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Balanitis xerotica obliterans in children and its incidence under the age of 5 years

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Abstract *Objective:* To analyse the incidence of BXO among paediatric circumcisions for preputial pathology, in particular in children under the age of 5 years.
Methods: Retrospective review revealed 1769 paediatric circumcisions performed between 1997 and 2008 at our institution. Data were collected on patient's age, date when sample received by pathology department and histological findings for all the foreskin samples received and examined during the study period. Epidemiological data were obtained from the Office for National Statistics, UK.
Results: A total of 346 foreskin samples were received and BXO was found in 182 (52.6%). There were 31 children under the age of 5 years circumcised for preputial pathology. BXO was reported in 6 (19.3%) and chronic inflammation in 16 (51.6%) of these patients. The foreskin was reported normal in 2 (6.5%) and the remaining 7 (22.6%) patients had preputial cysts or other pathology. Epidemiological population data analysis revealed the incidence of BXO per year to be 3.01 cases/1000 boys under 15 years of age and 0.322 cases/1000 boys under 5 years.
Conclusion: The incidence of BXO in boys noted in our study is higher than previously reported. BXO can result in significant complications and should be considered in children even under 5 years.

Introduction

Balanitis xerotica obliterans (BXO) is a chronic progressive inflammatory dermatological condition of unknown aetiology affecting the male genitalia. First identified by Stuhmer in 1928 and initially described in the literature as a 'post-circumcision phenomenon' [1], the exact aetiology of this disease still remains unknown. Features of BXO may be seen clinically (Fig. 1); however the diagnosis is a histological one. Histopathological examination would reveal

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Figure 1 Pathological phimosis and scarred foreskin suggesting BXO.

hyperkeratosis and hyperplasia of the squamous mucosa along with homogenous collagen deposition in the upper dermis [2]. Circumcision is usually curative, although some patients may require further treatment for meatal stenosis or urethral involvement.

BXO was regarded exclusively as an adult disease until a case was documented in a 7-year-old boy in 1962 [3]. Further reports of prepubertal BXO followed during the 1970s and currently it is recognised as a common cause of acquired phimosis and meatal stenosis in boys [4]. The evidence in the literature has consistently suggested that the incidence of BXO in the paediatric population is low, at 9%—19% among boys undergoing circumcision for preputial pathology [5], and is rare in children under the age of 5 years [6]. However, we believe that the incidence of BXO is much higher and there is an increasing tendency for younger patients to be affected. We therefore aimed to analyse the incidence of BXO among paediatric circumcisions for preputial pathology at our institution, looking in particular at the children under the age of 5 years.

Materials and methods

Retrospective review of the operative records revealed a total of 1769 paediatric circumcisions performed between 1997 and 2008 at our institution. From these, a total of 346 foreskin samples were received by our pathology department for histopathological examination. Data were collected from the pathology database regarding the patient's age, date when sample received and histological findings for all the foreskin samples received and examined during this study period.

We collected additional retrospective data on clinical history and examination findings at presentation and subsequent reviews for all patients under the age of 5 years at the time of circumcision. Data were incorporated into a Microsoft Excel spreadsheet (Version 2007) and analysed using GraphPad software (copyright © 2002—2005 by GraphPad Software Inc.). Fisher's exact test was used for statistical analysis and a two-tailed *P*-value of <0.05 was considered statistically significant.

Epidemiological data were supplied by the Office for National Statistics [7]. The catchment population of our institution (Leicester Royal Infirmary) was taken as being that of the Leicestershire County and Rutland Primary Care Trust. Data were obtained individually for the population of boys under the age of 15 years (0—14 years) and 5 years (0—4 years) for each year between 1997 and 2008. Our study included data on boys under the age of 16 years (0—15 years), but for the epidemiological data analysis alone we excluded patients with BXO ($n = 1$) at 15 years of age during the study period.

Results

Over the study period of 12 years (1997—2008), 346 paediatric foreskin samples were received and histopathological examination was performed on all of them. The examinations were carried out at a single centre at our institution. BXO was found in 182 samples (52.6%) and inflammation without any evidence of BXO was noted in 130 patients (37.6%). The histology results were reported as normal in 6 patients (1.7%). Other pathologies, including preputial cyst, naevus and ulcer, were found in 28 patients (8.1%).

The mean age of the patients with BXO was 8.9 years and the median was 9 years. Fig. 2 depicts graphically the age distribution of histological results for all foreskin samples examined. The peak incidence of BXO and inflammation was noted at 7 and 8 years of age, respectively. Epidemiological population data analysis from our catchment area revealed the corresponding incidence of BXO per year to be 3.01 per 1000 boys under 15 years of age. Also, in boys under the age of 5 years the incidence of BXO was found to be 0.322 per 1000 per year.

Of the children under the age of 5 years ($n = 31$) who had circumcision for preputial pathology, BXO was reported in 6 patients (19.3%) and inflammation was reported in 16 patients (51.6%). Among the 6 patients who had BXO, 5 patients were 4 years of age and 1 patient was 2 years of age at presentation. The foreskin was reported normal in 2 patients (6.5%) and the remaining 7 patients (22.6%) had preputial cysts or other pathology.

For the 31 children under the age of 5 years, clinical history with symptoms and examination findings at

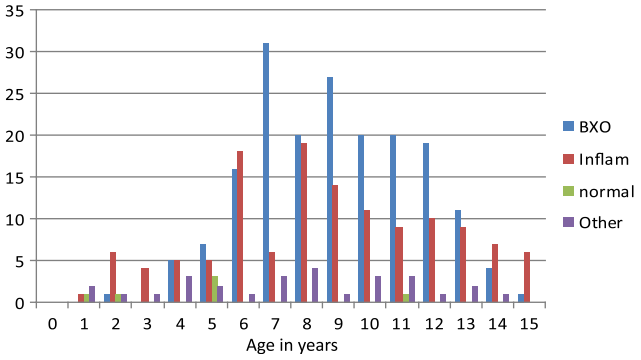

Figure 2 Age distribution of paediatric foreskin histology results. Note peak incidence of BXO at 7 years of age.