

Evaluation of the Role of Circumcision in Reducing Symptomatic Urinary Tract Infection Following Valve Ablation

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Abstract

Aim: The aim of this single center short-term prospective study is to determine the effects of circumcision in reducing the risks of symptomatic urinary tract infection (UTI) in post posterior urethral valve (PUV) ablated patients and to compare them with their non-circumcised counterparts.

Objective: The specific objective of this study in the group includes: a. To identify patients with PUV who develop UTI with subsequent renal damage. b. Proportion of children with symptomatic UTI in each group. c. Relative risks of presenting with symptomatic UTI after PUV ablation and. d. To analyze statistically when circumcision really reduces the incidence of UTI in valve ablated patients.

Materials and Methods: A single institutional prospective study of patients who were admitted with PUV between April 2016 and September 2017 Institutional Ethics Committee Clearance and informed consent of the parents were taken. Boys with congenital anomalies along with hypospadias and epispadias or any other condition rendering circumcision impossible were excluded from the study.

Results: We identified 38 patients in all of whom 23 underwent circumcision at the time of valve ablation. The mean age of these patients was 41.22 days on a mean follow-up period of 1 year. Only one patient (4.35%) in the circumcised group had two episodes of UTI, whereas three patients (20%) who had not undergone circumcision had five episodes of UTI.

Conclusion: Circumcision along with PUV ablation does protect these patients from post-ablation symptomatic UTI and thus is protective against ongoing renal damage.

Key words: Circumcision, Urinary tract infection, Posterior urethral valve

INTRODUCTION

Posterior urethral valve (PUV) is the most common urethral anomaly that causes bladder outlet obstruction in male child.^[1] The incidence ranges from 1 in 5000 to 1 in 8000 male births.

Although majority of the diagnosis is made in the antenatal period about 24%–45% of the patients suffer from renal

insufficiency during childhood or adolescence and require transplantation within their first 18 years of life.^[1,2]

The patients with PUV are prone to develop recurrent urinary tract infections (UTI) because of multiple causes, namely, vesicoureteric reflux, valve bladder, and subvesical obstruction^[3] with or without bladder neck hypertrophy.

It has been widely accepted that circumcision prevents UTI through there are controversies regarding the age of operation and risk profile of the patients.^[4]

Our study aims to find a correlation between the risk and incidence of symptomatic UTI in post ablated cases of PUV and compare it with those who did not undergo circumcision following valve ablation.

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MATERIALS AND METHODS

Single institutional prospective study was carried out between April 2013 and September 2014 with informed consent from the parents and approval of the ethical committee. Patients were selected consecutively with the inclusion criteria of the patients with PUV.

Inclusion Criteria

Boy diagnosed with PUV within the first 3 years of life.

Exclusion Criteria

Boys with various phallic anomalies such as hypospadias or epispadias which renders circumcision impossible were excluded in the study.

Surgical Technique

Cystoscopic valve ablation (at 5'O', 7'O', and 12'O' clock position) with bladder neck incision in appropriate cases following circumcision was performed under general anesthesia with per-operative antibiotic coverage (coamoxiclav) which was continued for 3–5 days postoperatively.

Rapidly absorbable polyglactin 910 suture was used for hemostasis and patients were put on the catheter.

We follow-up protocol consists of

- Voiding cystourethrogram (VCUG) 3 months post valve ablation
- Serial estimation of serum urea, creatinine, and routine microscopic examination of urine at monthly intervals for 3 months followed by 3 monthly interval for the next 5 years
- US of the kidney, ureter, bladder along with an estimation of post-void residue every 6 months for 3 years and thereafter annually for 20 years

Table 1: Age distribution of patients who had undergone circumcision along with PUV ablation

Age in days	Total number of patients
0–60	16
60–180	5
>180	2
Total	23

PUV: Posterior urethral valve

Table 2: Mode of diagnosis in patients with PUV

Method	Number of patients	
	Circumcised	Un circumcised
Antenatal US	14	6
Post-natal US	21	12
VCUG	22	13
Cystoscopy	23	15

PUV: Posterior urethral valve, VCUG: Voiding cystourethrogram

- Urodynamic study in all cases emphasizing on bladder compliance and PdetQmax.

Drainage of the bladder from 3 post-operative days, no dressing was applied.

Patients were followed up in the outpatients department. Parents were specifically asked to report immediately if their wards suffer from any of the following conditions.

- High rise of temperature
- Crying during micturition
- Turbid urine
- Hematuria
- Dysuria or any other symptoms pertaining to UTIs. Patients suffering from UTI were admitted and started on broad-spectrum antibiotics pending urine culture sensitivity report and associated resuscitative measures were taken. Parenteral antibiotics once started were continued for at least 7–10 days and later shifted to oral medications until the urine becomes sterile. Thereafter chemoprophylaxis was continued till the upper tract dilation improves, which may take several years.

RESULTS

Thirty-eight patients of PUVs were admitted to the study group. Twenty-three underwent circumcision at the time of valve ablation which 15 did not. The mean age of these patients was 41.22 days [Table 1].

All the patients in both the groups had antenatal and post-natal US, VCUG, and cystoscopy for the diagnosis of PUV [Table 2].

Among the 23 patients who had undergone circumcision at the time of valve ablation, nine (39.13%) had undergone urinary diversion for various reasons. One patient had high diversion and the rest had vesicostomy. Correspondingly, the number of patients who had undergone urinary diversion in the other group was 6 (40%). Valve ablation was done about 4–6 weeks later after the patients became hemodynamically and biochemically stable [Table 3].

On the mean followup period of 1 year only one patient (4.35%) in the circumcised group had suffered from Urinary tract infection after posterior urethral valve ablation.

The number of patients suffering from UTI after PUV ablation with 1 year follow-up had two episodes of UTI, whereas three patients (20%) who had not undergone circumcision had five episodes [Table 4].

Table 3: Mode of treatment in a patient with PUV

Group of patients	Primary	After diversion	
Number of PUV patients with circumcision	14	(After vesicostomy) 8	(After ureterostomy) 1
Number of PUV patients without circumcision	9	5	1

PUV: Posterior urethral valve

Table 4: Number of patients suffering from UTI after PUV ablation with 1 year follow up

No of patients with and without circumcision	Number of patients	Number of episodes
With circumcision	1	2
Without circumcision	3	5

PUV: Posterior urethral valve, UTI: Urinary tract infection

DISCUSSION

Boys with PUVs are at increased risk of suffering from febrile UTI apart from bladder dysfunction and renal damage.^[3] Several studies had shown that circumcision reduces the risk of UTI^[5] but there is a scarcity of data regarding the effect of circumcision in PUV patients.

Circumcision is an age-old surgery and is the most common surgical procedure carried out on pediatric population.^[6] It is well accepted now that circumcision confers several benefits such as reduced incidence of UTI, sexual transmitted diseases, penile malignancy, acquired phimosis, paraphimosis, and a reduction in the occurrence of human papillomavirus related cervical cancer in female sexual partners. The reduction of zipper injury of the prepuceal skin is also a known benefit of circumcision. A meta-analysis by Greval *et al.*^[5] has concluded that circumcision reduces the risk of UTI. They have stated that for a given risk of UTI in normal boys of about 1%, the number of boys needed to be treated to prevent one UTI is three. This figure goes down to 1–2 and 1–4 in 10% and 30% approximately for boys with recurrent UTI and high grade (>3) reflux, respectively. Hemorrhage and infection are the most common complication of circumcision, occurring at a rate of about 2%–10%. They concluded that the net clinical benefits are likely only in boys who are at high risk of UTI. Hence, their study thus indirectly supports the hypothesis of practicing circumcision in PUV patients.

Mukherjee *et al.*, in their study, identified 78 patients who experienced severe eight episodes of UTI in an uncircumcised state. Twenty-seven of them were subsequently circumcised and they experienced only eight episodes of UTIs. Eighteen boys were diverted. The authors concluded that in PUV patients, circumcision reduces the incidence of UTI by 83% and that every circumcision prevents one UTI on an average.^[3] Our results also match with this large series, i.e., 1/23 (4.35%) patients who underwent circumcision had two episodes of UTI whereas 3/15 (20%) uncircumcised patients had five episodes of UTI.

CONCLUSION

Circumcision following PUV ablation does confer protection from recurrent UTI and thus is helpful in delaying the ongoing renal damage. However, larger randomized control trial should be considered to validate our contentions.

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