

Circumcision Rates after the Release of Preputial Adhesions

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Abstract

Aim

We aim to determine if the release of preputial adhesions (RPA) successfully managed symptoms related to physiological phimosis and prevented the need for circumcision.

Methods

We performed a retrospective review and analysed data on RPA procedures performed between January 2005 and December 2017.

Results

534 RPA's were performed. Median age at RPA was 52.7 months (range: 3-197 months). Mean follow-up was 108 months (range: 4.7 to 152.4 months). 44 children and 1 child subsequently required a circumcision or preputioplasty respectively (8.4% incidence). There was no statistical difference in the circumcision rates in children who had RPA over 5 years vs those that had RPA under 5 years old (6.6% vs 9.8%; $p = 0.21$). The histology of the 44 excised foreskins showed BXO in 2 (4.5%) and chronic inflammation in 11 (25%).

Conclusion

RPA is an effective alternative to circumcision where either reassurance on the benign and self-limiting nature of physiologic phimosis or steroid treatment are unsuccessful in managing symptoms.

Introduction

The non-retractile foreskin in children is one of the most frequent indication for referral to a paediatric surgeon in Ireland. This is probably due to parental concerns when children complain of related symptoms coupled with a misperception among some general practitioners (GP) of the natural separation process of the inner surface of the prepuce from the glans surface^{1,2,3}. Phimosis from the Greek word 'Ψιμοσις' (muzzling) generally describes the non-retractile foreskin. Phimosis is best classified as either pathological or physiological. Pathological phimosis is either due to balanitis xerotica obliterans (BXO) or due to a constricting phimotic ring that hinders retraction, both usually in the older boy. Physiological phimosis is simply the non-retractile or incompletely retractile state of the foreskin in usually asymptomatic young boys. Foreskin retraction has been established to be complete by the age of 3 years in 90%¹ and by the age of 16 years in 99%² of boys. During this preputial separation process, complaints such as local discomfort, ballooning of the foreskin during micturition and smegma retention cysts are common and require simple reassurance only³. No pathologic sequelae have been attributed to these physiologic processes on assessing urine flow rates, post-void residual bladder volumes and bladder wall thickness in young boys with physiologic phimosis³. Furthermore, as partial separation of the foreskin ensues, young boys can suffer from episodes of balanoposthitis^{1,3}. This inflammation of the glans and prepuce (or prepuce only - termed posthitis) generally resolves with antibiotic treatment and can be prevented with improved local hygiene. Therefore, absolute and strong indications for a medical circumcision are limited to pathological phimosis due to BXO and prevention of recurrent urinary tract infections (UTI) usually in children with vesicoureteric reflux or posterior urethral valves respectively^{4,5}.

However, there is a subset of children usually over the age of 5, in whom the prepuce fails to completely retract or remains adherent to the glans and as a result might report ongoing local symptoms including recurrent balanoposthitis, local discomfort, painful penile tumescence, persisting smegma retention cysts, ballooning of the prepuce during voiding due to malalignment of the external urethral meatus and the preputial orifice and associated post void dribbling. On inspection no pathology is usually found except that preputial separation is incomplete and the term preputial adhesions is often ascribed to this condition. The release of preputial adhesions (RPA) ^{6,7,8} has been reported to successfully ameliorate these symptoms thereby avoiding a circumcision which should not be necessary since we know that natural preputial separation can eventually be achieved even by the age of 16 years.

The aim of this study was to review the practice of RPA at a tertiary paediatric surgical centre over a 12-year period. We determined whether RPA successfully managed the non-retractile foreskin and therefore prevented the need for circumcision. If circumcision was subsequently offered, we determined in what percentage of children and how long after the RPA it was required. Furthermore, we examined the findings on histopathological analysis of the excised foreskin. Based on our results we have inferred the success rates of the RPA procedure in managing the aforementioned symptoms.

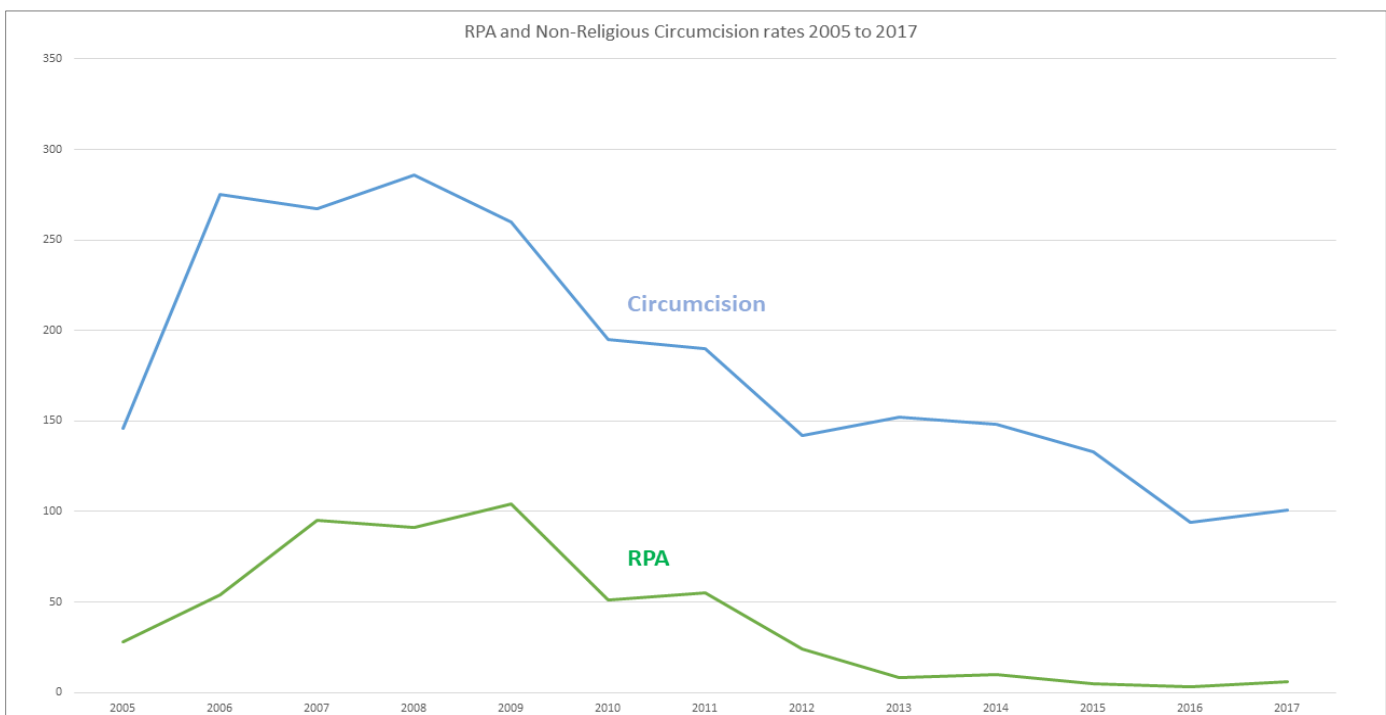
Methods

After obtaining institutional review board approval we performed a retrospective review of our electronic operative database. Data on all RPA procedures performed between January 2005 and December 2017 was analysed. We identified all children that were still symptomatic and underwent a circumcision or preputioplasty post-RPA within this study period. Children that had RPA after having a circumcision, megaprepuce repair, hypospadias repair or division of frenulum breve were excluded. For this study, categorical data was analysed with the Fisher's exact test. Probability value (*P*) less than 0.05 was considered statistically significant.

Results

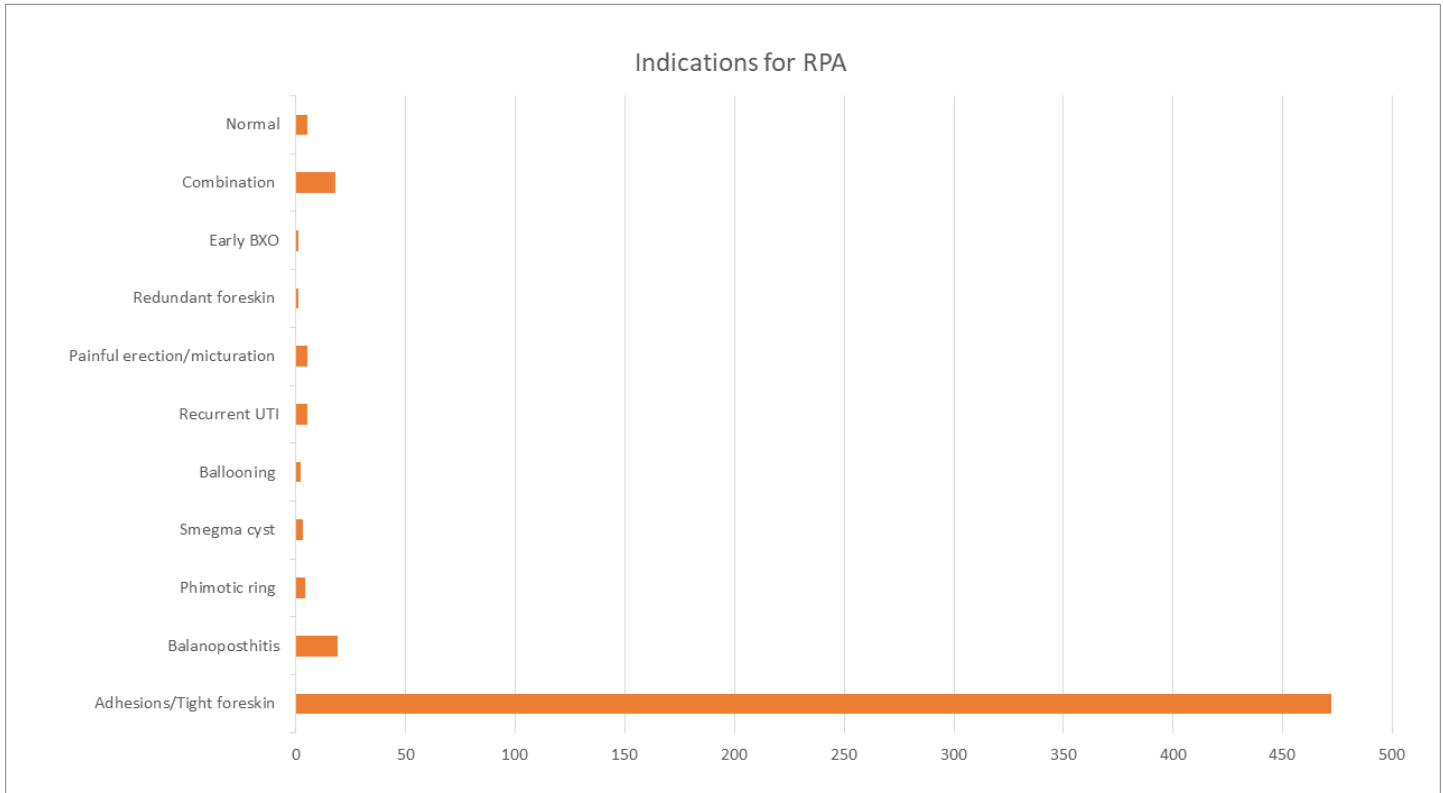
During the study period, 534 RPA's were performed. Over the years we noticed a simultaneous decline in the number of RPA's and non-religious circumcisions that were performed (Fig 1).

Figure 1: Number of release of preputial adhesions (RPA) and Non-Religious Circumcisions performed per year between January 2005 and December 2017



Several children were booked for circumcision due to a “phimosis”, but intra-operatively were found not to have significant “phimosis” so had an RPA performed instead. Figure 2 shows the frequency of the other documented indications for performing an RPA in these children.

Figure 2: Indications for the release of preputial adhesions (RPA) for the entire cohort



These RPA procedures were performed at a median age of 52.7 months (range: 3-197 months) and the mean follow-up was 108 months (range: 4.7 to 152.4 months). 44 children and 1 child subsequently required a circumcision or preputioplasty respectively. The overall incidence of requiring a further procedure was thus 8.4%. The mean time interval between RPA and a further procedure was 20 months (range: 1.7 to 88 months). The median age at which a further procedure was performed was 65.4 months (range: 20.2-201 months).

We divided the RPA cohort into 2 subsets; children older than or younger than 5 years at the time of RPA. Table 1 Shows the Circumcision rates for both subsets. There was no statistical difference in the circumcision rates in children who had RPA over 5 years compared to those that had RPA under 5 years old (6.6% vs 9.8%; $P = 0.2107$).

Table 1: Children who had release of preputial adhesions (RPA) over 5 years of age compared with children under 5 years of age at the time of RPA

	Number RPA (n)	Age at RPA median (range) months	Number Circumcisions (%)	Age at circumcision Median (range) months	Time interval between RPA and circumcision mean (range) months
>5 years	227	88.3 (60-197)	15(6.6%) ^a	107(83-201)	24(2-88)
< 5 years	307	37.1(3-59.9)	30(9.8%)	58.3(20-122)	18.2(1.7-69)

a Includes 1 preputioplasty

The histology of the 44 excised foreskins when analysed showed BXO in only 2 patients (4.5%), Chronic inflammation in 11 (25%), Normal histology in 26 (59%) and results were unavailable in 6 (13%). The median age at the time of circumcision for children with BXO and chronic inflammation was 65 months old (range: 28 to 135 months). In these children,

circumcision was performed at a mean of 15.7 months (range: 1.8 to 40.4 months) after their RPA. The 2 children with BXO were 83 and 125 months old respectively at the time of their circumcision.

Discussion

This is the largest published series reviewing the release of preputial adhesions. We found that majority of children, after having an RPA, do not require a further procedure because their symptoms generally resolve. This finding supports the effectiveness of the procedure also seen in previous reports^{6,7,8,9}. Alternatively, one can make a counter argument that since it has been reported that 99% of foreskins will eventually retract² then probably RPA was unnecessary if parents can be successfully reassured about the likelihood that the related symptoms will resolve. We found that the procedure is now offered less often either because steroid treatment to resolve physiologic phimosis¹⁰ and simple reassurance is increasingly practiced and better accepted by parents or due to fewer referrals from GP's.

A little over half of the children with persisting symptoms after RPA that went on to have a circumcision demonstrated no pathology in their excised prepuce. The unavailable histology specimens may have looked grossly normal to the operating surgeons and thus were not sent for analysis. Those with pathologic findings on histology may either have been unsuitable candidates for RPA because pathological phimosis was not apparent prior to the procedure or alternatively the pathology may have subsequently developed after the procedure. This is particularly true in BXO which almost exclusively occurs in older boys over the age of five^{3,8}. In our series, the 2 children with BXO were nearly 7 and 10 years old respectively. Those with chronic inflammation on histology, which may be an early finding prior to fully developed BXO, were also predominantly over 5 years old at the time of circumcision. This raised the question whether children over 5 years of age were more likely to have an unsatisfactory result after RPA. However, our results did not corroborate this. Furthermore, it is possible that retraction of a somewhat tight prepuce can lead to tearing and subsequent scarring rendering the prepuce now pathologically non-retractile prompting a circumcision². Finally, failure to practice ongoing retraction and local hygiene at home after the RPA procedure may have predisposed to recurrence of their symptoms^{6,7}.

In utero, the epithelium lining the inner surface of the developing prepuce and outer surface of the glans are contiguous. By a process of desquamation, these 2 epithelia separate, and the preputial space is formed. This gradual, spontaneous separation begins in late gestation and as we now know continues after birth for a variable length of time^{1,3,6,7}. The non-retractile nature of the foreskin at birth probably serves to protect the glans from ammoniacal dermatitis and meatal ulceration or subsequent stenosis while the child is still in nappies^{1,3}. Until foreskin retraction is complete, children who have ongoing local symptoms require simple reassurance. If symptoms are unrelenting, topical steroid treatment to accelerate retraction¹⁰, RPA and preputioplasty are viable options if foreskin preservation is desired³. Absolute indications for circumcision include BXO and UTI particularly in children with VUR or PUV. Conditions such as megaprepuce, hypospadias and frenulum breve should be recognized and be referred for a specialist urology opinion.

We conclude that RPA followed by regular gentle retraction at home is safe and has a high success rate in managing symptomatic children with non-retractile foreskins or physiological phimosis. Very few will go on to require circumcision. Careful assessment of the prepuce to exclude pathology prior to RPA must be performed and the procedure should be gentle to prevent tearing of the prepuce and subsequent scarring that will make the foreskin pathologically non-retractile prompting the need for a circumcision. Paraphimosis, a reported complication after having an RPA, can be avoided by teaching parents and children to ensure that the foreskin is always returned to its non-retracted state⁷. RPA is an effective alternative to circumcision where either simple reassurance on the benign and self-limiting nature of physiologic phimosis or steroid treatment instituted by the child's GP are unsuccessful in managing the local related symptoms.

The main limitations to this study were the ambiguity in the indications documented for RPA, the unavailable data on prior steroid treatment before RPA or prior to circumcision, adherence to daily retraction regimen after RPA, and circumcisions that may have been performed at another centre.

Declaration of Conflict of Interest:

The authors have no conflict of interest to declare.

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