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Case Report

The versatile irrigation set tube: a case report of a frugal nephrostomy tube in a complex percutaneous nephrolithotomy irrigation tube as a nephrostomy alternative

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ABSTRACT

Nephrostomy tubes were once the norm following a standard percutaneous nephrolithotomy (PCNL). Nowadays they are a rarity, since most PCNLs are performed without the use of a Nephrostomy tube in the post-operative period (tubeless PCNL). We present the use of a simple irrigation set tubing as a low-cost nephrostomy tube alternative in patients with post-PCNL hemorrhagic complications.

Keywords: Irrigation tube, Nephrostomy tube, Complex PCNL, Haemorrhage

INTRODUCTION

Whilst trying to perform a renal arteriogram, in 1955 Willard Goodwin placed a needle into the collecting system of a hydronephrotic kidney and placed the first ever nephrostomy tube (NT).[1] Through decades, the NT has undergone a myriad of changes in terms of sizes and the material used. Regardless, an ideal NT should be strong, biocompatible and easy to manage.[2] With an ideology of being near-ideal while remaining cost-effective, we discovered that the simple irrigation set tubing (transurethral resection-TUR set) which we use for every PCNL/TUR case, can be conveniently fashioned into a nephrostomy tube following complex PCNL procedures.

CASE REPORT

A 63-year-old female admitted for planned right PCNL for a 2 cm proximal ureteral calculi. Cystoscopic placement of ureteral catheter performed and patient positioned prone. Infra-coastal, inferior calyx entry was achieved and 22 French (Fr) amplatz secured. During nephroscopy stone migrated into the upper calyx. The application of excess torque on the parenchyma led to a torrential bleed. Decision taken to abandon the procedure. We were exploring options for a wider calibre nephrostomy tube for better tamponade and in that search we found that the irrigation set tubing attached to the nephroscope was better suited (20 Fr size with adequate pliability). The usual NTs available in our operating theatre (suction catheter, Malecot catheter, Pigtail catheter) are of a small calibre (<16 Fr) which might not suffice in face of ongoing haemorrhage. The large calibre foley catheters have a branching tail which hinders amplatz removal.

Hence, spontaneous decision to use a TUR irrigation tube, being adequate size and pliable and controlled via a thumb-operated clamp, was fashioned as a nephrostomy tube which passed through the 22 Fr Amplatz sheath with ease. Patient's postoperative haemoglobin was monitored and once urine cleared, we revisited for a second-look PCNL after 48 hours. Contrast initially instilled through our nephrostomy tube and second puncture taken in superior calyx and stone was cleared. Nephrostomy tube was removed after clearing the stone. The patient was discharged 48 hours after the procedure, 100% stone free with no post-op complications.

Following this case, we found multiple advantages with this irrigation set tubing, that too without any added cost and hence we started using an irrigation tube in situations needing nephrostomy tube for either tamponade or relook in 1-2 days' time in our PCNL cases.

The technique

The already utilized irrigation tubing is detached from its nephroscope connection and cut for a length of 35-40 cm and the cut end is placed into the amplatz sheath under fluoroscopic guidance. Contrast agent can be injected from back of the tube with the help of a ureteral catheter adapter already attached to the indwelling ureteral catheter or directly attaching a syringe to flexible latex tubing and the position of the tube is confirmed. Amplatz sheath removed over the tube easily as there is no widening or branching of the tail end. Now the thumb operated clamp is inserted and the clamp is activated and tube fixed to skin with sutures. Urine bag is attached to flexible latex tubing (Figure 1).

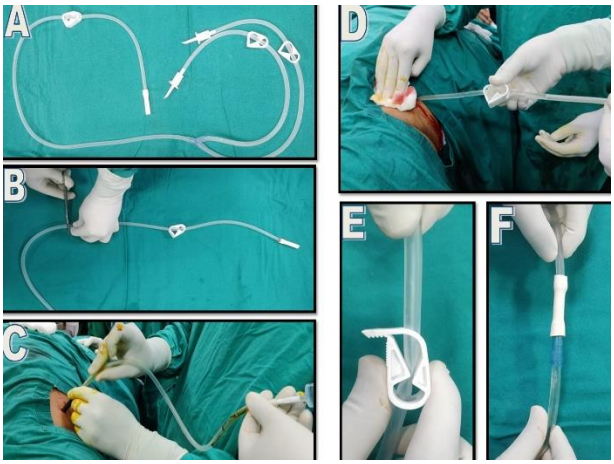

Figure 1: Explaining stepwise technique.

DISCUSSION

Bellman first introduced the idea of a tubeless PCNL procedure, challenging the need for a NT. This further gave the idea for a totally tubeless PCNL, without the use of either a NT or an antegrade DJ stent.[3,4] Our institute's protocol places emphasis on tubeless PCNL procedures, with NT insertion only in complicated PCNL procedures i.e. infection, haemorrhage, planned re-look. In the reported case, we demonstrate the use of an irrigation set tubing as a make-shift nephrostomy tube.

Although PCN insertion is standardized, the material of the tube used is not. Tubes are made of silicon, polyurethane, and latex. None superior to the other.[2] Our Irrigation nephrostomy tube is universally available for every PCNL case on table and made of non-toxic latex free material. This irrigation tube is non traumatic, pliable with a size of 21 Fr which is suitable for all conventional PCNL cases (≥22 Fr) where in majority of the haemorrhagic compilations occur (Figure 2). Varied trials have tried to justify a better option based on the size/calibre used. Maheshwari et al concluded that a smaller 14 Fr Pigtail catheter, compared to a larger 28 Fr end hole PCN tube had better outcomes, however they incorporated only simple, non-complex PCNL cases.[5] Cormio et al sided towards Large bore tubes for similar hemorrhagic cases to reduce the overall complication rate of complex PCNLs.[6] Foley's catheter is another universally available, bigger calibre tube but has its own set of disadvantages, such as the presence of a balloon channel as a branching tail which hinders amplatz removal and the balloon inflation may potentially occlude one or more calyces and cause pain if balloon is overinflated. Irrigation tube is easy to insert, without a broadening tail end or a tail branching, so as to facilitate easy removal of the Amplatz sheath around it.

Irrigation nephrostomy tube is very economical especially in Indian setting as it is already a part of the operative armamentarium and no additional cost is borne by the patient.

Figure 2: Size of tube compared to known Amplatz sheath sizes.

Advantages

The advantages include: universally available, sterile tube, nontoxic latex free tube, no cost involved, neither too big nor too small (20 Fr size) for a standard PCNL (>20 Fr), already available ready to use thumb operated clamps, non-traumatic pliable tube, easy connection to urine bag (tip has flexible latex tubing), no bulky or branching tail (easy to remove Amplatz tube, thumb operated clamp or stopper can be removed and replaced easily), radio-opaque, easy to insert guidewire in relook PCNL, and easy to inject contrast (contrast agent can be injected from back of the tube with the help of an ureteral catheter adapter or directly attaching syringe to flexible latex tubing).

Considering these advantages with no additional cost involved, we suggest this irrigation nephrostomy tube for short term placement, to tide over any complexity during a PCNL, with a planned relook after 24-48 hours and thus warrants a detailed study for future use.

CONCLUSION

Economical, practical and universal, the irrigation set tube is a good alternative as a short term nephrostomy tube, especially in haemorrhagic complications with the need of relook PCNL. It matches up to the already established nephrostomy tube alternatives, and warrants a detailed study for future use.

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