EVALUATION OF THE RESULTS OF BURIED PENIS TREATMENT IN 484 PATIENTS

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There are many surgical techniques for buried penis but the surgical indication and the age of surgery are not consistent, so we conducted this descriptive study to evaluate the treatment outcomes for buried penis . The mean age of 484 patients was 7.1 years old. Buried penis was classified into three grades according to penile shaft burial: Mild grade occurred in 36 cases (7.4%): penile shaft buried, but glans and coronal sulcus protrude above pubo-scrotal skin . Moderate grade occurred in 89 cases (18.4%): penile shaft and corona buried, only part of the glans visible above pubo-scrotal skin. Severe grade occurred in 359 patients (74.2%): entire penis buried, glans located at or below pubo-scrotal skin.Surgical indication: severe and moderate cases operated from 1 year of age, mild cases from 6 years old. Operative technique: 2.5-cm scrotal incision (upper quarter), release of penile shaft, cut of Buck's fascia along the lateral aspects of the corpora cavernosa, fixation of the penile base, and preservation of the prepuce. Outcomes: good in 46.6% (169/363) and fair in 53.4% (194/363). Surgical results showed that the age of surgery according to buried penis grade with the new surgical technique gave favorable results.

Keywords: Buried penis.

I. INTRODUCTION

Buried penis is a congenital anomaly in which the meatus is located at the glans, the penis is straight but buried into the scrotum at different degrees. Several terminologies have been used to describe this anomaly, such as hidden penis, concealed penis, inconspicuous penis, short penis, and congenital megaprepuce.[1-5] This anomaly adversely affects urination, sexual and reproductive function, as well as patient psychology. Many hypotheses regarding etiology and surgical techniques for buried penis have been proposed.[6-9] However, according to Smeulders N the surgical treatment of buried penis remains a challenge with generally disappointing outcomes. Indications for surgical intervention are still inconsistent: at what age and at which degree of severity should surgery be performed.[9]

Due to these variations, we conducted this study to evaluate the treatment outcomes for buried penis.

II. MATERIALS AND METHODS

1. Subjects

Patients under 17 years old with congenital buried penis who underwent surgery.

Exclusion: acquired buried penis due to radical circumcision or obesity.

Penile examination was performed in non - erect state. We classified into three grades:

Mild: penile shaft buried, but glans and coronal sulcus protrude above pubo-scrotal skin.

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Moderate: penile shaft and corona buried, only part of the glans visible above pubo-scrotal skin.

Severe: entire penis buried, glans located at or below pubo-scrotal skin.

2. Methods

Study design: Prospective, descriptive study.

The sample size: convenient

Study period and setting: from June 2013 to April 2024, at the following hospitals: An Viet Hospital: 269 cases (55.6%), Hanoi Hospital: 106 cases (21.5%), Hung Viet Hospital: 68 cases (14%), Hong Ngoc Hospital: 41 cases (8.5%).

Key points of our surgical techniques

A 2.5cm midline incision from penile base to scrotum (Fig. 1B). Skin and subcutaneous tissue were dissected off Buck's fascia. Fibrous adhesions were excised and Buck's fascia was incised along both corpora cavernosa (Fig. 1C). Penile base was fixed and penoscrotal angle reconstructed by suturing tunica albuginea of corpora cavernosa to external spermatic fascia and scrotal tissue at four positions (9h, 7h, 5h, 3h) using absorbable sutures (Fig. 1D). In cases of phimosis, only preputial ring was widened while preserving prepuce. A Foley catheter was inserted for 2–3 days postoperatively. Figs. 1A, 1E: pre - and postoperative.

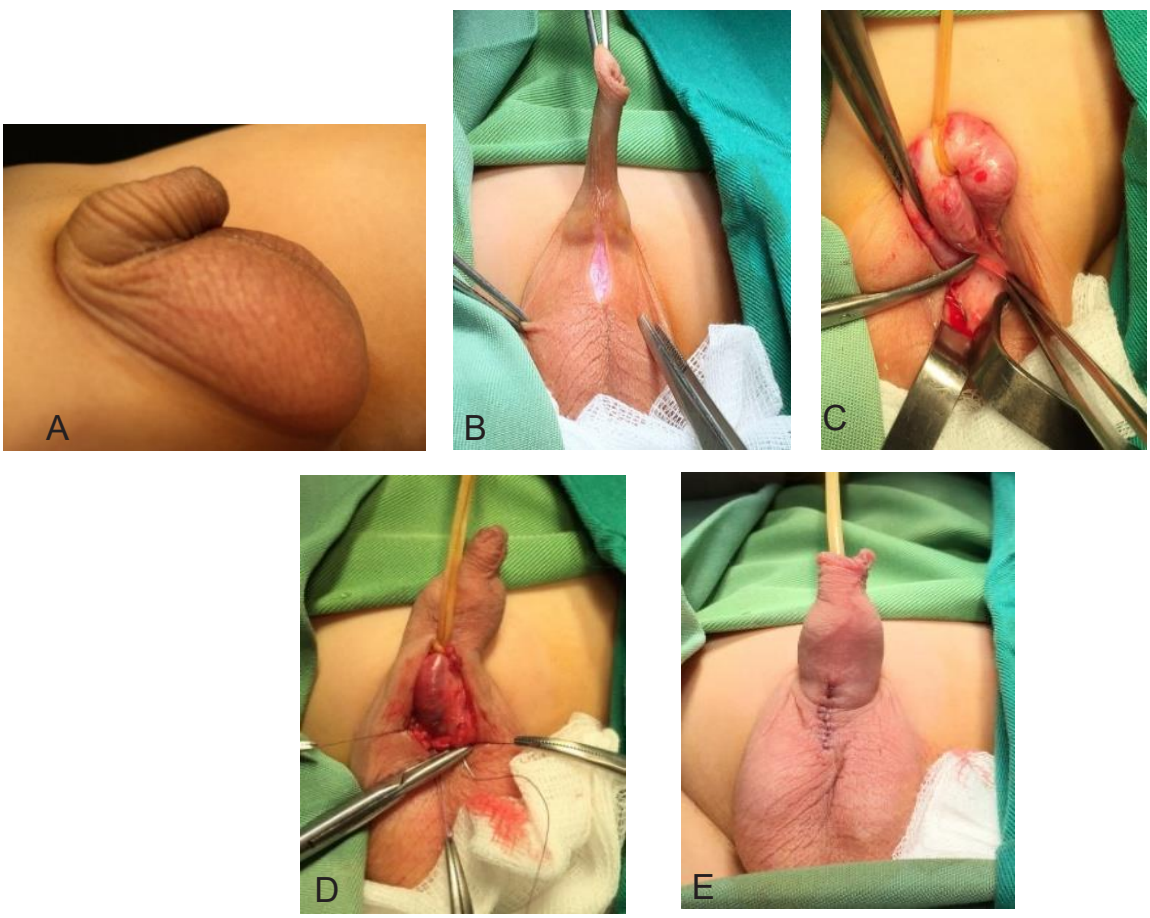

Figure 1. Key points of our surgical techniques

Outcome assessment: rated on 3 levels

- Good: no residual buried penis.
- Fair: improvement by 1–2 grades, but residual buried penis remains.
- Poor: no improvement.

3. Research ethics

Approved by the Medical Ethics Committee of An Viet General Hospital (Decision No. 07/QĐ-BVAV dated 1/4/2022).

III. RESULTS

1. Number of patients, mean age and associated anomalies

A total of 484 patients, mean age 7.1 years old (range 1 – 15).

Associated anomalies: Mild phimosis in 308 cases (63.6%); retractile testis in 39 cases (8.1%); undescended testis in 7 cases (1.4%); inguinal hernia in 4 cases (0.8%); glanular hypospadias in 17 cases (3.8%).

2. Grading of buried penis, indications and surgery for other diseases

Grading of buried penis and number of patients.

Mild grade of buried penis occurred in 36 patients (7.4%).

Moderate grade of buried penis occurred in 89 patients (18.4%).

Severe grade of buried penis occurred in 359 patients (74.2%).

Indications for surgery according to severity

Moderate and severe: surgery indicated at all ages, starting from 1 year old.

Mild: surgery indicated above 10 years; in patients aged 6 – 10 years old, surgery performed if requested by family after ≥ 3 years old of follow-up without improvement.

Table 1. Classification of buried penis

Age group	Severe	Moderate	Mild	Total
1–5 yrs	188 (93.5%)	13 (6.5%)	–	201 (100%)
6–10 yrs	128 (71.1%)	37 (20.6%)	15 (8.3%)	180 (100%)
11–15 yrs	43 (41.7%)	39 (37.9%)	21 (20.4%)	103 (100%)
Total	359 (74.2%)	89 (18.4%)	36 (7.4%)	484 (100%)

Associated procedures performed concurrently

Preputial widening: 49 cases; orchidopexy: 39 cases; orchiopexy for undescended testis: 7 cases; herniorrhaphy: 4 cases; urethral advancement to glans: 17 cases.

3. Surgical outcomes

Postoperative complications

Mild penile skin edema in 125 patients (25.8%); preputial edema in all patients who underwent preputial widening.

Hospital stay: 3 days.

Evaluate outcomes

Table 2: Early outcomes (at discharge)

Preoperative grade	Good (no buried penis)	Fair (residual mild/moderate)	Total
Severe (n = 359)	81 (22.6%)	278 (77.4%)	359 (100%)
Moderate (n = 89)	56 (62.9%)	33 (37.1%)	89 (100%)

Preoperative grade	Good (no buried penis)	Fair (residual mild/moderate)	Total
Mild (n = 36)	36 (100%)	–	36 (100%)
Total (n = 484)	173 (35.7%)	311 (64.3%)	484 (100%)

Chi-squared test: p < 0.01

All three groups showed improvement in grade of buried penis. Moderate group had lower good-outcome rate than mild but higher than severe (p < 0.01).

Follow-up outcomes

363 patients (75%) were followed up for a mean of 35 months (range 6 – 84). 121 patients (25%) were excluded (follow-up < 3 months).

Table 3. Long-term outcomes

Preoperative grade	Good (no buried penis)	Fair (residual mild/ moderate)	Total
Severe (n = 257)	85 (33.1%)	172 (66.9%)	257 (100%)
Moderate (n = 84)	62 (73.8%)	22 (26.2%)	84 (100%)
Mild (n = 22)	22 (100%)	–	22 (100%)
Total (n = 363)	169 (46.6%)	194 (53.4%)	363 (100%)

Chi-squared test: p < 0.01

Progress after follow-up: the good outcome rate of mild group remained unchanged, while moderate and severe group increased. The good outcome rates of the 3 different groups were statistically significant with p < 0.01.

Table 4. Comparison of good outcome rates after 35 months with those at discharge

Patients Buried grade	At discharge	After 35 months	p
Severe	22,6% (81/359)	33.1% (85/257)	< 0,01
Moderate	62.9%(56/89)	73.8%(62/84)	> 0,05
All 3 grades of buried penis	35,7% (173/484)	46,6% (169/363)	< 0,01

Remark: Through follow-up, the overall good rate of all 3 groups and the severe group increased significantly compared to the results at discharge with < 0.01. The good rate of the moderate group increased but was not statistically significant with > 0.05.

IV. DISCUSSION

Our classification is based on visibility of glans and penile shaft relative to pubo-scrotal skin. This method is simple, clinically applicable and useful for assessing progression and treatment outcomes, differing from Chin, Hadidi

AT and Cromie.[6,10,11] Chin W and Cromie WJ also divided into 3 levels of severity, but Chin W was based on the degree of penile skin loss calculated by the Skin/Penile shaft ratio, Cromie WJ, both the average and severe gradehad no palpable penile shaft within the penile canal. Hadidi AT divided into 3 degrees: degree I: Abnormally long foreskin, degree II: degree I with retracted penis shaft, degree III: includes degree I+II and excess fat on the pubis.

According to medical literature, there is no consensus on the age of surgery or the gold standard for penile buried surgery.[12] Rod J indicated early surgery for buried penis with congenital phimosis.[5] The average age of surgery according to publications is 1.9 years old (from 1 month to 11.4 years old). Redman JF commented that surgery can be safely performed from 3 months of age.[4]

Our indications depend on severity: surgery for severe and moderate cases at ≥ 1 year old; mild cases at ≥6 – 10 years old. Mean age in our series was 7.1 years old, higher than in literature, because most patients present late and with mild cases, we perform surgery between the ages of 6 and 10 years old.

Our surgical indications by age were based on the following rationale: Buried penis essentially represents a short penile shaft. Surgery aims to provide favorable conditions for gradual penile growth over time. Therefore, early surgery is recommended for patients with severe and moderate buried penis, as long-term follow-up is required. For mild cases, surgery is indicated after the age of six. These indications were consistent with the outcomes presented in Tables 2, 3 and 4.

Our surgical technique was based on the theoretical concept of abnormal tight adhesion of the corpora cavernosa to the deep fascia and scrotal tissues surrounding the penile shaft.[9]

In the literature, various incision approaches have been described at different sites, including the dorsal and lateral aspects of the penis, the ventral surface, the scrotum, the penoscrotal junction, and the subcoronal region.[1,4,7,9] Several incision designs have also been reported, such as circumferential, Z-plasty, Y-V plasty, anchor-shaped, and longitudinal incisions.[1,4,7,9,1213]

In our series, a short skin incision from the penile base to the scrotum was sufficient for complete penile shaft dissection and release, excision of Buck's fascia, and four-point fixation of the penile base.

Skin coverage of the penile shaft defect: We preserved the prepuce and performed surgery only after it became adequately widened or mildly stenotic, when simple preputial widening was sufficient to provide full skin coverage of the penile shaft. Preservation of the prepuce makes the penis appear longer and more physiological. In the literature, various techniques for penile shaft coverage have been described, such as using the preputial mucosa, preputial skin, or the entire prepuce.[4,5,9,14]

Compared with literature, our technique differs in incision site, dissection extent, penile base fixation, preputial preservation, and Buck's fascia excision.[1,2,4,6,7,12-14]

Surgical results in tables 2 and 3 show: Best outcomes were in mild cases, poorest in severe cases. The level of buried penis decreased in the patient groups immediately after discharge. Through follow-up, the rate of good results in all 3 patient groups increased significantly ($p < 0.01$). However, the rate of good results in the mild group did not change, the rate of moderate group increased but not significantly, while the rate of good results in the severe group increased significantly ($p < 0.01$) (Table 3, 4).

The above results have proven that the

indication for surgical age according to the severity of buried penis is correct and we continue to perform our indications and surgical methods. Our results are favorable. We continue to follow patients until puberty to assess long-term outcomes and provide adjuvant endocrine therapy when necessary. According to literature reports, revision rates were approximately 4 – 5%.[13,15]

We did not use a comparative group or a historical control group because our classification of buried penis, the surgical indications according to age, and our methods of outcome evaluation differed from those reported in the literature. The essence of buried penis lies in varying degrees of penile shortening at three levels; therefore, our evaluation of surgical outcomes was based on the reduction in the degree of penile burying immediately after surgery and during follow-up.

V. CONCLUSION

We proposed a three-grade classification of buried penis, indications for surgery, and surgical techniques. Surgical outcomes were favorable with satisfactory cosmetic results.

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