

## Day Case Ureteric Stent Replacement Under Local Anaesthesia in Both Sexes Using a Flexible Cystoscope and Fluoroscopic Guidance: A Surgical Technique

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### Keywords:

Flexible cystoscopy; Fluoroscopy;  
Local anaesthesia; Stents; Ureter

## 1. Abstract

**1.1. Introduction:** Long-term ureteric stents play a crucial role in the management of obstructive uropathy. There were significant delays in changing these stents under general anaesthetic during the COVID19 pandemic. The aim of the study was to evaluate a technique of retrograde JJ stent replacement using a flexible cystoscope and fluoroscopic control as a day case procedure under local anaesthesia in both sexes.

**1.2. Patients and Methods:** Twelve patients with long term stents requiring stent replacement were included in the study. The age range was 34 to 89 years (median 72). Five patients were male and seven female. All the procedures were performed as a day case under local anaesthesia with the assistance of a c-arm fluoroscopy unit. After application of topical anaesthetic, a flexible cystoscope was inserted into the bladder and a guidewire was advanced into the renal pelvis. The previous JJ stent was then removed under vision using the same cystoscope. A JJ stent was then advanced over the wire under fluoroscopic control. Post procedural questionnaires in the form of a likert questionnaire was used to assess the patient's satisfaction and tolerance levels along with likelihood of having the stent replaced under local anaesthesia again.

**1.3. Results:** Overall, eleven of thirteen attempts (84.6%) were successful. Two procedures were abandoned due to stent encrustation. The procedure was rated as acceptable or uncomfortable in five and eight patients respectively with none reporting the procedure as painful. There were no post procedural complications reported and 75% chose to have their stent changed under local

anaesthesia going forward.

**1.4. Conclusion:** Stent replacement can be performed as a day case under local anaesthesia using a flexible cystoscope and fluoroscopic control. The procedure is safe, effective and tolerable. This method can avoid delays in stent changes and its associated consequences.

## 2. Introduction

Traditionally, the exchange of ureteric stents has been performed under general anaesthesia (GA) using a rigid cystoscope [1]. Day case flexible cystoscopy has been shown to be time and cost efficient [2]. Studies have described stent placement via flexible cystoscopy conducted either in the interventional radiology suite with radiologist assistance [3] or without any fluoroscopic control [4]. This study aimed to assess the flexible cystoscope-assisted insertion of ureteric stents under fluoroscopic guidance with local anaesthesia (LA).

## 3. Materials and Methods

This prospective study was conducted over 8 months. It included twelve patients with long-term stents necessitating regular replacement. The age of the participants ranged from 34 to 89 years, the median age being 72. Both sexes were evaluated, five males and seven females. All procedures were conducted as day cases under LA, with the aid of a C-arm fluoroscopy unit. (Table 1) outlines the stent indications. One patient underwent bilateral ureteral stent replacement, resulting in a total of 13 attempted procedures. Informed consent was taken, abdominal x-rays reviewed and antibiotics given in accordance with hospital policy. The operator

required assistance of a theatre nurse and a radiographer. The duration of the procedure and length of fluoroscopic guidance were documented, the former representing the time from the insertion of the cystoscope into the urethral meatus to the final stent placement. Subsequently, patients were given a questionnaire accompanied

by a visual analogue scale, to rate the procedure. They were then asked to choose whether they would proceed with this procedure under LA in the future. (Table 2) outlines the results of the questionnaire.

**Table 1:** Clinical data for stent replacement

| Indication  | Patients number | M/F | Ureter number |
|---|-----------------|-----|---------------|
| Pelvi-ureteric junction obstruction                 | 3               | F   | 3             |
| Retroperitoneal fibrosis                            | 2               | F   | 2             |
| Calculi   | 2               | F   | 2             |
| Radiotherapy induced ureteric stricture             | 2               | M   | 2             |
| Malignant ureteral obstruction from prostate cancer | 2               | M   | 2             |
| Benign ureteric stricture                           | 1               | M   | 2             |

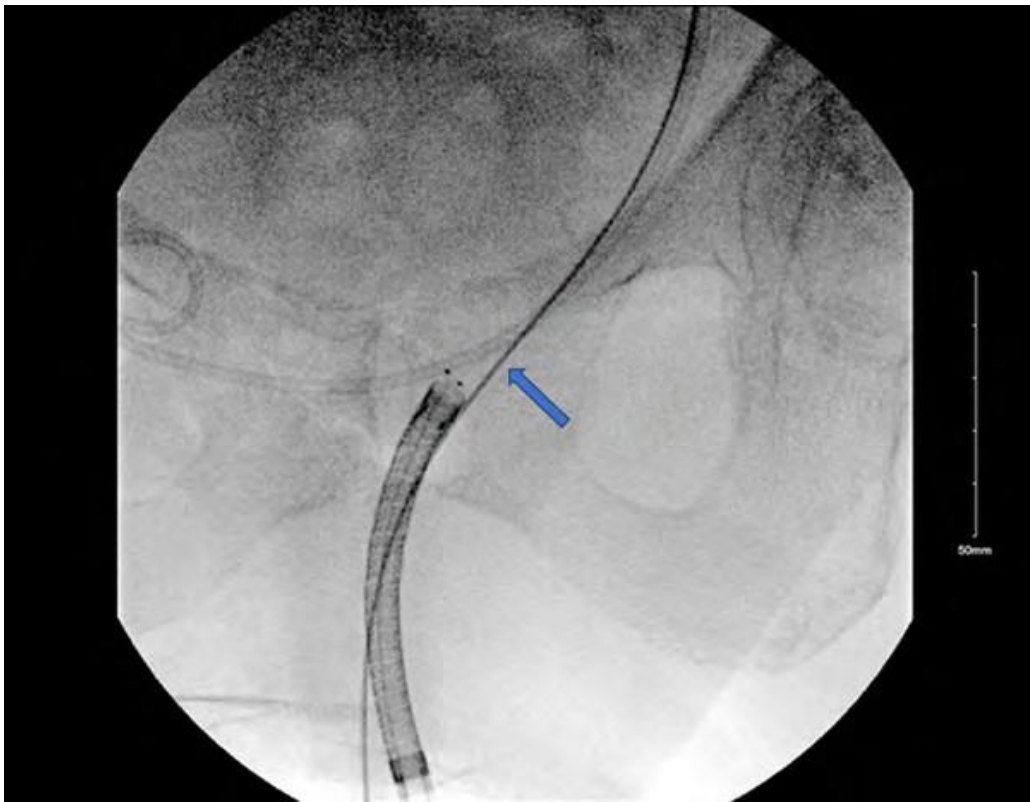
**Table 2:** Results

|                                     |                       |
|-------------------------------------|-----------------------|
| Successful attempts/total attempts  | 11/13 (84.6%)         |
| Mean operative time (minutes)       | 12 min, 40 sec (7-22) |
| Mean fluoroscopic time (seconds)    | 14 (6-22)             |
| Procedure attempts rating           |                       |
| Acceptable                          | 5 (38.4%)             |
| Uncomfortable                       | 8 (61.5%)             |
| Painful                             | 0 (0%)                |
| Would have procedure again under LA |                       |
| Yes                                 | 9                     |
| No                                  | 3                     |

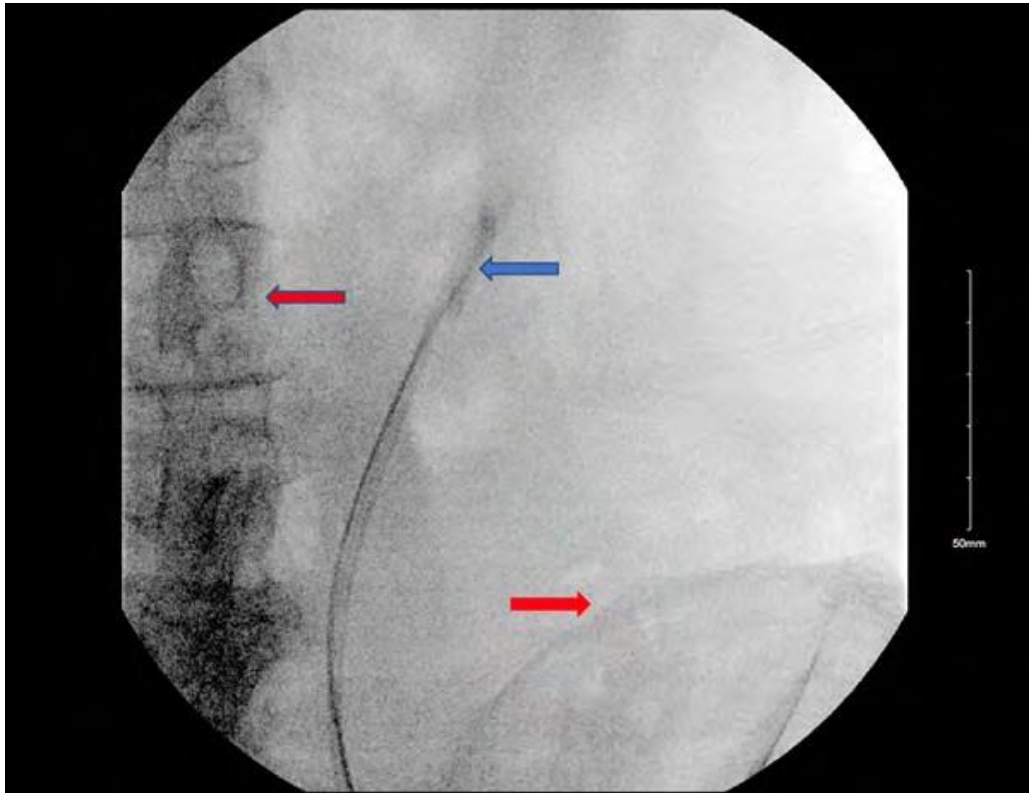
#### 4. Technique of Stent Replacement

Patients were requested to void and lie supine on the table, females in frog-leg position. The external genitalia were prepped and 5-10ml of 2% lidocaine gel was injected into the urethra. Subsequently, the penis was clamped with swab wrapped around for 3-5 minutes. A 16Fr disposable flexible cystoscope was inserted. A 0.035-inch guidewire with a 3 cm hydrophilic-coated end was fluoroscopically guided alongside the original stent to the renal pelvic. The position of ureteric orifice is identified in relation to symphysis pubis by obtaining a fluoroscopic image after placing the tip of the scope at the corresponding ureteric orifice and saved to be use later. This crucial information helped to avoid inserting the entire stent into the ureter after the old stent is removed. (Figure 1). Subsequently, a fluoroscopic image was obtained to

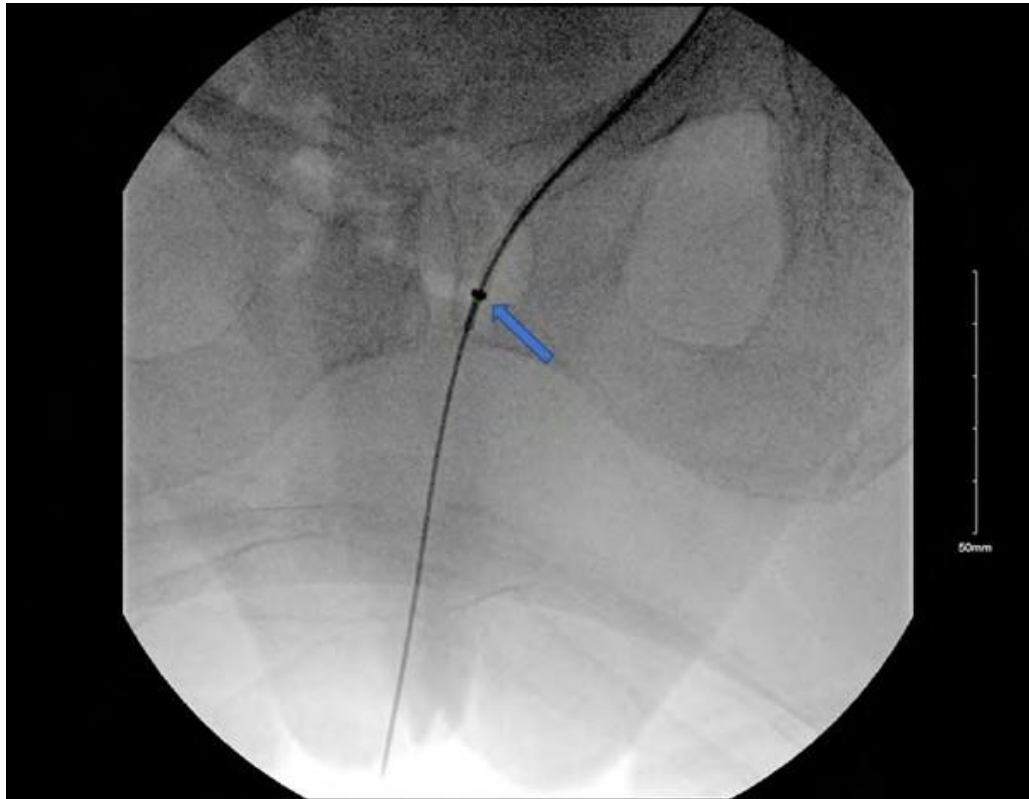
confirm the location of the proximal end of guidewire in renal pelvis, appreciating the relation to the iliac crest and the lumbar vertebra. The flexible cystoscope was removed, leaving the guidewire in situ. (Figure 2) The flexible cystoscope then reinserted and the distal end of the stent identified and withdrawn with 5Fr grasping forceps. All subsequent manipulations were done under fluoroscopy. A JJ stent was passed over the guidewire. The stent pusher has a radiopaque marker at its tip to allow recognition of the distal end of the stent under fluoroscopic control. The stent was advanced over the guidewire in a railroad fashion to the renal pelvis. The C-arm moved down to the pubic symphysis level. Guided by the radiopaque marker on the pusher, the stent was advanced to the renal pelvis in comparison to the saved fluoroscopic image taken prior. (Figure 3). The guidewire and pusher were then withdrawn, releasing the stent in its final position (Figure 4,5).



**Figure 1:** Fluoroscopic image identifying ureteric orifice position in relation to symphysis pubis ( arrow pointing at left ureteric orifice).



**Figure 2:** Fluoroscopic image showing the wire in renal pelvis in relation to 2 bony landmarks ( blue arrow indicating the renal pelvis position and the left red arrow pointing at the same level lumbar vertebra in relation to iliac crest indicated by the right red arrow).



**Figure 3:** Fluoroscopic image showing the radio-opaque tip of the ureteric stent pusher at the level of the left ureteric orifice as identified earlier on image 1.



**Figure 4:** Fluoroscopic image showing final position of upper end of ureteric stent in the renal pelvis in good position in relation to preidentified landmarks (left red arrow pointing at corresponding lumbar vertebra and right red arrow pointing at iliac crest).



**Figure 5:** Fluoroscopic image showing final position of lower end of ureteric stent in the urinary bladder.

## 5. Results

Successful placement was obtained in eleven of thirteen cases. (84.6%) (Table 2). In 2 patients, stent encrustation which was not identified on pre procedure scans prevented removal of the stent. In both, procedures aborted and planned for change under GA. No intra-operative or infective complications occurred for stents replacement. In no cases was the stent misplaced. Mean procedural time was 12 minutes and 40 seconds, with mean fluoroscopic time of just 14 seconds. Seven patients (4 men and 3 women) rated the procedure ‘uncomfortable’, yet four of these (2 women and 2 men) were willing to undergo the same procedure again in the future. Five patients rated the procedure ‘acceptable’(1 man and 4 women). A total of nine patients were happy to have their stent replaced under LA again in the future.

## 6. Discussion

Only four reports in the literature detail the use of LA and flexible cystoscopes, with limited patient numbers [1,2,3,5]. Mark et al. [1] detailed the success of placing stents in 30 out of 34 patients before shock wave lithotripsy. Similarly, Mark and Montgomery [2] successfully used a flexible cystoscope for placing ureteric stents in 14 patients. Adeyoju et al [4] had success in 5 of 6 patients consented for JJ stent insertion, notably not using fluoroscopic guidance in their technique. The largest study to date conducted by Giannakopoulos et al reported on 70 patients undergoing outpatient stent placement and replacement using a flexible cystoscope under

LA. The prospective study demonstrated the procedure’s feasibility and high patient acceptance.[5] Two aspects of our technique are essential. The 16 Fr disposable cystoscope is well tolerated. We use brief fluoroscopy to prevent a third scope reinsertion, significantly enhancing patient tolerance. Completing the final steps under fluoroscopic control ensures a safe, effective, and reliable stent placement. Flexible cystoscope’s expanded range of motion is particularly beneficial in selected cases such as pelvic organ prolapse or post-radiotherapy, including those unable to assume lithotomy position. Furthermore, our study demonstrates that this method is efficacious in a wide range of pathologies. Both procedure and fluoroscopic time were acceptable. Patient selection is necessary with x-ray prior to the procedure aiding to identify stent encrustation and avoiding procedure failure. Going forward we would like to introduce this method at wider scale. Further objective measurement of patient satisfaction and identification of patients not suitable for changes under LA will help to define our suitable subgroup and integrate this procedure into our mainstream practice.

## 7. Conclusion

Stent replacement can be performed safely and effectively as a day case procedure under LA using the flexible cystoscope and fluoroscopic control. The procedure can be easily tolerated by most patients, obviating the need for rigid cystoscopy under GA.

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