



Application of porcine intestinal submucosa in Peyronie's disease treatment

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■ ABSTRACT

Background: Peyronie's disease is an acquired condition characterized by the formation of fibrous plaques in the tunica albuginea of the penis. The majority of patients can be managed conservatively with oral or intralesional medication. Surgical options vary from tunica albuginea shortening contralateral to the curvature, to resection of the fibrous area with graft application. One alternative is the use of porcine small intestine submucosa.

Objective: To demonstrate porcine intestinal submucosal graft application in the treatment of Peyronie's disease.

Clinical case: Patient is a 66-year-old man with 9-year disease onset presenting with cephalic penile curvature accompanied by pain during erection. Test with alprostadil showed penile curvature and 2 cm dorsal plaque. Patient was treated with vitamin E and colchicine for 6 months with no improvement. The decision was made to apply porcine intestinal submucosal graft.

Conclusions: Porcine intestinal submucosa application is a useful alternative in treating Peyronie's disease. It provides length and flexibility while correcting penile curvature by generating healthy cell growth at the fibrosis site, converting it into functional tissue. It is

■ RESUMEN

Antecedentes: La enfermedad de Peyronie es una condición adquirida caracterizada por la formación de placas fibrosas en la túnica albugínea del pene. La mayoría de los pacientes pueden ser manejados conservadoramente con medicamento oral o intralesional. Las opciones quirúrgicas varían desde acortamiento de la túnica albugínea contralateral a la curvatura así como resección del área fibrosa con aplicación de injertos. Una alternativa es el uso de submucosa de intestino delgado porcino.

Objetivo: Mostrar la técnica de aplicación de injerto de submucosa intestinal porcina, en el tratamiento de la enfermedad de Peyronie.

Caso clínico: Masculino de 66 años, Inició su padecimiento actual hace nueve años al presentar curvatura peneana con desviación cefálica acompañada de dolor durante las erecciones. Prueba de alprostadil con evidencia de desviación peneana y placa dorsal de 2 cm. Es tratado con vitamina E y colchicina durante seis meses sin mejoría. Se decidió realizar aplicación de injerto de submucosa intestinal porcina.

Conclusiones: La aplicación de submucosa intestinal porcina es una alternativa útil en el tratamiento de la

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easy to rehydrate and suture, it minimizes scar tissue formation, and it is infection-resistant.

Key words: Intestinal submucosa, graft, Peyronie, Mexico.

enfermedad de Peyronie. Provee longitud y flexibilidad corrigiendo la curvatura peniana, generando crecimiento de células sanas en el sitio de fibrosis, remodelándolo a tejido funcional. Es fácil de rehidratar y suturar, minimiza la formación de tejido cicatricial y es resistente a infecciones.

Palabras clave: Submucosa intestinal, injerto, Peyronie, México



■ BACKGROUND

Peyronie's disease is an acquired condition of unknown origin characterized by the formation of fibrous plaque in the tunica albuginea of the corpora cavernosa of the penis. Plaque is generally located at the penile midline,¹ and disease incidence is an approximate 1%.² The majority of cases occur between the ages of 45 and 60 years.³ It has been associated with a large number of conditions. Dupuytren's contracture is the principal association with a 20-40% of cases. Other conditions are tympanosclerosis, diabetes, gout, Paget's disease, the use of β -blockers, and trauma.^{4,5} Peyronie's disease can be insidious or acute, characterized by an initial phase in which erection can be painful and the penis can be deviated or deformed. In the later "stabilization" phase of the deformity, painful erection may disappear.⁶ Patient evaluation includes clinical history, physical examination, blood chemistry, testosterone (if libido is reduced), combined injection and stimulation test to examine curvature, deformity and fibrous plaque size, as well as penile length (both the long and short sides)⁷ and Doppler ultrasound to evaluate penile and collateral arteries.⁸ The majority of patients can be managed conservatively with psychological and educational counseling,⁹ 1-2 mg oral colchicine twice daily for three months,¹⁰ p-aminobenzoic acid,^{11,12} 800 - 1000 units of vitamin E daily for 3-6 months,^{13,14} or intralesional verapamil.^{15,16} Surgical options are indicated in patients that have been in the "stable" phase of the disease for more than 3 months, with persistent pain for more than 12 months, with sexual dysfunction caused by deformity, curvature, or marked stretching, or a combination of these events.^{17,18}

Different surgical techniques have been described that include shortening of the tunica albuginea

contralateral to the curvature,¹⁹ as well as resection of fibrotic area with graft application.²⁰ Different grafting materials have been used, such as tunica vaginalis,²¹ pericardium,²² *fascia temporalis*,²³ and saphenous vein.²⁴

■ OBJECTIVE

The objective of the present study is to demonstrate the porcine intestinal submucosal graft application technique after H-incision in the fibrous plaque in the treatment of Peyronie's disease.

■ CASE PRESENTATION

Patient is a 66-year-old man with history of discoid lupus erythematosus in treatment with chloroquine. Present illness began 9 years prior to evaluation with ventral penile curvature accompanied by painful erection and inability to penetrate. He was evaluated at the authors' institution with alprostadil test that showed 30° curvature and dorsal plaque of approximately 2 cm was palpated in the middle third of the body of the penis. Doppler ultrasound showed unaltered corpora cavernosa, adequate systolic velocity, as well as suspicious fibrotic zone, and 2 cm long dorsal calcification (**Image 1**). Peyronie's disease was diagnosed and medical treatment was begun with 300 mg vitamin E daily for 6 months and 2 mg colchicine daily for 3 months.

After 9 months of unsuccessful medical treatment the decision was made to carry out porcine intestinal submucosal graft application.

Procedure description: Initially a subcoronal circumcision incision was made, skin and subcutaneous tissue was dissected and turned outward up to the base of the penis. Dorsal neurovascular structure was

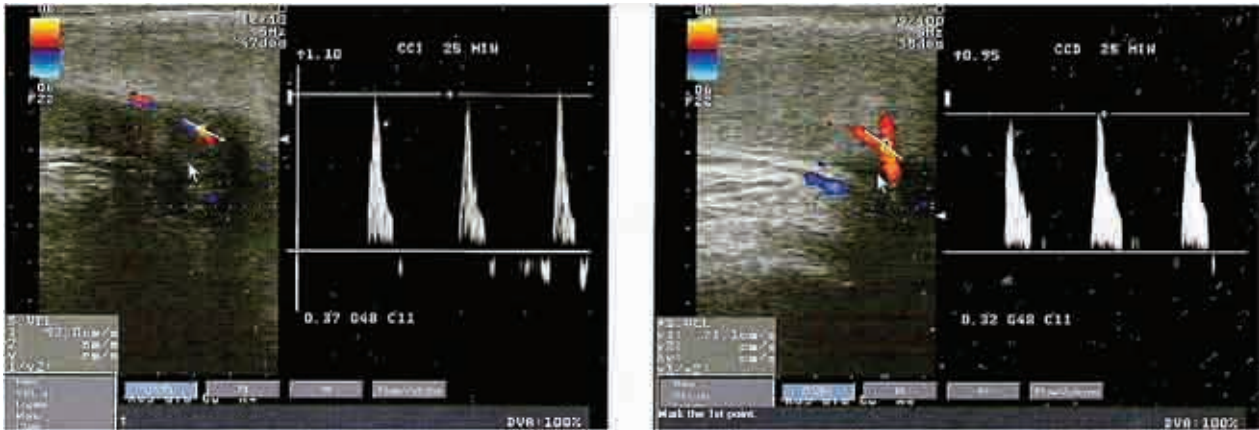


Image 1. Doppler ultrasound of the penis showing adequate systolic velocities.

identified. Artificial erection was induced using a 25 G needle inserted in the lateral region of one of the corpora cavernosa and physiological solution outlined dorsal fibrous plaque and degree of penile curvature was identified (**Image 2**). Deep dorsal vein, dorsal arteries, and tunica albuginea nerves (in this step surgical magnifying loupes are especially useful to avoid causing injury) were isolated (**Image 3**). Fibrous plaque was outlined and marked with colorant. Ligature was placed at the base of the penis to avoid bleeding of the corpora cavernosa. An H-shaped relaxing incision was made on the fibrous plaque of the tunica albuginea

(**Image 4**). When the plaque is very large a segment can be resected. Adequate graft size was determined; adequate size should be 30% larger than the defect (**Image 5**). Porcine intestinal submucosal graft was sutured at the edges of the defect using absorbable 4-0 suture. There were no significant leaks at the repair site and hemostasis was carried out (**Image 6**). Skin and subcutaneous tissue closure was performed with 3-0 chromic catgut running suture.

During immediate postoperative management penis was maintained in an upward position against the body with slight compression (**Image 7**). Patient was



Image 2. Ventral penile curvature.



Image 3. Dorsal neurovascular structure is isolated.

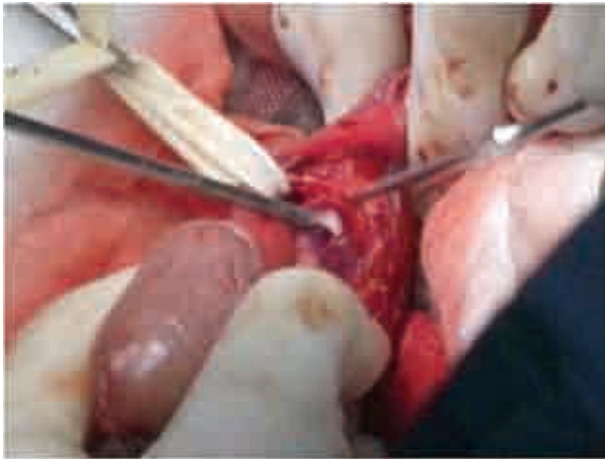


Image 4. H-shaped incision on the fibrous plaque.



Image 5. Adequate graft size is determined.

released on the following day with instructions to avoid physiological erections for 2 weeks and sexual relations for 8 weeks.

Patient currently presents with adequate deformity correction and is able to have satisfactory sexual activity. No new scar tissue has formed, there has been no graft rejection, no infection or associated lesions.

■ DISCUSSION

The ideal material for closing tunica albuginea defects has yet to be discovered. One alternative is the use of porcine small intestine submucosa.²⁵ This material has demonstrated its usefulness in abdominal hernia and anal fistula repair.²⁶

Porcine intestinal submucosa is a three-dimensional extracellular biomaterial made up of collagen, glycosaminoglycans, proteoglycans, and glycoproteins that, once implanted, promotes colonization by means of cells and blood vessels, thus favoring connective tissue and epithelial tissue growth and differentiation. This results in fibrotic site conversion into functional tissue without generating immune response or surgical site infection.^{27,28}

Porcine intestinal submucosal graft reduces penile curvature to less than 10 degrees in 90% of patients. In published series, in patients without preoperative erectile dysfunction, 79% achieve total erection while 21% will require oral or intracavernous medication or penile prostheses in order to achieve satisfactory erection. Shortenings, infections, or immunological reactions have not been reported.²⁹



Image 6. Site repaired with porcine intestinal submucosa graft.



Image 7. Penile position with slight compression in the immediate postoperative period.

■ CONCLUSIONS

Porcine intestinal submucosa application is a safe and useful alternative in treating Peyronie's disease. It provides length and flexibility while correcting penile curvature, generating healthy cell growth in the fibrotic site converting it into functional tissue. It is easy to rehydrate and suture, it minimizes the formation of scar tissue and is resistant to infection.

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