Outcomes of Surgical Management of Men With Peyronie's Disease With Hourglass Deformity

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OBJECTIVE To investigate the outcomes of two surgical interventions for Peyronie's disease (PD) with hourglass deformity: partial excision and grafting (PEG) or inflatable penile prosthesis (IPP) implantation.

MATERIALS AND METHODS Retrospective data were collected from two centers: Technical University of Munich (PEG) and Tulane University Medical Center (IPP). Collected variables included patient demographics, sexual function, penile vascular measurements, and treatment outcomes.

RESULTS A total of 50 PD patients with hourglass deformity (26 PEG [group 1] and 24 IPP [group 2]) were included in this study. Patients in group 1 had higher mean preoperative Sexual Health Inventory for Men scores (22.2 vs 10.3, $P < 0001$), required less erectile dysfunction treatment (35% vs 79%, $P = .005$), and had more nonvascular etiology (77% vs 21%, $P < .0001$). There were no intraoperative complications, 2 patients in group 1 had postoperative glans hypoesthesia, and 1 patient in group 2 required surgical revision. All patients in both groups had significant ≥20% improvements in penile curvature with mean changes of 68.1 degrees (12.7) in group 1 and 49.6 degrees (13.5) in group 2, $P < .0001$. Resolution of hourglass deformity was achieved in 85% of patients in group 1 and 100% of patients in group 2, $P = .045$. The mean postoperative change in Sexual Health Inventory for Men score was −0.3 (1.3) in group 1 and 16.7 (4.7) in group 2, $P < .0001$.

CONCLUSION Both options provide excellent outcomes for well-selected patients with PD and an hourglass deformity. PEG can be offered to patients with good erectile function, whereas the IPP remains the preferred option for patients with poor erections. UROLOGY 91: 119–123, 2016. © 2016 Elsevier Inc.

Peyronie's disease (PD) is a fibrotic condition of the tunica albuginea characterized by penile deformity, discomfort, and, in some patients, erectile dysfunction (ED). The pathophysiology of this connective tissue disorder is poorly understood. The etiology is thought to be due to microtrauma in genetically susceptible men with subsequent abnormal healing of the tunica albuginea.[1-4] The reported prevalence is 3%-9% in the general population.[5]

The most common penile curvature is dorsal, followed by lateral and ventral.[6] Swan neck deformities and hourglass deformities are not well classified because of their relatively low prevalence.[7,8] Hourglass deformity in this area is defined as bilateral notching at the same level of the penile shaft.[9] In a study by Kendirci et al, they reported the presence of true hourglass deformity in 7 of 523 (1%) patients with PD.[8]

ED has been reported in up to 61% of patients with hourglass deformities.[8] In a study by Cakan et al, ED was observed in 68% of patients with notching or hourglass deformity.[9] This higher association may be, in part, due to bilateral decreased cavernosal arterial blood flow secondary to the structural deformity.[8]

Incision/partial excision and grafting (PEG) is considered in patients with hourglass deformity, normal erectile function (EF), short penile length, complex deformity, and men concerned about penile length loss. In those with documented preoperative ED, insertion of an inflatable penile prosthesis (IPP) is the recommended treatment of choice.[10,11] We sought to assess the outcomes of patients with PD with an hourglass deformity undergoing either PEG or IPP insertion.

MATERIALS AND METHODS

Patient Population

Retrospective data were collected for PD patients with a nonventral plaque and hourglass deformity who underwent IPP or PEG between January 2010 and July 2015 from two academic centers:

Financial Disclosure: *The authors declare that they have no relevant financial interests.*

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Submitted: December 23, 2015, accepted (with revisions): January 27, 2016

Technical University of Munich (PEG, group 1) and Tulane University Medical Center (IPP, group 2). Hourglass deformity was defined as a concentric narrowing of the penis due to plaque. A total of 50 patients were included in the study (26 PEG, 24 IPP). Charts were reviewed and data were collected, pre- and postintervention, regarding various patient demographics, sexual function, penile curvature measurements, presence of hourglass deformity, penile vascular parameters, surgical technique, and treatment outcomes.

Penile Duplex Doppler Evaluation and Measurements

All patients underwent baseline penile duplex Doppler ultrasound (PDDU) after intracavernosal injection of a vasodilator agent before (IPP, PEG) and after intervention (PEG). Peak systolic velocity (PSV), end-diastolic vascular velocity (EDV), and resistive index were documented and used to assess the etiology of ED. Arterial insufficiency was defined as PSV < 30 cm per second and EDV ≤ 5 cm per second; veno-occlusive dysfunction as EDV > 5 cm per second and PSV ≥ 30 cm per second; mixed vascular disorder as PSV < 25 cm per second and EDV > 5 cm per second; and nonvascular etiology as PSV > 30 cm per second, EDV ≤ 5 cm per second, and resistive index > 0.8. Studies were performed by a single experienced operator in each institution using standardized technique.[12]

Inflatable Penile Prosthesis

Eligibility criteria for IPP were PD with hourglass narrowing with any degree of curvature and poor EF not responding to oral therapy. Exclusion criteria were PD with good EF or patients opting to try a less invasive intralesional injection therapy option.

IPP insertion was done under general anesthesia in all patients. All procedures were performed through a penoscrotal incision and all implanted devices were 3-piece. Patients received either a Coloplast Titan (Coloplast, Minneapolis, MN) or an AMS 700 CX (American Medical Systems, Minneapolis, MN) IPP. Patients received perioperative antibiotics and a 3M Ioban antimicrobial drape (St. Paul, MN) was used. The straightening algorithm was as follows: Once the cylinders were implanted, they were fully inflated and any curvature was assessed. If the penis was not adequately straight (<30°), then manual modeling was performed (the penis is bent in the contralateral direction to the curvature for 90 seconds for 2 cycles). In patients who did not achieve satisfactory penile straightening (>30° after 2 rounds of manual modeling), the next step was either plication, multiple tunical incisions, or, occasionally, incision or excision with or without grafting. All reservoirs were placed through the same penoscrotal incision in the space of Retzius. Pumps were all placed in a similar fashion in a posterior mid-dartos location in the dependent portion of the scrotum. Drains were not used.

The follow-up regimen for patients undergoing IPP was as follows: 1-2 weeks after discharge from hospital for wound inspection, followed by a device education and activation visit at 6 weeks postoperatively, followed by regular visits 3, 6, and 12 months after surgery, and then annually thereafter. The International Index of Erectile Function (IIEF) was used to assess EF at baseline. Any residual or recurrent deviation and any persisting hourglass narrowing were recorded. Any glans hypoesthesia, difficulties with sexual intercourse, or complications after surgery were tabulated.

Partial Excision and Grafting

Eligibility criteria for PEG were: PD with curvature ≥ 50°, hourglass narrowing, loss of penile length due to PD, and good EF as determined by IIEF, PDDU, and/or an intracavernous injection test. Exclusion criteria were: PD with curvature < 50°, ventral deviation, poor EF, and previous surgery for PD.

PEG was done under general anesthesia in all patients. Surgical magnifying loupes were used. First, a circumcising skin incision followed by penile degloving was performed. After lateral dissection and mobilization of the neurovascular bundle on both sides, an artificial erection was achieved to assess the degree of deformity, the point of maximum curvature, and the extent of the hourglass deformity. A partial plaque excision of the tunica albuginea was then performed over the area of maximum curvature on the concave side of deviation, meaning the excision of a spindle-shaped part of the tunica albuginea measuring 2.0 cm × 0.5 cm (transverse and longitudinal directions, respectively). The tunical defect was then extended laterally in the transverse direction on both sides of the penile shaft to expand the area of the hourglass narrowing, leaving at least 1 cm distance from the urethra. The hourglass deformity is almost always located at the point of maximum curvature (which is usually also the site of the plaque), beginning on the dorsal aspect of the penis and reaching the lateral aspect of the penis on both sides. Therefore, using our technique, the hourglass deformity is corrected sufficiently. Grafting of the tunical defect was performed using a ready-to-use, self-adhesive collagen fleece coated with tissue sealant (TachoSil, Baxter, Deerfield, IL). As the graft is coated with tissue sealant, it sticks on the tunica albuginea and on the defect. Additional fixation by sutures is not required. Three minutes after attaching the fleece on the defect, a watertight closure is achieved. One graft sufficed for each case. An artificial erection was again performed at the end of surgery to confirm the results.

The follow-up regimen for patients undergoing PEG was as follows: 1 week after discharge from hospital for wound inspection, followed by regular visits after 3, 6, and 12 months after surgery, and then annually thereafter. The IIEF was used to assess EF. Any residual or recurrent deviation, and any persisting hourglass narrowing were measured by a ruler and recorded following artificial erection with a vasodilating agent. PDDU was performed 3 months following surgery. Any glans hypoesthesia, difficulties with sexual intercourse, or complications after surgery were tabulated.

Statistical Analysis

A descriptive analysis of general and clinical characteristics was performed using frequency distributions. Discrete variables were examined by the chi-square test first. If the cells had counts of less than 5, they were reexamined with Fisher's exact test. Continuous data are presented as means ± standard deviation. Two-tailed Student *t* test was used for comparisons between groups for continuous variables. All analyses were performed using SAS statistical software (version 9.3 for Windows; SAS Institute, Inc., Cary, NC), and the significance level was set at 0.05.

RESULTS

Pretreatment Characteristics

Twenty-six patients underwent PEG (group 1) and 24 patients had IPP implantation (group 2). The mean ages were 58.1 years (SD = 5.3) for group 1 and 63.3 years (SD = 7.5) for group 2, $P = .006$. With regard to EF, patients in group 1 had higher mean preoperative Sexual Health Inventory for Men (SHIM) scores (22.2 vs 10.3, $P < .0001$), required less preoperative ED treatment (35% vs 79%,