

SURGICAL OUTCOME OF CONGENITAL PENILE CURVATURE TREATMENT WITH CORPORAL ROTATION TECHNIQUE

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Congenital penile curvature (CPC) is a rare condition in men but has considerable impact on male sexual activity as well as their mental health. Many techniques had been proposed to manage this condition, however the corporal rotation technique had the advantage of preserving the penile length. Therefore, we conducted a study on 16 men with CPC who were treated with corporal rotation surgery to evaluate the outcome of this technique. The results showed that the mean degree of curvature was 51 ± 12.2 degree. The majority of patients had a moderate penile curvature (< 60 degree) and ventral curvature (75%). After the surgery, the residual curvature decreased significantly (from 51 ± 12.2 degree to 16.6 ± 6.34 degree with $p < 0.001$). We observed no remarkable changes in all penile dimensions including stretched penile length (13.6 ± 0.93 cm before the surgery compared with 13.3 ± 0.89 cm after the surgery with $p = 0.01$). Erectile function of the subjects was also significantly improved especially in the intercourse satisfaction domain.

Keywords: Congenital penile curvature, corporal rotation technique, erectile function.

I. INTRODUCTION

Congenital penile curvature (CPC) is the result of abnormal growth of the penile corpus cavernosum and is not associated with urethral malformation. CPC is a relatively rare disease with an incidence of less than 1% in men.¹ In most cases, CPC usually occurs on the ventral side of the penis but can also occurs laterally but rarely on the dorsal side.² The disease is usually discovered when boys start going through puberty and become more obvious while having an erection. In some cases, severe congenital penile curvature often interferes with sexual intercourse and affects a man's quality of life or even fertility.

Treatment techniques for penile curvature have progressed over time. Nesbit was the first surgeon to describe the method of correction

plication of the tunica albuginea in 1965.³ Since then, many improvements of this method have been done to improve efficiency as well as to reduce the risks of surgery. However, the disadvantage is the reduction in length of the penis by about 1.5 - 2.5cm.⁴ More recently, graft procedures that lengthen the short side of the penis have also been used. However, the effectiveness of this method in treating congenital penile curvature is still limited and not widely recommended.

Until 2006, the author Shaeer proposed a surgical method to correct congenital penile curvature based on the principle of rotation of the corpora cavernosa at a position opposite to the maximal concave curvature side of the cavernous body.⁵ As a result, the curvature of the corpora cavernosa will press against each other instead of the previous resonance and cancel the effect of penile curvature. Therefore, this method can correct the curvature of the penis without much impact on the length of the penis. However, this method is still new

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and has not been widely applied. Therefore, we conducted a study to evaluate the surgical outcome of congenital penile curvature treatment with corporal rotation technique.

II. METHODS

1. Research subjects and location

Research subjects

All patients with symptoms of penile curvature come to the hospital for examination and treatment at the Andrology and Sexual Medicine Unit - Hanoi Medical University Hospital.

Selection criteria:

- Patient has symptoms of penile curvature.
- Take a picture of the penis in maximum erection to determine the curvature and angle of curvature with two perpendicular planes from the top down and from the side according to Yachia.⁶ All patients with curvature $> 30^{\circ}$ were included in the study.

- Have surgery to correct the curvature of the penis according to the method of rotating the shaft of the corpora cavernosa (Shaeer III technique).

- Have completed the International Index of Erectile Function (IIEF).

Exclusion criteria:

- Have a history of penile trauma or penile fracture.

- Acquired penile curvature (Peyronie's disease) or hypospadias, urethral malformation.

- The patient could not be followed up during the study.

Location

Andrology and Sex Medicine Unit - Hanoi Medical University Hospital.

Time study

The study was conducted from July 2019 to July 2021.

2. Method

Research design

Descriptive longitudinal study.

Sampling and sample size

The sample size of the study was taken by the convenience sampling method. 16 patients who met all the criteria were recruited for the study.

3. Surgical procedure

The surgical procedure is based on the corporal rotation technique proposed by Shaeer et al.⁷

The patient was given spinal anesthesia in a supine position.

The surgeon makes an incision around the circumference of the penis about 2cm below the corona penis. The subcutaneous tissue was dissected, Dartos fascia to approached Buck's fascia, then the entire dissected tissue was degloved close to the base of the penis. A Garrot is placed at the base of the penile shaft. Artificial erection is then induced by saline injection through a butterfly canula inserted in the cavernosum. At maximum curvature, the angle of curvature was determined by a protractor and marked with a sterile pen, then the Garrot was removed. The tunica albuginea of the corpora cavernosa was exposed at a position opposite to the maximum curvature of the penis position.

- If the penis is curved on the lateral side, only dissection of the Buck's fascia on the opposite side is required.

- If the penis is curved toward the ventral side of the penis, dissection of the dorsal nerve bundle of the penis is required.

After the corpora cavernosa is fully exposed, 2 parallel lines was marked along the longitudinal axis of the penis, the length of which depends on the degree of curvature of the penis. The fold was then sutured by Prolene

3.0 thread along the longitudinal axis based on the 2 marked proximal lines.

After suturing, an artificial erection is induced and a protractor is used again to measure the residual angulation between the proximal and the distal section of the penile shaft.

The dorsal vascular bundle of the penis was reattached and the subcutaneous tissues was closed.

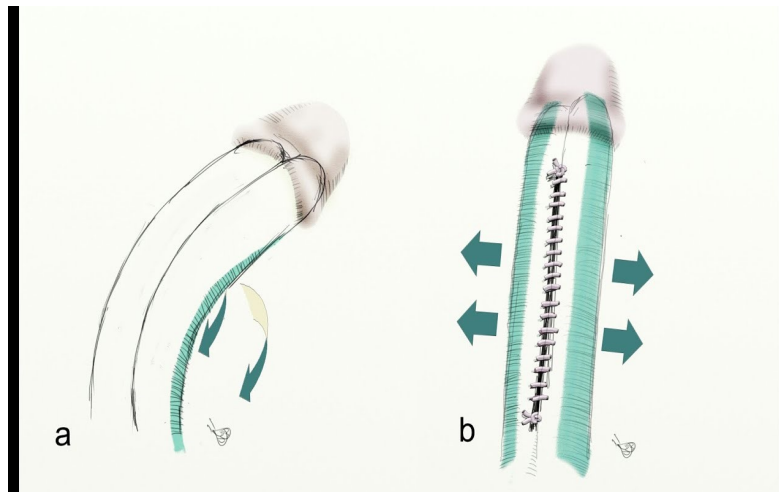


Figure 1. Corporal rotation technique (Source: Shaer et al⁷)

4. Tracking outcomes in surgical care

After 3 months:

- Evaluation of late complications such as the feeling of lumps due to suture knots and decreased penile sensation, erectile dysfunction.
- Assess the curvature of the penis at maximum erection.

5. Ethical consideration:

This study received approval from the Directorate of Hanoi Medical University’s Hospital for using patients’ medical records. The patients’ information was protected. Results from this study would be only used for research purposes to serve and protect community health.

6. Methods of Data Processing

Collected data are processed with Excell

213 software and R 3.6.1 software for Windows. Continuous variables are described as mean ± standard deviation, the difference between the two groups is estimated by the algorithm T-student test for normally distributed variables and Mann Whitney test for non-normally distributed variables. Categorical variables were described as numbers and percentages, the difference between the ratios was estimated using algorithm X2 or Fisher’s exact tests. Analysis of variance (ANOVA) and Bonferroni posthoc analysis were used to compare differences between multiple groups. p-value < 0.05 was considered to be statistically significant.

III. RESULT

Table 1. General characteristics of the study subjects

	N	%	Medium	SD	Mode	Min	Max
Age (year)	16		24.31	3.66	25	19	30
Height (cm)	16		171.37	6.38	170	162	183

	N	%	Medium	SD	Mode	Min	Max
Weight (kg)	16		67.93	9.06	69	52	82
BMI (kg/m ²)	16		23.1	3.08	24.04	16.7	27.6
< 18	1	6.25					
18 - 23	6	37.5					
> 23	9	56.25					
Sexual activity status	16						
Sexually active	12	75					
Not sexually active	4	25					

The average age of the study group was 24.31 ± 3.66 years old. This is the age of young men who are just starting to have sexual relations. The majority of patients in the study were mildly overweight (56.25%) and sexually active (75%).

Table 2. Pathological characteristics of the study group

	N	%	Medium	SD	Mode	Min	Max
Curved angle (degree)	16		51	12.2	49	35	80
< 60	12	75					
≥ 60	4	25					
Direction of curvatures							
Ventral	11	68.75					
Left	3	18.75					
Right	2	12.5					
Dorsum	0	0					
Penis dimensions (cm)							
Flaccid penile length			8.09	1.03	7.8	6.5	10.1
Stretched penile length			13.6	0.93	13.8	12.3	15
Glans diameter			2.88	0.33	2.9	2.4	3.6
Penile body diameter			2.94	0.41	2.9	2	3.5

The mean internal angle of the study subjects was 51 ± 12.2 degrees. Of which, the majority of patients have an average curvature < 60 degrees. Most patients have a primary ventral curvature. None of the patients had dorsal curvature. The dimensions of the penis are within the average range of Vietnamese men.

Table 3. Surgical outcome of congenital penile curvature treatment with corporal rotation technique

	Pre-surgery		Post-surgery		p
	Mean	SD	Mean	SD	
Penile body diameter	51	12.2	16.6	6.34	< 0.001
Penis size (cm)					
Flaccid penile length	8.09	1.03	7.93	0.84	0.11
Stretched penile length	13.6	0.93	13.3	0.89	0.01
Glans diameter	2.88	0.33	2.95	0.23	0.61
Penile body diameter	2.94	0.41	2.92	0.3	0.3
IIEF – 15 score	47.63	10.26	58.9	4.45	< 0.001
Erectile function	22.6	3	24.6	2.29	0.01
Orgasmic function	7.8	2.61	8.11	1.53	0.93
Sexual desire	6.81	2.04	7.9	1.37	0.08
Intercourse satisfaction	5.72	3.1	10.81	0.87	< 0.001

IIEF: International index of erectile function

After the surgery, mean residual curvature was 16.6 ± 6.34 degrees. No patient reported penile curvature of more than 30 degrees. In all penile dimensions, we only noted a mild decrease in the stretched penile length (0.3cm). Significant improvement in IIEF score was observed in the intercourse satisfaction domain and overall satisfaction with the highest percent of improvement.

IV. DISCUSSION

In cases of CPC without hypospadias, abnormalities of penile curvature can occur at any location. Based on embryological origin, Devine and Horton classified CPC into 5 types: (I) abnormality in spongiform, (II) abnormality in Dartos or (III) Buck, (IV) abnormality in tunica albuginea and (V) congenital short urethra.⁸ In particular, cases of congenital short penis type IV often have no clinical manifestations before

puberty. In this study, the average age of the study group was 24.31 ± 3.66 years old (19 - 30 years old) (Table 1). This is a group of subjects whose age is near the end of puberty or adults who can recognize abnormalities of the genital organs during sex or when the penis is fully erected. Therefore, many patients, even though they had no previous sexual experience, sought medical consultation due to the abnormal curvature of the penis. Our results are also similar to the results of the author Nyirady's study performed on patients with congenital curvature of the penis without hypospadias with an average age of 24 years.⁹

In our study, the average degree of curvature of CPC patients was 51 ± 12.2 degrees with the minimum and maximum values being 35 degrees and 80 degrees, respectively. Most of the study subjects had a ventral curvature (68.75%), the rest of the patients had a lateral

curvature of the penis, there were no case of dorsal curvature (Table 2). In many previous studies, the authors also found that most of the patients with congenital penile curvature without hypospadias often curve ventrally and laterally, the rate of congenital penile curvature on the dorsal side is very rare.¹⁰ When evaluating the erectile dysfunction scale IIEF, we found that patients with congenital penile curvature can still achieve an erection before intercourse. However, these patients experienced a decrease in sexual satisfaction (Table 3). Normally, the male penis has a physiological curvature that ranges from 10 to 20 degrees. If the curved angle is over 30 degrees, the patient feels very uncomfortable during intercourse, sexual pleasure is reduced as well as the patient's mental health.

After 3 months of surgery, the results showed that the mean penile curvature of the study subjects decreased significantly (from 51 ± 12.2 degrees to 16.6 ± 6.34 degrees with $p < 0.001$). This result showed that this is one of the effective methods in correcting the curvature of the penis, especially in cases with a moderate degree of curvature (< 60 degrees). However, unlike previous methods such as Nesbit or plication of the tunica albuginea, the corporal rotation technique does not significantly change the length of the penis. If previous studies show that for techniques that shorten the longer side of the corpora cavernosa, the length of the penis is usually reduced by 1 - 2.5cm in 41 - 90% of cases.¹¹ In Shaeer's study, a study on 128 patients with congenital penile curvature showed that the corporate rotation technique had the ability to preserve the length of the penis (with the length of the penis when inducing artificial erection before and after surgery was 14.69 cm and 14.63 cm, respectively, with $p = 0.007$).⁷ In our study, the length of the stretched

state was used to replace the length of artificially erected penis because currently, artificial induced erection drug is not yet available in Viet Nam. However, the length of the flaccid penis at maximal stretched state has been shown to correlate well with the length of the erect penis.¹² Our results show no significant change in penis size after surgery including penis length at a maximum stretch (13.6 ± 0.93 cm before surgery compared with 13.3 ± 0.89 cm after surgery, with $p = 0.01$). Also, in Shaefer's study, the results showed a marked improvement in erectile function based on the IIEF-5 scale. If before surgery, the study subjects had an average IIEF-5 score of 11.65 ± 3.4 , then after surgery, the IIEF-5 score increased to $p < 0.001$. In this study, we used the IIEF-15 scale, which is the full version of the IIEF-5 questionnaire. In addition to erectile function, IIEF-15 also assesses the extent to which arousal, ejaculation, and sexual satisfaction are achieved. We found that in patients with congenital penile curvature, erectile function was still well maintained and this difference before and after surgery, although statistically significant, was not clinically significant (22.6 ± 3 before surgery compared with 24.6 ± 2.29 after surgery with $p = 0.01$). However, we found a remarkable change in sexual satisfaction in these patients (Table 4). Therefore, the corporate rotation technique in the treatment of congenital penile curvature is effective to improve the quality of the patient's sex life.

V. CONCLUSION

Congenital penile curvature is a rare disease in men, but it has a great impact on sexual satisfaction and affects the psychology of patients.

The corporal rotation technique is an effective method in the treatment of congenital penile curvature, which has the ability to preserve

the length of the penis and help improve the patient's sexual quality.

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