



## Surgery

## SUPRAPUBIC PUNCTURE TECHNIQUE FOR PER-CUTANEOUS SUPRAPUBIC CATHETERIZATION IN PATIENTS ADMITTED WITH ACUTE URINARY RETENTION: A TIME-BOUND DESCRIPTIVE RISK-BENEFIT ASSESSMENT

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**ABSTRACT** **Background:** Per-cutaneous Supra Pubic Catheterization is a common procedure done to treat acute retention of urine when transurethral catheterization is not possible in patients. Supra Pubic Catheterization is a simple solution for indwelling catheterization but there are no standard guidelines available for it. Study was carried out to evaluate the risk and benefit of supra pubic puncture technique for per cutaneous Supra Pubic Catheterization. Supra Pubic Catheterization was done via Seldinger method using SUPRACATH PLUS catheter. **Method:** After ethical clearance, a hospital-based time-bound descriptive study was carried out over a period of two years. Patients with acute urinary retention for whom SPC was indicated were selected for the procedure. Procedure was completed within one puncture. Pain during and after two hours from the procedure was measured with VAS scale and complications were noted. **Result and conclusion:** The mean (SD) time for performing the procedure was 6.3(1.3) minutes. median VAS score of pain during and after 2 hours of procedure were 2(±1) and 0(±1). Complications were observed among 8.5% patients in which haematuria was the most common followed.

**KEYWORDS :** Suprapubic catheterization, urinary retention, risk-benefit ss, descriptive study

### Introduction:

Normal voluntary emptying of the bladder is a reflex function involving the motor and sensory pathways and this reflex is exerted through upper motor neurons, and at least one pyramidal tract is functioning normally. The type of incontinence depends on behaviour of the spinal reflex. When depressed, urine is retained and later followed by overflow incontinence. However, when the spinal reflex is exaggerated, precipitancy of micturition occurs. Lesion of the posterior column tracts results in an atonic bladder. Paralysis of the sphincter vesicae and dribbling incontinence. Supra Pubic Catheterization (SPC) can be applied as a simple solution for indwelling catheterization in patient with severe incontinence or neurogenic bladder outlet dysfunction.(Hall et al., 2019)

Common techniques for percutaneous suprapubic catheterization Seldinger technique, stainless trocar and cannula, suprapubic balloon catheter with trocar and direct cystoscopic visualization.(Patel, Wong, Commander, Kim, & Bream, 2021)-(Jane Hall, Harrison, Harding, Reid, & Parkinson, 2020)

Inevitably, the use of an SPC subjects' patients to the risk of complication. Occasionally complications such as haematuria, catheter displacement, SPC site bleeding, infection, intestinal perforation may occur.(Hall et al., 2019)

This study was designed to evaluate risk and benefit of supra pubic puncture technique for per cutaneous supra pubic catheterization with regards to indication of Percutaneous SPC, surgical time, VAS during procedure and 2 hours after procedure, number of punctures required for catheter placement history of previous abdominal surgery or abdominal radiotherapy or previous Cystostomy and the involved complications.

### Methodology:

A time-bound descriptive study was carried out in the Department of Surgery, SSG Hospital, Baroda, after taking the approval of Institutional Ethics Committee for Biomedical and Health Research (IECBHR), Medical College and SSG Hospital, Baroda.

From September 2017 to December 2019, the number of patients admitted to the department with acute urinary retention in which a urethral catheter could not be passed, such as prostatic enlargement secondary to benign prostatic hyperplasia, urethral trauma, complicated lower genitourinary tract infection, and the need for long-term urinary diversion, were taken.

After taking the written consent, 82 patients were followed up and studied for the indication of Percutaneous Supra-Pubic Catheterization (SPC), total time between incision to catheter fixation, Visual Analogue Scale (VAS)(Thong, Jensen, Miró, & Tan, 2018) during

procedure and 2 hours after the procedure, number of punctures required for catheter placement and complications. The collected data was entered into a password protected Microsoft Excel spreadsheet and analyzed with Epi Info 7("Epi InfoTM | CDC," n.d.) and Medcalc software("MedCalc statistical software - free trial available," n.d.). The key output analysis for quantitative variables were summarized as the mean (standard deviation) and qualitative variables as proportions and percentages.

Each procedure was performed under the ultrasonographic assistance and local anaesthesia with 10 ml of 2% lignocaine injection. The diagnostic puncture was made in between umbilicus and pubic symphysis with the help of 18 G 1.5-inch needle and 0.5cms long stab incision was placed in skin and subcutaneous tissue. After making the incision, 5ml of 2% lignocaine was then infiltrated in prevesical space. Supra Cath Plus was then inserted via the incision with screwing movements and trocar was withdrawn. Bulb was inflated once clear urine comes and catheter was secured with silk no 1 on cutting needle. The catheter used in this study was foley catheter manufactured from 100% silicon, non-toxic and non-irritant material designed for cystostomy and suprapubic drainage.

### Results:

Total 82 male patients were included in the study. Indication for the procedure is given in the figure 1. Other associated factor for the surgery was past history of abdominal surgery (20%) followed by past history of cystostomy (18%). The procedure was completed within one puncture in all the patient. (Table 1, Figure 1)

The mean (SD) time for the procedure was 6.3(1.3) minutes. The maximum time for doing the procedure was 10 minutes and minimum time for doing the procedure was 5 minutes. Pain during and after two hours from the procedure was measured with VAS scale. Median (IQR) VAS score at the time of procedure was 2(±1) and median (IQR) VAS score after two hours from the procedure was 0(±1).

Complications were developed in 7(8.53%) of patients among them haematuria was the main among them. Other complications are mentioned in the (Table: 2).

### Discussion:

Percutaneous suprapubic catheterisation is a frequently performed method for urinary drainage. It is an effective and alternate method to urethral catheter as it is easily manageable and protect urethra as well as decreased bacteriuria and decreased nursing care. Some studies even regard SPC superior to TUC, by reducing the risk of urethral stricture when treating urinary retention due to BPH or performing transurethral resection of the prostate.—"(Horgan, Prasad, Waldron, & OSullivan, 1992)(Hammarsten & Lindqvist, 1992). In our study we have used SUPRACATH PLUS catheters for the suprapubic

cystostomy which is available in the set of suprapubic balloon catheter with available silicon trocar.

A study done by NK Goyal et al revealed that mean age for doing catheterisation was 42.4 years.(Goyal, Goel, & Sankhwar, 2012) The average age of patients was 65.2 (±17.9) years in a study done by Kriegmair MC.(Kriegmair, Mandel, & Ritter, 2015) In our study average age found in the study was 44.21(±16.35) years. There is no similarity in age group is found between other studies and as the procedure is related with indication related to urethra the relation of procedure with age cannot be commented upon. The main indication for SPC was stricture urethra, rupture urethra and BPH in our study which is supplemented by article by CJ Corder which describes most common indication was urinary retention when urethral catheterisation is not feasible. (Corder & LaGrange, 2021)

Mean operative time for the procedure done by according to a study done by Kriegmair MC et al was 9.3±4.7 in which they have used Suprapubic catheter(the set contains dilated balloon catheter with guided wire).(Kriegmair et al., 2015) The mean (SD) time for the procedure in our study was 6.3(1.3) minutes. It suggests that which suggest readily available catheter with trocar made up of silicon is more feasible for surgeon as well as for patient as it requires less operative time. Pain is measured using VAS, patients were asked to give a number according to their experience from 0 to 10 considering "0" as no pain and "10" as worst pain.

A systemic review done for the comparison of Suprapubic catheterisation and TUC revealed that postoperative pain was less in the suprapubic catheterisation as compared to TUC (Mean difference: -0.70, p=0.04).(Li et al., 2019) This highlights the superiority of Suprapubic catheterisation over TUC. In our study mean VAS score during procedure is 1.7 and mean VAS score after 2 hour is 0.34.As per MC Kriegmair study VAS score during and 2 hour after procedure was 2.3(±1.1) and 0.3(±0.5) respectively. It claims that the placement of the SPC was more tolerable in readily available suprapubic catheter with trocar made up of silicon.

Sheriff published the largest data of retrospective series of 157 patient who had inserted under controlled condition in the operation theatre under cystoscopic guidance. They reported 10% complication rate with 2.7% incidence of bowel injury (Sheriff et al., 1998) and in our series we found the overall complication rate is 8.5% which is quite similar to the Sherrif's study. A study done by Carmel G Cronin et al also has a 13 case of small bowel injury as they had used foley and pigtell catheter(Cronin et al., 2012) while we did not found any case of small bowel injury in our study.

Hematuria or SPC site bleeding are common problem within first hours following SPC insertion. In our study haematuria occurred in 7.3% patient with no SPC site bleeding and it was noted 11.5% in a study by MC Kriegmair(Kriegmair et al., 2015).(Kriegmair et al., 2015) Puncture cannula is notably smaller in supracath plus than in conventional sets, hence likelihood of vessels injury is smaller and so less bleeding.In our study no case for displacement of catheter was found, while Carmel G Cronin et al found 2 case of catheter displacement.(Cronin et al., 2012)

Generally Suprapubic catheterisation offers great satisfaction to the patient and convenient for the performing the Doctor. In our study we found good satisfaction in the patient. Certainly, we have limitations in our study that we have not compared the other conventional method of SPC with the technique we have used and other limitation is we did not follow up the patient for the relevant long-term complication. Nevertheless, our study is prospective series with selected patients for evaluation of Supracath plus catheter for SPC.

**Table: 1 Age-group wise distribution of patients**

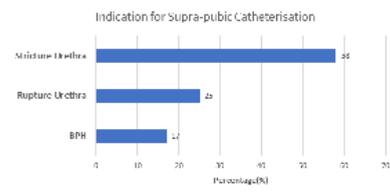
Age group	Number of patients	percentage
18-25	6	7.3%
25-50	43	52.4%
50-75	22	26.85%
75-100	11	13.41%

**Table: 2 Complication followed by Supra-pubic catheterisation**

Complication	No of patient	Percentage
Haematuria	3	3.65%

Catheter displacement	0	0%
SPC site bleeding	1	1.2%
Wound infection	1	1.2%
Clot retention	2	2.1%
Intestinal perforation	0	0%

**Figure: 1 Indications for Suprapubic Catheterisation**



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