

RESULTS OF SURGICAL TREATMENT FOR SIMPLE URETHRAL FISTULA AFTER HYPOSPADIAS REPAIR: REPORT 52 PATIENTS

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ABSTRACT

Objective: Evaluate the results of surgery to treat simple urethral fistula after hypospadias surgery

Methods: Patients diagnosed with the simple urethral fistulas after hypospadias repair. Prospective study, case series description.

Results: In the period from March 2019 to July 2021, 52 patients had an average age 8.6 years old. Classification: fistula for first repair in 32 patients (57.5%) and recurrent fistula in 17 patients (42.5%). 52 patients with 56 fistulas were classified into coronal 21.4% (12/56), penile 78.6% (44/52 pts). No more prepuce in 77 patients (90.4%).. The technique: Fistula suture 10 patients (25%), fistula patch by rotational skin flap 18 patients (45%), urethroplasty 14 patients (26.9%). Results: The overall successful ratio for urethral fistula repair was 80,8% (42/52), recurrent fistula was 19.8% (10/52). The successful ratio for fistula for first repair was 84.4% (27/42) and for recurrent fistula was 75% (15/42). The successful ratio of fistula suture was 95.3% (20/21), of fistula patch by rotational skin flap was 64.7% (11/17), of urethroplasty was 78.6% (11/14).

Conclusion: Depending on the severity of the urethral fistula, surgical techniques such as fistula suture, fistula patch or urethral reconstruction are selected to have a high success rate.

Keyword: Hypospadias, Urethral fistula

I. INTRODUCTION

There are 3 main types of complications after hypospadias surgery including urethral fistula, urethral stricture, and penile curvature. Urethral fistula is the most common complication, followed by urethral stricture and penile curvature (1) . Urethral fistula can be found at any location on the urethral canal with different fistula sizes, it can be a simple fistula (2) or a complex fistula combined with urethral stricture and penile curvature penile (3) . Depending on the severity of Urethral fistula, there are different surgical techniques such as: closure, patch urethroplasty (2, 3) .

The success rate of urethral fistula surgery depends on the material used to create and

cover the urethra. There have been many studies in the world on the treatment of urethral fistula with recurrence rates ranging from 2.7% to 25.4% and if urethral fistula repair fails, the success rate of the next surgical repair will be also low (4, 5, 6). Therefore, urethral fistula is still considered a challenge for surgeons when treating hypospadias. The remaining problem when researching the treatment of urethral fistula is the need to choose surgical techniques for each type of urethral fistula and evaluate the success rate of those techniques. So we will gain experience in choosing and perfecting surgical techniques to achieve a high success rate when performing surgery to treat urethral fistula. Therefore, we carried out the topic: "Results of surgical treatment for simple urethral fistula after hypospadias surgery: report 52 patients".

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Research objective: Evaluate the results of surgery to treat simple urethral fistula after hypospadias surgery.

II. SUBJECTS AND METHODS

2.1. Subjects

Inclusion criteria: All patients (patients, pts) with urethral fistula after hypospadias surgery, including urethral fistula repaired for the first time or recurrent urethral fistula.

Exclusion criteria: Urethral fistula accompanied by urethral stricture and penile curvature.

Urethral fistula is defined as a connection between the two surfaces of the urethral epithelium and penile skin (7).

Penile curvature is determined when the penis is erect: there is an angle of ≥ 100 between the axis of the penis body and the axis of the glans.

Urethral stenosis is determined when small urine stream and urethral dilation detect urethral stricture.

2.2. Methods

Prospective study, case series description.

Research design: Prospective study, case series description

Study sample size: Convenient sample size

Research location: Department of Urology, Vietnam National Children's Hospital.

Research period: from March 2019 to July 2021

Main variables in the study: Including patient age, fistula location, fistula size, condition of the foreskin and skin around the fistula, types of surgical techniques to treat urethral fistula and surgical results.

Choose the type of surgical technique

Urethral fistula suturing (for grade 1 fistula)

Indications: when there is enough skin around the fistula, suturing does not cause narrowing of the urethral lumen. Usually applied to small fistulas.

Technique: suturing the fistula in 3 layers: urethral wall, subcutaneous tissue layer, skin.

Urethral fistula patch (for grade 2 fistula)

Indications: large fistula, fistula cannot be sutured. If the fistula is sewn closed, it will narrow the urethral canal or shorten the urethra.

Technique: Depending on the size of the fistula and the amount of skin around the fistula, the following materials can be applied to patch the fistula: skin flip flap, skin flap with vascular pedicle, free skin grafts.

Urethroplasty (for grade 3 fistula)

Indications: When the urethra is cannot be sutured or patch.

Technique: Priority is given to using skin flaps in place, skin flaps with vascular pedicles, and then skin grafts.

Calculate the average surgery time of different types of surgery techniques.

Evaluate treatment results

Time to evaluate results: Long-term results after surgery: ≥ 3 months.

How to evaluate results: Success or complications (2).

Success: No need for re-operation. Includes the following criteria: Penis is straight when erect, urination passes through the tip of the glans, urination is large and easy, no urethral fistula, no urethral stricture or urethral stricture but dilation with good results.

Complications: There are complications that require re-operation such as urethral fistula, urethral stricture, and penile curvature. These complications can be single or combined with each other.

Data processing: According to statistics.

Medical ethics: The topic was approved by the ethics council of the National Children's Hospital according to decision No. 1443/BVNTWVNCCSTE dated September 24, 2020.

III. RESULTS

3.1. Some clinical characteristics of the patients

Number of patients and average age (years)

The 52 patients had an average age of 7 ± 2.9 (3 - 14) years old, of which the average age of 32 patients with first fistula was 6.2 ± 2.4 (3 - 13) and of 20 patients with recurrent fistula is 8.6 (5-14).

Fistula location according to anatomy

Table 1. Anatomic fistula location

Fistula location Patient group	Foreskin groove	Penis, scrotum*	Total (56 holes/52 pts)	P
First fistula (32 holes/32 pts)	8 (66.7%)	24 (54.5%)	32 (57.1 %)	0,020
Recurrent fistula (24 holes/20 pts)	4 (33.3%)	20 (45.5%)	24 (42.9%)	
Total number of fistulas	12 (100%)	44(155)	56 holes/52 pts	

Size of the fistula

Table 2. Size of fistula: 52 patients had 56 fistulas.

Patient group	Size of fistula	< 4 mm*	≥ 4 mm	Number of fistulas	P
First fistula		18 (60 %)	14 (53.8%)	32 (57.1%)	P= 0,021
Recurrent fistula		12 (40 %)	12 (46.2%)	24 (42.9%)	
Number of fistulas		30 (100%)	26 (100%)	56 (100%)	

Note: * <1mm there was 1 fistula in the 1st fistula group.

Foreskin: Loss of foreskin in 47 patients (90.4%).

Classification of urethral fistula

Table 3. Classification of fistula into 2 types: partial fistula and complete fistula in 2 groups of urethral fistula

Patient group	Fistula type	Partial fistula	Complete fistula	P	Number of Patients
First fistula		23 (71.9%)	9 (28.1%)	P=0.022	32 (100%)
Recurrent fistula		16 (80%)	4 (20%)		20 (100%)
Number of Patients		39 (75%)	13 (25%)		52 (100%)

Remark: Partial fistula accounts for a high rate in both groups of urethral fistula and is higher than total fistula, the difference is statistically significant with P = 0.022.

3.2. Surgical techniques

Table 4. Surgical techniques and skin covering the urethra in 52 patients

Skin covering	Techniques	Fistula suture	Fistula Patch	Urethroplasty	Number of Patients
Skin around the fistula		18 (85.7%)	0 (0 %)	4 (28.6%)	22 (42.3%)
Rotating skin flap		3 (14.3%)	17 (100%)	10 (71.4%)	30 (57.7%)
Number of Patients		21 (100%)	17 (100%)	14 (100%)	52 (100%)

Average surgery time: Surgery time (minutes) for fistula suture is 56.4 ± 10.5 (n = 21), for fistula patch is 73.8 ± 19.4 (n = 17) and for urethroplasty were 117.9 ± 12.2 (n=14).

Evaluation of surgical results: Surgical results through average follow-up were 12.8 months (5-24 months).

Table 5. Surgical results of 2 groups of urethral fistula

Patient group	Results	Success	Complications	Number of Patients	p
First fistula		27 (84.4%)	5 (15.6%)	32 (100%)	0,022
Recurrent fistula		15 (75%)	5 (25%)	20 (100%)	
Number of Patients		42 (80.8%)	10 (19.2%)	52 (100%)	

Remark: The success rate of the first urethral fistula group was higher than the recurrent fistula group with statistical significance P = 0.022.

Table 6. Results according to 3 types of surgical techniques through follow-up: only success rate is calculated

Techniques	Patient group	First fistula	Recurrent fistula	Number of Patients	p
Fistula suture		93.8% (15/16)	100% (5/5)	95.3% (20/21)	0,022
Fistula patch		71.4% (5/7)	60% (6/10)	64.7%(11/17)	
Urethroplasty		77.8% (7/9)	80% (4/5)	78.6% (11/14)	
Number of Patients		84.4% (27/32)	75% (15/20)	80.8% (42/52)	

3.3. Postoperative complications

There were 10 patients with urethral fistula after surgery. Three patients were re-operated using fistula suture technique. Results: success in 1 patient in the first fistula group. Complications of re-fistula in 2 patients belonged to the recurrent fistula group, caused by infection in both of these patients.

IV. DISCUSSION

4.1. The characteristics of patients in the study

Age of patients

In our study, the average age of the patients was 8.6 years old. The age for surgery to treat urethral fistula in some studies according to foreign medical literature is: Awad M S (8) operated on 32 patients with an average age of 5 years. Mohamed S (4) operated on 35 patients with an average age of 3.5 years.

4.2. Evaluate the results of surgery to treat urethral fistula

Depending on the size of the fistula and the condition of the skin around the fistula, we prescribe and perform surgical techniques from

simple to complex such as suturing, patching, and reconstructing the urethra with the principle of ensuring circulation of the urethra, there is no risk of urethral stricture.

Evaluating the results of surgery to treat urethral fistula after 3 months from hospital discharge: Overall success for both types of urethral fistula is 80.8%, complications of re-fistula are 19.2%, which is a positive result. In our study: first-time urethral fistula had a higher success rate than recurrent fistula. This result is consistent with the results of urethral fistula treatment by some other authors.

Srivastava R.K (9) operated on 35 patients with urethral fistula with 60 fistulas and 41 surgeries. The success rate in surgeries to treat urethral fistula is as follows: Urethral fistula with

first surgery: In the first surgery, the success rate is 89%, complications of urethral fistula are 11%. Second-time surgical urethral fistula (recurrent fistula): re-fistula rate is 33.3% (1/3 patients) and success rate is 66.6% (2/3 patients).

The success rate of foreign authors (7, 8) shows that after the 2nd and 3rd surgery to close the fistula, the success rate is only 50-80%. Shankar and CS (6) in their study with 10 patients with recurrent urethral fistula had a success rate of 50% after the 3rd and 4th surgery.

According to the above surgical results, the complication rate in our fistula suture and urethroplasty is high but in the fistula patch technique, the recurrent fistula rate is high compared to urethral creation.

According to common inference, severe form will have a lower success rate than mild form. However, there are also research results showing that mild forms have a lower success rate than severe forms.

Research results of Muruganandham K (2010) (5) operated on 51 patients with urethral fistula divided into 3 groups according to fistula size: group I had fistula size < 2 mm (17 patients, 33.4%), group II fistula size 2 - 4 mm (21 patients, 41.2%), Group III had fistula size over 4 mm or multiple fistulas (13 patients, 25.4%). Group I had only fistula suture. Groups II and III were operated on to repair urethral fistula using the flip flap technique. Follow-up results of 3.5 years: there was no recurrent urethral fistula in group III (the most severe form) while group II (the second most severe) had a recurrent urethral fistula rate of 9.5 % (2 patients) and group I (the mildest form) has a recurrent urethral fistula rate of 25.4% (4 patients).

However, we also have to interpret our results ourselves to learn from experience. We think that the result of fistula patch has a higher complication rate than urethroplasty surgery, possibly because when fistula patch: The suture line of the subcutaneous tissue layer is often located close to the skin suture line and the suture line in the urethral canal wall and if this

subcutaneous tissue layer is thin and the blood supply is poor, the fistula is more likely to recur.

Therefore, we will need to pay more attention when using the subcutaneous tissue as an intermediate layer between the urethra and the skin and avoid overlapping sutures.

V. CONCLUSION

Depending on the severity of the urethral fistula, surgical techniques such as fistula suture, fistula patch or urethral reconstruction are selected to have a high success rate.

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