



Original article

Long-term efficacy of fulguration of trigonitis for recurrent urinary tract infections in women



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ABSTRACT

Objective: Women with a longstanding history of recurrent urinary tract infections (RUTIs) represent a challenging population because of gradual development of antibiotic resistance and frequent antibiotic allergies. We report on the long-term results of women with RUTIs and trigonitis who were treated using endoscopic fulguration and were prospectively followed.

Materials and methods: Following institutional review board approval, charts of non-neurogenic women with RUTIs (defined as ≥ 3 UTIs/y), no voiding dysfunction or incontinence, and normal upper tracts by imaging, who underwent cystoscopy with fulguration of trigonitis (CFT) under anesthesia with 1 year minimum follow up after CFT, were reviewed. Trigonitis was defined as a condition of inflammation of the trigone region of the bladder. The primary outcome was complete resolution of trigonitis based on follow-up office cystoscopy 6 months after CFT. The secondary outcome was the total number of antibiotic courses (AC) prescribed for UTI-related symptoms and/or positive urine cultures (PUC) following CFT. We hypothesized that patients with complete trigonitis resolution after CFT fared best.

Results: From 2004 to 2008, 33 women met the inclusion criteria with a mean follow up of 48 ± 19 months (range, 14–82 months). Resolution of trigonitis at 6 months was noted in 25 (76%) patients. This group averaged 0.51 ± 0.5 total AC and/or PUC/y compared with 2.03 ± 1.1 total AC and/or PUC/y for women with persistent trigonitis following CFT ($p = 0.006$).

Conclusion: Patients with resolved trigonitis at 6 months after CFT did best; however, both groups benefited from the procedure over time.

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1. Introduction

Women with recurrent urinary tract infections (RUTIs) are increasingly frequent and difficult to treat, in part because of drug allergies, side effects, and resistant strains.^{1–3} There have been advances in the understanding of the pathogenesis of UTIs in recent years that may explain the difficulty in treating RUTIs. In addition to retrograde ascent of bacteria up the urethra,⁴ studies in animal models have indicated that other mechanisms may be at play, including formation of quiescent intracellular reservoirs.⁵ Trigonitis is a condition of inflammation of the trigone region of the bladder diagnosed visually during cystoscopy. We hypothesized that in women with RUTIs and trigonitis, the trigone may be the reservoir site for UTI reinfection. Therefore, starting in 2004,

we chose to eradicate these sites using a minimally invasive outpatient technique consisting of cystoscopy with fulguration of trigonitis (CFT). The feasibility of such an approach has already been tested by Costantini et al⁶ using laser therapy, albeit in a very different subset of women with irritative symptoms and negative urine cultures. As time progressed, additional studies were performed in association with our microbiology unit, including trigonal biopsies to isolate bacterial species⁷ and test their ability to form a biofilm. This was made possible by the fact that CFT was done under general anesthesia and the site of biopsy was treated as part of the fulguration procedure. Furthermore, since 2007, CFT has been performed with other procedures such as urethral dilation, anterior compartment prolapse repair, or during bulking agent injections, and those patients have been followed over time in an institutional review board-approved long-term prospective study.

In this report, we were interested to find out if the initial group of women with RUTIs treated with only CFT (and no additional

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procedures) benefited in the long term, implying that the eradication of these presumed chronic bacterial reservoir sites from the trigone had a durable impact. Therefore, the aim of this study was to review the long-term outcome of women with RUTIs treated with CFT alone, including the rate of UTI recurrences following CFT.

2. Materials and methods

Medical charts of women who underwent CFT for RUTIs were reviewed from a prospectively maintained, institutional review board-approved, database. Included in the study were non-neurogenic women with RUTIs who had failed multiple courses of antibiotic therapy, had normal upper tract imaging studies, had at least 1 year of follow up, and underwent an office cystoscopy at 6 months after their CFT procedure. RUTI was defined as three or more UTIs/y. Exclusion criteria included neurogenic bladder, incontinence or voiding dysfunction requiring additional procedures at the time of CFT, and uncontrolled diabetes. Men were excluded due to small sample size. Also, patients who did not undergo follow-up office cystoscopy at 6 months, or patients with complicating urological factors that predisposed them to RUTIs such as chronic intermittent catheterization or indwelling catheters, were excluded. Demographic information, clinical examination, laboratory data including urinalysis and urine culture results, pre- and postoperative cystoscopic findings, imaging studies, and subsequent treatment data were collected from an electronic medical record (EPIC) and reviewed by a neutral investigator not involved with patient care.

There is no single evidence-based, accepted definition of RUTI to date; however, most literature defines RUTIs as three episodes of UTIs in the past 12 months or two episodes in the past 6 months.^{1,8} For our study, RUTI was defined as three or more episodes of uncomplicated (symptomatic) UTIs/y, with at least one documented positive culture in the past year. Trigonitis was defined as a chronic mucosal inflammation of the trigone region (not pseudomembranous trigonitis) or squamous metaplasia of the trigone,⁹ and was diagnosed during flexible urethroscopy. Urethroscopy consisted of a methodical inspection of the urethra for areas of urethritis and bladder neck polyps along with the trigone, bladder, and bladder neck (including retroflexion). Fig. 1 provides a typical example of trigonitis with pus pockets, bullous lesions, and submucosal calcifications. All endoscopic procedures were documented with pictures and performed by the same experienced urologist and/or his trained physician assistants. Women with

normal imaging of their upper urinary tracts, trigonitis findings, and RUTIs refractory to multiple courses of antibiotic therapy underwent a CFT procedure. However, women with incidental trigonitis findings on cystoscopy, but no history of RUTI were not included in this study.

CFT was performed on an outpatient basis under anesthesia using a 17.5-French female urethroscope and a fine-tip Bugbee electrode on a low setting of 20 to cauterize all inflammatory areas involving the trigone, or any adjacent inflammatory lesions that have spread beyond the margins of the trigone (Fig. 2). All procedures were performed by the same surgeon. Patients were discharged home on the day of surgery without a urethral catheter.

At or near 6 months after CFT, patients routinely underwent office cystoscopy to assess trigonal healing. This procedure was done after documentation of a negative urinalysis. Therefore, all studied patients had no ongoing infection at the time of this follow-up office cystoscopy. A healed trigone has complete resolution of trigonitis with no new lesions over the confine of the trigone. This follow-up office procedure was performed by a variety of clinicians (fellow trainees, physician assistants, or urologists). Pictures obtained for documentation were reviewed and compared with pre-operative and intraoperative CFT photographs to objectively document persistence or resolution of trigonitis. Patients were monitored long-term for repeat episodes of UTIs as documented by positive urine cultures (PUC), and/or any antibiotic courses (AC) prescribed for lower urinary tract symptoms suggestive of UTI, whether accompanied by a urine culture or not. The independent reviewer tallied these two outcome measures (PUC and AC) from EPIC without the knowledge of the cystoscopic findings at 6 months after CFT to avoid interpretation bias.

The primary outcome measure was complete resolution of trigonitis on follow-up office cystoscopy (Fig. 2), with photographic documentation preserved in EPIC. Secondary outcomes, determined through querying EPIC, were the total number of AC prescribed for UTI-related symptoms and/or PUC in the years following CFT. Not all women with PUC were treated and vice versa, not all women who received AC obtained a urine culture before treatment. Therefore, one or both of these events (AC and/or PUC) was chosen to study the course of RUTIs after CFT. Because these patients experienced ≥ 3 UTIs/y pre CFT, patients with zero total AC and/or PUC over the follow-up period after CFT were defined as “cured” of RUTI. Those who averaged between 0 UTIs/y and 2 UTIs/y, and more than two AC and/or PUC per year were defined as “improved” and “no improvement”, respectively. Of note, in this study, it was

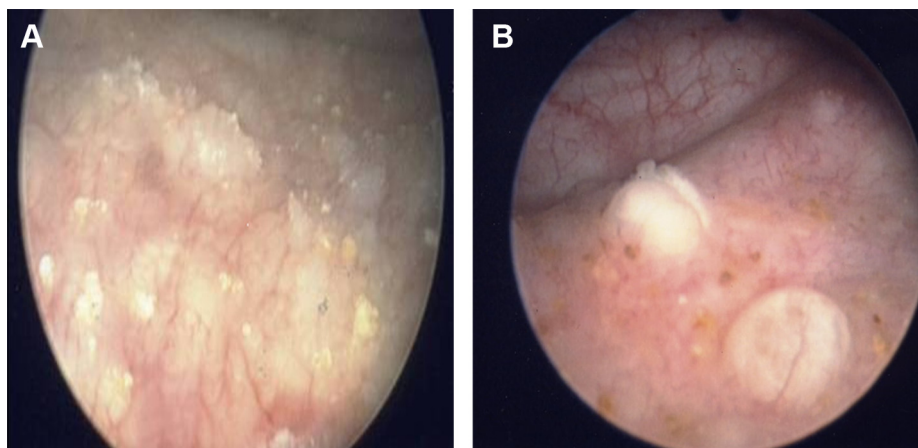


Fig. 1. (A) Flexible cystoscopy performed before fulguration reveals characteristic trigonitis with bullous edema and submucosal calcifications. (B) A closer view of trigonal inflammation shows two large mucosal pus containing pockets.

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