

Original article

The response of phimosis to local steroid application

C. S. Kikiros, S. W. Beasley, and A. A. Woodward

Department of General Surgery, Royal Children's Hospital, Flemington Road, Parkville, Vic 3052, Australia

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Abstract. The effectiveness of topical steroid application in relieving phimosis was studied in 63 boys treated with local application of steroid ointment to the foreskin. Betamethasone valerate 0.05% (42 patients), hydrocortisone 1% (18 patients), or hydrocortisone 2% (3 patients) was applied three times daily for 4 weeks. Thirty-seven of the patients treated with 0.05% betamethasone valerate ointment (half-strength Betnovate) showed an initial improvement and circumcision was performed on 5 non-responders. Six patients showed initial improvement but later redeveloped phimosis: they were given a further course of treatment, resulting in 2 satisfactory responses and 4 failures requiring circumcision. Two patients using 2% hydrocortisone and 16 using 1% hydrocortisone ointment showed improvement, but 2 of the latter group ultimately required circumcision. Overall, a permanent improvement was achieved in 51 of the 63 patients, with the ability to retract the foreskin after one or more treatments. The remaining 12 boys required circumcision. Local application of steroid ointment to the foreskin results in resolution of phimosis in the majority of cases, but if the foreskin has a circumferential white scar, it is slightly less likely to respond. Following cessation of steroids, phimosis redevelops in a proportion of patients.

Key words: Circumcision – Phimosis – Steroids

Introduction

In 1981, the rate of circumcision was 80% in the United States of America, 40% in Australia and Canada, and 6% in United Kingdom. Over the last decade the rate in Australia has declined, in large part as a result of statements by the American Academy of Pediatrics and the Australian Col-

lege of Paediatrics that neonatal circumcision is not medically indicated. Australian medical practitioners tend to encourage preservation of the foreskin in infants and children.

The main current surgical indication for circumcision is phimosis, although recurrent balanitis and paraphimosis may be considered relative indications. Circumcision is also performed for religious and social reasons. Phimosis, which is defined as constriction of the preputial orifice so that it cannot be drawn back over the glans, may result from a variety of factors, including recurrent balanitis, ammoniacal dermatitis, forceful retraction of the foreskin, or incomplete circumcision.

Our aim in this study was to determine whether the topical application of steroids to the foreskin could reverse phimosis, and perhaps make circumcision unnecessary. This paper reports the effectiveness of this method, and identifies those features of the foreskin that may be used to predict a successful or unsuccessful outcome.

Materials and methods

Sixty-three boys with established phimosis were studied. Phimosis secondary to incomplete circumcision was not included in the study. The phimosis was graded according to its severity in terms of the degree to which the foreskin could be retracted, and its appearance (Table 1). A distinction was made between phimosis (where the foreskin is tight distal to the glans penis) and the normal congenital adherence of the underside of the foreskin to the glans penis, which is a normal occurrence in infants and small children. Restriction of full retraction to the corona by these adhesions was not considered abnormal, and could be distinguished easily from true phimosis.

Steroid ointment – either 1% hydrocortisone, 2% hydrocortisone, or 0.05% betamethasone valerate (half-strength Betnovate, Glaxo) – was applied to the tight part of the outer surface of the prepuce between two and four times daily for a period of 2 to 12 (average 4) weeks. The ointment was spread thinly by the parents over that tight part of the foreskin that becomes exposed during gentle retraction without causing discomfort to the child. The prepuce was examined and graded prior to steroid application, immediately at the completion of treatment, and 6 weeks later.

Table 1. Grading of prepuce according to severity of phimosis and appearance of skin

A. Retractability of foreskin	
Score:	
0.	Full retraction, not tight behind glans, or easy retraction limited only by congenital adhesions to the glans
1.	Full retraction of foreskin, tight behind the glans
2.	Partial exposure of glans, prepuce (not congenital adhesions) limiting factor
3.	Partial retraction, meatus just visible
4.	Slight retraction, but some distance between tip and glans, i. e. neither meatus nor glans can be exposed
5.	Absolutely no retraction
B. Appearance of foreskin	
Score:	
0.	Normal
1.	Crack in prepuce, "skin-splitting" on gentle retraction
2.	Small white scar, partial circumferential
3.	Balanitis xerotica obliterans or severe scarring \pm bleeding

Results

Results are summarised in Tables 2–4. Of 37 boys who responded to half-strength Betnovate ointment, 6 later redeveloped phimosis and required a further course of treatment. This resulted in 2 further improvements, but the remaining 4 patients required circumcision. The 5 boys who showed no improvement with the first course of treatment had circumcision performed as well. In all, 33 boys showed an improvement after one or two courses of half-strength Betnovate application, and circumcision was necessary in the 9 who did not respond (Table 2).

Of the 18 patients treated with 1% hydrocortisone ointment, 16 improved. Phimosis recurred 6 weeks later in 1 patient, and after a further course of treatment he had a normal foreskin, which was maintained. Two circumcisions were necessary in this group (Table 2). Two of the 3 patients treated with 2% hydrocortisone ointment improved.

Overall, 51 out of 63 patients treated with local application of steroid ointment to a phimotic foreskin showed

Table 2. Results of application of topical steroids to phimotic prepuce (N = 63)

	Half-strength Betnovate N = 42	1% hydrocortisone N18	2% hydrocortisone N = 3
Age (years)			
Range	6/12–11	18/12–8	18/12–6
Average	3.9	3.2	3.5
Duration of treatment (weeks)			
Range	2–4	4–12	4
Average	3.8	5.4	4.0
No. of applications/day			
Range	2–4	2–4	2
Average	2.7	3.0	2.0
Improved	37 ^a	16 ^b	2
Circumcision required	5	2	1

^a Six foreskins redeveloped phimosis and received 4 further weeks of treatment, of which 2 gained permanent improvement and 4 required circumcision

^b One boy redeveloped phimosis, was given 4 weeks, further treatment, and improved

improvement to a normal or near-normal state, obviating the need for circumcision, which was performed in only 12 patients. In general, non-responders tended to have a higher grade of abnormality in the appearance of the foreskin at presentation.

Discussion

Controversy continues as to whether circumcision should be performed routinely, and at what age. Some surgeons prefer the procedure to be performed in the neonatal period, advocating that it is relatively painless, although there is little evidence to support this contention. Others argue that it is safer in the older child in whom immunity is better developed, making septicaemia and meningitis less likely. The procedure is then usually performed with the child under general anaesthesia as an elective procedure, and the cosmetic results are said to be superior to neonatal circumcision.

Table 3. Average gradings of foreskin

No. of patients	Average retractability score		Average appearance score	
	Prior to treatment	After treatment	Prior to treatment	After treatment
A. Responders (N = 51)				
Half-strength Betnovate	33	3.9	0.5	0.4
1% hydrocortisone	16	3.1	0.3	0.9
2% hydrocortisone	2	4.0	0	1
B. Non-responders (N = 12)				
Half-strength Betnovate	9	4.0	3.2	0.9
1% hydrocortisone	2	3.5	2.5	2
2% hydrocortisone	1	5	5	0

Table 4. Relationship of response to initial appearance of foreskin (all treatments)

Initial appearance of skin (No.)	Final appearance of skin (No.)
Normal (35) (no split or scar)	Normal (35)
Crack or skin splitting (14)	Normal (11) Crack or skin split (3)
White scar (14)	Normal (9) White scar (5)

Proponents of circumcision claim that it produces a more hygienic penis [8] and reduces the risk of penile and cervical cancer [4], genital herpes [17], and urinary tract infection. On the other hand, circumcision involves a number of disadvantages and complications, including haemorrhage (1%–7% incidence) [3, 12], meatitis and meatal ulceration (8%–31% incidence) [9] meatal stenosis (11% incidence) [14], removal of an inadequate amount of skin leading to secondary phimosis, removal of excessive skin [16], infection (4%–6% incidence), which may be local – including Fournier’s syndrome [7, 15, 16] – and systemic leading to septicaemia [10], meningitis [16], staphylococcal scalded skin syndrome [1], and perhaps even necrotising enterocolitis [16]. Also reported are wound dehiscence [6], electrocautery damage to the tip or entire shaft of the penis [16], urethral fistula [9], circumcision of an unrecognized hypospadias [6], and death [1]. Complications can arise from both local and general anaesthesia, and in addition the procedure is costly: \$60 million were spent on circumcising infant boys in the United States in 1981 [18].

The current recommendation by the Australian College of Paediatrics and the American Academy of Pediatrics is that circumcision is unnecessary. As a result, circumcision in Australia for non-medical, other than religious, reasons is not encouraged. More than 60% of Australian boys now remain uncircumcised [18]. About 3%–5% of uncircumcised boys will develop phimosis, for which circumcision has become the accepted treatment. Given the morbidity of circumcision, a non-surgical method of dealing with phimosis might have appeal.

It is important to distinguish the normal non-retractability of the foreskin due to the physiological adherence of its undersurface to the glans penis from phimosis. In the neonate and infant, the foreskin is often unretractable, and the danger of over-diagnosis of phimosis is well-recognized [13]. Gairdner reported that 50% of foreskins are not fully retractable by 1 year of age, and 20% by 2 years of age. The foreskin becomes fully retractable in 96% of school-boys [5]. When these congenital adhesions alone are present, the foreskin can be retracted back sufficiently to expose the urethral meatus and adjacent glans penis. In phimosis, however, the impediment to retraction is distal to the glans penis, such that often the glans and urethral meatus may not be visible at all. In the most severe cases, absolutely no retraction can be achieved, and there may be only a tiny pinhole opening through which urine can escape.

Previous studies have shown that local application and even injection of steroids into the prepuce reduces or abolishes phimosis, and in some cases can reverse the process of balanitis xerotica obliterans [2, 11, 16]. This may obviate the need for circumcision. In our study, 51 of 63 boys treated for phimosis locally with steroid ointment showed improvement in the retractability of the foreskin, such that after treatment previously unretractable foreskins became retractable. Betnovate ointment (half-strength) used up to four times daily for, on average, 4 weeks proved to be satisfactory treatment. If phimosis recurs, a further course of Betnovate ointment is recommended, as this can improve the situation permanently. Circumcision is recommended if improvement does not occur. Thick, fibrous scars of the prepuce appear to be more resilient to local steroids, and ultimately, circumcision is more likely to be necessary in these cases.

Nevertheless, all patients presented to us because of non-retractability of their foreskins or complications resulting therefrom. Rather than perform a circumcision *ab initio*, non-surgical treatment was offered and corrected the non-retractability of the foreskin in the majority of cases. Local application of steroids made circumcision unnecessary in many of these boys, satisfied the parents, who were pleased to avoid surgery on their children, and avoided the morbidity (discomfort and complications) of circumcision.

How does it work? It is our suspicion that local application of steroids may make the skin thinner as well as reduce any inflammatory component. In a way, it is this “sideeffect” of topical application of steroids on the skin, which limits its usefulness in other skin diseases, that is being used to advantage in phimosis. It is possible that the daily gentle retraction of the foreskin to expose that part onto which the ointment is applied has contributed to the improved retractability, but in an earlier unpublished study there was a significant difference between the application of steroids and the application of a placebo (non-steroid preparation).

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