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Pathological Investigation of Childhood Foreskin: Are Lichen Sclerosus and Phimosis Common?

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ABSTRACT

Objective: To evaluate histopathological results of foreskin removed during circumcision in the pediatric age group and the relationship between these and the degree of phimosis.

Study Design: Cross-sectional study.

Place and Duration of Study: Department of Urology, Samsun Training and Research Hospital, Samsun, Turkey, from June to December 2014.

Methodology: Male children undergoing planned circumcision were examined for the presence and degree of phimosis which was recorded before the operation. After circumcision, the preputial skin was dermatopathologically investigated. Pathological investigation carefully evaluated findings such as acute inflammation, chronic inflammation, increased pigmentation and atrophy in addition to findings of Lichen Sclerosus (LS) in all specimens. The pathological findings obtained were classified by degree of phimosis and evaluated.

Results: The average age of the 140 children was 6.58 ±2.35 years. While 61 (43.6%) children did not have phimosis, 79 (56.4%) patients had different degrees of phimosis. Classic LS was not identified in any patient. In a total of 14 (10%) children, early period findings of LS were discovered. The frequency of LS with phimosis was 12.6%, without phimosis was 6.5% (p=0.39). The incidence of histopathologically normal skin in non-phimosis and phimosis groups was 37.7% and 22.7%, respectively. In total, 41 (29.3%) of the 140 cases had totally normal foreskin.

Conclusion: Important dermatoses such as LS may be observed in foreskin with or without phimosis. The presence of phimosis may be an aggravating factor in the incidence of these dermatoses.

Key Words: Circumcision. Male. Phimosis. Foreskin. Pathology. Lichen sclerosus.

INTRODUCTION

Completed for ethnic, religious and medical reasons in different areas of the world, circumcision is one of the most frequently performed operations.¹ Despite being one of the most common procedures performed in the neonatal period, especially in the USA, it remains a controversial surgical intervention in Europe.² Along with research debating its benefits and applications, there are studies showing that it reduces the risk of urinary infection, penile inflammatory diseases, and Sexually Transmitted Infections (STI) in adults.³ A variety of dermatoses are related to preputial skin. In some countries, the foreskin is given to the family for cultural and ethnic reasons, and routine pathological investigation is not completed.

Nonetheless, some histopathological investigations of preputial skin have reported rates of 10 - 84% for

important dermatoses like Balanitis Xerotica Obliterans (BXO) and Lichen Sclerosus (LS).⁴⁻⁸ Accepted as a genital variant of LS, BXO undoubtedly is the most important of these pathologies observed in preputial skin.⁹ LS is a dermatosis with unclear etiology, and it has characteristics of precursor dermatosis for squamous-cell cancer.^{7,10} There is insufficient literature information about the effect of phimosis on incidence of these dermatoses with unclear etiologies. Phimosis is a physiological situation observed in varying degrees in children, and it might cause infection and/or inflammation.

The aim of this study was to evaluate histopathological results from preputium skin removed during circumcision in the paediatric age group, as well as prospectively evaluating the relationship between these results and the degree of phimosis.

METHODOLOGY

The foreskins of male children who underwent circumcision from June to December 2014 were dermatopathologically investigated. Before circumcision, all children were examined again in the operating room, and the presence of phimosis was recorded. These findings are defined as band-like chronic inflammatory infiltration of the upper dermis obscuring the dermo-epidermal junction and focal epidermal atrophy.⁷ If the

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preputium skin could not be retracted or less than half of the glans penis was visible, complete phimosis was recorded. If more than half of the glans penis was visible, but it could not be fully revealed, partial phimosis was recorded. If the preputium skin could be fully retracted without applying force and the whole glans penis was visible, an absence of phimosis was recorded.

All patients had the foreskin removed using the circumcision method by the same surgical team under general anaesthesia. During the procedure, care was taken not to traumatize the foreskin. The foreskin was fixed in 10% formaldehyde solution and later immersed in a paraffin block. Step sections then were taken and stained with Haematoxylin and Eosin for examination by the same pathologist. During pathological investigation, specimens were carefully examined for findings of acute inflammation, chronic inflammation, increased pigmentations, atrophy, and LS.

IBM SPSS for Windows, version 21.0 (Chicago, USA) was used for statistical analysis. Data were calculated as mean ± standard deviation and frequencies with percentages. Fisher's exact test was used, and $p < 0.05$ was accepted as significant.

RESULTS

The children had an average age of 6.58 ± 2.35 (1 - 12) years. Twenty-two children (15.7%) had complete phimosis, and 57 (40.7%) had partial phimosis; a total of 79 patients (56.4%) were identified as having differing degrees of phimosis. Of all the children, 61 (43.6%) had no phimosis. On examination, none of our patients had findings of paraphimosis or balanoposthitis.

While no patient had classic LS, a total of 14 (10%) children were found to have early-period findings for LS (Figure 1). None of the patients had the classic LS findings of epidermal orthokeratotic hyperkeratosis and extensive edema and hyalinization of the upper dermis. Of the 14 children with LS, 10 were patients with different degrees of phimosis. The frequency of phimosis with LS was 12.6%, while the frequency without phimosis was 6.5%. However, there was no statistically significant difference found between the rate of incidence of LS in the two patient groups, those with and

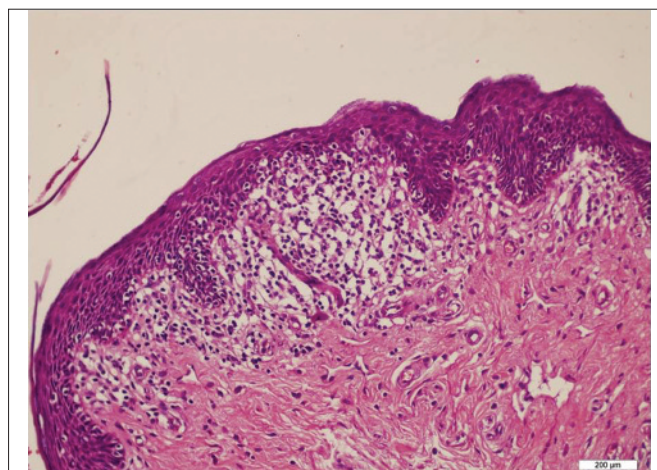


Figure 1: Early LS. Band-like chronic inflammatory infiltration at the upper dermis obscuring the dermo-epidermal junction, focal epidermal atrophy (X200, H.E.).

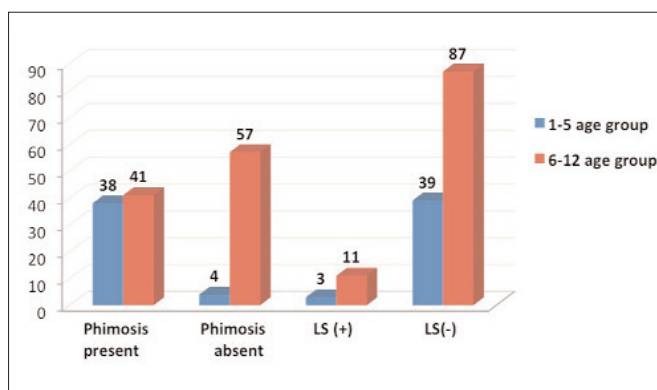


Figure 2: Phimosis and LS incidence rates according to age group.

without phimosis ($p=0.39$, Table I). Other pathological findings included minor changes like pigmentation, acute inflammation, chronic inflammation, edema and atrophy. Table II displays the pathological findings according to degree of phimosis. The incidence of histopathologically normal skin in non-phimosis and phimosis groups was 37.7% ($n=23$) and 22.7% ($n=18$), respectively. In total, 41 (29.3%) of the 140 cases had totally normal foreskin.

In the literature, phimosis may be physiologically observed in infants with the majority resolving by 3 years of age, while in most resistant cases phimosis continues until 5 years of age.¹¹ Guided by this knowledge and taking note of the age of our patient group, as recommended in the literature, the critical age was accepted as 5 years. In conclusion, in the 1 - 5 years age group, of 42 patients, 38 (90.5%) had phimosis, while in

Table I: Degree of phimosis and LS identification rates in children .

Degree of phimosis	Total patients	LSA +	p-value
Phimosis present	79 (56.4%)	10/79 (12.6%)	0.39
Phimosis absent	61 (43.6%)	4/61 (6.5%)	
Total	140 (100%)	14/140 (10%)	

Table II: Pathological findings of preputial skin by degree of phimosis.

	Acute chronic inflammation	Chronic inflammation	Pigmentation	Edema and minor changes	No abnormality	LSA +	Total
Full phimosis	3 (13.6%)	4 (18.2%)	1 (4.5%)	8 (36.4%)	4 (18.2%)	2 (9.1%)	22 (100%)
Partial phimosis	11 (19.3%)	3 (5.3%)	15 (26.3%)	6 (10.5%)	14 (24.6%)	8 (14%)	57 (100%)
No phimosis	10 (16.4%)	8 (13.1%)	8 (13.1%)	8 (13.1%)	23 (37.7%)	4 (6.5%)	61 (100%)

the 6 - 12 years age group of 98 patients, 41 (41.8%) had phimosis identified. LS findings were present in 3 of 42 patients (7.1%) in the 1 - 5 years age group and in 11 of 98 patients (11.2%) in the 6 - 12 years age group (Figure 2).

DISCUSSION

The controversies related to circumcision are not just debated in terms of the medical procedure; it is also considered from political, economic and sociological angles.^{2,12,13} From a medical perspective, circumcision has positive effects, preventing complications linked to phimosis, acting as a prophylaxis for urinary system infections in infants, preventing the development of penile cancer and its precursor LS, and protecting against sexually transmitted diseases.^{3,14,15}

Apart from ethnic and cultural reasons, the most frequent indications for circumcision are phimosis and urinary infection prophylaxis. However, the genital region is associated with many dermatoses like LS, allergic dermatitis and venereal disease. Undoubtedly, LS is one of the most important of these dermatoses. LS is an inflammatory skin disease with unknown etiology; it affects the genital region, resulting in vulvar keratosis in women and phimosis in men. Though there are different classifications in the literature, Mattioli *et al.* distinguished three groups of LS, early LS and non-specific chronic balanitis.^{6,8} Histopathologically, typical LS findings are characterized by the atrophy of stratum Malpighi and presence of hyperkeratosis, which may be accompanied by widespread edema and upper dermis hyalinization. Sometimes, there are also lymphoid cells obscuring the dermo-epidermal junction and histiocytes forming a band of dermal inflammatory infiltration.^{6,16}

When these characteristics are examined, early LS and non-specific chronic balanitis LS may be defined as possible precursor dermatoses. In the patient group, no patient had classic LS findings. In 14 of the patients, early LS findings were identified. In the adult age group, LS is defined as a disease of uncircumcised males, an important marker of the link between LS and circumcision.¹⁷ Though glans and distal urethra involvement may be observed in male patients, the most frequent region involved is the foreskin. Removing the foreskin reduces the involvement of the glands and distal urethra, a situation that has not been explained by current data. While LS may cause balanoposthitis of the foreskin and result in phimosis, the incidence of LS in patients with phimosis is higher.^{9,17,18} Contrary to this finding, Tokgoz *et al.*, in a study of 32 patients, identified only one patient with LS. They concluded that that patient was one who did not have phimosis.¹⁵ In the present group, there was no statistical difference found, but there was a higher rate of LS in patients with phimosis compared to patients without phimosis (12.6%

vs. 6.5%). Considering that there were 140 children and none of them had any inflammation seen on physical examination, these rates in broader patient series may show differences in favour of the patient group with phimosis.

Generally, LS is closely related to penis cancer in the adult age group.^{7,10} Squamous Cell Carcinoma (SCC) is observed as a complication of LS at a rate of 7 - 9.3%. When this rate is examined, SCC may appear to be a rare complication of LS; however, the incidence of LS in patients diagnosed with penile SCC is reported to be 44 - 55%.¹⁹⁻²² After a patient develops classic LS, a full cure cannot be provided, and spontaneous remission is rarely observed. There is no certain data that early diagnosis and treatment can prevent the development of SCC.²³ However, the incidence of LS in circumcised adult males falls significantly. As in this patient group, the patients with early period findings of LS may be the candidate for possible classic LS in the future.

In some countries, pathological investigation of foreskins from circumcision performed for ethnic and cultural reasons is considered unimportant and is not routinely performed. However, pathological investigation of all foreskins should be carefully performed as such research is of great importance to answer the remaining questions about this topic. Even if circumcision reduces the risk of development of LS, there is no data on whether circumcised patients developing LS in adulthood had findings of early period LS in their foreskin. Therefore, pathological investigation of all foreskins should be routinely done, and long-term follow-up with patients with early period LS using broader series is necessary. Additionally, it would be appropriate to inform and warn families of this issue.

In this group, age-related data showed that 38 of 42 patients (90.5%) in the 1 - 5 years age group had phimosis; while in the 6 - 12 years age group, 41 of 98 patients (41.8%) had phimosis. LS findings were seen in 3 of 42 patients (7.1%) in the 1 - 5 years age group, and in 11 of 98 patients (11.2%) in the 6 - 12 years age group. Considering the presence of phimosis identified especially in those below 5 years of age and the peak of LS incidence around 10 years of age, these findings are not expected.¹¹

Apart from LS, other pathological findings were: acute inflammation alone, chronic inflammation, pigmentation, edema and minor changes (Table II). Apart from LS, no results could be obtained about the effect of phimosis on other pathological findings. However, it is noteworthy that for patients with no abnormalities, 18.2% (n=4) had full phimosis, 24.6% (n=14) had partial phimosis, and 37.7% (n=23) had no phimosis. There is no certain data about why dermatopathological changes are more frequently seen in the presence of phimosis. However, various studies have blamed chronic exposure to urine

as a factor in developing dermatoses like LS.^{17,24} In the presence of phimosis, this effect may be more intense.

The medical advantages of circumcision should include not only findings from the paediatric age group, but also an evaluation of the benefits in adulthood. However, in today's environment, performing circumcisions to prevent dermatoses in the paediatric age group will continue to be debated from both medical and economic perspectives.

CONCLUSION

Glans foreskin may develop important dermatoses like LS, and the frequency increases in the presence of phimosis. Whether phimosis is present or not, after circumcision, pathological investigation of all foreskins should be completed. If important dermatoses like LS is identified, it is important that the families be informed about this issue. Investigating foreskin pathologies of circumcised patients, who are diagnosed with LS in adulthood, may provide interesting results.

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