



## Single position for the management of ureterohydronephrosis in advanced malignancies

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### General Note

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### ABSTRACT

*Introduction:* Management of ureteral obstruction in the advanced abdominal or pelvic malignancy is challenging. Management of such patients requires percutaneous nephrostomy tube (PCN) placement or indwelling ureteral double j (DJ) stent insertion for drainage of the obstruction. Endoscopic DJ stent insertion is commonly done in lithotomy position but PCN placement in the prone position. Change of patient's position is often required in the failure of one method of urine drainage. Management of ureteral obstruction in Flank free oblique supine modified lithotomy position (fosml) position allows DJ stent placement in both retrograde &

antegrade manner along with PCN insertion. We report our experience with the FOSML position for the management of ureterohydronephrosis in a single position. *Materials and Methods:* All patients who underwent urinary drainage for ureteral obstruction secondary to advanced malignant disease in the FOSML position from January 2019 to February 2020 were prospectively included in the study after meeting inclusion criteria. In all the cases, preference was given to DJ stent insertion. PCN placement was performed after failure to stent the patient in both retrograde and antegrade attempts. *Results:* Out of 36 patients of ureterohydronephrosis, 15 underwent retrograde DJ stent insertion, 3 patients had successful antegrade DJ stent insertion, and the remaining 18 patients underwent PCN insertion after the failure of retrograde and antegrade ureteral stent placement. *Conclusion:* FOSML position is safe and feasible for managing ureterohydronephrosis secondary to pelvic malignancy. It avoids the surgeon's dependency on more than one position for urine drainage and saves crucial operative time.

**Keywords:** Single position; ureteral obstruction; management; FOSML

## 1. INTRODUCTION

Management of ureteral obstruction in advanced abdominal or pelvic malignancy is considered as a therapeutic challenge. Obstruction occurs because of metastatic disease directly compressing the ureter (cervical, bladder, prostate or colorectal), metastatic lymph nodes encasing ureter, or retroperitoneal tumour causing external compression. Progressive obstruction may complicate and lead to uremia, urinary tract infections, electrolyte imbalance, and renal deterioration (Kouba et al., 2008). Management of such patients requires percutaneous nephrostomy tube placement or indwelling DJ stent placement for drainage and decompression of the obstruction. Both procedures have their advantages and disadvantages.

Placement of endoscopic metallic ureteral stents can technically be challenging or even impossible in some advanced malignancy (Ku et al., 2004) but still, it is preferred as they do not hamper patient's quality of life and do not occlude for long-duration by debris (Kim et al., 2018 and Yachia et al., 2011). They make the procedure expensive due to their high cost. Percutaneous nephrostomy (PCN) is also a commonly used alternative as a primary procedure or in the failure of DJ stent placement. PCN insertion is a more invasive method and has a higher incidence of tube dislodgement. Patients do not prefer a PCN tube due to the presence of an attached external collecting bag to the tube. The preferred positions for performing these procedures are different. Endoscopic ureteral DJ stent insertion is commonly performed in lithotomy position but PCN tube placement in the prone position. Management of ureteral obstruction in Flank free oblique supine modified lithotomy position (FOSML) position has the advantage of simultaneous antegrade and retrograde renal access. This position allows both for PCN insertion and DJ stent placement either retrograde or antegrade manner without the need to change patient position. A single position instead of two positions save crucial intraoperative time. It also avoids accidents and complications related to changing patient's positions like endotracheal tube displacement and musculoskeletal trauma to patients and health care providers. This position also allows retrograde pyelography through the ureteral catheter to visualize ureter and pelvicalyceal anatomy through fluoroscopy along with sonographic guidance for a percutaneous renal puncture during PCN insertion which avoids dependency on a single method of guidance. Establishing a feasibility FOSML position for the management of ureteral obstruction in a single position was the aim of this study.

## 2. MATERIALS AND METHODS

Data was prospectively analyzed from all patients who underwent drainage for ureteral obstruction secondary to advanced malignant disease in the FOSML position between January 2019 and February 2020. The study was approved by the Ethics committee and required consent was taken. The inclusion criteria included external ureteral obstruction caused by abdominal or pelvic malignancy showing hydronephrosis which was documented on ultrasonography (US) or computed tomography (CT) scans. The exclusion criteria were as follows; 1) history of allergies to contrast media; 2) condition of the patient requiring dialysis, and 3) poor performance status of 3 or 4 according to the Eastern Cooperative Oncology Group performance status scale. All procedures were performed with the patient in either general or spinal anesthesia.

### Patient Position

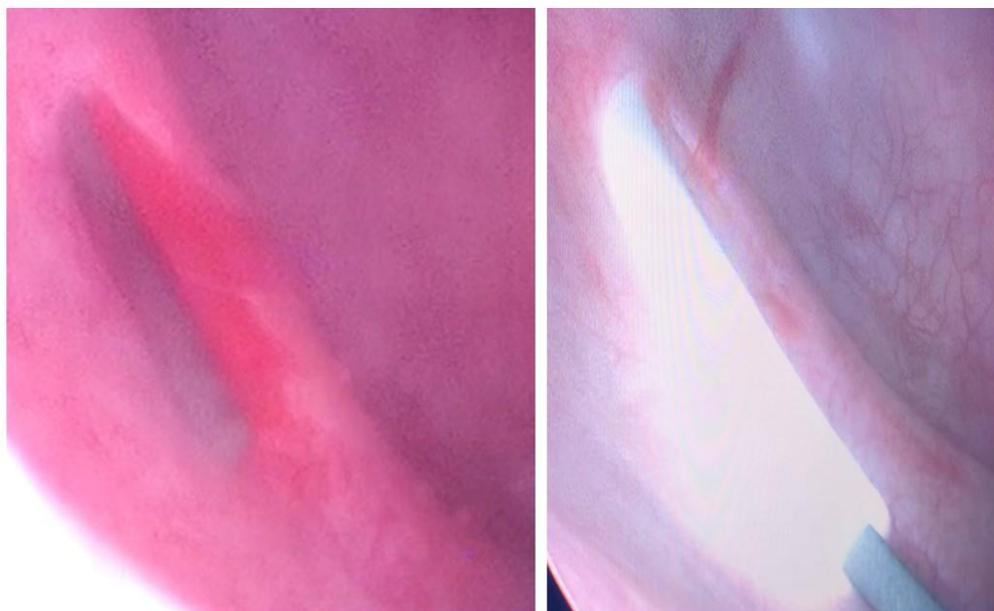
Before positioning the patient, marking of important Surface landmarks (Ribs, Iliac crest, and Posterior axillary lines) were done (Figure 1). The patient is turned lateral (90°) towards the contralateral side and upper back is rested against padded support. Both Lower limbs are supported and fixed on lithotomy stirrups and ipsilateral buttock rests on soft Pad. The ipsilateral lower limb is slightly extension on hip with knee partially flexed and goes down below the level of the table. The contralateral lower limb is kept in a conventional lithotomy position with flexion abduction, external rotation at hip and flexion at the knee (Aditya et al., 2018).



**Figure 1** Patient in FOSML position

### Steps

After patient positioning, the first attempt is made to perform cystoscopic retrograde metallic DJ stent insertion. In failure to pass metallic DJ stent in a retrograde manner, an attempt of antegrade DJ stent insertion was made under fluoroscopic and ultrasound guidance. Cystoscopic confirmation of antegrade DJ stent position done as and when required during the procedure (Figure 2). In all cases, the first preference to drain the obstruction was given to metallic DJ stent because of its better patient's quality of life then PCN tube. In case of failure of DJ stent insertion in both antegrade and retrograde manner, obstruction was drained through PCN tube placement. Triangulation Method was adopted for renal access; puncture was always behind the Posterior axillary line.



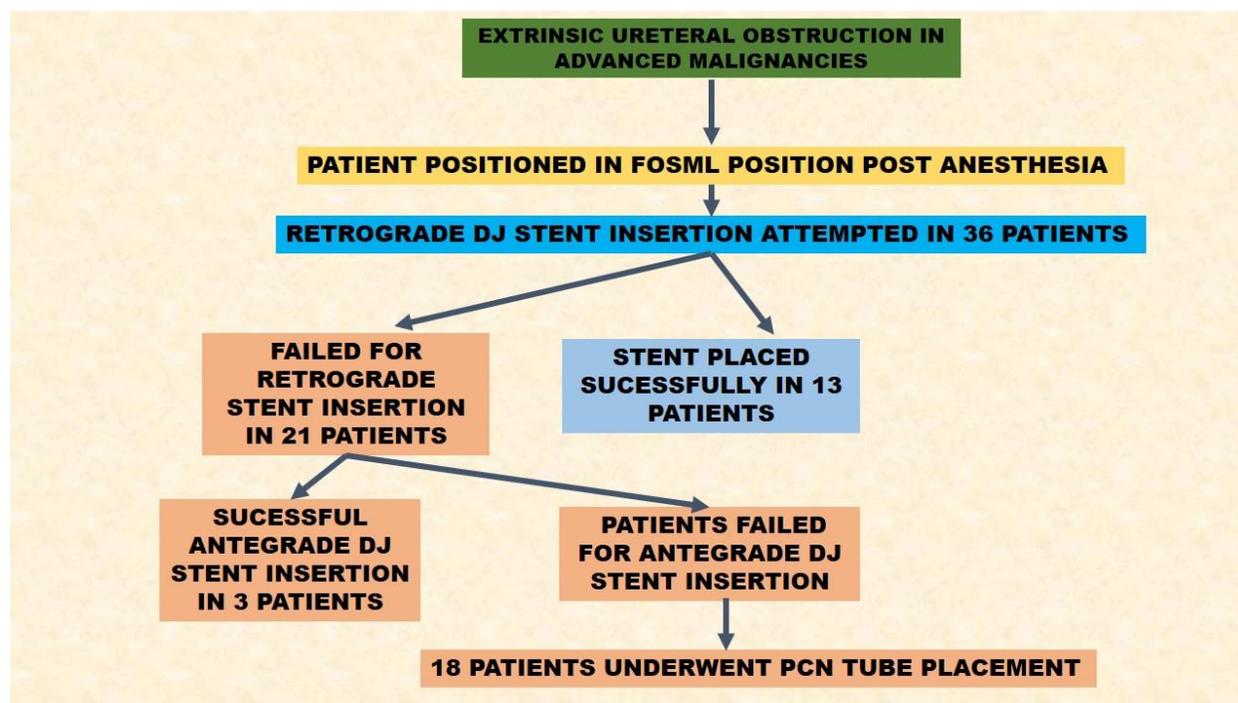
**Figure 2** Cystoscopic confirmation of antegrade DJ stent placement.

### 3. RESULTS

A total of 36 patients required management of ureteric obstruction, out of which 15 underwent retrograde DJ stent insertion. Among 15 retrograde DJ stents, 9 patients required unilateral stent placement and 6 had bilateral. 3 patients had successful antegrade DJ stent insertion after the failure of the retrograde approach (table 1). Remaining 18 patients underwent PCN insertion after the failure of both retrograde and antegrade DJ stent placement. Method and result flowchart is given in figure 3.

**Table 1** Patient Characteristics

VARIABLES		NO	DJ STENT	PCN
MALIGNANCY				
	CA PROSTATE	9	8	1
	CA RECTUM	18	10	8
	CA CERVIX	9	0	9
SEX				
	MALE	14		
	FEMALE	21		
HYDRONEPHROSIS				
	GRADE 2	9	9	0
	GRADE 3	21	7	14
	GRADE 4	6	2	4



**Figure 3** Flowchart showing method of drainage of ureteral obstruction in our study

Malignancies responsible for ureterohydronephrosis were carcinoma (CA) cervix in 18 patients, CA Prostate in 9 patients, and Ca Rectum in 9 patients, respectively. Among these malignancies ca cervix was the most common. Females were more than males (females 21, males 14) with a mean age of 61.4 years in both sexes. Serum creatinine ranged from 2 to 6 mg/dl and had a mean of 3.3 mg/dl. Most patients had grade 3 hydronephrosis (21) followed by grade 2 hydronephrosis (9) and grade 4 hydronephrosis (6).

### 4. DISCUSSION

Ureteral obstruction secondary to external malignant compression by pelvic malignancy is the usual presentation of such diseases. Along with external compression, radiation therapy to the primary tumour can cause ureteral ischemia and can lead to ureteral

obstruction by forming strictures. A therapeutic dilemma always remains whether to perform PCN tube insertion or indwell DJ stenting. As indwelled metallic DJ stents have a better quality of life and remain patent for long-duration our first preference was DJ stenting, only patients who failed metallic DJ stent insertion underwent PCN tube placement.

In our study, 3 patients underwent antegrade DJ stenting after the failure of the retrograde cystoscopic approach. In the usual setting these patients would have landed up with PCN tube placement or would have had longer intraoperative time by requiring a change of patient position. Over the years, there are limited reports (Singh et al., 1979; Harding et al., 1993 and Chitale et al., 2002) on the successful placement of antegrade DJ stents on the failure of the retrograde approach with success rate of 85%, 92% and 98% respectively. In our study, our success rate was 14.28% which is quite less than the studies mentioned above and we believe this is due to the advanced nature of the malignant disease of the patients which we could not manage just by DJ stent placement.

FOSML position saves crucial intra-operative time by avoiding a change of patient's position during the procedure. Additional guidance of fluoroscopy along with ultrasound added more confidence in performing renal access for both antegrade DJ stenting and PCN tube placement. It also avoids accidents and complications related to changing patient's positions like endotracheal tube displacement and musculoskeletal trauma to patients and health care providers. In this study, these types of early complications of the procedure were not seen. However, we could not evaluate the delayed complications related to the procedure as some patients are still on the follow-up but we will consider this in future studies on this topic. With the improvements in endo-urological techniques, advanced imaging it is now possible to relieve such types of obstruction, at least temporarily. The idea of prolonging 'quality life' for these patients with minimal interventional sittings and reduced operative time should be the main goal.

## 5. CONCLUSION

FOSML position is safe and feasible for managing extrinsic ureteric obstruction secondary to pelvic malignancy. It reduces the crucial operative time by avoiding a change of position for decompressing the ureteric obstruction and avoids the surgeon's dependency on more than one position for drainage of ureterohydronephrosis. This position also allows pelvic-calyceal anatomy delineation through contrast-enhanced fluoroscopy along with ultrasound guidance which adds more confidence to operating surgeons in performing renal access. Experience with more cases is required for detailed assessment.

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### Author Contributions

VS: Conceptualized, performed the surgery, written and edited the manuscript. DS, AA, AG, PG and RK: collected the data, assisted in analyzing the cases. SG: helped in technical aspects of the surgery. All the authors reviewed the manuscript and agreed the same.

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This study has not received any external funding.

### Conflict of Interest

The authors declare that there are no conflicts of interests.

### Informed consent

Written & Oral informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

### Ethical approval

The study was approved by the Institutional Ethics Committee.

### Data and materials availability

All data associated with this study are available upon request to the corresponding author.

### Peer-review

External peer-review was done through double-blind method.

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