Evaluation of Endoscopic Laser Excision of Polypropylene Mesh/Sutures Following Anti-Incontinence Procedures

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Abbreviations and Acronyms

SUI = stress urinary incontinence

TVT = tension-free vaginal tape

UTI = urinary tract infection

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Purpose: We reviewed our experience with and outcome of the largest series to our knowledge of patients who underwent endoscopic laser excision of eroded polypropylene mesh or sutures as a complication of previous anti-incontinence procedures.

Materials and Methods: A total of 12 female patients underwent endoscopic laser excision of suture/mesh erosions at 1 center during a 10-year period. Primary outcome variables were the requirement of additional endoscopic or open surgery to remove mesh/sutures. Secondary outcome variables were persistence of urinary symptoms, postoperative complications, continence status and requirement of additional anti-incontinence procedures.

Results: The mean interval from previous surgery to erosion was 59 months (range 7 to 144) and the duration of presenting symptoms ranged from 3 to 84 months (mean 19). Ten patients underwent endoscopic excision of the mesh/suture with the holmium:YAG laser and 2 underwent excision with the thulium laser. Mean operative duration was 19 minutes (range 10 to 25) and followup was 65.5 months (range 6 to 134). Postoperatively 6 patients remain asymptomatic and 2 required a rectus fascial sling for recurrent stress urinary incontinence. Four patients underwent a second endoscopic excision due to minor persistence of erosion. Only 1 patient ultimately required open cystotomy to remove the eroded biomaterial. No intraoperative complications were recorded and all patients are currently asymptomatic.

Conclusions: Endoscopic laser excision is an acceptable first line approach for the management of eroded biomaterials due to its high long-term success rate and minimally invasive nature.

Key Words: urinary incontinence; intraoperative complications; endoscopy; lasers, solid-state

Stress urinary incontinence is among the top 10 most prevalent medical conditions among adult females.[1] Several minimally invasive surgical procedures for effectively managing SUI have gained widespread acceptance since the introduction of TVT® in 1996.[2] In fact, the popularity of such techniques continues to increase due to decreased morbidity, reduced inpatient stay and cure rates that now approach 95%.[3] Although TVT insertion is considered safe due to its relative ease, there are several reports that describe specific procedure related complications such as bladder perforation (2.5% to 11.7%) and mesh or suture erosion (0.6% to 5.4%).[1] Bladder perforations are typically recognized intraoperatively with cystourethroscopy, and can often be managed without additional therapy apart from prolonged

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transurethral catheterization.[4] Cases of bladder or urethral erosion are less common and are encountered almost exclusively with synthetic biomaterials. Eroded mesh may go unrecognized for several months due to the wide variety of nonspecific presenting symptoms that may lead to delays in diagnostic investigations.[5]

Initially, erosion into the bladder required open cystotomy for effective and definitive management.[6] Intuitively, less invasive endoscopic approaches with transurethral electroresection or endoscopic scissors were described subsequent to invasive open techniques.[4,7] However, recent studies have used the holmium laser as an alternative tool for excising the eroded material from the lower genitourinary tract.[5,8–10] This endoscopic technique was pioneered at our institution in 2005,[5] and has increased in popularity due to its minimal morbidity and low complication rates. The safety and efficacy of the holmium laser are reflected by the fact that 95% of its energy is absorbed after traversing 0.5 mm under water. Thus, its energy is contained superficially and conveys excellent underwater cutting properties.[5,8–10] To date, studies describing the use of laser therapy for excising eroded mesh or suture have been limited to case reports and small case series without sufficient long-term followup data.[11] To our knowledge we present the largest series of patients who underwent endoscopic laser excision of eroded polypropylene mesh or sutures as complications of previous anti-incontinence procedures. We also discuss the long-term clinical outcomes associated with this minimally invasive technique and compare our results with those of other published studies.

MATERIALS AND METHODS

Patient Demographics

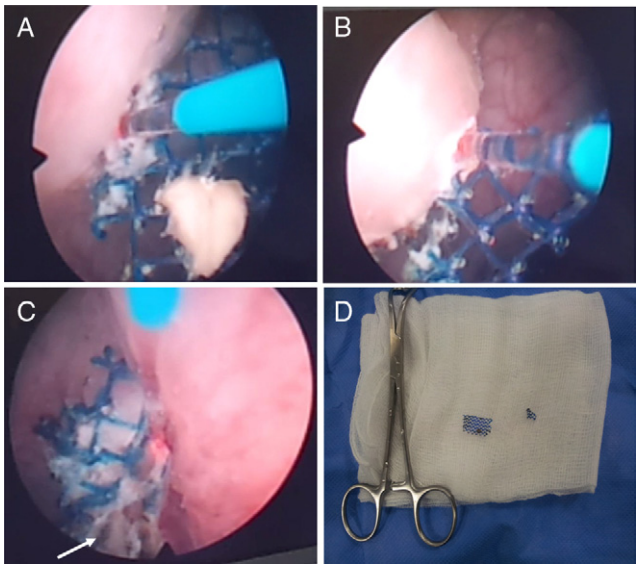
Patients with intravesical or urethral exposure to polypropylene mesh and/or sutures after anti-incontinence procedures were followed during a 10-year period at our institution. Their records were retrieved and data extracted. The relevant information gathered included age at presentation and past urological/gynecological surgical procedures. The patients' presenting symptoms, their duration and preoperative diagnostic investigations were also recorded. In addition, the time between prior urological/gynecological procedure and endoscopic laser excision was documented.

Technique of Endoscopic Laser Excision

All patients were in the lithotomy position under general anesthesia or sedation and given perioperative intravenous gentamicin (5 mg/kg body weight). All procedures were performed as an ambulatory procedure by 1 surgeon (HDF). Cystourethroscopy was performed and the laser fiber advanced through the working channel of the endoscope, usually through a 6Fr ureteral catheter. Initially, all calcified material was fragmented off the polypropylene with the laser in direct contact with the encrusted material (part *A* of figure). The mesh fibers were then vaporized with the laser deep to the mucosal surface (part *B* of figure). The resected specimen was then extracted endoscopically. In technically challenging cases the edges of the eroded mesh or suture were grasped with a stent grasper (placed alongside the cystoscope) to stabilize the mesh/suture by applying tension before deploying the laser (part *C* of figure). All patients were catheterized during the immediate postoperative period for 1 to 3 days and received oral ofloxacin for 72 hours. The relevant intraoperative data recorded included location of the exposed/eroded material, the number of mesh exposures, the type of laser fiber deployed, the laser output settings, the duration of the procedure and any procedure related complications.

Postoperative Followup

All patients underwent flexible cystourethroscopy at 3-month followup. Patients were then followed on an outpatient basis every 6 months thereafter with an interview, physical examination and urinalysis. Any patient who presented with recurrence of symptoms during followup underwent urodynamics and repeat cystourethroscopy. The primary outcome variables measured were the requirement of additional endoscopic or open surgery to remove mesh/sutures. Secondary outcome variables were persistence of urinary symptoms, postoperative complications, continence status and the requirement of additional anti-incontinence procedures.



Intraoperative images demonstrating surgical technique for endoscopic laser excision of eroded TVT. Calcified area on mesh was initially fragmented and polypropylene vaporized rapidly with laser fiber (*A*). Resection deep to bladder mucosal surface was then performed (*B*). For technically challenging cases edges of eroded mesh or suture were grasped with stent grasper (*C*, arrow) to stabilize mesh by applying tension before deploying laser. Resected specimens were then extracted endoscopically (*D*).