perineal nerve travel through the scrotal septum to the anterior wall of the scrotum, giving off horizontal branches to the lateral scrotal walls. Moreover, the scrotal septum contains a rich neural network of intercommunicating branches from both sides [15]. Theoretically, the preservation of most part of such vascular and neural structures may result in a reduction of post-operative pain, scrotal sensation abnormalities, phantom neuralgias and perhaps in a

better contractile capacity of the dartos. Moreover, a less extensive dissection of scrotal soft tissue may contribute to the reduction of spaces available for edema and hematomas. Although it is not possible to objectively quantify the extent of scrotal edema, we did not observe a perceptible swelling of the scrotum. We observed three cases of hematoma in our series, noticeably limited to the space surrounding the pump and not extended to the whole scrotum. We argue that our technical modification may contribute to an early activation of prosthetic cylinders, needed to prevent corporal fibrosis and penile shaft downsizing, especially for length expanding prosthesis such as AMS LGX. Another issue related to scrotal discomfort is the feeling of "palpable" tubes below the skin at the base of the penis. This is a common self-complaint among many implanted patients. This problem occurs when corporotomies are not enough proximal or when the scrotal soft tissue covering the tubes is thin. Regarding the latter issue, SSSt ensures a better hiding of tubes since one of them results deeper concealed under the septum.

CONCLUSION

Our modification to the standard procedure requires simple surgical maneuvers and appears to be effective and reproducible. SSSt seems to reduce the occurrence and severity of scrotal complications by means of a less invasive scrotal dissection. Moreover, this technique provides a better hiding of connecting tubes into the scrotum. Ultimately, determining whether our technique improves clinical outcomes requires a comparative trial with the standard techniques.

ACKNOWLEDGEMENTS

No financial support.

The authors have no conflicts of interest to declare.

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FIGURES

Figure 1

Exposure of the corpora avoiding the division of the scrotal septum

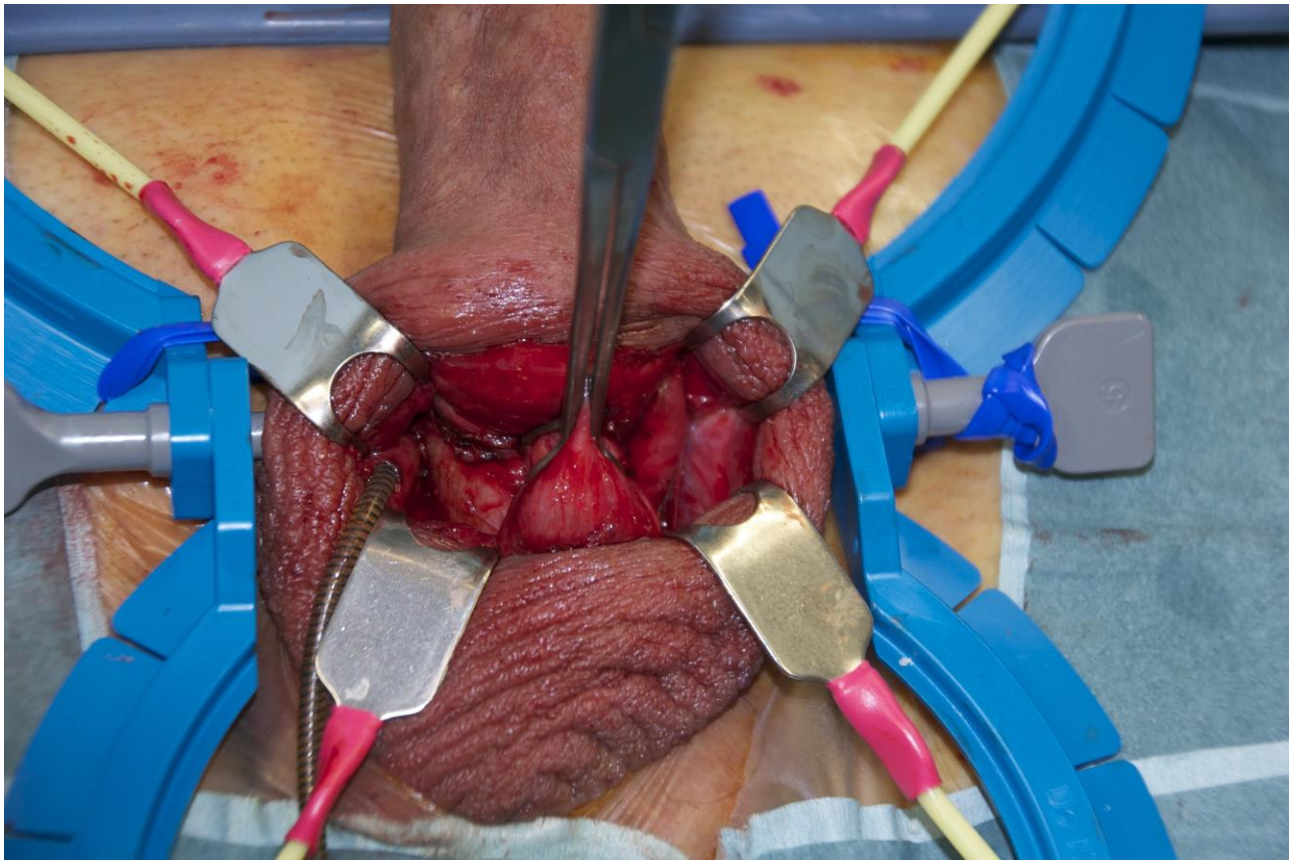

Figure 2

The left cylinder is passed through the window between the corpus spongiosum and the scrotal septum.

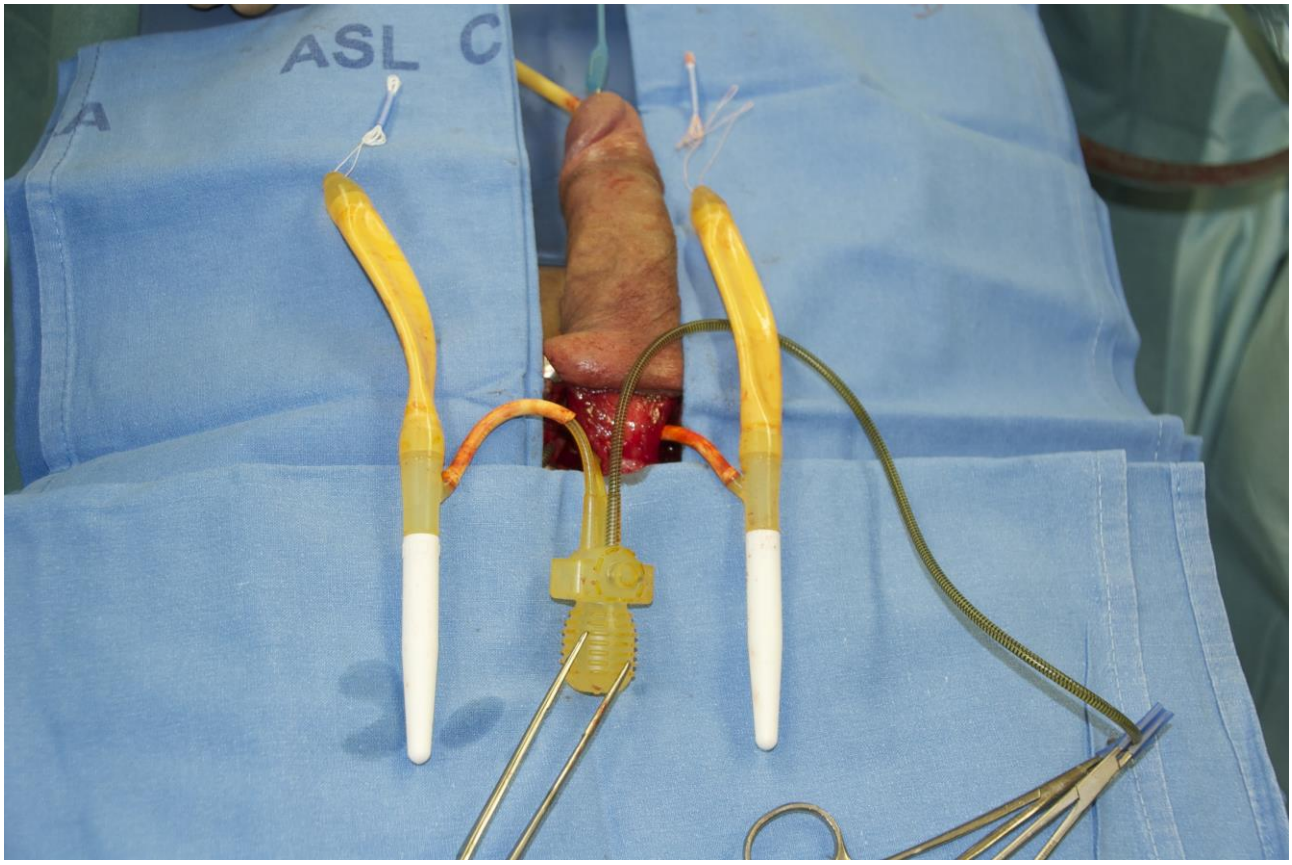

Figure 3

Layout of tubes coming from corporotomies after cylinders insertion

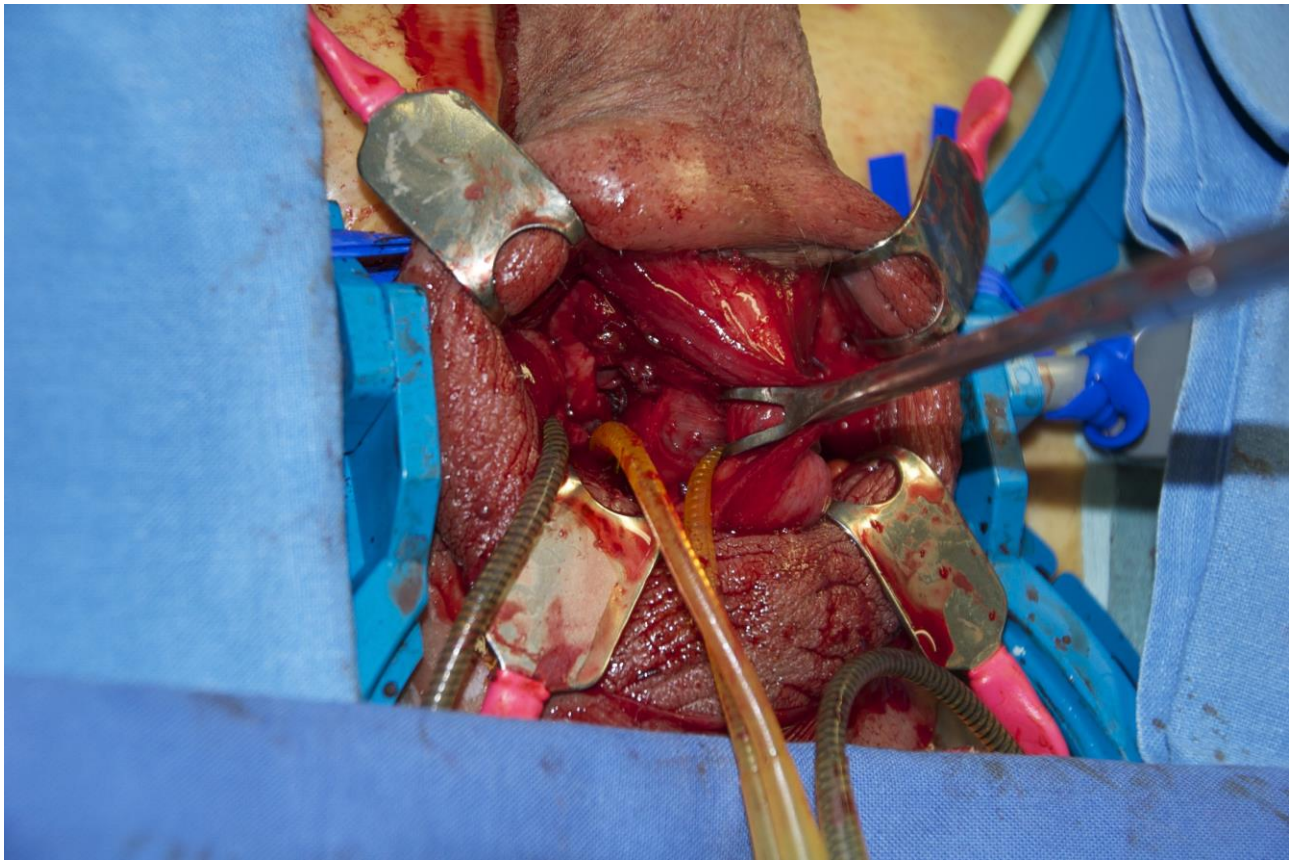

Figure 4

At the end of the procedure, the scrotal septum appears preserved.

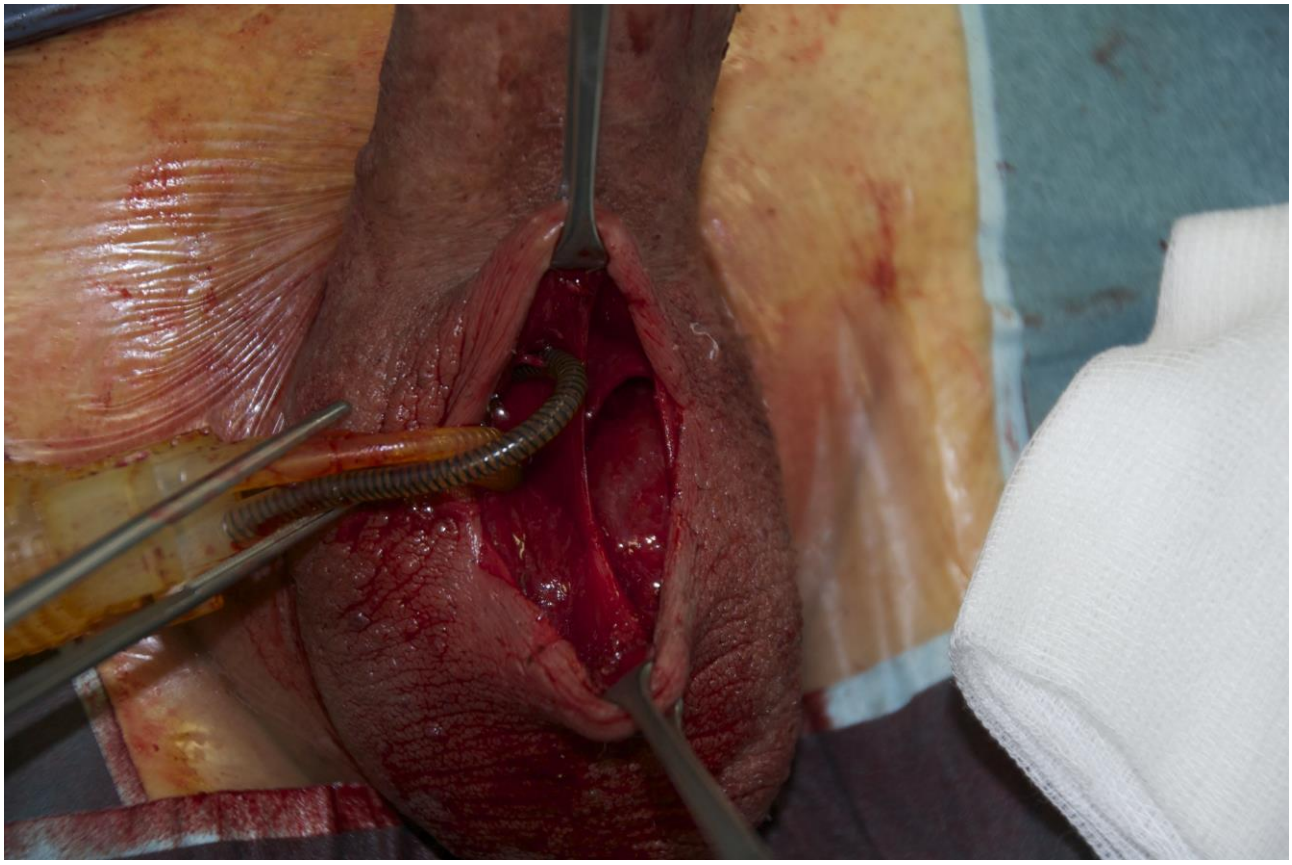

Figure 5

Peno-scrotal compressive dressing.

Figure 6
Scrotal appearance before the procedure (PRE-OP), immediately after surgery (POST-OP) and in post operative day 1 (POD-1).


PRE-OP
POST-OP
POD-1
PRE-OP
POST-OP
POD-1
PRE-OP
POST-OP
POD-1