

# ORIGINAL ARTICLES

## Endourology

### Bilateral Same-Session Ureteroscopy: Its Efficacy and Safety for Diagnosis and Treatment

MOHAMMADREZA DARABI\*, MALIHEH KESHVARI

*Department of Urology, Imam Reza Hospital, Mashhad University of Medical Sciences, Mashhad, Iran*

#### ABSTRACT

**Purpose:** To report the results of bilateral same-session ureteroscopy in patients with bilateral pathologies in urinary system.

**Materials and Methods:** From among nearly 3000 patients who had undergone diagnostic or therapeutic ureteroscopy in our center, 23 (13 females and 10 males) were treated with bilateral same-session ureteroscopy. Pathologies included bilateral ureteral stone in 19, hematuria of unknown etiology in 3, and bilateral obstructive uropathy in 1. Hospital and follow-up records of the patients were reviewed in this study.

**Results:** Of 19 patients with bilateral ureteral stone, 11 had anuria and increased serum creatinine. Ureteroscopy was successful in 9, and the stones were fragmented. Ureteroscopy insertion was not successful in 1, and in 1 another, upper ureteral stone was pushed into the Kidney. Six patients had normal urine output and normal serum creatinine. In 5 of them, ureteroscopy was done and the stones were fragmented, but due to ureteral stricture, ureteroscopy was impossible in 1. In 2 patients with oliguria and increased serum creatinine, bilateral ureteral stones were extracted successfully. Of 3 patients with hematuria of unknown origin, 2 had normal ureteroscopy, and 1 had a small non-opaque stone that was extracted successfully. In 1 patient with obstructive uropathy and the diagnosis of obstructive megaureter, bilateral ureteroscopy was done and bilateral ureteral stents were placed. Finally, from 23 patients, 21 had successful bilateral same-session ureteroscopy. Postoperative complications included pyrogenic infection in 2 and gross hematuria in 4, all of which were resolved with medical treatment.

**Conclusion:** Bilateral same-session ureteroscopy is an appropriate therapeutic and diagnostic option, with its own specific indications. It can reduce hospital stay, prevent multiple anesthetics, and alleviate the costs. We recommend this approach in patients with bilateral ureteral pathologies, provided that they are amenable to ureteroscopy.

**KEY WORDS:** urolithiasis, hematuria, bilateral ureteroscopy, obstructive uropathy

*Received December 2004*

*Accepted March 2005*

*\*Corresponding author: School of Medicine,  
Mashhad University of Medical Sciences,  
Mashhad, Iran. Tel: ++98 511 843 0734*

## Introduction

Endoscopic procedures on ureter were first done by two distinguished urologists; in 1912, Yang passed a rigid cystoscope into ureter in a patient with posterior urethral valve.<sup>(1,2)</sup> In 1964, Marshal passed a 3-mm fiberscope into distal ureter to observe a distal ureteral stone.<sup>(2)</sup> Gradually, with technical advancements, more sophisticated flexible and rigid ureteroscopes were introduced. Today, ureteroscopy, as an ideal approach for a series of diagnostic and therapeutic measures, is one of the daily urologists' practices, and it accounts for great achievements in ureteral surgeries.<sup>(2,3)</sup> Bilateral same-session ureteroscopy can reduce hospital stay and prevent multiple surgical procedures and anesthesia, and also its complications in patients with bilateral ureteral pathologies are minimized, provided that the surgeon has enough experience in endoscopic procedures. In this study, we report the results of bilateral same-session ureteroscopy in patients with bilateral pathologies.

## Materials and Methods

From among nearly 3000 patients who had undergone ureteroscopy or transureteral lithotripsy (TUL) at our center, between September 1995 and September 2002, 23 (13 females and 10 males) were treated with bilateral same-session ureteroscopy. Their age range was 4 to 78 years. Pathologies included bilateral ureteral stone in 19, hematuria of unknown etiology in 3, and bilateral obstructive uropathy in 1. Symptoms and signs in patients with bilateral ureteral stones were anuria with increased blood urea nitrogen (BUN) and creatinine in 11 patients (creatinine range 4.2 mg/dL to 18 mg/dL), oliguria with slightly increased BUN and serum creatinine in 2 patients, and normal urine output with normal serum BUN and creatinine in 6. Patients with hematuria complained only of periodical flank pain in addition to microscopic hematuria. The patient with obstructive uropathy had recurrent urinary infections, growth disorder, and impaired serum creatinine and BUN.

All patients with increased creatinine and BUN, and anuria or oliguria were initially evaluated with ultrasonography and KUB. In patients with normal serum creatinine and urine output, ultrasonography, KUB and/or intravenous urography (IVU) were done. Patients with

hematuria were evaluated with ultrasonography, IVU, urinalysis, and urine culture. In one of them CT scan was also done. The patient with bilateral obstructive uropathy underwent ultrasonography, VCUG and IVU. Laboratory evaluations, consisting of urine analysis, urine culture, biochemistry, and hematology were taken either during hospitalization or afterwards.

**Therapeutic Measure.** All of the patients with ureteral stone underwent bilateral same-session ureteroscopy and TUL. All the patients were started on intravenous cephalothin 1gr. Under general anesthesia, first, cystoscopy was done in lithotomy position. Thereafter, a 0.038-inch floppy tip guidewire was inserted into the ureter and then with a 8 F Wolf or 10.5 F Storz ureteroscope, ureteroscopy was done. In the presence of stone, lithotripsy was performed. In patients with hematuria, thorough evaluation of ureter was done with ureteroscope, in order to detect the cause of hematuria, tumor, or any other potential pathology. In the patient with bilateral obstructive uropathy, due to severe tortuoses of ureters, double J ureteral stents were placed with ureteroscope.

## Results

Of 11 (47.8%) patients with bilateral ureteral stone, anuria, and increased serum creatinine and BUN, 9 (39.1%) had successful ureteroscopy and stone fragmentation. Bilateral ureteroscopy was impossible in 1 patient and the upper ureteral stone was pushed into renal pelvis in 1. Ureteroscopy was successful in 2 patients with oliguria and increased serum creatinine and BUN. In 6 (26%) patients with normal urine output and normal serum creatinine and BUN level, bilateral same-session ureteroscopy was done successfully in 5 (21.7%), and in 1 patient, due to ureteral stricture, ureteroscopy was impossible in one side. Overall, there were 38 ureters (in 19 patients, 82.6%) with ureteral stone, in 35 of which ureteroscopy was successful (bilateral in 16 patients and unilateral in 3 patients, 76%). In patients with anuria, after TUL, ureteral catheter was inserted bilaterally (fig. 1,2). Postobstructive diuresis was observed in a volume range of 6 to 19 liters in the first 24 hours and serum creatinine level returned back to nearly normal level within 4 to 12 days. In patients with oliguria and increased serum creatinine and BUN, after successful lithotripsy, bilateral ureteral catheterization was done.

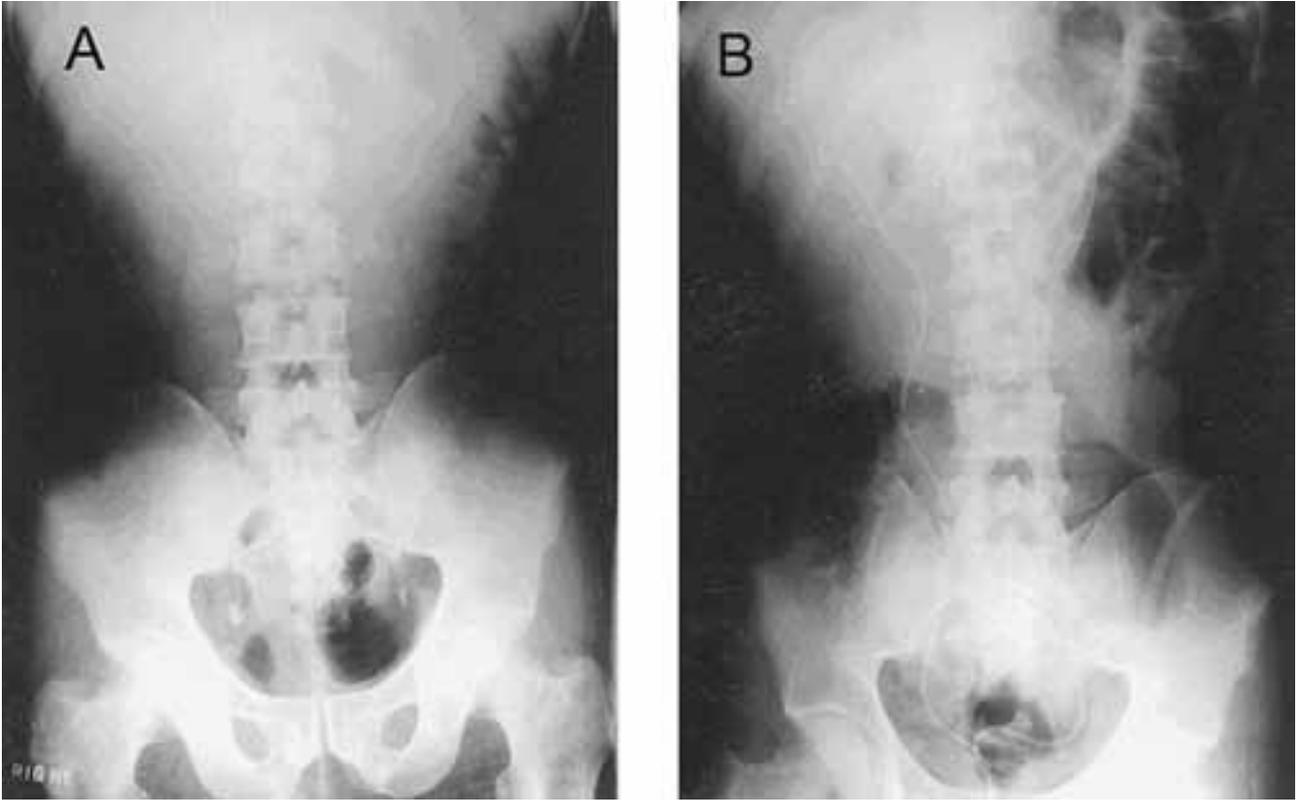


FIG. 1. Bilateral ureteroscopy in a patient with bilateral ureteral stone, A. before the procedure, B. after the procedure

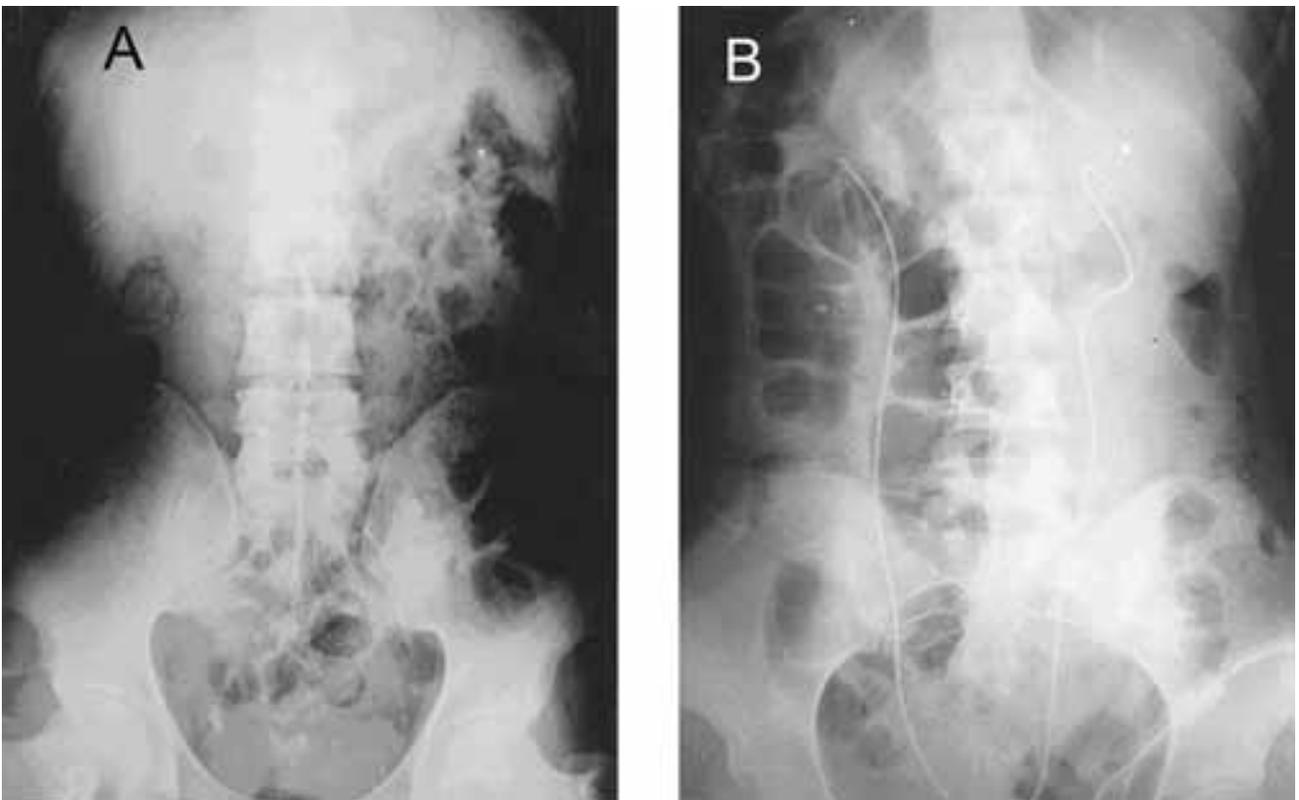


FIG. 2. Bilateral ureteroscopy in a patient with bilateral ureteral stone, A. before the procedure, B. after the procedure

Subsequent diuresis was less remarkable than that in anuric patients (volume range 4 to 6 liters in 24 hours). Serum creatinine level reached to nearly normal level after 2 weeks. In patients

with normal urine output and normal serum creatinine and BUN levels, stones were fragmented and bilateral catheterization was done. This was done unilaterally in one patient.

Bilateral same-session ureteroscopy was also done in 3 (13%) patients with hematuria of unknown origin. No pathologic finding was detected in 2 of them, and 1 had a small non-opaque ureteral stone.

Obstructive megaureter was the diagnosis made with ureteroscopy in the patient with obstructive uropathy, and bilateral double J ureteral stents were placed using ureteroscope (fig. 3).

Ultimately, of 23 patients with bilateral ureteral pathology, 21 (91.3%) had successful bilateral same-session ureteroscopy. Complications were seen in 3 cases, including pyrogenic infection in 2 and gross hematuria without requiring transfusion in 4.

### Discussion

In 1912, Yang was the first urologist to use endoscopic approach for ureteral disorders; he passed a rigid cystoscope into ureter in a patient with posterior urethral valve.<sup>(1,2)</sup> In 1964, Marshal passed a 3-mm fiberscope into distal ureter to observe a distal ureteral stone.<sup>(2)</sup> Gradually, with technical advancements, more sophisticated flexible and rigid ureteroscopes were introduced. In 1960 Hopkins cylindrical lens systems were introduced to market.<sup>(2)</sup> Today, ureteroscopy is one of the daily urologists'

practices.<sup>(3)</sup>

Ureteroscopy can be used for several diagnostic and therapeutic measures. Diagnostic measures include evaluation of pyelocaliceal filling defects, upper urinary tract hematuria, and unilateral positive cytology, and also surveillance of patients with upper urinary tract malignant tumors that had been treated endoscopically. Therapeutic measures include treatment of stones, ureteral strictures, localized low-grade and low-stage upper urinary tract urothelial tumors, and foreign bodies in upper urinary tract.<sup>(2-7)</sup> Also ureteroscopy can be used for placement of ureteral stent in cases in which stent insertion is not possible with cystoscope.<sup>(7)</sup>

With increasing usage of ureteroscopic procedures, the rate of complications, such as ureteral strictures, ureteral perforation, and ureteral avulsion increases, as well.<sup>(8,9)</sup> Predisposing factors such as inexperienced surgeon, using rigid instruments with large diameter, negligence, and lack of insight into the anatomy can lead to complications.<sup>(10)</sup>

Indications of bilateral same-session ureteroscopy are similar to those of unilateral ureteroscopy. With increasing usage of ureteroscopy, bilateral ureteroscopy has been also used for more cases with bilateral pathologies.<sup>(8)</sup>

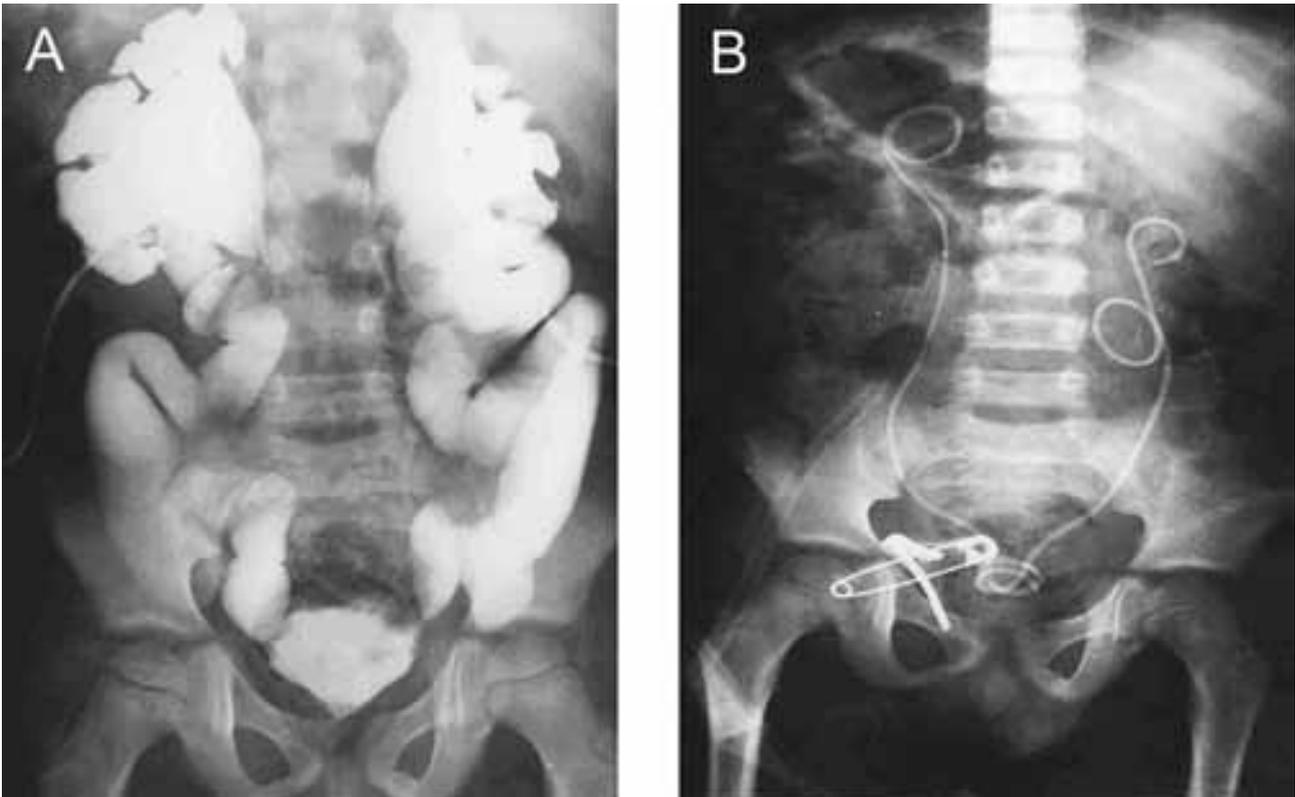


FIG. 3. Bilateral ureteroscopy in a patient with obstructive megaureter, A. before ureteroscopy and DJ stent insertion, B. after ureteroscopy and DJ stent insertion

The best candidates for bilateral same-session ureteroscopy are patients with bilateral distal ureteral stone. This approach can be used as an appropriate diagnostic and therapeutic tool, provided that the rate of ureteral complications is reduced. It can decrease number of anesthesia and surgical sessions, and hospital stay.<sup>(3,11)</sup> However, the surgeons' concern about intraoperative complications may make them evade bilateral same-session ureteroscopy, but a correct patient selection and appropriate use of instruments can minimize the complication.<sup>(3,11)</sup> In one report, bilateral same-session ureteroscopy had been used for diagnosis of bilateral pyeloureteritis cystica.<sup>(12)</sup> In another report, bilateral fibroepithelial polyp in a child was treated by this method.<sup>(5)</sup> Also, it has been recommended for treatment of obstructive uropathy following radiotherapy, percutaneous nephrostomy, and ureteroscopy.<sup>(13)</sup>

In this study, we used bilateral same-session ureteroscopy for the treatment of bilateral ureteral stone in 19 patients, hematuria of unknown origin in 3, and bilateral obstructive uropathy in 1. Sixteen patients with bilateral stones and 3 patients (3 ureters) with unilateral ureteral stones (35 ureters), became stone free (90.3%). Among 3 patients with hematuria of unknown origin, 2 had normal ureters, and 1 had a small non-opaque stone, detected in the right ureter and treated successfully. Severe complication did not occur; however, in 2 patients, pyrogenic fever developed, which was alleviated using medical treatment, and in 4 patients, gross hematuria occurred, but transfusion was not needed. Complications of ureteroscopy are perforation, avulsion, stricture, false passage, rupture of balloon dilator, hemorrhage, and sepsis, occurring in 2% to 20% of cases.<sup>(2,14,15)</sup> With advancements in less invasive therapeutic measures, postoperative morbidity has decreased and treatment success rate has increased.<sup>(8,11,15)</sup> Complications such as perforation and stricture are directly associated with ureteroscope diameter.<sup>(2)</sup> We had not such complications in our patients. To reduce complications, we should use safety guidewire in all of the cases and in those with excessive manipulation, ureteral stents are recommended.<sup>(2)</sup>

### Conclusion

Bilateral same-session ureteroscopy can prevent

frequent surgeries and anesthesia and reduce hospital stay. Proper patient selection, ample experience of surgeon, and appropriate instruments, all reduce complications and increase treatment success.

### Reference

1. Young HH, McKay RW. Congenital valvular obstruction of the prostatic urethra. *Surg Gynecol Obstet.* 1929;48:509.
2. Su LM, Sosa RE. Ureteroscopy and retrograde ureteral access. In: Walsh PC, Retik AB, Vaughan ED Jr, et al, editors. *Campbell's urology.* 8th ed. Philadelphia: WB Saunders; 2002. p.3306-18.
3. Camilleri JC, Schwalb DM, Eshghi M. Bilateral same session ureteroscopy. *J Urol.* 1994;152:49-52.
4. Bhalla RS, Schulsinger DA, Wasnick RJ. Treatment of bilateral fibroepithelial polyps in a child. *J Endourol.* 2002;16:581-2.
5. Franco I, Eshghi M, Bruder J, et al. Endourological management of 40 ureteral strictures. *J Urol.* 1988;139(pt 2):201 A.
6. Kasmaoui EH, Ghadouane M, Jira H, Alami M, Ouhbi Y, Abbar M. [Treatment of ureteral calculi with rigid ureteroscopy. Report of 67 cases]. *Ann Urol (Paris).* 2001;35:207-9. French.
7. Schwalb DM, Eshghi M, Franco I, Fernandez R, Addonizio JC. Expanding the role of the ureteroscope. *J Urol.* 1990;143:485-8.
8. Stackl W, Marberger M. Late sequelae of the management of ureteral calculi with the ureterorenoscope. *J Urol.* 1986;136:386-9.
9. Hollenbeck BK, Schuster TG, Faerber GJ, Wolf JS Jr. Safety and efficacy of same-session bilateral ureteroscopy. *J Endourol.* 2003;17:881-5.
10. Flam TA, Malone MJ, Roth RA. Complications of ureteroscopy. *Urol Clin North Am.* 1988;15:167-81.
11. Deliveliotis C, Picramenos D, Alexopoulou K, Christofis I, Kostakopoulos A, Dimopoulos C. One-session bilateral ureteroscopy: is it safe in selected patients? *Int Urol Nephrol.* 1996;28:481-4.
12. Yamada H, Asano K, Abe K, et al. [Bilateral pyeloureteritis cystica: a case report]. *Hinyokika Kyo.* 2003;49:427-9. Japanese.
13. Zeng GH, Li X, Wu KJ, Chen WZ. [Endoscopic management of bilateral ureteral obstruction after radiotherapy]. *Ai Zheng.* 2004;23:108-9. Chinese.
14. Huffman JL, Bagley DH, Lyon ES, Morse MJ, Herr HW, Whitmore WF Jr. Endoscopic diagnosis and treatment of upper-tract urothelial tumors. A preliminary report. *Cancer.* 1985;55:1422-8.
15. Heney NM, Nocks BN, Daly JJ, Blitzer PH, Parkhurst EC. Prognostic factors in carcinoma of the ureter. *J Urol.* 1981;125:632-6.