

Clinical effect of Brisson operation modified by Y-shaped incision for treatment of concealed penis in adolescents

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Abstract

Objective: To analyze the clinical effect of the Brisson operation modified by a Y-shaped incision in treating adolescent concealed penis.

Methods: We retrospectively analyzed clinical data of 27 adolescents with a concealed penis treated with the Brisson operation modified by a Y-shaped incision in our hospital from January 2017 to March 2020.

Results: The operation went smoothly in all 27 patients. Postoperative foreskin edema occurred in 12 patients and spontaneously resolved within 1 month postoperatively. Two patients developed postoperative retropubic infection. After administering antibiotics and symptomatic treatment, both patients' conditions improved within 1 week. All operations obtained satisfactory results. Postoperatively, when the penis was in a non-erect state, it was clearly exposed without retraction or concealment; thus, demonstrating good surgical results. The prepuce was distributed naturally without obvious accumulation of redundant preputial tissue. The penile scar resembled that after circumcision. The postoperative follow-up period was 6 months, during which no patients developed recurrence.

Conclusion: The Brisson operation modified by a Y-shaped incision is effective for treating a concealed penis in adolescent patients. This technique may relieve the pathological abnormalities and retain the penile skin's integrity to the greatest extent with minimal scarring and a satisfactory appearance.

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Keywords

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Introduction

A concealed penis is a congenital malformation characterized by normal development but abnormal exposure of the penis. This abnormality can induce inflammation of the prepuce, glans, and external meatus and can cause psychological stress in children.¹ It is generally believed that early surgical correction is the key to successful treatment of a concealed penis.² However, some parents of affected children lack adequate information about this condition and therefore miss the optimal time period for surgical correction. In such cases, the children often remain untreated until they reach adolescence. However, the currently available surgical methods are not optimal for treatment of such patients and may result in complications such as recurrence of concealment, an unsatisfactory appearance, and intractable edema of the prepuce.³ We made improvements to the traditional Brisson operation to resolve these problems. We herein report the outcomes of adolescent patients treated with this modified technique in our institution.

Materials and methods

Study population

The data for this study were collected from January 2017 to March 2020. A modified Brisson operation with a ventral Y-shaped incision was performed to treat adolescent patients with a concealed penis in our department. Twenty-seven patients were enrolled in the study, and all patients

completed follow-up. The patients ranged in age from 9 to 22 years (mean, 14.8 ± 1.2 years).

The study was approved by the ethics committee of Changzhou Second People's Hospital (approval no. [2019]BYL07), and every participant provided written informed consent. We have de-identified the details such that the identity of the patients may not be ascertained in any way.

Urination and testicular development were normal in all patients. With the patients in the supine position, the skin around the penis was pushed back with the clinician's thumb and index finger. This revealed that the length and development of the penis were basically normal. After releasing the hand, the body of the penis quickly retracted, and the foreskin was mound-like with a height of about 1 to 2 cm.

Surgical methods

The patients were placed in the supine position, and the operation was performed under sacral anesthesia plus intravenous anesthesia. The circumcision was performed as completely as possible to maximally relieve the stenosis. The penile head and prepuce were separated from the coronal sulcus to ensure exposure of the penile head. The suture was placed on the dorsal side of the glans as a traction line, and traction was carried out. A circular incision was made in the inner plate of the foreskin at a distance of about 5 to 7 mm from the coronal sulcus. The whole skin layer was incised to the vascular free space outside Buck's fascia. The dysplastic fibrous tissue

within this gap was fully separated to facilitate degloving of the penis to its root. If the sarcolemma was dystrophic, it was slightly trimmed and resected. Next, a Y-shaped incision was made at the junction of the penis and scrotum to ensure that the incision was at the same level as the degloving. The penis was pulled out from the Y-shaped incision, and the penile root was fully exposed. The dysplastic fascia and sarcolemma and the hyperplastic tissue of the penile body and root were removed. The glans and penile skin were pulled with a skin hook to expose the root of the penis and confirm that the penis was free of fibrous tissue adhesion and that the penile body did not retract after loosening. The dorsal root of the penis was sutured at the 10-, 12-, and 2-o'clock positions, and the sarcolemma tissue was fixed to the ipsilateral pubic periosteum; the lines among the three points formed an approximately equilateral triangle. Next, the prepuce was reset and the redundant prepuce was pruned. The skin and sarcolemma around the Y-shaped incision at the junction of the penis and scrotum was cut off, and the penile body was confirmed to be free of tension and smooth when covered by the remaining penile skin. Absorbable suture was used to suture the incision in an interrupted fashion. The indwelling catheter remained in place for 7 days postoperatively, and a bandage was applied with appropriate pressure.

After the operation, the perineum was compressed with tight briefs and the penis was exposed. Anticoagulant therapy was started 24 hours after the operation in high-risk patients with thrombi to prevent bleeding of the surgical wound. Figure 1 shows the individual steps of the surgical procedure.

Postoperative evaluations

The dressing was removed 7 days postoperatively, and follow-up was performed at 1,

3, and 6 months after discharge. The Boemers criteria⁴ were used to evaluate the postoperative effect, including penile body exposure and penile skin coverage.

Results

The operation was successfully completed in all patients. The mean operation time was 72.3 ± 7.2 minutes. The mean length of the vertical penis was 1.8 ± 0.7 cm before the operation and 4.4 ± 0.4 cm after the operation. No patients developed infection or necrosis of the preputial flap. All 27 patients completed follow-up. During the follow-up period, 12 patients developed varying degrees of penile skin edema, mainly edema of the inner prepuce, which subsided within 1 month after the operation. Two patients developed postoperative retropubic infection, which improved within 1 week after administration of antibiotics and symptomatic treatment. One patient experienced severe postoperative pain at the root of the penis, which improved after symptomatic treatment (Table 1). None of the patients exhibited penile body retraction in the exposed position or end sitting position of the penis after the operation, and the patients' family members were satisfied with the penile appearance (Figure 2).

Discussion

A concealed penis is a common urologic disease. Since Keyes⁵ first described a concealed penis in 1919, this condition has gradually attracted attention. Most scholars believe that a concealed penis will not only cause phimosis, balanitis, dysuria, and other clinical complications but will also have a serious impact on patients' penile function and mental health.^{6,7}

A concealed penis is mostly caused by congenital factors. During the process of development, the anterior segment of the

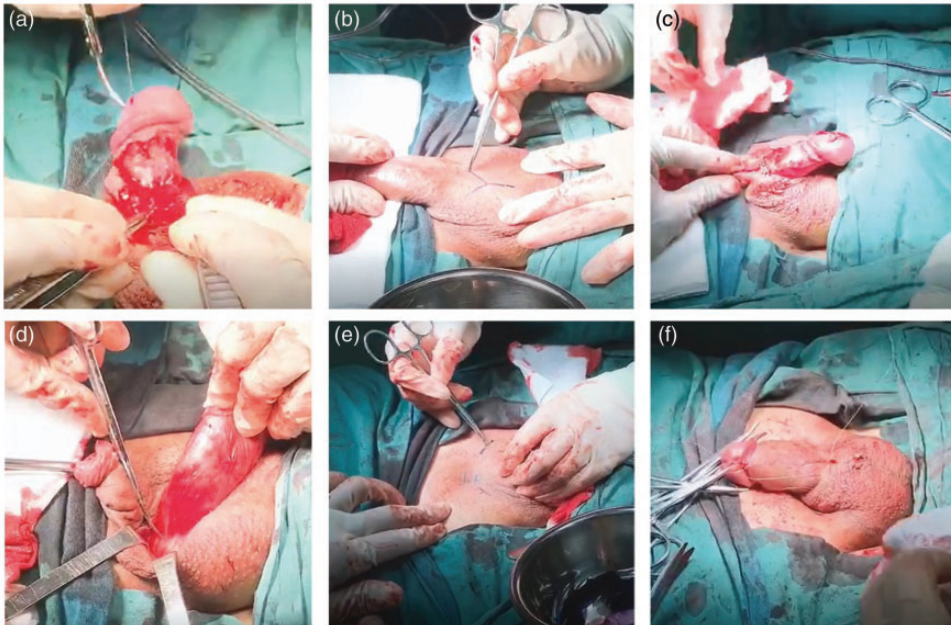


Figure 1. Surgical procedure of the Brisson operation modified by a Y-shaped incision. (a) The penis was degloved to its root. (b) A Y-shaped incision was made at the junction of the penis and scrotum. (c) The penis was pulled out from the Y-shaped incision. (d) The dysplastic fascia of the penile body and root was removed. (e) The dorsal root of the penis was sutured at the 10-, 12-, and 2-o'clock positions. (f) Absorbable suture was used to suture the incision in an interrupted fashion.

Table 1. Patients' general operative data.

Characteristic	Result
Age, years	17.8 ± 1.2 (range, 15–22)
Body mass index, kg/m ²	26.3 ± 3.2
Operation time, minutes	42.3 ± 7.2
Preoperative penile length, cm	1.8 ± 0.7
Postoperative penile length, cm	4.4 ± 0.4
Edema	12 (44.4)
Infection	2 (7.4)
Recurrence	0 (0.0)

Data are presented as mean ± standard deviation or n (%).

penis is attached to the sarcolemma, which will form a fibrous cord and then restrict the penis. Moreover, because of the poor elasticity of the sarcolemma and the lack of attachment of the penile body to the superficial fascia, the degree of penile

concealment is further aggravated. When this is combined with the narrow ring of the foreskin, the head of the penis cannot be exposed, resulting in the unique external appearance of the concealed penis.⁸ In other words, only part of the penis can be exposed or only a small mound of tissue can be seen during physical examination. After the penile skin has been pushed to the pubic symphysis, the relatively normal penis can be exposed.

The diagnosis of a concealed penis should be differentiated from a short penis and simple phimosis. An incorrect diagnosis will lead to the performance of an inappropriate operation, which will increase the severity of the symptoms of the concealed penis. In particular, simple circumcision will make the preputial coverage insufficient after correction of the concealed

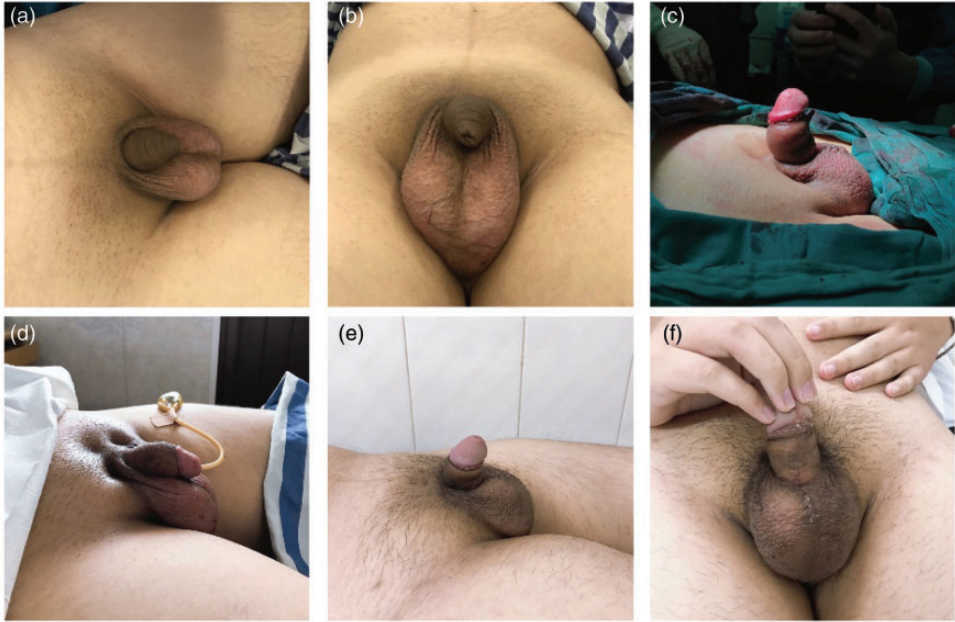


Figure 2. Comparison of preoperative and postoperative effects. Male patient, 17 years old. (a, b) Preoperative frontal view. (c) Immediate postoperative lateral view. (d) One-week postoperative lateral view. (e) Three-week postoperative lateral view. (f) Three-week postoperative frontal view.

penis, leading to failure of the whole operation.⁹ In addition, it is important to distinguish a congenital concealed penis from an obesity-induced concealed penis; the pathogenesises of the two are completely different. In patients with obesity, penile concealment is caused by accumulation of fat in front of the pubis; however, the skin at the root of penis is well adhered, and most children's condition gradually improves with weight reduction. Surgery is not recommended in such patients; instead, these patients should undergo planned physical exercise, diet control, and weight loss. In some patients, body weight naturally decreases with age, and the related symptoms naturally disappear.^{10,11} In the present study, all patients had a concealed penis caused by congenital dysplasia, and correction of the penile deformity could not be achieved without surgical treatment.

Most scholars believe that a true congenitally concealed penis cannot resolve without treatment and should undergo surgery as soon as possible. The optimal time for the operation is before puberty; the penis has undergone a certain degree of development by this time, which is conducive to the operation. Some studies have indicated that earlier performance of surgery is associated with less severe postoperative pain.^{12,13} Moreover, if necessary, fat can be removed from the scrotum during the operation. Several surgical methods with good therapeutic effects are available, including the Shiraki, Johnston, Devine, and Brisson methods.¹⁴⁻¹⁶

Because some parents have an inadequate understanding of a concealed penis, they may mistake the condition for simply a short penis or phimosis. Thus, they may not present their child to the hospital until

puberty, which delays the optimal treatment period. For such patients, the postoperative effect of the above-described operation is controversial; such patients may develop occult recurrence, intractable edema of the prepuce, and an unsatisfactory appearance of penis. More importantly, the longitudinal and V-shaped incisions designed for children are not suitable for the penile body in adolescents. Therefore, the choice of surgical method is particularly critical for adolescent patients with a concealed penis.

We improved the classic Brisson procedure to reduce the above-mentioned problems. Three major modifications were made. First, a Y-shaped skin incision was performed at the junction of the penis and scrotum. This incision exposes the operative field to the greatest extent, facilitating the subsequent release and fixation of the penis, reducing the difficulty of the operation, and retaining the penis and scrotal skin to the maximum extent; additionally, the incision is easy to learn and master. Second, relaxation of the penis is achieved. The abnormal fascia around the penis is the cause of poor exposure, and incomplete removal of the fascial limitation is an important cause of concealed recurrence of penis after the operation.¹⁷ We believe that fixation between the penis and skin should be established on the premise of completely removing the abnormal restraint of the penis and only using strong fixation between the penis and skin to correct the concealed penis. In addition to an unnatural appearance of the scrotum, recurrence of the concealed penis can also easily occur after loosening at the same point during the healing process. The Brisson operation can fully release the abnormal attached fascial tissue and resolve the concealed penis from an etiologic standpoint.¹⁸ Based on this operation, we further resected the peripenile and root sarcolemma tissue to obtain maximum penile exposure. In addition, some previously described

modified surgeries advocated the removal of thick fat pads anterior to the pubis. However, we found that removal of such fat pads significantly increases the surgical bleeding and operation time. We prefer to use a figure-8 suture when the root of the penis is fixed to the pubic periosteum; this suture pattern can compress the fat pad and achieve an effect similar to that of fat pad removal, and the operation time is greatly reduced. For patients with obesity, we recommend surgery after weight loss. Third, our modified technique achieves fixation of the penis. Proper fixation after adequate release of the penis is the key to better postoperative exposure of the penis. The traditional operation and most of the subsequently improved operations involve suturing of the traction tissue to the dermis of the penile root. Although various fixation techniques have been carried out, there are still reports of postoperative retraction. We believe that large-scale fixation may also be a cause of pain caused by excessive tension at the root of the penis. More stable tissue should be present in the pubic symphysis as a fixed point; that is, the pubic periosteum. This is consistent with the view by Jung et al.¹⁹ In the selection of fixation points, we abandoned a wide range of fixation and instead chose three points for fixation of the dorsal root of the penis (10, 12, and 2 o'clock). The structure of an approximately equilateral triangle is formed among the three points. The penis does not retract after the operation, and the postoperative exposure and appearance of the penis are improved.

Notably, fixing the penile body to the pubic fascia requires a large amount of free space, and the surgical wound is relatively large. Dead space will form if the bandaging and compression are inadequate, facilitating postoperative infection. We recommend that patients routinely wear tights after surgery to compress the free space behind the pubic area. After this

postoperative management, no other patients developed infection. Additionally, in contrast to children, the preputial regeneration ability is poor after puberty, especially in adult patients; thus, the prepuce should be retained as far as possible. Patients should receive adequate preoperative education because a large amount of prepuce is preserved during the operation; some patients may have a redundant prepuce after the operation and thus require a secondary operation.

No unified standard has been established for evaluation of the therapeutic effect of surgery for a concealed penis. The Boemers criteria⁴ were used to evaluate the postoperative appearance of the penis. We believe that the ideal surgical correction of a concealed penis should include (1) cutting off the fibrous tissue that restricts penile extension, (2) improving penile skin that is too short because of poor attachment, (3) releasing the preputial scar, and (4) correcting the web-shaped penis scrotal angle and suturing and fixing the dermis and fascia at the junction of the penis and scrotum. This further achieves significantly improved penile exposure, no retraction in the upright and sitting positions, and complete release of the penile head without restriction of penile development.²⁰ All 27 patients in the present study were satisfied with the appearance of the penis, and no patients developed retraction or occult recurrence during follow-up.

This study has two main limitations. First and most importantly, this study was retrospective in nature and therefore has inherent selection bias. Second, the patients' follow-up data were minimal, and a larger-sample study is thus needed.

Conclusion

We improved the traditional Brisson operation using a Y-shaped incision and found that our modified technique retained the

advantages of full penile release while resolving the problems of recurrence, a poor appearance, and intractable preputial edema. This procedure had a good clinical effect and provided a satisfactory appearance. Our modified Brisson operation for adolescent patients with a concealed penis may therefore have significant value for clinical application.


Declaration of conflicting interest

The authors declare that there is no conflict of interest.

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References

1. Boliglowa DK, Ryu SM, Ebrahim T, et al. [Plastic surgical correction of buried penis]. *Handchir Mikrochir Plast Chir* 2017; 49: 85–90.
2. Cimador M, Catalano P, Ortolano R, et al. The inconspicuous penis in children. *Nat Rev Urol* 2015; 12: 205–215.
3. Higuchi TT, Yamaguchi Y, Wood HM, et al. Evaluation and treatment of adult concealed penis. *Curr Urol Rep* 2012; 13: 277–284.
4. Boemers TM, De Jong TP. The surgical correction of buried penis: a new technique. *J Urol* 1995; 154(2 pt 1): 550–552.
5. Keyes EL. Phimosis—paraphimosis—tumors of the penis. In: *Urology*. New York: D. Appleton & Co., 1919, p. 649.

6. Maizels M, Zaontz M, Donovan J, et al. Surgical correction of the buried penis: description of a classification system and a technique to correct the disorder. *J Urol* 1986; 136: 268–271.
7. Cubilla AL, Velazquez EF, Amin MB, et al. The World Health Organisation 2016 classification of penile carcinomas: a review and update from the International Society of Urological Pathology expert-driven recommendations. *Histopathology* 2018; 72: 893–904.
8. Borsellino A, Spagnoli A, Vallasciani S, et al. Surgical approach to concealed penis: technical refinements and outcome. *Urology* 2007; 69: 1195–1198.
9. Shaeer OK. Shaeer's technique: a minimally invasive procedure for monsplasty and revealing the concealed penis. *Plast Reconstr Surg Glob Open* 2016; 4: e1019.
10. Cheng G, Liu B, Guan Z, et al. A modified surgical procedure for concealed penis. *Can Urol Assoc J* 2015; 9: E723–E726.
11. Han DS, Jang H, Youn CS, et al. A new surgical technique for concealed penis using an advanced musculocutaneous scrotal flap. *BMC Urol* 2015; 15: 54.
12. Chin TW, Tsai HL and Liu CS. Modified prepuce unfurling for buried penis: a report of 12 years of experience. *Asian J Surg* 2015; 38: 74–78.
13. Kim JJ, Lee DG, Park KH, et al. A novel technique of concealed penis repair. *Eur J Pediatr Surg* 2014; 24: 158–162.
14. Shiraki IW and Shirai RS. Congenital micropenile skin sleeve. *J Urol* 1975; 114: 469–472.
15. Brisson P, Patel H, Chan M, et al. Penoplasty for buried penis in children: report of 50 cases. *J Pediatr Surg* 2001; 36: 421–425.
16. Chen C, Li N, Luo YG, et al. Effects of modified penoplasty for concealed penis in children. *Int Urol Nephrol* 2016; 48: 1559–1563.
17. Xu JG, Lv C, Wang YC, et al. Management of concealed penis with modified penoplasty. *Urology* 2015; 85: 698–702.
18. Caione P, Cavaleri Y, Gerocarni Nappo S, et al. The concealed penis: the “two corners” surgical technique. *Minerva Urol Nefrol* 2019.
19. Jung EH, Son JH, Jang SH, et al. Simple anchoring of the penopubic skin to the prepubic deep fascia in surgical correction of buried penis. *Korean J Urol* 2011; 52: 787–791.
20. Mirastschijski U, Schwenke C, Melchior S, et al. [Buried penis: a comprehensive review on aetiology, classification and plastic-surgical reconstruction]. *Handchir Mikrochir Plast Chir* 2017; 49: 78–84.