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Case Report

Three-Component Penile Prosthesis Implantation Under Completely Local Anesthesia: A Case Report

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ABSTRACT

Background: To our knowledge, no authors have published the implant of a three-component device under local anesthesia, until now. The aim of this paper is to report this particular case focusing on its technical and anatomical details. **Materials and Methods:** A 60-years-old man presented to our attention due to erectile dysfunction unresponsive to PDE-I oral and alprostadil intracavernosal therapies, following a motorbike trauma accident with multiple lumbosacral vertebral fracture and incomplete S2-S4 spinal cord injury. After the trauma accident, the patient immediately underwent spinal surgery with lumbosacral vertebral plate positioning. During knee surgery for postural disorders following the previous trauma accident, the patient had an intraoperative heart arrest which required cardiopulmonary resuscitation and post-cardiac arrest care. Considering the high surgical risk due to the previous heart arrest and the inability to perform a spinal anesthesia due to the previous lumbosacral vertebral plate positioning, we proposed to implant the three-component device under completely local anesthesia. **Results:** Preoperative antibiotic prophylaxis was performed. Local anesthesia was administered using an 80-20 mixture of 7.5% ropivacaine and 2% mepivacaine with adrenaline for both the penoscrotal and abdominal surgical sites. A three-component (AMS 700™ CX with MS pump™) prosthesis was implanted with no complications. The patient didn't experience any pain during the procedure. The follow-up was uneventful. One month after surgery, the patient reported a satisfactory sexual intercourse. **Conclusion:** Our experience demonstrates that a three-component penile prosthesis implantation under completely local anesthesia can be successfully performed with satisfactory outcomes. However, particular attention should be paid to some anatomical details, the anesthetic procedure and patient's counselling. This technique could be addressed to those patients with comorbidities which contraindicated spinal or general anesthesia or in patients unwilling to undergo these types of anesthesia.

1. Introduction

Penile prosthesis implantation represents a valid therapeutic option suitable for those patients in whom a pharmacological approach is ineffective or contraindicated. In these cases, patient and partner satisfaction rates after implantation range in literature from 75% to 100% depending on the type of prostheses. Furthermore, these devices have been subject to continuous development, achieving today a remarkable mechanical reliability and safety [1-3]. Patient satisfaction and the widespread use of prostheses reflect their quality and the experience gained by the surgeons in their implantation. Generally, these procedures are performed in spinal anesthesia. However, some authors have already reported encouraging results following penile semi-rigid or two-component inflatable prosthesis surgery under local anesthesia, generally with intravenous sedation [4-6]. To our knowledge, no authors have published the implant of a three-component device under local anesthesia, until now. The aim of this paper is to report the particular case of a three-component penile prosthesis implantation under completely local anesthesia, focusing on the technical and anatomical details which allowed us to complete this procedure.

2. Case Report

2.1. Patient

A 60-years-old man presented to our attention due to erectile dysfunction since 1987, following a motorbike trauma accident with multiple lumbosacral vertebral fracture and incomplete S2-S4 spinal cord injury, which were responsible for incomplete urinary retention due to neurogenic bladder dysfunction and failure of superficial sensitivity

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from perineal and genital areas. After the trauma accident, the patient immediately underwent spinal surgery with lumbosacral vertebral plate positioning followed by a long rehabilitation protocol. Regarding urinary function, he wore an indwelling catheter during hospitalization and then did self-catheterizations due to severe postvoid residual urine volumes. After two months, the patient stopped self-catheterization due to pain reported during catheter positioning and the decrease of postvoid residual urine volume. He returned to spontaneous micturition using abdominal pressure with a residual urine volume ranging between 200 and 250 mL and rare cases of urinary infection. As regards the loss of sensation in the perineal and genital areas, it slowly improved during the postoperative rehabilitation. The patient also experienced constipation which spontaneously resolved in the postoperative period.

Concerning the erectile dysfunction treatment, the patient reported no response to PDE-I oral therapy and an incomplete, unsatisfactory response to alprostadil intracavernosal therapy which was also quickly interrupted due to penile dysesthesia during the injection. As regards the general history, the patient was a smoker and suffered from arterial hypertension and dyslipidemia, both treated with oral therapies. In 2015, during knee surgery for postural disorders following the previous trauma accident, the patient had an intraoperative heart arrest which required cardiopulmonary resuscitation, advanced life support interventions, and post-cardiac arrest care. The patient was discharged after fifteen days with no complications.

In May 2023, the patient presented to our attention with the request of undergoing a penile prosthesis implantation due to erectile dysfunction non-responsive to the pharmacological therapy. The choice of a three-component prosthesis device was reached after a detailed counselling with the patient and his partner regarding their expectations from the different devices available. However, considering the high surgical risk due to the previous heart arrest which contraindicated a general anesthesia and the inability to perform a spinal anesthesia due to the previous lumbosacral vertebral plate positioning, we proposed to implant the three-component device under local anesthesia for both the penoscrotal and abdominal accesses. In order to allow the possible need for a booster sedation, a pre-operative evaluation for general anesthesia was performed and the procedure was scheduled under monitored anesthesia care.

3. Surgical Procedure

3.1. Infection Control Measures

The urine culture test was negative before surgery. Preoperative antibiotic prophylaxis included intravenous administration of 1 g vancomycin three times a day and 80 mg gentamicin once a day. The same schedule was repeated for two days after surgery and followed by oral levofloxacin 500 mg daily and amoxicillin/clavulanic acid twice a day for seven days. Twenty days after surgery, the patient repeated the urine culture test with a negative result.

Shaving of the penoscrotal and abdominal area was performed in the pre-anesthesia room, close to the operatory theatre. Accurate disinfection of the scrotum, the perineum and the lower abdomen was achieved using iodopovidone solution. The operative field was prepared for both the penoscrotal and lower abdominal areas, extending from the umbilicus to the pubic symphysis.

All components of the AMS 700™ CX prosthesis were pre-coated with the antibiotic InhibiZone. In our experience, this type of prosthesis is preferred to others available on the market due to this antibiotic surface treatment. This aspect was particularly important in this patient who reported an increased risk of urinary infection due to his rather high residual urine volume.

3.2. Anesthesia Protocol

Local anesthesia was administered by the urologist using an 80-20 mixture of 7.5% ropivacaine and 2% mepivacaine with adrenaline for both the penoscrotal and abdominal surgical sites.

3.3. Surgical Procedure

A 20 cc anesthetic mixture was injected into the infrapubic space on both sides along the mid-line of the penis. This infiltration provided an effective anesthesia of the afferent fibers of the dorsal nerve which innervate the dorsolateral portion of the penis. In order to anesthetize the afferent ventral portion of the penis, a mixture of 10 cc was also injected superficially at the level of the penoscrotal junction on both sides. This infiltration involved the superficial branch of the perineal nerve providing an anesthesia of both the ventral portion of the penis and the penoscrotal skin. Furthermore, some minutes later, after identifying the bulb of the urethra, another 10 cc mixture deep infiltration was performed bilaterally at the same level in order to anesthetize the deep branches of the perineal nerve, which innervates the urethra.

After insertion of a 16 Fr urinary catheter, the procedure started with a "inverted Y shaped" penoscrotal incision of approximately 4 cm. Using a Scott retractor, the skin and Colle's fascia were retracted to expose the corpora cavernosa. Buck's fascia was dissected to expose the tunica albuginea and two Vicryl 2-0 stay sutures were placed on both sides. A 3 cm corporotomy was then performed between the stay sutures starting from the right side. A dilatation using Hegar dilators from 8 to 13 Fr, was performed gently without the patient experiencing any discomfort. The same procedure was repeated on the left side.

After measuring the cavernosal bodies, two 18 cm cylinders + 2 cm of residual tip of the AMS 700™ CX prosthesis, were implanted. This procedure was also well tolerated by the patient who experienced only a slight pricking sensation as the needle passed through the glans. After confirming the functionality of the device, the corporotomies were closed using four longitudinal stay sutures. Two additional sutures were needed on both sides for complete closure of the corporotomies. The housing for the activation and deactivation MS pump™ was created in the mid-line of the scrotum as an extradermal pocket.

Subsequently, a local anesthesia was administered for the blockade of the iliohypogastric and ilioinguinal nerves using a "blind technique". In particular, after identifying an ideal line from the anterosuperior iliac spine to the umbilicus, considering that iliohypogastric and ilioinguinal nerves are quite superficial, located between the internal oblique muscle and the aponeurosis of the transverse muscle and run rather close 5-15

mm medially from the anterosuperior iliac spine, an infiltration with the same 20 cc mixture was performed in this area at a depth of 2.5 - 4 cm. A 5 cm cutaneous incision was then made in the same site. After the incision of the fascia, the muscle plane was developed with a blunt technique, reaching the transversalis fascia. A minimal preperitoneal space was created and the AMS Conceal™ reservoir of the prosthesis was introduced and inflated initially to 30-50 cc, and then to 80 cc, without any signs of backflow pressure. Subsequently, a suprafascial passage of the reservoir tubes toward the scrotum was achieved with connection to the pump using the quick-connect system. This procedure was also well tolerated by the patient. Activation of the prosthesis was successful. Closure of the abdominal and scrotal surgical wounds followed. Overall, the procedure lasted 180 minutes. The prosthesis remained activated for 24 hours and was then deactivated, the catheter was removed after 30 hours.

The patient was discharged two days after surgery. He started to activate and deactivate the prosthesis device five days after surgery. This procedure was slightly painful and required treatment with one ibuprofen 600 mg tablet daily for the first days. As for the rest, the follow-up was uneventful. One month after implantation, the patient experienced satisfactory sexual intercourse. At 6 months follow-up he and his partner are even more satisfied with the prothesis implantation.

4. Discussion

The aim of this case report was to show an innovative approach to penile prosthesis implantation under completely local anesthesia. By combining specific infiltration methods and anatomical targeting, we achieved effective anesthesia, successful implantation, and postoperative comfort. To the best of our knowledge, this is the first case in literature of penile implantation under completely local anesthesia. In fact, the existing body of literature has already reported promising results with local anesthesia but only for semi-rigid or two-component inflatable prosthesis implantation or as a complementary measure to spinal anesthesia [4-6]. Our approach showed the feasibility and effectiveness of achieving successful outcomes with completely localized anesthesia.

However, some considerations must be mentioned. Concerning the type of local anesthesia, we chose an 80-20 mixture of mepivacaine with adrenaline and ropivacaine based on their different pharmacodynamic characteristics, combining the advantages of the early onset of action provided by mepivacaine with the medium/long-term anaesthetic effect provided by ropivacaine, respectively. This aspect is particularly important considering the rather long operative time needed for a three-component penile prosthesis implantation. The addition of adrenaline to an anesthetic drug is a well-known practice due to its vasoconstrictive action, in order to amplify and prolong the effect of the combined anesthetics. These aspects highlight the importance of choosing an adequate anesthetic mixture considering how it could influence the subsequent surgical procedure. Furthermore, the need of a booster mixture of anesthetics should also be kept in consideration depending on the patient feedback.

This type of procedure can be performed only after an adequate anatomical study on penis and abdomen innervation. In fact, in order to reach an effective anaesthesia, we needed to involve firstly the penile and perineal innervations and then the iliohypogastric and the ilioinguinal nerves [7, 8]. Of course, an incorrect site of infiltration can negatively influence the efficacy of the anesthesia. Furthermore, the build of the patient must be considered because it can also hamper the efficacy of the anaesthetic infiltrations. In our case the patient was thin and the procedure was rather easy with a “blind technique” but, in case of fat patients, the identification and anaesthetization of the nervous structures can be more difficult and then less effective. Actually, in these patients, the use of ultrasound guidance can help to target the anesthetic infiltrations.

In the present case, the patient didn’t experience any pain during the procedure and no intravenous sedation was needed. He reported only a moderate slight pricking sensation during the passage of the needle through the glans which did not impede completion of the procedure and was resolved by reassuring him about the good proceeding of the implant. This aspect seemed to confirm a partial absorption of the anesthetic drugs also by the corpora cavernosa although we didn’t perform a direct infiltration into the cavernous tissue with our procedure. However, the patient must be counselled preoperatively regarding the need of his cooperation during the surgery and this aspect could limit the reproducibility of our technique, especially in anxious patients. Furthermore, although local anesthesia could be performed by the urologist, as in our case, the participation of an anesthetist in the operatory room remains crucial in case a booster sedation or a general anesthesia became necessary. The patient didn’t report any pain even after the surgical procedure although the problem of postoperative pain after penile implantation has been highlighted by some authors in literature [9, 10].

We think that, in these cases, postoperative penile pain could be related to the development of hematoma along the corpora cavernosa. In our routine, the risk of this complication has been decreased by paying attention to a careful anatomical dissection and dilatation of the corpora cavernosa and by activating the prosthesis device for the first 24 hours postoperatively. As regards the pain reported after starting activation and deactivation of the prosthesis device, it was mild and probably due to the patients’ still inadequate manual dexterity. In fact, it resolved in the following days after the administration of ibuprofen.

Of course, a completely local anesthetic surgery can be more time consuming than a similar procedure under spinal or general anesthesia. In fact, besides the time of the different infiltrations, the surgeon must wait some minutes for their action and the dosage could be increased depending on the case, with a delay of the overall operative time. However, our procedure lasted 180 minutes and we think that it could be considered an acceptable timing as a first experience.
Finally, our procedure was planned based on the patient’s operative risks and comorbidities and we don’t think it could be addressed to all patients selected for prothesis implantation. However, our results seem to confirm the role of this technique in particular patients with comorbidities which contraindicated spinal or general anesthesia or in patients unwilling to undergo these types of anesthesia.

5. Conclusion

Our case report demonstrates that a three-component penile prosthesis implantation under completely local anesthesia can be successfully performed with satisfactory outcomes. However, particular attention should be paid to some anatomical details, the anesthetic procedure and patient's counselling. This technique could be addressed to those patients with comorbidities which contraindicated spinal or general anesthesia or in patients unwilling to undergo these types of anesthesia. Further studies are still needed to explore the benefits of this approach in a larger patient population and for comparison with other different anesthesia protocols.

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Conflicts of Interest

None.

Presentation

None.

REFERENCES

[1] Carlo Bettocchi, Fabrizio Palumbo, Marco Spilotros, et al. "Penile prostheses." *Ther Adv Urol*, vol. 2, no. 1, pp. 35-40, 2010. View at: Publisher Site | PubMed

[2] Francesco Chierigo, Paolo Capogrosso, Federico Dehò, et al. "Long-Term Follow-Up After Penile Prosthesis Implantation-Survival and Quality of Life Outcomes." *J Sex Med*, vol. 16, no. 11, pp. 1827-1833, 2019. View at: Publisher Site | PubMed

[3] F Akdemir, E Okulu, Ö Kayıgil "Long-term outcomes of AMS Spectra® penile prosthesis implantation and satisfaction rates." *Int J Impot Res*, vol. 29, no. 5, pp. 184-188, 2017. View at: Publisher Site | PubMed

[4] H Ghanem, G Fouad "Penile prosthesis surgery under local penile block anaesthesia via the infrapubic space." *Int J Androl*, vol. 23, no. 6, pp. 357-359, 2000. View at: Publisher Site | PubMed

[5] J J Kaufman "Penile prosthetic surgery under local anesthesia." *J Urol*, vol. 128, no. 6, pp. 1190-1191, 1982. View at: Publisher Site | PubMed

[6] J M Dos Reis, S Glina, M F Da Silva, et al. "Penile prosthesis surgery with the patient under local regional anesthesia." *J Urol*, vol. 150, no. 4, pp. 1179-1181, 1993. View at: Publisher Site | PubMed

[7] Brittney H Cotta, Charles Welliver, Anand Brahmamdam, et al. "Long-acting liposomal bupivacaine decreases inpatient narcotic requirements in men undergoing penile prosthesis implantation." *Turk J Urol*, vol. 42, no. 4, pp. 230-234, 2016. View at: Publisher Site | PubMed

[8] David Weech, Muhammad Atif Ameer, John V. Ashurst "Anatomy, Abdomen and Pelvis, Penis Dorsal Nerve." In: *StatPearls [Internet]*, Treasure Island (FL): StatPearls Publishing, 2023. View at: PubMed

[9] Donghua Xie, Marilin Nicholson, Mohammed Azaiza, et al "Effect of operative local anesthesia on postoperative pain outcomes of inflatable penile prosthesis: prospective comparison of two medications." *Int J Impot Res*, vol. 30, no. 3, pp. 93-96, 2018. View at: Publisher Site | PubMed

[10] Jeffrey L Ellis, Andrew M Higgins, Jay Simhan "Pain management strategies in penile implantation." *Asian J Androl*, vol. 22, no. 1, pp. 34-38, 2020. View at: Publisher Site | PubMed