

Short Communication

Catheterization related urethral injury in periphery due to improper technique

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ABSTRACT

Background and Objectives: Catheterization related urethral injury (CRUI), particularly in men, is common and produces significant morbidity. However, it seems to have gathered little interest of concerned authorities towards prevention. The objective of the study is to reveal that many CRUI are usually due to improper technique.

Material and Methods: This is a retrospective and descriptive study carried out at Janaki Medical College & Teaching Hospital, Janakpur between May 2013 and September 2016. It included 18 male patients presenting in emergency with acute CRUI. Re-catheterization was attempted by experienced surgeons in them unless there was history suggestive of urethral stricture and the outcome was analyzed.

Results: Mean age of the patients was 62.9 ± 17.7 (range: 22 - 90) years. When the consultant attended them, 8 (44.4%) patients had catheter in place with intraurethral balloon inflation (IUBI), and 10 patients had catheter removed. One patient in each group had scrotal hematoma suggesting urethral perforation. Excluding two patients with typical history suggestive of urethral stricture, manual urethral re-catheterization was attempted by surgeon in 16 patients and succeeded in 12 (75%) patients, which was remarkable. Rest of the 6 patients had suprapubic catheterization.

Conclusion: Most of the CRUI results from technical fault and are potentially preventable.

Key Words: Catheterization technique, Urethral injury

INTRODUCTION

Urethral catheterization is generally performed by junior doctors and other health workers. Though often taken lightly, improper technique may result in significant

morbidity. An important complication is catheterization related urethral injury (CRUI) particularly in men. There are few case reports [1-3] and few institution based studies [4,5]. However, its incidence is largely unknown. We get frequent call from

emergency department for CRUI. Apart from immediate morbidity due to hemorrhage, pain, added hospital stay and cost, its late sequelae like urethral stricture produces prolonged morbidity and imposes huge financial burden. Most of these injuries are due to technical fault and are preventable [4]. With limited available data, we made a preliminary effort to study CRUI in males and reveal that such injuries are usually due to improper technique. This knowledge would also throw light on the need for planning and implementing preventive strategies to reduce a common morbidity in our community people.

MATERIAL AND METHODS

This is a retrospective and descriptive study carried out at Janaki Medical College Teaching Hospital, Janakpur between May 2013 and September 2016. It included all male patients presenting in emergency with clinical features of acute CRUI. Exclusion criteria were females, children (< 18 years of age), meatal stenosis, urethral stone, injury produced by self-pulling-out of catheter and accidents. The Patients who met the inclusion criteria were identified from emergency register and author's personal record. Then their record files were explored for relevant information regarding demographics, comorbid conditions, clinically suspected reason for first catheterization, pattern of injuries like intraurethral balloon inflation (IUBI), urethral perforation or hemorrhage and failed catheterization, and emergency management by experienced surgeons. Records of 32 patients with CRUI were found. Twenty four had records of treatment by surgeons. However, reasonable information was available only for 18 patients which were studied.

When catheter was not in place at the time of assessment by surgeon, CRUI was clinically diagnosed by history of catheterization followed by frank blood at meatus. When catheter was in place diagnosis of IUBI was labeled based on severe persistent pain in the urethra usually associated with frank blood at meatus and/or urobag, with or without palpable Foley-balloon in the perineum, and active bleeding at deflation of the balloon. When doubt existed of IUBI it was confirmed by ultrasound finding of absence of Foley-balloon in the bladder. Urethral perforation was diagnosed by perineal/scrotal hematoma developing after traumatic catheterization. There was no provision for immediate retrograde urethrogram or urethroscopy to further rectify the pattern of injuries.

Reason for first catheterization was acute or near retention of urine in almost all the patients. Benign prostatic hyperplasia was suspected in patients over 50 years with history of intermittency and little improvement or deterioration with straining. Urethral stricture was suspected by history of persistently weak though uniform urine stream and improvement with straining. Urinary tract infection was suspected in young patients who had previously normal urine stream and gave history of acute onset burning micturition for a few hours to a few days prior to retention. Objective evidence of etiological diagnosis was clear in few patients before discharge.

Many patients already had first catheterization before presenting in the emergency department. Some had multiple trials in emergency also by health workers and junior doctors. Except in patients with clinical features strongly suggestive of urethral stricture, re-catheterization was

attempted by experienced surgeons. Those with successful catheterization were discharged either from emergency or after a few days of admission. All failed ones had suprapubic catheterization (SPC).

Statistical analysis was done in MS-Excel 2010. Demographic parameter (age) is presented in terms of mean, standard deviation and range, and other variables are presented in terms of absolute values and percentages.

RESULTS

Mean age of the patients was 62.9 ± 17.7 (range: 22 - 90) years. Causes of retention of urine and number of patients with IUBI are shown in the table. Out of 18 patients 10 had no catheter and 8 had IUBI (44.4%) when the consultant attended them. One patient in each group (with and without catheter) had urethral perforation.

Two patients without catheter gave typical history suggestive of urethral stricture and were directly subjected for SPC. Remaining 16 patients were re-attempted for urethral catheterization by surgeon and succeeded in 12 (75%) patients, which was a remarkable finding of this study are as shown in figure 1 and table 1.

One patient with clinically suspected urethral perforation had 10 Fr catheter, and surgeon's re-attempt with 16 Fr catheter and gentle manipulation of bulbar urethra from perineum made it a successful attempt. Re-attempt of urethral catheterization by surgeon failed in 4 (25%) patients (two with IUBI and two without catheter). The latter included a patient with paraplegia also. These 4 patients already had multiple attempts of catheterization before, and finally had SPC. At

the time of discharge all patients with successful urethral catheterization as well as SPC were comfortable, drained urine satisfactorily and hematuria subsided.

DISCUSSION

Modern Balloon catheter was designed by Dr Frederic Foley in 1929 [6]. Though very useful, its use as urethral catheterization is replete with complications. In 1988 Kunin published comprehensive indictment of the Foley catheter [7]. The times reported: It has rightly been said to be healthcare's hidden scandal of neglect that the Foley catheter, a device originated in the 1930s and which is directly responsible for tremendous morbidity and significant mortality, is still in routine long-term clinical use today [8].

There are several studies reporting the effects of placement of urinary catheters for longer duration [7,9]. However, studies about iatrogenic injury to the urethra caused by improper technique are scarce. In a study conducted at a tertiary care center, Thomas et al reported that out of 51 catheter related complications by intern doctors, urethral trauma was most common (67%). IUBI was found in 6 (12%) patients [5]. The present study differs in that it included CRUI mostly from periphery and the person who inflicted initial trauma is not clear. Also it included only acute injuries that may be the reason of higher percentage of IUBI. In another institutional based study, Kashefi et al reported the incidence of iatrogenic urethral injury to be 14 per 4,310 male admissions. After appropriate intervention to minimize it, it reduced to 3 per 4,523 male admissions. This represented a statistically significant decrease in risk by a factor of 4.9 ($p = 0.006$).

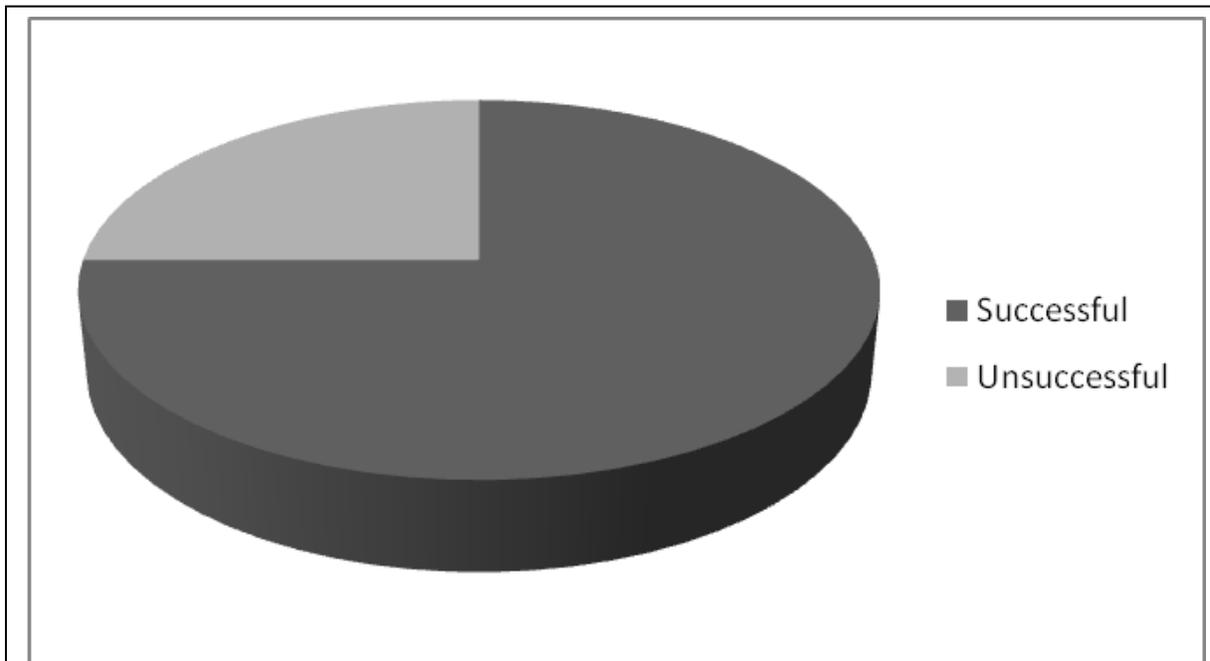


Fig 1: Result of re-urethral catheterization by experienced surgeon in patients with CIUI.

Table 1. Causes of retention of urine, no. of IUBI, and outcome of urethral re-catheterization by experienced surgeon

Cause of AUR	No of patients	IUB (no)	Successful urethral re-catheterization (no.)	Failed urethral re-catheterization (no)
BPH	9	6	8	1
Urethral stricture	2	0	-	-
UTI	2	1	2	0
Paraplegia	1	0	0	1
Unknown	4	1	2	2

[4]. So, this study also suggests that effort made for improvement in technique of catheterization prevents most of the CRUIs.

Subramanian et al reported that patients with spinal injury were at increased risk of intra-urethral Foley catheter balloon inflation because of lack of sensation in urethra, urethral sphincter spasm, and false passage due to previous urethral trauma [1]. These

types of patients require meticulous technique and precaution during catheterization.

Limitations are as follows. Number of patient is less and valid conclusion may be difficult to draw. It does not clarify how often catheterization is traumatic in periphery and in hospital. Likewise technical problems which lead to traumatic catheterization are

not clear. Post-discharge management and follow-up is not discussed. This was because follow-up record keeping was not proper. Being a retrospective study a few more limitations are not unexpected.

At the end, the author feels it worth mentioning some suggestions for juniors to minimize CRUI based on his experience.

- Frequently small size catheter is seen to be used for BPH. Smaller size catheter may coil up in slit like widened urethra predisposing to IUBI. So, use larger size catheter (say 16 or 18 Fr). It can be usually distinguished clinically from urethral stricture by proper history as mentioned above.
- Probably the most important reason for most unsuccessful and traumatic catheterization, in absence of urethral stricture, is non-installation of lubricating lignocaine jelly in the urethra. Mere lubrication of catheter tip with jelly is not enough. Pain during catheterization causes spasm of sphincter, and undue force applied at catheter tends to make a false passage. Once false passage is made, tip repeatedly tend to lodge in it and becomes difficult to redirect the tip towards normal passage.
- Another advantage of jelly installation is that free passage of jelly gives important clue to absence of urethral stricture. After installation of the jelly wait for at least 2-3 minutes for the anaesthesia to produce its effect.
- Do not exert excessive force when catheter does not pass easily or else you may create a false passage. Rather

withdraw and gently try again. It is wise to seek expert help if it is repeatedly impeding.

- Before inflation of the balloon one must make sure it is inside the bladder.
 - Mere noticing of urine in drainage tube does not ensure balloon in the bladder. It may just be jelly or urine from the urethra or just tip only may be in the bladder. There should be free flow of urine.
 - Catheter should be completely inserted up to the bifurcation of the catheter. If the catheter tends to recoil, it is less likely to be in the bladder.
 - While inflating balloon, one must look at patient's face. If patient winces, something is wrong with balloon position. Pain of IUBI is not masked by anesthetic jelly.

CONCLUSION

Most of the CRUI results from technical fault. This problem needs to be further rectified by larger well-designed prospective studies and emphasis should be laid on training of health workers and junior doctors should this common morbidity be prevented.

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AUTHOR'S CONTRIBUTION

RKP– Overall conception and design of study;
VKJ– Acquisition of data and literature; **SC**–

Reviewed literature and discussion; **NS**–Data analysis and manuscript drafting; **PKT**–important intellectual concept and discussion during manuscript drafting.

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