



Magnetic resonance image and the diagnosis of penile prosthesis disturbances. Case Report

Imagen de resonancia magnética y diagnóstico de alteraciones de las prótesis de pene. Reporte de un caso

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Abstract

Penile prostheses are the third line of treatment for erectile dysfunction. It produces high patient satisfaction. Complications can occur, and the urologist must be prepared to recognize and treat them. Nuclear magnetic resonance imaging (MRI) can be a valuable tool for diagnosis and decision-making.

We report the case of a patient with a penile prosthesis with a complication related to the device, in whom MRI was essential for the assessment, diagnosis, and treatment. In conclusion, urologists should be familiarized with MRI, an alternative imaging method for diagnosing complications associated with penile implants.

Keywords:

Penile prosthesis, magnetic resonance imaging, erectile dysfunction, diagnosis, complications

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Resumen

Las prótesis de pene son la tercera línea de tratamiento para la disfunción eréctil. Produce una alta satisfacción del paciente. Pueden ocurrir complicaciones y el urólogo debe estar preparado para reconocerlas y tratarlas. La resonancia magnética nuclear (MRI) puede ser una herramienta valiosa para el diagnóstico y la toma de decisiones.

Presentamos el caso de un paciente portador de prótesis de pene con una complicación relacionada con el dispositivo, en quien la resonancia magnética fue fundamental para su valoración, diagnóstico y tratamiento.

En conclusión, los urólogos deben estar familiarizados con la resonancia magnética, un método de imagen alternativo para diagnosticar las complicaciones asociadas con los implantes de pene.

Palabras clave:

Prótesis de pene,
resonancia magnética,
disfunción eréctil,
diagnóstico,
complicaciones

Introduction

Erectile dysfunction (ED) is the persistent inability to achieve and maintain an erection that is sufficiently rigid to allow satisfactory sexual intercourse.

Different treatment options include lifestyle changes and pharmacological and surgical management. Penile prostheses are the third line of treatment for ED.⁽¹⁻³⁾ Although they are an excellent treatment option, there are complications in up to 5% of cases.⁽⁴⁾

Diagnostic images can aid physicians in assessing the malfunction of the prosthesis and complications associated with those devices. The urologists must be familiarized with magnetic resonance imaging (MRI) for clinical and surgical decisions.⁽⁵⁾

The objective of this review was to describe imaging findings that may suggest a disturbance in the functioning of the penile prosthesis.

Case report

We reported the case of a patient with a penile prosthesis that had complications related to its device, in whom nuclear magnetic resonance imaging was helpful in assessing, diagnosing, and treating the case.

An 81-year-old patient with cT2cN0M0 prostate cancer underwent a radical prostatectomy in May 2005. He had an adequate postoperative evolution, with mild urinary incontinence, which improved in the first four

months. He also showed complete erectile dysfunction and underwent an inflatable penile AMS 700 prosthesis in 2009.

The patient had implant dysfunction and never achieved an erection with the prosthesis. In 2016, urologists implanted a three-piece inflatable penile prosthesis. The surgical report described a challenging procedure due to the distal dilatation of both cavernous bodies. Nonetheless, there were no complications at the end.

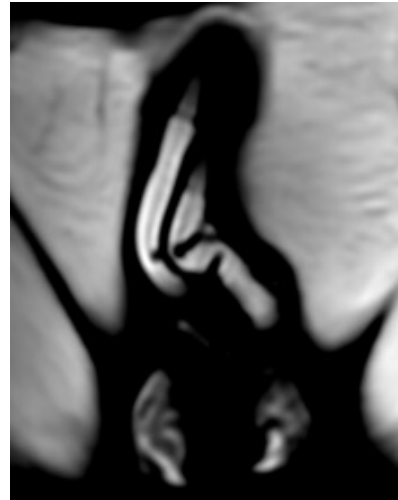
This patient attended our clinic in September 2018 due to the inability to achieve an erection, and a pelvic magnetic resonance described a retraction of the left cylinder with a loss of volume or fluid leakage. He underwent the third implantation of a penile AMS 700™ prosthesis in January 2019, with the following intra-surgical findings: An extensive perforation of the intercavernous septum that causes the left cylinder to migrate to the right cavernous body. Additionally, the tip is directed towards the right crura. We placed a new AMS CX 700 implant. There were no complications.

The patient did not show signs of infection during his postoperative control. He presented a curvature with indentation of the left cylinder in the penis and difficulty reaching the distal portion of the cavernous body on the left cylinder without obstructive urinary symptoms, erosion, or extrusion of the prosthesis at follow-up. He was taken to a new simple, and contrasted MRI of the penis with evidence of left cylinder elbowing and notorious penile asymmetry, mainly when inflating the implant, possibly due to a weak or absent intercavernous septum that was not reported by the radiologist (Figures 1 and 2).

Figure 1. Remarkable retraction of the left cylinder inside the corpus cavernosum



Figure 2. Retracted and folded cylinder in MRI



Inflatable three-piece prostheses are the most frequently used devices for the management of ED.⁽²⁻⁴⁾ Although these prostheses have a high success rate (67-88% at a ten-year evaluation),⁽⁶⁾ authors describe complications in up to 5% of the cases.^(7,8) These are classified

into intraoperative and postoperative complications. Intraoperative complications include hematoma, glans hypermobility, corporal crossover, perforation, and injury of the urethra or other organs such as the bladder, bowel, or large vessels. These complications are not in the scope of this article. Complications can be of the intraoperative type, which occurs in 0.5-1%, but 78-82% of the procedures are successful even ten years later.⁽⁹⁾

Conversely, two of the most common postoperative complications are infection, which occurs in 10% of the cases.⁽¹⁰⁾ Risk factors include spinal cord injury, prolonged surgery time, long-term intake of steroids, and revision surgery. The most commonly associated microorganism is *S. epidermidis* and other skin pathogens. Treatment usually requires surgical management and replacement of the prosthesis.⁽⁸⁾ Secondly, mechanical failure occurs in 10% of the cases.^(11,12) Cylinder alterations can include rupture, buckling, herniation of a segment of the cylinder, aneurysmal dilatation of a segment of the cylinder, corporal crossover, and extrusion. Other problems may include weak inflation, visible deformity, palpable abnormality, and painful intercourse.^(5,8,13) A physical examination can be insufficient for an accurate diagnosis when a device malfunction occurs.

Among other complications, we have extrusion in 17% of cases, but it decreases to 5% if hydraulic prostheses are used; we also have a mechanical failure in 2-4% of cases, but only 2% require surgical revision.⁽¹⁴⁾

When available, we think MRI should be the preferred image modality for assessing and diagnosing complications because it offers a multiplanar evaluation and superior soft-tissue contrast resolution. Also, it has proven to be

safe and the most reliable for the diagnosis of alterations in patients with inflatable penile prostheses; In this case, MRI is superior to CT because it offers a better image with higher resolution, which makes it possible to identify and characterize diseases with greater probability.^(5,15)

The protocol for evaluation should include T1, T2-weighted transaxial, coronal, and sagittal fast spin-echo sequences. The penis should be as straight as possible when the image is taken. There must be images of the collapsed and activated prosthesis. The T2-weighted sequence is usually the most helpful because it shows a tremendous anatomical definition of the prosthesis components and soft tissues.⁽¹⁶⁻¹⁹⁾

The relationship and collaboration between the urologist and radiologist are essential to guarantee proper care for the urological patient since it increases the possibility of a better diagnosis and a more effective treatment from urolithiasis to urological cancers. In countries like Chile, it has been shown that correct communication between these specialists increases the success rate of treatment in various urological diseases by 42%.⁽²⁰⁾

The urologist and radiologist should familiarize themselves with the typical aspect of the prosthesis in an MRI. The main components of the implant, such as The two cylinders located inside both cavernous bodies, look hyperintense in the T2 images. The cavernous bodies are also hyperintense, and the tunica albuginea is hypointense. The proximal end of the cylinder lies on the crus of the corpora. The distal end has a rounded aspect and is located towards the glans of the penis. The reservoir is in the retropubic space, and hyperintense is observed in T2.^(17,19)

In MRI, a thickening of T2 hyperintensity and hyperenhancement of the prosthesis surrounding soft tissue suggests an infection, and a collection suggests an abscess.⁽¹⁷⁾

As for device malposition, it is infrequent that one of the parts of the prosthesis migrates, although it is possible. Most commonly occurs with the reservoir, and it has been reported to migrate to the inguinal canal, which is easily seen in the image. The cylinders can also change their original position generating an asymmetry of the glans and difficulty with intercourse.^(5,16)

A loss of continuity shows the rupture of the cylinder in the MRI. It is important to note if the prosthesis is activated, the volume of each cylinder, and if it changes. With aneurysmal dilation and buckling, the albuginea remains intact. Whereas when the cylinders are extruded, there is erosion through the tunica albuginea. The most common site of the rupture is distal. Corporal crossover happens more frequently during surgery.^(16,18)

In our case, MRI showed an anomalous position of the cylinders, leading us to make a surgical decision. Unfortunately, for the last intervention, we did not observe the configuration of the intercavernous septum in detail, which would surely guide us to a better position of the cylinders and not have the result we achieved.

Magnetic resonance has proven to be an essential tool for diagnosing complications or alterations associated with inflatable penile prostheses. It is a safe, non-invasive procedure now available in health services. Some studies have reported the superiority of the MRI in assessing the device alterations compared to physical examination.^(5,16,21)

Conclusion

Nuclear magnetic resonance can be an essential tool in evaluating cases of mechanical failure of penile prostheses. It can be fundamental in operating on patients and defining possible causes of failure.

Conflict of interest

None of the authors have any conflicts of interest or financial ties to disclose.

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