นิพนธ์ต้นฉบับ

ผลของความยาวส่วนเกินของสายระบายหลอดไตชนิด Double J ต่ออาการทางปัสสาวะและความเจ็บปวดภายหลังการใส่สาย

เชาวน์วัศ พิมพ์รัตน์ พ.บ.*

ธีระพล อมรเวชสุกิจ พ.บ.*

บทคัดย่อ

วัตถุประสงค์ของการวิจัย เพื่อศึกษาความสัมพันธ์ของความยาวส่วนเกินของ DJ stent จากความยาวหลอดไตทางภาพรังสีต่ออาการทางปัสสาวะและความเจ็บปวดในผู้ป่วยที่ใส่ DJ stent

วิธีการดำเนินงานวิจัย ศึกษาแบบก้าวหน้า (prospective study) จากผู้ป่วย 41 รายที่ได้รับการใส่สายระบายหลอดไตชนิด DJ stent ขนาด 6 French ภายหลังการทำหัตถการเพื่อรักษานิ่วทางเดินปัสสาวะ โดยผู้ป่วยเคยได้รับการถ่ายภาพรังสีชนิด intravenous pyelography หรือ retrograde pyelography มาก่อนการได้รับการทำหัตถการ หลังจากนั้นประเมินผู้ป่วยด้วยแบบสอบถามเกี่ยวกับอาการทางปัสสาวะและคะแนนความเจ็บปวดที่ 2 สัปดาห์ ภายหลังได้รับการใส่ DJ stent

ผลการศึกษา คะแนนอาการทางปัสสาวะมีตั้งแต่ 6 ถึง 27 คะแนน โดยมีค่าเฉลี่ย 15.1 คะแนน (SD 4.4) ส่วนเกินของ DJ stent มีความสัมพันธ์เชิงบวกกับอาการทางปัสสาวะ โดยมีค่า Spearman r ที่ 0.506 (p=0.001) ค่าความยาวส่วนเกินของ DJ stent ที่มากกว่า 4.3 เซนติเมตร ปรากฏอาการทางปัสสาวะที่มีนัยสำคัญ และส่วนเกินของ DJ stent มีความสัมพันธ์เชิงบวกกับคะแนนความเจ็บปวดโดยมีค่า Sperman r ที่ 0.353 (p=0.023)

สรุป ความยาวส่วนเกินของ DJ stent เทียบจากการวัดความยาวหลอดไตจากภาพรังสีมีความสัมพันธ์เชิงบวกกับอาการทางปัสสาวะ โดยค่าที่มากกว่า 4.3 เซนติเมตรจะมีอาการทางปัสสาวะที่มีนัยสำคัญ การวัดความยาวของหลอดไตจากภาพรังสีอาจมีบทบาทในการพิจารณาการเลือกความยาวของ DJ stent ที่เหมาะสมเพื่อช่วยลด stent-related symptoms ได้

Keyword: Double J stent, Stent-related symtoms

** สาขาศัลยศาสตร์ยูโรวิทยา ภาควิชาศัลยศาสตร์ คณะแพทยศาสตร์ศิริราชพยาบาล มหาวิทยาลัยมหิดล*

The effect of excess length of double J stent on stent related symptoms.

Chaowat Pimratana, MD*

Teerapon Amornvesukit, MD*

Abstract

Objective: To evaluate the relation between the excess length of double J stent on urinary symptoms and pain in patients who indwelling double J stent.

Method: A total of 41 patients, who had opted for management with insertion of a 6 F double J ureteral stent after stone management and undergone intravenous pyelography or retrograde pyelography before procedure, were prospectively observed. Tolerance to the indwelling double J stent was assessed using a urinary symptom questionnaire and pain score at 2 weeks after placement.

Results: The urinary symptoms varied from 6 to 27 with mean of 15.1 (SD=4.4) and median of 16. Plot of excess length of double J stent against urinary symptoms revealed a positive correlation with Spearman r of 0.506 (p=0.001). The mean excess length of double J stent which causing significant symptom score was 4.3 cm. The excess length of double J stent against pain score showed a positive correlation with Spearman r of 0.353 (p=0.023).

Conclusions: The excess length of double J stent, measured from imaging ureteral length, was positive correlation to urinary symptoms. The urinary symptoms were significant when excess length of double J stent more than 4.3 cm. The ureteral length from imaging may be helpful for stent selection to reduce stent related symptoms.

Keyword: Double J stent, Stent-related symptoms

*Division of Urology, Department of Surgery, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand

Introduction

Ureteral stents have been used in urology for over 25 years[1] and often inserted prophylactically if patients are at risk for urinary obstruction following a procedure. Over 3,000 double J stents had been used per year in Thailand and over 400 double J stents per year in Siriraj Hospital. Clinical symptoms associated with stents include dysuria, frequency, flank pain, and hematuria are called stent-related symptoms. The pathophysiology of stent-related symptoms remains unknown. Flank pain is thought to be due to reflux, especially during micturition. Bladder symptoms for example dysuria and frequency are theorized to be mucosal irritation of nerves located in the submucosa concentrated in the bladder trigone[2].

Stent-related symptom is a major clinical problem for patients who indwelling ureteral stents. Joshi et al demonstrated that 76% of patients had urinary symptoms, 70% had pain severe enough to require significant analgesics, 42% had to reduce their activities[3,4,5]. Currently studied, alpha 1-blockers can minimize stent-related symptoms[6]. The risk factors of stent-related symptoms were varieties such as material, diameter, position and length of stents.

We hypothesize that the excess length of double J stent measured from imaging radiography might influence the stent-related symptoms. By the literature reviews, the proper stent length and position can reduce stent-related symptoms. There are many armamentariums described to determine the ureteral length but poor reliability such as direct measurement of ureter with guidewire, endocatheter ruler or a formula base on the patient's height[7]. Shah and Kulkarni found patient height did not correlate with ureteral length[2]. A pre-procedure imaging e.g., intravenous pyelography or retrograde pyelography is a method to correct the ureteral length. These studies were described in Western patients but lack in Asian. Because Asian and Western patients are difference in body size, our study will define a suitable armamentarium to determine the ureteral length of Thai patients for ureteral stent selection. Currently there is no published literature studied in ureteral length from imaging to correct the proper length of ureteral stent.

Method

Forty-one patients (41 ureters) were studied. There were 20 men and 21 women, with an age range of 25-76 years, who underwent unilateral insertion of a 6 F double J ureteral stent after stone treatment procedure (shockwave lithotripsy, ureteroscopy, percutaneous nephrolithotomy) at Division of Urology, Department of Surgery, Siriraj hospital, Mahidol University. All of them underwent intravenous pyelography or retrograde pyelography before procedure. The exclusion criteria included patients with neurogenic bladder, urinary tract infection, previous bladder or prostate surgery, previous pelvic irradiation, history of benign prostatic hyperplasia that international prostatic symptom score (IPSS) more than 8, history of prostate cancer, bladder cancer, prostatitis, stricture urethra or other bladder outlet obstruction.

All patients were inserted with the same type of double J stent (Hydro Plus Coating ureteral stent size 6 F and variable length 22-30 cm). The length of double J stent (measured from the shortest distance of double J stent) is 25 cm. The ureteral length was measured in computer radiographic with 100% proportion from ureteropelvic junction to ureterovesical junction. The excess length of double J stent was recorded by subtracting the stent length from ureteral length. To assess the stent-related symptoms of urinary symptoms and kidney pain, patients had to complete a self-administered questionnaire that

applied questions from Thai version IPSS (frequency, nocturia, urgency, sense of residual urine, and quality of life) and pain score (range 0-10) at 2 weeks after stent placement. We define urinary symptom score more than 16 is significant. The kidney pain was evaluated at 2 weeks after minimally invasive procedure to reduce confounding factors from postoperative pain. Statistical analysis for correlation was performed with Spearman correlation in SPSS version 12.

Results

As shown in Table 1, the mean age of patients was 45.3 years (25-76), 20 male, 21 female. The ureteral length measured from imaging varied from 18 to 26 cm with mean of 21.5 cm.

Table 1 *Patient characteristics*

Patient characteristics	
Patients (n)	41
Mean Age (years)	45.3 (25-76)
Gender	
Male	20
Female	21
Ureteral length (cm)	21.5 (18-26)

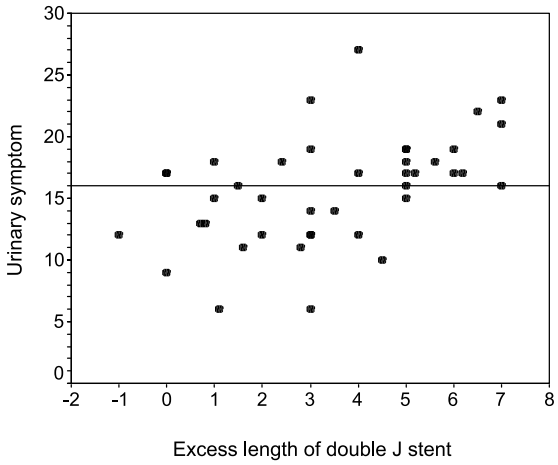

Figure 1 *Correlation between excess length of double J stent and urinary symptoms.*

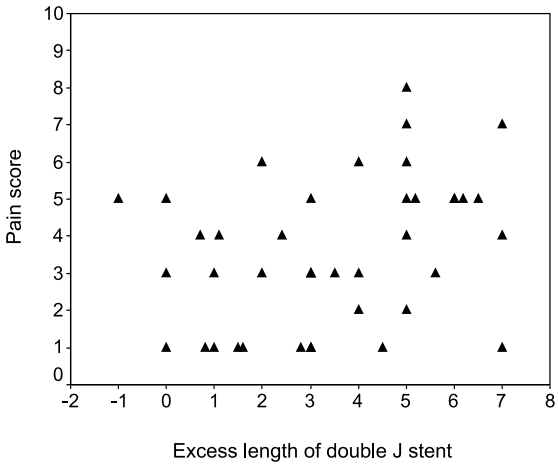

Figure 2 *Correlation between excess length of double J stent and urinary symptoms.*

Table 2 *Excess length of double J stent which causing significant urinary symptom score.*

Urinary symptoms score	n	Excess length of double J stent (cm)		
		Mean	SD	Min, Max
		2.6	1.9	-1, 7
≤16	21	20	4.3	2.2
>16	20	0, 7		
Total	41	3.4	2.2	-1,7

The urinary symptom scores varied from 6 to 27 with mean of 15.7 (SD=4.4) and median of 16. Plot of excess length of double J stent against urinary symptoms (Figure 1) revealed a positive correlation with Spearman r of 0.506 (p=0.001). The mean excess length of double J stent which cause significant urinary symptom scores (>16) was 4.3 cm (p=0.006), while the mean excess length that cause less significant urinary symptom scores was 2.8 cm. (Table 2)

Stent-related pain was identified in pain score, the plot of excess length of double J stent against pain score (Figure 2) shown a positive correlation with Spearman r of 0.353 (p=0.023).

Comment

Placement of indwelling ureteral stents has become routine in the management of a variety of urinary tract diseases. Stents prevent upper urinary tract obstruction and divert urine for faster tissue healing and for dilated ureter[8]. However, the universal stent is not yet available. Many patients have significant stent-related morbidity, and additional procedure to remove the stent is usually needed[3-5]. Rane et al. examined whether the position and length of indwelling stent played any role in causing irritative voiding symptoms or loin pain. Proper stent length and placement appropriate to each patient's ureteral length is necessary to improve comfort[2].

Determining patient's ureteral length is not an easy task. Using body height as a surrogate measure of ureteral length is one common method. Pilcher and Patel found that ureteral length correlated by patient's height is more accurate than direct endoluminal measurement. They recommended stent length of 22 cm for patient shorter than 178 cm, 24 cm for patients between 178 and 193 cm, or 26 cm stents for patients taller than 193 cm.[2,7] However Shah and Kulkarni revealed the patient's height did not correlate well with ureteral length. Breau and Norman also found low predictive value in patient's height to correlate with ureteral length. These authors recommend direct measurement of ureteral length on a standard x-ray from the ureterovesical junction to ureteropelvic junction is a more accurate measurement.[2] Previously, the data of ureteral length of Thai patients for clinical practice had not been studied.

Joshi et al.[3-5] were the first to develop and assess the ureteral stent symptom Questionnaire (USSQ). However we applied the international prostatic symptoms score (IPSS), that has undergone linguistic validation in Thai language for determine urinary symptoms and the pain score for determine stent related pain. The low positive correlation in pain may due to the varying pain from stent such as flank pain during micturition, perineal pain, and pelvic pain.

Excess length of double J stent from imaging ureteral length in our study is positive correlation to urinary symptoms and pain. Urinary symptoms may cause by increase mucosal irritation of bladder trigone due to excess portion of double J stent. Flank pain may cause by increase of reflux during micturition when the stent is not proper in length and increase bladder contractility.

Currently, the exact mechanism of stent related symptoms remains unknown, and there is no perfect universal ureteral stent for individual patient. Our study supports the stent length is an influence of stent related symptoms. The most accurate method of determining ureteral, and hence stent, length remain controversial. The application from this study is the important of choosing the correct stent length to reduce stent-related symptoms.

Conclusion

The excess length of double J stent, measured from imaging ureteral length, was positive correlation to urinary symptoms. The urinary symptoms were significant (>16) when excess length of double J stent more than 4.3 cm.

Proper stent length to each patient's ureteral length is necessary to decrease stent-related symptoms. The ureteral length measured from imaging radiography may be helpful for stent selection to reduce stent related symptoms.

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