Intraoperative Decision-making for Precise Penile Straightening During Inflatable Penile Prosthesis Surgery

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OBJECTIVE To present a novel algorithm for definitive reconstruction of penile curvature in men undergoing inflatable penile prosthesis (IPP) surgery as an alternative to manual penile modeling and grafting procedures.

METHODS Patients with erectile dysfunction and concomitant penile curvature undergoing IPP placement were divided into 2 treatment groups: (1) group 1, penile deformity known preoperatively, and (2) group 2, penile curvature recognized intraoperatively after IPP placement. Group 1 patients underwent penile plication after artificial erection and immediately before IPP insertion via the same penoscrotal incision, whereas group 2 patients were treated with a Yachia (Heineke-Mikulicz) corporoplasty over the intact cylinders. Patients completed postoperative Patient Global Impression of Improvement (PGI-I) questionnaires assessing overall satisfaction.

RESULTS Among 405 men receiving IPP at our institution from 2007 to 2014, 30 patients received synchronous correction of penile curvature (7%). Group 1 included 23 of 30 (77%) patients, and 7 of 30 (23%) were in group 2. Overall mean initial curvature was 36°, and all patients were corrected to <10°. Average operative times were 18 minutes longer compared with patients who underwent IPP placement alone (82 vs 64 minutes, $P < .05$). At an average follow-up of 13 months (range 7-32), 19 of 20 (95%) group 1 and 6 of 7 (86%) group 2 patients who completed surveys reported an improved overall condition. No patient reported chronic pain, recurrent deformity, or device malfunction.

CONCLUSION Penile curvature can be safely and reliably corrected at the time of IPP placement, regardless of whether the deformity was identified preoperatively. UROLOGY 86: 1048–1052, 2015. © 2015 Elsevier Inc.

Men with erectile dysfunction (ED) often present with concomitant Peyronie's disease (PD). Penile prosthesis insertion alone is often not sufficient to correct penile curvature, requiring many patients to undergo additional straightening maneuvers such as manual modeling, plaque incision or incision and grafting.[1] Synchronous treatment of curvature with penile plication and prosthesis insertion during the same operation has been described with excellent results.[2,3]

Some men who have long suffered from refractory ED may not be aware of their concomitant development of curvature before penile prosthesis surgery. When the penile curvature is diagnosed intraoperatively after prosthetic cylinders have been implanted and test-filled, further maneuvers such as plication, plaque incision, and/or grafting techniques require prosthesis removal or risk damage to the device from needle passages. Manual modeling, described by Wilson and Delk[4] in 1994, involves forcibly fracturing the plaque over inflated cylinders and carries a 3%-5% risk for urethral injury and a tendency for significant residual curvature.[5] We present an efficient algorithm for definitive correction of PD in men undergoing concomitant inflatable penile prosthesis (IPP) surgery as an alternative to penile modeling.

METHODS

We reviewed our institutional review board approved IPP database and identified patients who underwent IPP insertion with PD correction between 2007 and 2014. We divided the patients into 2 treatment groups based on when the penile curvature was recognized (Fig. 1). Group 1 patients were diagnosed preoperatively and underwent penile plication immediately before IPP

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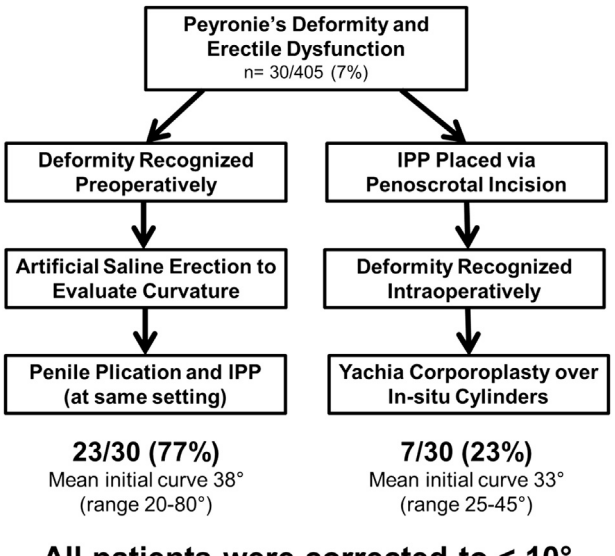

Figure 1. Reconstructive algorithm for patients with erectile dysfunction and Peyronie's disease.

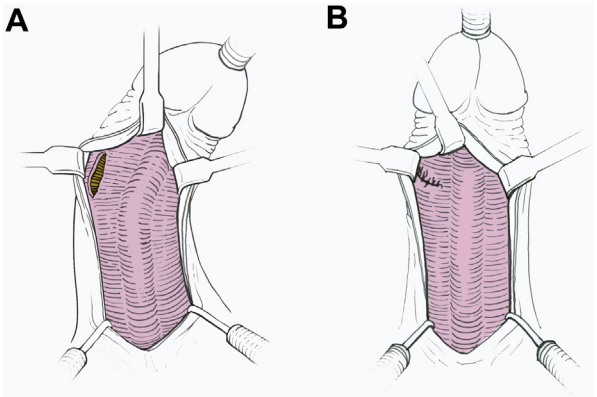

Figure 2. Yachia corporoplasty after prosthetic cylinders have been placed. **(A)** 2-cm longitudinal incision made in the convex tunica albuginea overlying the in-situ cylinder. **(B)** Interrupted 2-0 polydioxanone sutures with buried knots are used to close the incision transversely in a Heineke-Mikulicz fashion. (Color version available online.)

insertion.[3] Group 2 patients were diagnosed intraoperatively after inflation of a newly inserted IPP and were treated with a Yachia (Heineke-Mikulicz) corporoplasty over the intact cylinders (Fig. 2).[6] In both groups, all procedures were performed via the same penoscrotal incision. Preoperative diagnosis of PD was based on history (including autophotography) and physical examination. Patients with known PD were required to have painless, stable penile curvature for at least 6 months before undergoing curvature correction.

Penile Plication

Group 1 patients underwent penile plication before IPP insertion via the following steps: (1) transverse scrotal incision first with exposure of the tunica albuginea bilaterally; (2) artificial erection with injectable saline and tourniquet; (3) retraction of incision distally as needed for exposure of the tunica albuginea; (4) a series of parallel, 2-0 polyesther sutures placed in an inverting, interrupted fashion in the tunica albuginea at the convex surface opposite of greatest curvature; (5) confirmation of correction with repeat artificial erection; and (6) IPP placement with corporotomies proximal to the plication sutures.

Yachia Corporoplasty

Group 2 patients underwent Yachia (Heineke-Mikulicz) corporoplasty over the intact cylinders after IPP placement: (1) complete IPP cylinder insertion with inflation; (2) exposure of the distal corporal body contralateral to the curve via the same penoscrotal incision, in a reverse-degloving manner (Supplementary Fig. 1); (3) using low-level (≤20 W) electrocautery, a longitudinal 2.0-cm incision was made directly over the in-situ cylinder overlying the area of greatest curvature. Stay sutures were placed to pull the vertical incision laterally to facilitate transverse closure with interrupted 2-0 polydioxanone sutures (Fig. 3).

Photographs from lateral and inferior views were taken intraoperatively to calculate degree of curvature (Supplementary Fig. 2). The wound was meticulously closed in 3 layers to bury tubing, prevent skin tethering, and ensure robust tissue coverage. A drain was placed in all patients, and they were observed overnight and discharged home the following morning after drain removal and voiding trial.

Postoperative evaluation and IPP instruction were conducted 6 weeks after surgery. Further clinic follow-up was conducted according to patient's preference or as medically indicated. A research assistant unfamiliar with the surgery or outcomes queried all patients with the Patient Global Impression of Improvement (PGI-I), assessing patient-perceived postoperative improvement (Supplementary Table 1).[7]

RESULTS

Among 405 men receiving IPP at our institution from 2007 to 2014, 30 patients received synchronous surgical reconstruction for penile curvature (7%). Group 1 included 23 of 30 (77%) patients who underwent simultaneous plication and IPP for dorsal (n = 11), lateral (n = 5), and biplanar curvature (n = 7). Group 2 included 7 of 30 (23%) patients who underwent IPP and Yachia corporoplasty for dorsal (n = 1), lateral (n = 4), and biplanar curvature (n = 2).

Overall, mean initial curvature was 36° corrected to <10° in both cohorts. For group 1 patients, mean initial curvature was 38° (range 20°-80°) and 33° (range 25°-45°) for group 2 (P=.86). All patients were corrected to <10°. A median of 4 sutures (range 3-6) was used for plication with each suture providing correction of approximately 8°. Average operative times were only 18 minutes longer for group 1 patients (83 vs 64, P <.05) compared with patients who underwent IPP placement only (82 vs 64 minutes, P <.05), and times for Group 2 patients were only 24 minutes longer (88 vs 64, P <.05). At an average 13 months of follow-up (range 7-32), on postoperative PGI-I questionnaires 19 of 20 (95%) group 1 patients who completed surveys reported an improved overall condition (mean 1.4, range 1-3) and in group 2, 6 of 7 (86%) patients reported improvement (mean response 1.3, range 1-2). No patient reported chronic pain, recurrent deformity, or device malfunction. To date, there have been no revisions or infections of any devices.

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