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Patient Care

Management of Ureteral Stent Discomfort in Contemporary Urology Practice

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Abstract

Introduction: Ureteral stents are used ubiquitously in routine urological practice, and despite their long-standing clinical use, stent associated urinary symptoms and pain continue to be of significant concern for patients. Therefore, we reviewed contemporary randomized controlled trials and meta-analyses investigating the alleviation of urinary stent symptoms.

Methods: A thorough search of randomized controlled trials and meta-analyses of pharmacotherapeutic means of alleviating urinary stent symptoms was conducted and reviewed. Efforts were made to evaluate the quality of studies based on methodology and tools used to assess symptoms.

Results: Our search resulted in 16 published reports that fit our criteria. Of these randomized controlled trials 13 involved oral agents while 3 studies evaluated intravesical therapies. Specific pharmacological classes that were assessed included nonsteroidal anti-inflammatory drugs, anesthetics, alpha-antagonists, anticholinergics and paralytics. The majority of randomized controlled trials evaluated the role of alpha-antagonists, which ultimately produced the most compelling evidence of a reduction in stent associated lower urinary tract symptoms and pain. The randomized controlled trials involving anticholinergic agents have produced inconsistent results.

Conclusions: Stent associated symptoms are a significant source of dissatisfaction for patients undergoing urological procedures. Numerous agents have been studied and uroselective alpha-antagonists have most consistently demonstrated a significant reduction in symptoms.

Key Words: stents, signs and symptoms, questionnaires, adrenergic alpha-antagonists, cholinergic antagonists

Abbreviations and Acronyms

COX = cyclooxygenase

ER = extended release

I-PSS = International Prostate Symptom Score

LUTS = lower urinary tract symptoms

QOL = quality of life

RCT = randomized, controlled trial

URS = ureteroscopy

USSQ = Universal Stent Symptom Questionnaire

VAPS = Visual Analogue Pain Score

Ureteral stents are part of most urologists' armamentarium, with the primary function of reestablishing or maintaining patency of the ureter in conditions of obstruction or injury, or as a prophylactic measure after endoscopic procedures involving the ureter, or after surgical repair of the ureter. Despite decades of clinical use and modifications of stents, stent associated symptoms are common in patients after insertion and continue to be a challenge to manage. Overall quality of life is impaired in 45% to 80% of patients with indwelling ureteral stents.[1]

As we transition into an era of medicine that focuses on patient experience and QOL, it is critical to use the available evidence to optimize comfort and satisfaction in patients who require a stent. To date, various methods have been investigated and used in an effort to alleviate these symptoms, ranging from pharmacotherapy to new stent materials and novel concepts such as drug eluting stents. A comprehensive discussion of engineering and novel stent design studies is beyond the scope of this study. Rather, the purpose of this review is to discuss the available evidence on clinically relevant pharmacological agents used to mitigate stent symptoms.

Methods

A MEDLINE® search was performed using the terms stent, ureteral stent, symptoms, stent related symptoms, USSQ,

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alpha-blocker, anticholinergic, analgesic and management to identify studies that assessed stent related symptoms and their management. Studies were filtered to include only RCTs or meta-analyses, and subsequently categorized as oral and intravesical therapies for the reduction of stent related symptoms. Efforts were made to include only those studies that used the validated USSQ.[1] However, based on the overall study design allowances were made to include other questionnaire based assessments.

Results

Our search revealed several RCTs evaluating the interventions aimed at reducing stent related symptoms. Studies were categorized into pharmacological class, and further into oral and intravesical therapies. Fifteen well designed studies fitting our inclusion criteria were identified and reviewed, and were divided into 12 RCTs on oral pharmacotherapy and 3 on intravesical therapies. Most of the studies used the USSQ to assess symptoms and the table highlights the key oral therapies.[2–11]

Oral Pharmacological Agents

Analgesics. Analgesics are often provided routinely after most procedures involving stent placement. There are currently no RCTs to our knowledge that strictly assessed analgesic use for the relief of stent symptoms. These medications are generally provided to alleviate postoperative global pain and discomfort. However, it has been shown that selective and nonselective COX inhibitors could decrease contractility in porcine and human ureteral tissue.[12] Therefore, Tadros et al conducted a randomized controlled trial to assess if administering a single dose of a nonsteroidal anti-inflammatory drug before stent removal could reduce severe pain after stent removal.[13] Accordingly, in this novel study a single dose of a COX-2 inhibitor was given before stent removal. None of the patients in the treatment arm had severe pain, and this group also demonstrated decreased narcotic use or additional hospital visits. The authors concluded that prior nonsteroidal anti-inflammatory drug use not only substituted for analgesic use in the immediate setting, but also prevented the development of severe pain afterward. Note that this approach was for mitigation of pain after stent removal and not for symptom control while the stent was in situ. Furthermore, the potential toxicities and side effects, including nephrotoxicity, gastrointestinal irritation and cardiovascular risks, of using COX-2 inhibitors for this purpose, should be weighed against the expected benefits.

Alpha-antagonists. The majority of studies identified evaluated the use of alpha-antagonists, particularly uroselective agents. Deliveliotis et al conducted a double-blind RCT in which 100 patients were randomized to 10 mg alfuzosin vs placebo and symptoms were assessed using the USSQ.[2] Interestingly the stents were inserted in these patients while they were under local anesthesia as initial conservative management of obstructing ureteral stones. This study reported significantly decreased LUTS, pain, general health and sexual function in the treatment group vs the control group.

Damiano et al subsequently conducted a RCT with 75 patients who received 0.4 mg tamsulosin vs no alpha-blocker who underwent stent placement after URS.[3] Patient symptoms were then assessed using the USSQ and results favored the alpha-blocker group with significant improvement. Unfortunately this study was weakened by the design in that the subjects and clinicians were aware of the treatment received.

Table.

References	No.	Intervention	Questionnaire	Double-Blind?	Conclusions
Deliveliotis et al[2]	100	Alfuzosin vs placebo	USSQ	Yes	Decreased LUTS, pain, general health + sexual function in treatment group
Damiano et al[3]	75	Tamsulosin vs placebo	USSQ	No	Results favored alpha-blocker group with significant improvement
Beddingfield et al[4]	66	Alfuzosin vs placebo	USSQ	Yes	Less overall pain + urinary symptoms with alfuzosin
Wang et al[5]	154	Tamsulosin vs placebo	USSQ + I-PSS	Yes	Reduction in urinary symptom scores in tamsulosin group vs placebo
Dellis et al[7]	150	Tamsulosin vs alfuzosin vs placebo	USSQ	Yes	Improvement in pain + general health with both alpha-blockers
Norris et al[8]	60	Oxybutynin vs phenazopyridine vs placebo	USSQ	Yes	No differences in bother or analgesic use between groups
Park et al[6]	52	Tolterodine ER vs alfuzosin vs placebo	USSQ		Both treatment groups better than placebo, no differences between anticholinergics + alpha-blockers
Lee et al[9]	140	Solifenacin vs control group	USSQ		Solifenacin group better with respect to LUTS + urethral/flank pain
Shalaby et al[10]	327	Placebo vs tamsulosin vs solifenacin vs combination	I-PSS, OAB-q + VAPS	No	Combination therapy more effective than either agent alone
Tehranchi et al[11]	104	Placebo vs terazosin vs tolterodine vs both	I-PSS + VAPS	Yes	QOL + suprapubic pain improved in combination therapy compared to either agent alone

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