Managing Bladder Neck Contracture

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Incidence: in recent literature, incidence of bladder neck contracture (BNC) 1% to 3% after open radical prostatectomy (RP), 1.2% after laparoscopic RP, and 1.1% after robotic RP.

Etiology: BNC associated with urine leak, large blood loss, pelvic hematoma, low surgeon volume, smoking, previous transurethral resection of prostate (TURP), and RP; BNC after RP can lead to urinary incontinence, diminished quality of life (QOL), multiple interventions, and progression of disease; BNC occurs after TURP in 3.4% to 9.7% of cases, especially in smaller glands; can combine transurethral incision of prostate (TUIP) with TURP to avoid BNC; holmium laser enucleation of prostate (HoLEP) presents low risk for BNC, but most data reported by high-volume specialists; incidence of BNC 21% after open prostatectomy, 8.5% to 12% after radiotherapy (RT) to prostate, 13% after cryotherapy, and 30% after high-intensity focused ultrasonic treatment; no randomized, controlled studies to guide treatment of BNC

Cold-knife incision: reasonable primary treatment; 83% response observed at 31 mo after primary treatment with incisions at 4 and 8 o’clock; International Prostate Symptom Score (IPSS) and continence in study group similar to those of patients who undergo RP; mitomycin C (MMC) — trial studied cold-knife incision with intravesical injection of MMC for recurrent BNC; MMC injected into 3 or 4 incision sites; at 1 yr, bladder neck patency in three-fourths of patients who had one procedure and in >90% of those having 2 procedures; men with incontinence achieved good results with implantation of artificial urinary sphincter (AUS) in staged procedure after 3 to 4 mo

Hot-knife incision: probably equivalent to cold-knife procedure; consider MMC or steroids for recurrent BNC; case series — studied patients with refractory BNC; 78% had failure of previous TUIP and 40% incontinent; study evaluated risk factors for BNC including diabetes, smoking, adjutant RT, RP, body mass index, and number of previous procedures; after balloon dilation, hot knife used at 9 and 3 o’clock; when deep lateral incisions not circumferential, remaining “scaffolding” may promote healing; 72% of patients had good outcome at 1 yr after one procedure; second treatment successful in half of remaining patients; failures associated with smoking and >2 previous endoscopic procedures; AUS placed successfully after 3 to 4 mo; electrocautery incisions — place at 4 and 8 o’clock or 3 and 9 o’clock; intermittent catheterization might help to stabilize scar

Educational Objectives
The goals of this program are to improve diagnosis and treatment of bladder neck contractures (BNC) and benign prostatic hypertrophy (BPH). After hearing and assimilating this program, the clinician will be better able to:

1. List the risk factors for BNC.
2. Manage a patient with BNC and incontinence.
3. Choose the most appropriate treatment option for a patient with BPH.
4. Discuss the benefits and characteristics of the types of lasers used to treat BPH.

Transurethral resection of bladder neck: used when bladder neck obliterated but patient prefers endoscopic procedure to reconstruction; dilate with balloon, then cut circumferentially with hot knife; poor outcomes reported, including new onset of incontinence

Simple dilation: can perform in office with Amplatz dilators over guidewire; in one series, success rate reasonable when patients sent home on clean intermittent catheterization for 2 to 3 mo, and resection performed for failure of treatment; no comparison data available, but balloon dilation probably less effective than incision; success rate of balloon dilation ≈60%; larger balloon size does not improve rate of success; repeat dilation not efficacious

Lasers: neodymium-doped yttrium aluminum garnet (Nd-YAG) — good results observed at 12 mo with cuts at 3 and 9 o’clock; unclear whether energy or cutting technique responsible for results; holmium — in patients with recurrent BNC, 80% success rate observed in those treated with keyhole cuts at 12, 4, and 8 o’clock and injection of steroids into incisions; for incontinent men, AUS placed after 8 to 10 wk

Artificial urinary sphincter: for staged procedure, wait 2 to 3 mo and ensure bladder neck patent, then place AUS; treatment of BNC unlikely to cause incontinence

Urethral stent: no longer on market; problems included encrustation, stone migration, and obstruction

Synchronous vs staged AUS: evaluate with cystoscopy; simultaneous treatment reasonable when new BNC found in incontinent patient, but perform staged procedure for refractory BNC or previous RT

Open reconstruction: for patient with many previous procedures, ascertain his goals; one option suprapubic tube; assess bladder capacity, especially after RT; AUS not helpful if bladder capacity 100 to 150 mL; in patients with previous TURP or RT with prostate in situ, consider transabdominal approach; if stricture anastomotic but sphincter spared, can use abdominal approach, but patient might need inferior pubectomy; bladder neck often fused to pubic symphysis; combined approach — use for lengthy BNC; make perineal and transabdominal incisions; use staged approach to manage incontinence in patients having open reconstruction, waiting 6 mo to place AUS; bladder capacity important because must develop wide bladder flap anteriorly and bring bladder to anterior urethrotomy; dissecting urethra posteriorly risks injury to rectum; patients also at risk for urine leak

Summary: most BNC evident within 6 mo after treatment; consider risk factors when counseling patients; incision and dilation both effective treatments; hot and cold knife incisions produce acceptable outcomes; deep lateral incisions effective; injection of MMC or steroids appears safe, but more data needed; for concomitant BNC and incontinence, simultaneous approach reasonable for primary treatment; open reconstruction last resort;

5. Counsel a patient who asks about emerging treatments for BPH.

Faculty Disclosure
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Surgical Treatment of Benign Prostatic Hyperplasia

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Treatment options: minimally invasive surgical interventions likely to increase as techniques and outcomes improve

Indications for surgery: consider for patients with moderate to severe symptoms who do not respond to medical therapy, want primary treatment with most effective option, or wish to avoid side effects of medications; surgery indicated for patients with obstruction on cystoscopy or other complications of benign prostatic hyperplasia (BPH) such as outlet obstruction with urinary retention, stones, recurrent urinary tract infection, changes in upper tract, or persistent gross hematuria

Transurethral needle ablation of prostate (TUNA): delivers radiofrequency energy to transition zone (TZ) while sparing urethral mucosa; goal to produce necrosis with resorption and sloughing of tissue, but ultrasonography, magnetic resonance imaging, and cystoscopy indicate that reduction in volume less than anticipated; in prospective, randomized trials some patients derived benefit, but TUNA inferior to resection and other options; procedure associated with lower rates of erectile dysfunction (ED), loss of anatrgue ejaculation, and bleeding; however, TUNA can result in acute postoperative urinary retention, and rates of retreatment high over long term

Microwave therapy: microwave antenna on urethral catheter used to heat TZ; recent models allow cooling of urethra; decreases symptoms; least operator-dependent surgical treatment; newer devices associated with greater efficacy but also more complications; perform as outpatient procedure; few sexual side effects; insufficient evidence on durability of outcomes

Prostatic stents: for men who cannot tolerate surgery; shifting of stent toward bladder and sphincter can cause irritation, dysuria, and encrustation with stones

Transurethral incision of prostate: effective for small prostates (<55 g); 1 or 2 cuts in different locations of capsule reduce constriction of bladder neck and urethra; in select patients, TUIP as effective as TURP, with fewer effects on sexual function and ejaculation, but patients often require secondary procedure

Lasers: include Nd:YAG, holmium, potassium titanyl phosphate (KTP), lithium triboride (LBO), laser diodes, and thulium; holmium, KTP, and LBO lasers work within green spectrum; due to different wavelengths, holmium laser targets water, and KTP and LBO lasers target hemoglobin; Nd:YAG, KTP, and LBO lasers have deeper penetration than holmium laser and laser diodes; deep penetration could cause more necrosis and sloughing, with consequent dysuria; use contact mode for cutting or ablating; defect laser to coagulate

Holmium laser: used for ablation, photovaporization, enucleation, and resection of prostate; HoLEP — tissue vaporized to depth of capsule to create TURP-like defect; short-term functional outcomes similar after HoLEP and TURP; separate median lobe from capsule, then work toward apex and base; like simple prostatectomy (SP), HoLEP can treat large glands; outcomes — when performed by experienced surgeon, HoLEP compares favorably with SP, but requires special equipment such as morcellator; long learning curve compared with other endoscopic treatment options; 5-yr outcomes based on IPSS similar to or better than those after TURP, and equivalent to SP when performed by experienced surgeon; HoLEP associated with lower risk of bleeding than TURP or SP, and not associated with transurethral resection (TUR) syndrome

KTP and LBO: goal of treatment to create TURP-like cavity; functional outcomes similar to those observed after TURP

Laser diodes: end-firing fiber used in contact mode; most recent development 200-W, dual-wavelength laser; light absorbed by water and by hemoglobin; combines shallow penetration with high energy level; permits rapid ablation of tissue (2-3 g/min) with excellent hemostasis; shallow penetration might result in less coagulation and necrosis of tissue, with less dysuria

Success of lasers: for management of BPH, most important benefit of lasers improved intraoperative safety profile compared with TURP; however, later postoperative outcomes and complications with laser treatment not necessarily superior; lasers preferred for patients on anticoagulants

Transurethral electrovaporization of prostate: bipolar TUIP adaptation of roller ball electrode; short- and intermediate-term functional outcomes similar to those observed after TURP; can use normal saline with bipolar current, eliminating risk for TUR syndrome; when compared with TURP, TUV associated with less bleeding and fewer strictures, but may increase risks for dysuria and retention; rates of reoperation higher after TUV than after TURP

Transurethral resection of prostate: highly effective and durable treatment; trend toward adoption of less invasive treatment options motivated by risks of TURP, including hematuria, transfusion, ED, BNC, incontinence, and TUR syndrome; outcomes with bipolar loop resection comparable to those observed after TURP, but loop uses NS, eliminating TUR syndrome

TUR syndrome: patient can absorb 20 mL/min of irrigant during resection, leading to dilutional hyponatremia, altered mental status, nausea, vomiting, brain edema, seizures, and death; treat with fluid restriction, furosemide (Lasix), and in some cases hypertonic fluids; complication rare with all methods except monopolar TURP

Simple prostatectomy: can use suprapubic (transvesical) or retropubic approach, or combined technique in which anterior cystotomy extended onto capsule of prostate; SP reserved for prostates >100 g; functional outcomes good, but SP associated with increased risks for blood loss, continuous bladder irrigation (CBI), transfusion, incontinence, and BNC; for large prostates, SP most effective treatment option available; laparoscopic SP associated with less blood loss, less need for CBI, shorter length of stay, and shorter duration of catheter use

Summary of advantages of lasers: meta-analyses show that laser treatments comparable to TURP; in some studies, laser associated with less blood loss, transfusion, perforation, and TUR syndrome, and shorter catheterization time and hospital stay; however, laser procedures take longer and reintervention rate higher in long run; TUVP has lowest intraoperative complication rate, followed by laser procedures, then TURP and HoLEP; green light lasers have highest rates of perioperative and late complications, including dysuria, urinary retention, and infection; TUIP associated with lowest rate of dysuria; noncontact lasers and SP associated with more dysuria; procedures that do not resect tissue result in less hematuria; hematuria and incontinence related to invasiveness of procedure; sexual side effects related to removal of tissue and therefore more common after laser procedures, TURP, and surgery; studies do not support lower rate of sexual side effects after laser ablation compared with TURP; TUNA and microwave therapies least effective options

Robotic SP: approach suprapubic or retropubic; limited data; in review of 125 cases, length of stay short; 2 transfections, 1 conversion, and 1 urine leak reported; no studies have compared robotic SP to open prostatectomy or other treatments; however, comparisons of laparoscopic SP and open SP show that laparoscopic SP associated with less blood loss and CBI, shorter length of stay and duration of catheterization, and equivalent functional outcomes

Prostatic urethral lift: tacks lateral lobes toward capsule; device has nitinol capsular end, stainless steel urethral end, and intervening monofilament; used for lateral lobe obstruction; device delivered anterolaterally at 2 and 10 o’clock; 4 to 6 implants typically used; procedure guided cystoscopically; can perform under local anesthesia; provides rapid effect, good functional outcomes, and few side effects of medications; surgery indicated for patients with obstruction on cystoscopy or other complications of benign prostatic hyperplasia (BPH) such as outlet obstruction with urinary retention, stones, recurrent urinary tract infection, changes in upper tract, or persistent gross hematuria
effects; no ED or loss of antegrade ejaculation reported; procedure not recommended for men with median lobe obstruction or complete retention; consider for patients with moderate to severe symptoms who do not have large prostate, men concerned about sexual side effects, and those unhappy with medical treatment

Prostatic arterial embolization: large case series report significant 23% to 65% reductions in prostate volumes, 11% to 18% improvements in IPSS, and improved QOL and functional parameters; not associated with ED or incomplete; although procedure successful in >95% of cases, patients in trials carefully selected; reduction in prostate volume does not necessarily correlate with clinical success; in clinical trials, patients stopped α-blockers for 2 mo, which could account for treatment effect; adverse effects bladder ischemia, inguinal hernoma, diarrhea, rectal bleeding, hematuria, burning sensation, pain, and dysuria; ongoing trials comparing prostatic arterial embolization (PAE) with TURP and evaluating safety and efficacy of PAE in patients with large prostates (>90 g)

Summary: treatment modality of choice depends on surgeon; must consider size of prostate, use of anticoagulants, presence of dysuria, and desire for sexual function; no head-to-head comparisons among lasers, but 5-yr outcomes with laser treatment comparable to outcomes after TURP

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Suggested Reading


Audio Digest Urology 37:18
1. Which prostatic treatment is associated with the highest incidence of postoperative bladder neck contracture (BNC)?
   (A) Open prostatectomy   (C) Cryotherapy
   (B) Radiotherapy   (D) High-intensity focused ultrasonic treatment

2. In a study of hot-knife incision for treatment of BNC, treatment failure was associated with:
   (A) Smoking   (C) Failure to use mitomycin C
   (B) Incorrect placement of incisions   (D) Preoperative incontinence

3. Simultaneous treatment of BNC and implantation of an artificial urethral sphincter is reasonable in a patient with:
   (A) New-onset BNC and previous brachytherapy
   (B) Recurrent BNC
   (C) New-onset BNC and previous external beam radiotherapy
   (D) None of the above

4. Compared with other treatment options, transurethral needle ablation of the prostate is associated with higher rates of:
   (A) Loss of antegrade ejaculation   (C) Acute urinary retention
   (B) Bleeding   (D) Erectile dysfunction

5. Which of the following procedures should be restricted to patients with prostates weighing ≤35 g?
   (A) Treatment with laser diodes
   (B) Transurethral incision
   (C) Holmium laser enucleation (HoLEP)
   (D) Prostatic arterial embolization

6. The ______ laser preferentially targets water.
   (A) Holmium   (B) Potassium-titanyl-phosphate   (C) Lithium triboride

7. HoLEP is associated with lower risk for bleeding than transurethral resection of the prostate (TURP) or simple prostatectomy.
   (A) True   (B) False

8. Compared with TURP, laser treatments are associated with:
   1. Shorter catheterization time
   2. Shorter procedure time
   3. Shorter hospital stay
   4. Lower rate of transfusion
   5. Lower rate of reintervention
   (A) 1,2,3   (B) 2,5   (C) 1,3,4   (D) 1,2,3,4,5

9. Prostatic urethral lift can be considered for men with _______, but is not recommended for men with _______.
   (A) Severe symptoms or concerns about sexual side effects; large prostate or median lobe obstruction
   (B) Large prostate or median lobe obstruction; severe symptoms or concerns about sexual side effects

10. Prostatic arterial embolization is not associated with:
    (A) Reduction in volume of prostate
    (B) Improvement in International Prostate Symptom Score
    (C) Improvement in quality of life
    (D) Erectile dysfunction

Answers to Audio Digest Urology Volume 37, Issue 17: 1-C, 2-B, 3-C, 4-A, 5-A, 6-B, 7-A, 8-D, 9-C, 10-D