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Case Report

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Double J stent: double edged sword

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The DJ stent placement is the commonest office urological procedure and is essential armamentarium of a urologist. Finney and Hepperlen first described "double-J" (DJ) or double pigtail. It is a thin polymer tube, when inserted into obstructed upper urinary tract, eases the outflow of urine and relieves obstruction. Currently used stents are commonly composed either of polyurethane or silicone. Silicone stents have a high friction coefficient and flexibility which make them more difficult to navigate through a tortuous or obstructed ureter. Drug-eluting and anti-adhesive stent coatings are the newer additions of the technology with the goal of improving stent handling, reducing biofilm formation, preventing encrustation, and improving patient comfort [1].

The Ideal DJ stent is easy to insert, has excellent flow characteristics, is resistant to infection and encrustation, is chemically stable after insertion in a urinary environment, has the ability to relieve obstruction (intraluminal and extra luminal), and is associated with minimum symptoms. Thus, the ideal stent should, therefore, have high tensile strength, a low friction coefficient, memory, and a self-retainment mechanism and should be biocompatible and affordable.

However, the use of DJ stent has not been standardized leading to frequent overuse and avoidable complications. Absolute and usually emergent indications for DJ stenting are drainage of bilateral obstruction, unilateral obstruction in the absence of a functional contralateral kidney, and ureteral obstruction with infected hydronephrosis. DJ stenting is also done after surgical procedures e.g. pyeloplasty, ureteral reconstructive surgeries, ureteroscopy, trauma, and an adjunct to ESWL.

Routine use of DJ stenting before shock wave lithotripsy (SWL) for kidney or ureteral stones does not improve stone clearance. It is still a common practice, considered by many to be safe to place a ureteral stent in combination with SWL for a stone larger than 1.5 to 2 cm.

Routine stenting has no beneficial effect on the stone-free rate or ureteral stricture formation after URS [2]. Stents are widely used in urologic reconstructive surgery for splinting the ureter. Routine prophylactic stenting reduces the incidence of major urologic complications like urinoma, fistula, and stricture [3].

No significant difference has been found in ureteral injury rate with or without prophylactic stenting prior to major pelvic gynaecologic and urological surgeries. It is, however, easier to identify ureteric trauma with a stent in situ [4].

Hematuria, urgency, frequency, dysuria, suprapubic and flank pain are the most common stent related symptoms. Irritation of the bladder mucosa, especially the trigone by the distal portion of the stent, reflux of urine, and smooth muscle spasm are thought to contribute to these symptoms. Fluoroscopic imaging in patients with an indwelling stent revealed positional changes of the stent in relation to standing, sitting, and bending, which may explain why physical activity can influence stent discomfort [5].

The combination of tamsulosin and solifenacin appears to significantly improve stent-related irritative and obstructive symptoms compared with monotherapy with either agent alone [6].

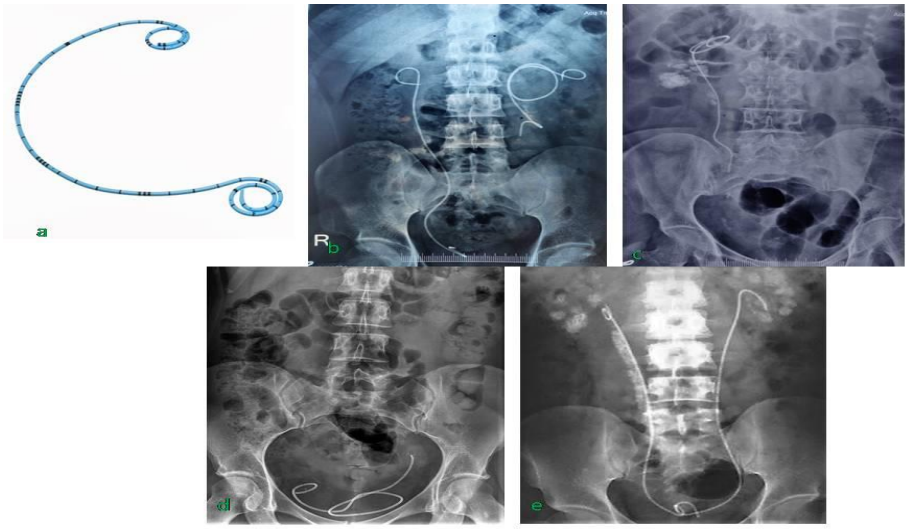

Figure 1 (a-e): a. DJ stent, b. Left proximal migration of DJ stent c. Right proximal migration of DJ stent d. Distal migration of DJ stent, e. Right steinstrasse after right ESWL.

Stent migration Despite the self-retaining design of DJ ureteral stents, distal migration into the bladder or proximal into the ureter is possible. Proximal stent migration into the ureter has been reported to occur in 1% to 8% of patients. The etiology of upward migration of DJ stent is multifactorial, resulting from a short stent, duration of a stent, the angle of distal part of stent <180 degrees, hydronephrosis, placement of a stent in upper pole instead of the pelvis. This can largely be prevented by choosing a sufficiently long stent and having an adequate loop both in the renal pelvis and in the bladder [7].

UTI in chronically stented patients, bacterial colonization reaches 100%. Indwelling time, female sex, diabetes, and chronic kidney disease are factors influencing colonization of ureteral stents [8].

Encrustation The duration of indwelling time of ureteral stents is the most important risk factor for the development of encrustation. Encrustation has been reported to occur in 9.2% to 26.8% of stents indwelling for less than 6 weeks, in 47.5% to 56.9% of stents indwelling 6 to 12 weeks, and in approximately 75% of stents indwelling longer than 12 weeks. Additional risk factors for stent encrustation include pregnancy, UTI or urosepsis, history of stone disease, metabolic or congenital abnormalities, urinary diversions, and chronic renal failure. A second DJ stent may be placed for 1-2 weeks for easing stent removal [9].

Forgotten DJ stent or neglected DJ stent the forgotten or neglected stent is a multifactorial problem that originates from both poor patient compliance and health system issues related to patient follow-up. The surgeon responsible for stent insertion is also accountable for its timely removal. In order to avoid encrustation, it has been reported that a time period of between 2 and 4 months is optimal for DJ stent removal or replacement. Ather et al has proposed a computerized tracking program for removal of stents [10].

Figure 2. (a-f): a. Encrustation of DJ stent, b. Left steinstrasse, c. Right Broken DJ stent, d. Left encrusted DJ stent, e-f. Encrusted DJ stent.

Inadequate Relief of Obstruction Occlusion of a stent lumen may occur at any time following insertion into the urinary tract. Short-term luminal obstruction, occurring within hours to days of insertion, may result from hematuria related to the technique or from increased urine viscosity and constituent debris associated with insertion in an infected system [11].

Stent Fracture Urine is a hostile environment. Polyethylene was abandoned as a construction material when it became evident that stents made of this material became brittle and fractured after relatively short indwelling times. Encrustation is also likely to play a role in stent fragmentation, with both of these complications increasing in prevalence in direct proportion to indwelling times [12].

Ureteral Erosion or Fistulisation The rarest, most feared complication of ureteral stent placement is the erosion of the stent into adjacent structures, especially the arterial system [13].

Conclusions Placement of indwelling ureteral stents has become routine in the management of a variety of urinary tract disease processes. The ideal stent is not yet available. The majority of patients will experience consequences, and some patients will have some complications. The stent should be monitored while in place, promptly removed when no longer needed, and changed periodically if chronically indwelling. Risk factors for complications should be minimized with high fluid intake, prompt evaluation of clinical complaints, and aggressive treatment of documented infection. The implanting physician bears the responsibility for informing the patient of the requirements, consequences, and complications attendant to stent placement. Failure to do so has obvious management and potential medicolegal implications.

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