Topical Steroid Is Effective for the Treatment of Phimosis in Young Children

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Background and Objective: *The purpose of the present study was to evaluate the effects of non-operative treatment using topical steroids on phimosis in infants and young children.*
Material and Method: *Between June 2003 and May 2005, the parents of the children with phimosis were instructed to apply and massage the phimotic skin with 0.05% betamethasone valerate cream twice daily for 2 months. During non-operative treatment, the patients whose parents were not satisfied with the results would undergo circumcision.*
Results: *Ninety-two phimotic boys with an average age of 32.62 months (range, 1 to 144 months) were enrolled for steroid application. Of the 92 patients, 79 (85.9%) were satisfied with their results. The other 13 patients whose outcomes clinically improved but did not satisfy their parents finally underwent circumcision. Histologically, circumcised skins of patients initially receiving steroid therapy revealed markedly interstitial edema and slightly increased vasculature. There were no systemic side effects or significant dermal atrophy in the present study.*
Conclusion: *Topical steroid treatment for phimosis is successful in young children. This therapeutic approach is a safe, easy, and inexpensive alternative to circumcision.*

Keywords: *Phimosis, Steroid, Circumcision, Histology*

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To date, the gold standard of the treatment for phimosis in boys is circumcision. The absolute indication of circumcision consists of fibrotic prepuce secondary to repeated trauma and such pathology as balanitis xerotica et obliteran. The other reasons, including preputial ballooning, balanoposthitis, recurrent urinary tract infection, religious beliefs, and even parental or personal preference, are considered as relative indications.

In 1993, the circumcision procedure had begun to face some questions. Jorgensen et al[1] and Kikiros et al[2] demonstrated that topical steroid application had been recognized for the first time as an alternative treatment of phimosis. Their reports revealed similar, excellent results. From that time, all published reports toward conservative treatment of phimosis also have concluded their therapeutic results in the same direction as it is safe, simple, and effective.

Although there is now a growing body of evidence to support the use of conservative treatment of phimosis with topical steroids, the studies confined their effectiveness of the topical agents in older boys. The purpose of the present study was to evaluate the effectiveness of the topical steroid, particularly in young children. In addition, the histology of preputial skin receiving topical steroid therapy was investigated.

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Material and Method

The present study was approved by the local ethics committee at Buddhachinaraj Hospital, School of Medicine, Phitsanulok. All of the patients were treated at the Pediatric Surgery Unit, Department of Surgery, Buddhachinaraj Hospital. Informed consents were obtained in all cases.

Patient classification

In the present study, "phimosis" was defined as a condition of the glans penis in which its overlying prepuce cannot be fully retracted. All of the parents of the patients were concerned and came to see doctors for treatment because of the difficulty in micturition. The authors graded the degree of retractability into 6 levels (Table 1), as previously described by Atilla et al[3].

Clinical study

Between June 2003 and May 2005, all parents or caretakers of the children with phimosis were instructed to apply and massage the phimotic skin with 0.05% betamethasone cream twice daily for two months. The instructions for use with the agent were explained and demonstrated to the parents before going home. No attempt was made to retract the prepuce otherwise, the skin would split or bleed. The patients were evaluated at 1 and 2 months following the beginning of treatment. The outcome was considered successful based on the satisfaction of the patients or their parents. Patients whose parents were not satisfied with their results of steroid therapy, regardless of the degree of retractability improvement, finally underwent circumcision. As the operation is the authors' routine practice, patients whose parents refused to use steroid cream will undergo circumcision and their specimens were used to compare histologically with the specimens retrieved from patients who failed the treatment.

In order to evaluate the effects of steroid to the phimotic skin, phimosis secondary to pathology (*i.e.*, fibrotic prepuce and balanitis xerotica obliteran) or with local infection were excluded.

Table 1. Grading score of retractability of prepuce

Grade 0	Full retraction
Grade 1	Full retraction of prepuce but tight behind the glans
Grade 2	Partial exposure of the glans
Grade 3	Partial retraction, meatus just visible
Grade 4	Slight retraction but distance between tip and glans (neither meatus nor glans can be exposed)
Grade 5	Absolutely no retraction

Histologic study

All circumcised skins, from patients either with or without steroid treatment, were studied. The authors retrieved specimens at operation as quadrangular as possible and marked inner preputial edge with tied sutures. The specimens were preserved within formaldehyde solution during transfer to the pathologist (SP). Clinical data was concealed by coding of the specimens. Routine study using the stain combination of hematoxylin and eosin (H&E stain) was carried out. A standard Verhoeff's method was exploited to facilitate the staining of elastic tissue. To compare the histological appearances of steroid group and non-steroid group, only the inner prepuce was used for the present study.

Statistical analyses

Demographic and clinical data between groups were compared. The decrease in phimotic grade was analyzed using paired t-tests, and one-way repeated measures ANOVA. The significant differences were set at $p < 0.05$. All data are expressed as mean and SD. SPSS software version 10.0 (SPSS Inc, Chicago, IL) was used for all statistical analyses.

Results

Ninety-two patients with the average age of 32.62+36.11 months (range, 1 to 144 months) were enrolled for steroid application. During the present study, six boys requested circumcision on the first visit. At two months post-therapy, there was a significant decrease in phimosis grade, compared to pretreatment (4.71 ± 0.62 vs. 2.12 ± 0.85, $p < 0.0001$ using paired t-tests). In addition, by using one-way repeated measures ANOVA, there was a steady decrease in phimosis grade over 3-time-points (pretreatment, at 1 month, and at 2 months) during steroid treatment (Wilks' Lambda = 0.123, $p < 0.0005$).

After 2 months of steroid treatment, seventy-nine patients (85.87%) were satisfied with their results. Their average post-therapeutic grade was 1.96 ± 0.76. The other 13 patients with the average post-therapeutic grade of 3.08 ± 0.76 ultimately underwent circumcision. Although their results of steroid therapy did show improvement in phimotic grading scores ($p < 0.001$ using repeated measures ANOVA), their parents were not satisfied with the outcome. Of all 92 patients, none actually achieved phimotic grade of

zero and none experienced steroid systemic side effects.

The authors categorized the satisfied group into two subgroups based on their age, 34 patients with age under 12 months old (infant group) and 45 patients with age older than 12 months (young children group). There was no difference in satisfaction of steroid treatment of the two subgroups, 27 (79.41%) and in 39 (86.67%) patients, respectively. Post-therapeutic grade between two subgroups showed no statistically significant difference at either the 1- or 2- month follow-up (Fig. 1).

Thirteen patients with initial steroid therapy and six patients without steroid therapy underwent circumcision. Histological features of inner preputial skin revealed markedly increased separation of collagen fibers contained in subcutaneous layer in children with steroid therapy compared to those without steroid therapy (Fig. 2). In addition, an increase in vascularities in most cases with steroid application was observed. No significant difference occurred with respect to the amount of elastic tissue between both groups. There were no significant changes of dermal papillae and epidermal ridges in those using steroid.

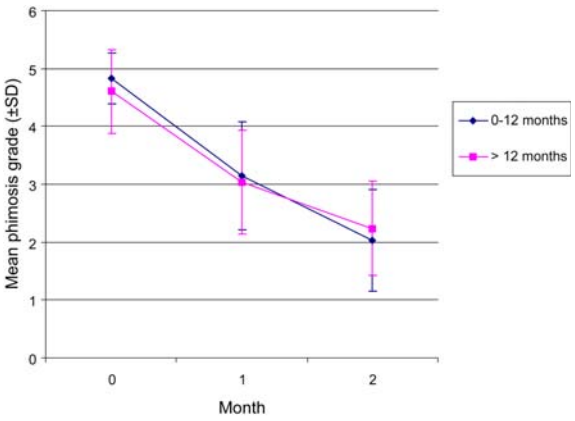

Fig. 1 Post-therapeutic phimotic grading scores between the 2 groups based on their age. Results showed no significant difference at each follow-up

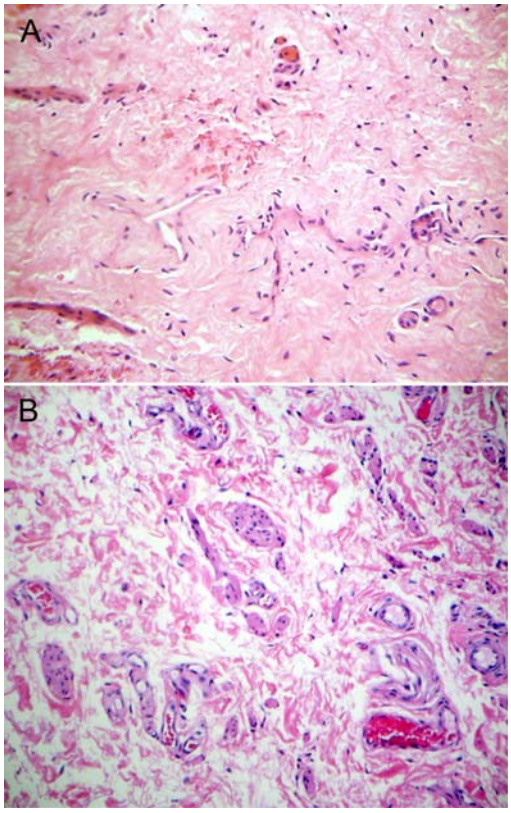

Fig. 2 The histological features revealed markedly interstitial edema and a relatively increase in vasculature in a group with steroid application; specimens retrieved from a 3-year-old boy who were not satisfied with their result (B), compared to the group without steroid therapy; specimens also retrieved from a 3-year-old boy who refused non-operative treatment (A)

Discussion

Many medical practitioners throughout the world still perform circumcision in boys with phimosis. The procedure is not without complications. Although the most commonly reported complications are minor, article reviews regarding this point of view always contain the severe forms, such as the total loss of the penis, sepsis, or even death, as a reminder of tragedies that must be avoided[4-7].

Over the past two decades, many reports have suggested non-operative treatment of phimosis in boys using topical agents as an alternative to circumcision with successful outcomes[2,8-18]. The studies used betamethasone valerate cream and yielded success rates ranging from 67-95% (Table 2). Most of these used half-strength concentration but varied in the duration of therapy. With the use of the same agent, the authors' success rate of 86% is comparable to these reports. According to the present result, the average age in the present study was lowest when compared with all reference studies. Although many surgeons think those with young age should not be considered as having phimosis because most of them are physiologic and will improve with the passage of time as proposed in a study by Gairdner[19], all patients in the present series were referred to us with a problem of

Table 2. Review of studies using betamethasone valerate cream as topical agent in the treatment of phimosis

Author	Period	Place	n	Mean age	Strengt	Duration	Success, n (%)
Kikiros et al[2]	1992	Australia	42	3.9 years	0.05%	2-4 weeks	33 (79)
Wright et al[8]	1993	Australia	111	Under 14 years	0.05%	1-2 months	89 (80)
Golubovic et al[9]	1994-1995	Yugoslavia	20	4.1 years	0.05%	4 weeks	19 (95)
Chu et al[10]	1997-1998	China	276	6.7 years	0.06%	2 weeks	263 (95)
Monsour et al[11]	1997-1998	USA	24	8.3 years	0.05%	1 months	16 (67)
Orsola et al[12]	1997-1998	Spain	137	5.4 years	0.05%	1-2 months	124 (91)
Ashfield et al[13]	1996-2000	Canada	194	5 years	0.10%	6 weeks	169 (87)
Lund et al[14]	2000	Hong Kong	66	6.7 years	0.10%	8 weeks	49 (74)
Elmore et al[15]	1999-2001	USA	27	11.3 years	0.05%	2 months	25 (92)
Marques et al[16]	2001-2003	Brazil	70	7.7 years	0.05%	1-4 months	66(94)
Yang et al[17]	2001-2003	Taiwan	32	4.7 years	0.06%	4-8 weeks	26 (81)
Zampieri et al[18]	2003-2004	Italy	247	7.6 years	0.05%	1-3 months	237 (96)
Present study	2003-2005	Thailand	92	2.7 years	0.05%	8 weeks	79 (86)

micturition and searched for some instructions or treatments.

The authors compared the response rates between two subgroups, those younger than 1 year of age and those older than one. There was no significant difference at each follow-up. Due to the fact that the foreskin can detach from the glans with age, in the present study the results of the older group (86.67%) that are slightly better than that of the young infant group (79.41%), perhaps the older boys' prepuce have a tendency to retract per se. Although in most series, it is clear that topical steroid for the treatment of phimosis is safe and effective in older boys; the authors believe that this agent is also safe and appropriate for younger children particularly in infants. Similar to other series, the use of topical steroid for a 2-month period, in the present study, showed no systemic side effects in treating children with phimosis. In a study by Golubovic et al[9], topical steroid application using the same agent did not significantly alter morning blood level of cortisol compared with controls. Moreover, the authors did not find any significant change in the appearance of dermal papillae or epidermal ridges in the steroid group, although there is scientific evidence to suggest that using full-strength beta- methasone valerate cream for 1- to 2- month period could produce skin atrophy and cause reduction in the size of viable epidermal cells[20,21]. This might be explained by the fact that the quantity of steroid used in the present study was very small.

In addition to utilizing betamethasone valerate cream as a topical agent, other agents have been exploited with excellent results. Some authors have noted successful outcomes by the application of clobetasol propionate cream, triamcinolone acetonide cream and hydrocortisone butyrate cream with the rate of 74 to 89%[1,22,23], 82 to 84%[24,25], and 89%[26], respectively. In a study by Atilla et al, they studied in 52 children and achieved a success rate of 75% using local nonsteroidal anti-inflammatory ointment (diclofenac sodium in petrolatum and lanolin mixture)[3]. There were two studies using topical hormonal ointment (0.1% conjugated equine estrogen) applied on prepuce of their patients[27,28]. They reported success rates of 87 and 93%, respectively. However, an adverse effect of gynecomastia was observed in one patient.

Yilmaz et al demonstrated that with the use of Diagnostic and Statistical Manual-III-Revised test conservative treatment using the topical steroid was able to decrease castration anxiety in children with phimosis during phallic period[29]. In addition, the authors could avoid the expense and personnel's workloads required to treat phimosis by circumcision. Although failure of the treatment will add to the cost in some cases, most parents or patients were satisfied with their results. When the treatment succeeds, the overall costs of therapy will be reduced by 75% that of circumcision[30,31].

It remains to be seen what the main effect of topical corticosteroids is. One of the most plausible explanations is that the steroid cream acts through a local anti-inflammatory mechanism[32-34]. Many authors believed that improved elasticity of the foreskin by steroids might play an important role in the therapeutic mechanism. Unfortunately, the authors found no significant changes of the staining of elastic tissue in

the present study. However, the obvious finding in the present study is the markedly increased separation of collagen fibers, that is, there has been a decrease in the number of collagen fibers in the steroid group. The slightly increased vasculature was also present. Histologically, according to the authors' knowledge, such findings associated with the use of the topical steroid have not been demonstrated at any dermal disorders and in any previous studies. In fact, the effect of topical corticosteroids that they modulate collagen synthesis in human skin has been shown in the literature[35,36]. The collagen propeptides concentration in suction fluid from induced blister at which the topical steroids were applied for a few weeks of treatment was decreased by 11-15%. Although the authors' findings cannot be used to explain how the topical steroid exercises its therapeutic effects in phimotic skin and more studies are needed to elucidate the real mechanisms of these preliminary results, the outcomes of the steroid therapy are still promising without any complications as it is accepted by a number of authors.

In conclusion, the present study demonstrates that topical steroid for phimosis is successful in young children. This therapeutic approach is a safe, easy and inexpensive method alternative to circumcision, thus avoiding its associated operative risks.

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การใช้ยาสเตียรอยด์ชนิดทาภายนอกได้ผลดีในการรักษาภาวะหนังหุ้มปลายอวัยวะเพศชายไม่เปิด

ไพบูลย์ สุขโพธารมณ์, สุชาติ พรเจริญพงศ์, ไพศาล เวชชพิพัฒน์

วัตถุประสงค์: *เพื่อการประเมินประสิทธิภาพในการรักษาภาวะหนังหุ้มปลายอวัยวะเพศชายไม่เปิดด้วยการ ใช้ยาสเตียรอยด์ชนิดทาภายนอกโดยไม่ผ่าตัดในเด็กเล็ก เปรียบเทียบกลุ่มเด็กวัยทารกกับวัยเด็กเล็ก*

วัสดุและวิธีการ: *ระหว่างปี พ.ศ. 2546 ถึง พ.ศ. 2548 ผู้ปกครองของเด็กที่มีภาวะหนังหุ้มปลายอวัยวะเพศชายไม่เปิดได้รับการแนะนำให้ทาและนวดปลายอวัยวะเพศด้วย ยา 0.05% betamethasone valerate cream วันละ 2 ครั้ง เป็นระยะเวลา 2 เดือน ในกลุ่มที่ผู้ปกครองปฏิเสธการรักษา ด้วยวิธีนี้จะได้รับการผ่าตัดขลิบหนังหุ้มปลายอวัยวะเพศ และในกลุ่มที่ซึ่งหากได้รับการรักษาด้วยวิธีนี้จนครบ 2 เดือน หรือในระหว่างการรักษา ไม่พอใจในผลการรักษาก็จะได้รับการผ่าตัดขลิบหนังหุ้มปลายอวัยวะเพศ*

ผลการศึกษา: *เด็กที่มีภาวะหนังหุ้มปลายอวัยวะเพศชายไม่เปิดทั้งหมด 92 คน มีอายุเฉลี่ย 32.62 เดือน (ระหว่าง 1 ถึง 144 เดือน) ในจำนวนนี้ 92 คน ผู้ปกครองสมัครใจที่จะรับการรักษาด้วยวิธีนี้ ส่วนอีก 6 คน ผู้ปกครองขอทำผ่าตัดขลิบหนังหุ้มปลายอวัยวะเพศเลย ในจำนวน 92 คนนี้พบว่า 79 คน หรือร้อยละ 85.9 พอใจในผลการรักษา ส่วนอีก 13 คน แม้ว่าจะสามารถรูดหนังหุ้มปลายอวัยวะเพศชายได้มากขึ้นแต่ก็ไม่พอใจในผลการรักษา และสุดท้ายได้รับการผ่าตัดขลิบหนังหุ้มปลายอวัยวะเพศ เมื่อเปรียบเทียบในทางพยาธิวิทยาพบว่าหนังหุ้มปลายของเด็ก กลุ่มที่ได้รับการทาและนวดปลายอวัยวะเพศด้วยยา 0.05% betamethasone valerate cream มาก่อน จะมีลักษณะบวมน้ำและมีหลอดเลือดมาเลี้ยงเพิ่มขึ้นเล็กน้อย ทั้งนี้ไม่พบว่ามีภาวะแทรกซ้อนใด ๆ จากการใช้ยาสเตียรอยด์เลยในการศึกษาครั้งนี้*

สรุป: *การใช้ยาสเตียรอยด์ชนิดทาภายนอกได้ผลดีในการรักษาภาวะหนังหุ้มปลายอวัยวะเพศชายไม่เปิดทั้งในเด็กวัยทารก และวัยเด็กเล็กการรักษาด้วยวิธีนี้จะเป็นอีกทางเลือกหนึ่งในการรักษาทดแทนการผ่าตัดขลิบหนังหุ้มปลาย อวัยวะเพศที่ปลอดภัย สะดวก และราคาถูก*