

# Effectiveness of Full Length and Cut Percutaneous Nephrostomy in Pediatrics Population

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## ABSTRACT

**Background:** Purpose of the study is to evaluate the safety and efficacy of full length Percutaneous (PCN) versus cut PCN in pediatric population. PCN is performed to establish temporary drainage of obstructed or dilated renal system till definitive management. PCN is well established procedure which is performed under deep sedation, local anesthesia or general anesthesia ultrasound guided or fluoroscopic guided.

**Methodology:** Randomized controlled study carried out in 200 children in the department of urology, Institute of Kidney Disease, Hayatabad Peshawar Pakistan from Jan 2020 to Apr 2022 and analysis was done by using SPSS version 20 to know the efficacy of the cut versus full length PCN in children.

**Results:** This study was carried out over 200 children using cut and full length percutaneous nephrostomy tube, 100 in each group. This study includes 119 males and 81 females of mean age 5.49+ 3.127 years. The cause of obstruction was 61% PUJ obstruction, 55% VUR, 47% obstructed stone and other causes in 37% patients. Effective decompression of hydronephrosis were noted in 89% in cut length vs 82% in full end PCN ( $p < 0.1\%$ ). Skin inflammation of 100% with cut end PCN and 20% with full length, 96% of PCN didn't show any inflammation ( $p < 0.001\%$ ). Dislodgment of PCN was noted multiple time in 54%, two times in 38% and 7% in full length PCN where as it is noted two times in 47% and one times in 45% in cut PCN ( $p < 0.001\%$ ). PCN exchange was needed multiple times in 51% patients and two times in 39% patients in full length PCN where it was needed two times in 41% and one time in 50% patients in CUT PCN arm (0.001%).

**Conclusion:** This study concludes that cut end PCN is more effective in term of PCN exchange and dislodgement but having more skin inflammation as compared to full length PCN

## INTRODUCTION

PCN placement is done for the relief of urinary obstruction and urinary bypass. It is also done to access urinary tract for endoscopic procedures and for diagnostic tests [1]. Renal stone disease is epidemic in developing countries. Recurrence after surgery is higher in children than adults. [2]. In children due to access difficulties, open surgery was only available treatment in recent decades. Several open surgeries were commonly associated with comorbidities [3]. Both in adults and children PCN is commonly placed to relieve urinary tract obstruction.

PCN is temporarily placed to maintain new parenchyma and hence to minimize renal deterioration. It is also done to control infection and sepsis until definite procedure. [4,5].

In pediatric patients, PCN is used as a temporary drainage tube for urinary tract obstruction and as a bypass surgery prior to definitive corrective surgery [6]. Obstruction of the ureter-pelvic junction is the most common cause of significant dilatation of the renal collecting system in the fetus [7,8,9]. Kidney stone disease in children has become an epidemic in developing countries. Nephrostomy catheters are associated with prolonged hospital stay, urine leakage, and obvious postoperative pain and discomfort [10].

## METHODOLOGY

**Study Setting:** Institute of kidney diseases, Peshawar Pakistan

**Study Design:** Randomized controlled study

**Duration of Study:** 2 years study conducted on pediatrics population from Jan 2020 to Apr 2022

**Inclusion Criteria:** Children with diagnosed case of hydronephrosis

**Exclusion Criteria**

- Bleeding disorders
  - Anemia
  - Thalassemia
  - Age above 9 years
- Placement of Percutaneous Nephrostomy Tube

## RESULTS

This study was carried out 200 children using cut and full length percutaneous nephrostomy tube 100 in each group. This study includes 119 males and 81 females of mean age 5.49+ 3.127 years. The cause of obstruction was 61% PUJ obstruction, 55% VUR, 47% obstructive uropathy stone and 37% were having other anatomical cause. The result shows effective decompression of hydronephrosis 89% in full length PCN and 82% in cut end PCN (table\_1), skin inflammation of 100% with cut end PCN and 20% with full length, 96% of PCN didn't show any inflammation (table-2). Dislodgment of PCN was noted multiple time in 54%, two times in 38% and 7% in full length PCN where as it is noted two times in 47% and one times in 45% in cut PCN ( $p < 0.001\%$ ).

PCN exchange was needed multiple times in 51% patients and two times in 39% patients in full length PCN where it was needed two times in 41% and one time in 50% patients in CUT PCN arm (0.001%). (table- 4)

Table 1: Type of PCN \* effective decompression Cross tabulation

Type of PCN	effective decompression		Total
	yes	no	
Cut PCN	89	11	100
Full length PCN	82	18	100
Total	171	29	200

Table 2: skin inflammation Type of PCN Cross tabulation

	skin inflammation	Type of PCN		Total
		Full length PCN	Cut PCN	
yes	20%	100%	120	
no	80	0	80	
Total	100	100	200	

Table 3: Type of PCN \* PCN dislodgment Cross tabulation

Type of PCN	PCN dislodgment				Total
	dislodged 1 time	dislodged 2 times	dislodged multiple times	no dislodgment	
Full length PCN	7	38	54	1	100

Cut PCN	45	47	5	3	100
Total	52	85	59	4	200

Table 4: Type of PCN \* exchanged Cross tabulation

Type of PCN	Exchange of PCN			Total
	1 time exchanged	2 times exchanged	multiple times exchanged	
Full length PCN	10	39	51	100
Cut PCN	50	41	9	100
Total	60	80	60	200

## DISCUSSION

This randomized controlled study was carried out on children presented to the department of

Urology with hydronephrosis. Percutaneous nephrostomy was first described in 1955 by Goodwin et al. It is used to relieve blocked kidneys and became a widely accepted operation in children in the 1980's [11,12]. PCN is mainly used to treat obstructed renal

system secondary to urinary stones, urinary tract infections, acute renal failure and urinary tract obstruction [13-15].

In our study PCN dislodgement was mainly with full length PCN i.e 54% dislodged multiple times, 38% dislodges 2 times and 7% dislodges 1 time while in cut end PCN 45% dislodges 1 times, 47% dislodges 2 times and 5% dislodges 1 time while study conducted in Yavascan pediatric nephrology in Infants and young children are concerned about catheter damage and displacement because these patients cannot properly care for the catheter [16]. While a study conducted in Evangelismos hospital in Greece shows that stent displaced in 3.5% of the patients [17].

A small catheter passed through the needle and X-rays were taken for drainage and renal localization. The percutaneous route to establish multiples has been shown to be safer, faster, easier and cheaper than surgery in repeated studies [18]. Percutaneous catheter drainage of the urinary tract is most often used for obstruction. It can also provide access for renal stones treatment, stenting, and other manipulative techniques [19,20].

## CONCLUSION

This study concludes that cut end PCN is more effective in term of PCN exchange and dislodgement but having more skin inflammation as compared to full length PCN

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