Artificial urinary sphincter for treatment of urinary incontinence in neurogenic bladder: technical aspects


ABSTRACT

Objective: To demonstrate technical aspects of placing AMS-800 artificial urinary sphincter in the treatment of urinary incontinence in neurogenic bladder.

Case presentation: Patient is a forty-four year-old paraplegic man with neurogenic bladder with continuous urinary incontinence of one-year progression and transurethral catheter connected to urine collecting bag. Urodynamics: defunctionalized bladder, detrusor areflexia, atonic urethral sphincter, abolished proprioceptive sensitivity, and bladder with adequate capacity (350cc). Procedure was placement of AMS 800 artificial sphincter at the bulbar urethra level with inferior scrotal approach.

Conclusions. Artificial urinary sphincter success is approximately 60% at five years or more. Model AMS 800 is currently the most widely used model providing the best long-term results. It can be used in neurogenic bladder patients with acceptable success rate and complication rate. Patients should be carefully selected given the morbidity and cost implied in artificial sphincter placement.

Keywords: Neurogenic bladder, artificial urinary sphincter, urinary incontinence, Mexico.

RESUMEN

Objetivo: Demostrar aspectos técnicos de la colocación del esfínter urinario artificial AMS-800 en el tratamiento de la incontinencia urinaria en vejiga neurogénica.

Presentación del caso: Hombre de 44 años parapléjico, vejiga neurogénica con incontinencia urinaria continua de un año de evolución, con sonda transuretral a derivación. Urodinamia: vejiga desfuncionalizada, detrusor arrefléxico, esfínter uretral atónico, sensibilidad propioceptiva abolida y vejiga de adecuada capacidad (350cc). Se procede a colocar esfínter urinario artificial tipo AMS-800 a nivel de la uretra bulbar con abordaje escrotal inferior.

Conclusiones: El éxito del esfínter urinario es de alrededor de 60% a cinco años o más. El modelo AMS-800 actualmente es el más difundido y con el que se han alcanzado los mejores resultados a largo plazo; puede utilizarse en pacientes neurogénicos con una tasa de éxito y complicación aceptable. La selección del paciente debe ser minuciosa por las morbilidades y costos que conlleva la colocación del esfínter artificial.

Palabras clave: Viejiga neurogénica, esfínter urinario artificial, incontinencia urinaria, México.
INTRODUCTION

Urinary incontinence has a significant negative impact on quality of life. It can be secondary to weakness or to urethral sphincter damage after urological surgery or have neurological causes.\(^1\)\(^2\) The latter can cause alterations in the urinary sphincter and the detrusor muscle, producing bladder storage and/or emptying abnormalities.\(^3\) In 1947 Foley designed the first artificial urinary sphincter for men\(^4\) that consisted of a ring placed around the penis that was inflated or deflated by a control pump hidden in the patient’s pocket. The concept of bulbar urethral compression for treating male urinary incontinence was introduced by Barry and developed by Kaufman by means of a silicon device.\(^5\) In 1972 Scott and Bradley introduced the AS-721 model, a prototype whose components were all implanted in the body and could be manipulated from the outside.\(^6\) In 1983 AMS-800 sphincter modified by Craggs and Mundy was developed and has been on the market for more than 25 years.\(^7\)\(^8\) It has a success rate of 60-80% up to a period of 5-10 years.\(^3\) Indication for artificial sphincter implant is severe urinary incontinence that interferes with patient quality of life. Urinary incontinence is secondary to prostatectomy in the large majority of male patients and the second most frequent cause is neurogenic bladder. Patients with problems of detrusor contractibility that need to perform the Valsalva maneuver in order to urinate or those neurogenic patients with acontractile detrusor do not appear to be at additional risk for complications.\(^9\)\(^10\)

OBJECTIVE

To demonstrate technical aspects of AMS-800 artificial urinary sphincter placement in the treatment of urinary incontinence in neurogenic bladder.

CASE PRESENTATION

Patient is a 44-year-old single man, Catholic, born in Michoacan and living in Mexico City who works as a computer programmer. Past medical history includes automobile accident in 1975 with thoracic column lesion at T10 level causing paraplegia, neurogenic bladder, and continuous urinary incontinence partially managed with clean intermittent catheter (CIC). He underwent simple left nephrectomy due to left xanthogranulomatous pyelonephritis in 2005. Present condition began one year ago due to inability to control continuous urinary incontinence with CIC. Patient presently has transurethral catheter attached to collecting bag. Urodynamic study reported defunctionalized bladder, detrusor areflexia, atonic urethral sphincter, abolished proprioceptive sensitivity, and diminished bladder compliance. Cystoscopy reported permeable urethra with multiple false pathways in bulbar urethra impeding catheterization, open external urethral sphincter and bladder neck, bladder with adequate capacity (350 mL), and continuous urinary incontinence. AMS-800 artificial urinary sphincter was placed at the bulbar urethral level with scrotal approach.

Procedure description: With patient in lithotomy position, scrotal approach was begun (Image 1). Bladder catheter was placed and bulbar urethra was located and dissected, affecting the bulbocavernosus muscle as little as possible. Urethra was dissected at the level where occlusive cuff was to be placed, enabling both its diameter and the cuff length to be measured (Image 2). Urethral cuff was placed (Image 3). Through the same incision, subcutaneous tunnel under the transversalis fascia at the paravesical level was made for placement of balloon reservoir that was previously filled with contrast solution or physiological solution (Image 4). The control pump was placed in the scrotal sac in the subdartos tunnel (Image 5). And finally the three elements...
were connected and incision was closed. System was checked to remain deactivated.

Patient showed good postoperative progression and was released 5 days after the operation.

**DISCUSSION**

Surgical management of urinary incontinence in the neurogenic patient is complex and even more so when it entails artificial sphincter placement. The surgical technique is effective, simple, and reproducible, but the technical principles of each device, in this case the AMS-800, must be followed. In addition to meticulous placing of the sphincter, strict patient follow-up must be carried out to detect possible complications. AMS-800 sphincter success rate in non-neurogenic patients is 70-80% with a complication rate of more than 30%, the most common of which are device failure (13-24%), extrusion (8-23%), and infection (4-6%).

Success rate in neurogenic patients is reported at 20-70% with complication rate up to 47%. In general, prognosis for the procedure in neurogenic patients is poor with high complication probability in these patients secondary to vascularization problems and tissue tropism in the genital area. In the present case, patient presented with partial tube extrusion that was conservatively managed.

**CONCLUSIONS**

Success with artificial urinary sphincter is around 60% at 5 years or more. AMS-800 model is currently the most widely used and is the model that has had the best long-term results.
Although it is mainly used in incontinence patients after radical prostatectomy, it can be used in neurogenic patients with acceptable success and complication rates. Neurogenic patients must be advised of the high complication probability. Patients should be carefully selected due to the morbidity and cost involved in artificial sphincter placement.

BIBLIOGRAPHY