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Protocol for removing bladder catheter in paediatric patients whilst double J stent is in place

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Introduction

After certain Paediatric Urological surgical procedures like Pyeloplasty, ureteric reimplant, kidney transplant etc, Double J Stents are place with one end in kidney and other end in the ureter to help drain the kidney, support an anastomosis of the ureter, promote wound healing, minimise pressure and thus prevent urine leakage following surgery to the urinary tract.[1] Often, along with the placement of Double J Stents bladder/urinary catheter are placed to help drain bladder, promote wound healing and monitor urine output. Bladder catheters are usually removed within a few days after the procedure while the double J Stents are general left in situ for few to several weeks time after the surgery.

At the time of taking the bladder catheter out, the JJ stent can get entangled or even knotted with the bladder/urinary catheter in bladder and can stent gets dislodged or even pulled out inadvertently.[2] This dislodgement or trapping of stent with the catheter has the potential of affecting the outcome of our surgical procedures.

The double J stent entangling with urethral catheters is a rare complication. Little is known about why some catheter gets entangled with the stent if it's present. Trapping of the double-J stent may have been an unfortunate circumstance but may also be caused by migration of the double-J stent down from the anastomosis, which is a known complication of JJ stent placements.[3] One hypothesis is that excessive length of the catheter inside the bladder leads to knotting with the stent. Also, with decompression of the bladder because of the catheter drainage, the catheter tip can loop through a coil of the catheter forming a knot on its own or even can get entangled in the loop of the JJ stent.[4,5] Another hypothesis is that the insertion of the catheter disturbs the surface tension of the fluid in the bladder, these results in a low pressure area around the tip thus creating water current and facilitating knot formation.[4] This report aims to generate awareness of a potentially preventable complication that can result in significant morbidity with a list of recommendations to minimize this risk.

Suggested protocol to avoid inadvertent removal/misplacement of JJ Stents when taking out bladder /urinary catheters

In order to avoid catheter knot in the bladder and trapping of JJ stent with the catheter and subsequent inadvertent removal or malpositioning of stent due to entrapment with catheter we suggest the following:

a. An important way to avoid excessive catheter length inside the bladder is by gently pulling the catheter after insertion thereby positioning the balloon against the lower wall of the bladder. This will hopefully avoid excess catheter length in bladder and will shun stent trapping with the catheter.

b. Also a larger part of the stent present in the bladder would have made it easier for the urethral catheter to form a knot around it and hence displacement of stent with catheter removal. It is therefore reasonable to use shortest possible stent avoiding large part of stent in bladder.

c. Clamp the bladder catheter for around 2-3 hours so that bladder gets filled and catheter and JJ stent hopefully are away from each other and then a bladder catheter can be removed with ease.

d. Bladder can be filled with water using a bladder syringe just before taking the catheter out, again to push both catheter and Stent away from each other.

e. Catheter should be taken out very gently and slowly, rotating the tubing along the way in an attempt to keep stent loop away. If there is any pull on the catheter, it may be wise to stop, fill bladder little bit further, rotate tubing a bit further or if still in doubt, and do an Ultrasound to ensure both tubes are away from each other.

Discussion

Catheters inserted for various purposes, urological as well as non-urological, are known to rarely knot or entangle with a double J stent in situ spontaneously inside the bladder. Raveenthiran could find only 40 cases of knotted urinary catheters on a recent review of the world literature.[4] Knotted urinary catheters[6] may also jeopardize delicate surgical reconstructions[7] and can lead to significant morbidity especially due to inadvertent dislodgment of the double J stent. Unfortunately, many doctor colleagues and nursing staff are unaware of this problem or its proper management. Removal of a urethral catheter should always be done gently.

Several hypothetical explanations have been offered for the knotting and entanglement of catheters with the stent. The tendency of a catheter to knot probably depends on its flexibility, smaller diameter and redundancy within the bladder.[4] The probable mechanism involves an extra length of catheter coiling around itself and then the

catheter end looping through these coils. The coils tighten cinching down in a knot when counter traction is applied to remove the catheter. Resistance during removal, therefore, should raise suspicion of a possible complication, for example, a knot or entanglement with a double J stent. The attention should be directed towards prevention of this complication by careful selection of the size and length of catheters and gaining better understanding of urethral anatomy and safe insertion lengths. It is also equally important to secure the catheter well in order to prevent inadvertent advancement of the catheter into the bladder.

Removal of the catheter by force has to be avoided. If a knot or trapping of catheter with JJ stent is suspected or detected, prior to the removal of the catheter, various techniques are described to remove the knotted catheter safely. These include manual removal after sustained traction under general anaesthesia; open cystotomy under general or local anaesthesia percutaneous cystotomy under general anaesthesia, and fluoroscopic manipulation of a guide wire to unknot the catheter in the bladder.[8,9]

Our paper is the first and only review found on literature search on the subject and suggests very simple methods that can be employed very easily in our clinical practice to avoid complications.

Conflicts of interest

None of the above authors have anything to disclose with regard to conflicts of interest and relevant financial interests and affiliations ore declarations.

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