INTRODUCTION

The foreskin might be the site of different genital dermatoses like balanitis xerotica obliterans (BXO), which is an inflammatory skin disease of unknown etiology that mainly affects the genital area and results in phimosis in male and vulvar keratosis in female.[1,2] BXO may result in meatal stenosis, urethral stricture and is associated with a high-risk human papilloma virus and can be a precursor lesion for the squamous cell carcinoma.[3] The incidence of BXO in patients with phimosis is variable in the literature and ranging from 10 to 40%.[2,4]

At birth there is a physiological phimosis in 97% of boys, which resolves spontaneously in 90% by age three years.[5] Indications for treatment of phimosis include persisting phimosis at six to seven years of age, pinpoint phimosis and balanoposthitis. First-line treatment is local application of steroids twice daily during six weeks, with instructions to retract the foreskin daily. Topical steroids are successful in 75-90% of boys with phimosis and 40% of those with clinical suspicion of BXO.[6]

Surgery is the next step in treatment when steroid treatment does not prove effective. Surgical methods range from preputioplasty, dorsal slit to circumcision to relieve foreskin tightness. Most clinics do not send the foreskin for histopathological examination, especially in countries where religious circumcision is common and therefore BXO is suggested to be overlooked in most children.[1]

In this cohort study, the aim was to investigate whether histological evaluation of the circumcised foreskin for medical indications affects clinical management.
2002 and June 2005. 112 patients were included in this cohort study and were divided into two groups. A study group which consisted of 52 patients that had medical indications for circumcision and their foreskins were sent for histopathology. The control group consisted of 60 boys who underwent circumcision for religious belief and did not have any history of foreskin diseases.

Data were collected from the pathology database. Preoperative physical examination findings were reviewed from the patients’ charts, focusing on indication for circumcision and if there was a clinical evidence of BXO. All circumcisions were done under general anesthesia. The procedures were performed with total removal of the foreskin in all patients. The foreskin then fixed in 10% formaldehyde solution and thereafter embedded in paraffin blocks. Sections were taken and stained with haematoxylin and eosin to be examined.

Data were incorporated into a Microsoft Excel spreadsheet (2007) and analyzed using Statistica software (2010). Fisher’s exact test was used for statistical analysis and a P-value of <0.05 was considered statistically significant.

**RESULTS**

The mean (range) age of boys in the study group was six (2-12) years. Thirty-six of the 52 boys (69%) were found to have phimosis as an indication for circumcision, while 15 (29%) had recurrent balanoposthitis and only one (2%) had paraphimosis that was operated acutely after failure of reduction.

The histopathological findings of the patients were summarized in Table 1. A total of 8 cases of BXO (15%) were diagnosed in the study group [Figure 1]. In five of the eight BXO, the histopathological examination revealed focal lichenoid infiltrate which was considered as early form of BXO.

In three of the eight boys with BXO, the diagnosis was suspected during physical examination (phimosis and scaring) and the histopathology matched the clinical suspicion. BXO was not suspected clinically in the other five patients with early changes of BXO.

The mean (range) age of boys in the control group was comparable five (2-10) years. The histopathology revealed three cases of acute inflammation and another three cases of chronic inflammation. No BXO found in this group.

A Fisher’s exact test (two tailed) analysis was used to find an association between the diagnosis and the histopathological findings in the groups. The study group had a clear association with BXO which was

| Table 1: Histopathological findings of foreskin of 112 boys |
|------------------------------------------------------------|
| BXO typical | BXO early changes | Chronic inflammation | Acute inflammation | No abnormality |
| Study group (52) | 3 | 5 | 7 | 15 | 22 |
| Phimosis (36) | 2 | 4 | 4 | 4 | 22 |
| Balanoposthitis (15) | 1 | 1 | 3 | 10 | 0 |
| Paraphimosis (1) | 0 | 0 | 0 | 1 | 0 |
| Control group (60) | 0 | 0 | 3 | 3 | 54 |
| Total (112) | 3 | 5 | 10 | 18 | 76 |

*Figure 1: BXO: Chronic inflammatory infiltrate at the upper dermis with hyperkeratosis and epidermal atrophy*
statistically significant ($P = 0.0016$). Furthermore, phimosis had a strong association with BXO ($P < 0.0021$) in spite of the small sample size, while balanoposthitis did not show such an association ($P < 0.038$).

**DISCUSSION**

Phimosis and recurrent balanoposthitis are the most common medical indications of circumcision. This study showed that 15% of boys (8/52) who were circumcised for medical indications had a histological evidence of BXO. The small sample size of this study (52 patients) may limit the value for defining the real incidence of this disease but this incidence is in consistence with the reported incidence of 10-40% in different studies,[2,4,7] Clinical features of BXO can range from mild to florid and extensive disease. Clinically, an established case of BXO can be detected easily; however, the early features of BXO in children are subtle and could be missed. Individual observations vary, and in our study with several surgeons interpreting clinical BXO, a selection bias exists, and we admit this as a limitation.

The histopathological evaluation was able to reveal five early changes of BXO that were not suspected on physical examination. The histopathological spectrum of BXO varies according to different classification, from early atypical changes to the typical fibrosing type.[7,8] However, any change within this spectrum has to be considered significant as it represents a precursor lesion that might develop to a full process. Without histopathology of circumcised foreskin, five of eight patients (62%) with BXO would have been missed in our study.

In our department, the policy is to send the foreskin for histopathological examination after circumcision for medical indications for follow up purposes. When BXO is diagnosed after circumcision, the parents and patients are informed about the nature of the disease, complications and risk of recurrence.

**CONCLUSION**

There is a place for routine biopsy after circumcision for medical indications and BXO cannot be excluded on the basis of a negative physical examination.

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Single-layer closure of typhoid enteric perforation: Our experience

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ABSTRACT

Background: Typhoid enteritis is rare in developed countries. The increasing prevalence of typhoid fever with enteric perforation in our environment is alarming. Peritonitis follows enteric perforation due to typhoid enteritis. Surgical treatments and repair of the perforated areas due to typhoid enteritis varies between institutions with high mortality and morbidity. Materials and Methods: We retrospectively studied the effects of single versus double layer intestinal closure after typhoid enteric perforation with peritonitis in 902 pediatric patients from September 2007 to April 2012. All the patients underwent laparotomy after resuscitation and antibiotic cover. The patients were divided into two groups: group A (n = 454) double layer closure and group B (n = 448) single layer closure. Results: There were 554 males and 348 females with male to female ratio 1.6:1. Ages of the patients were three years to 14 years with mean age at eight years and mode at nine years. The following clinical outcomes were recorded: burst abdomen 38 (8.3%) vs 3 (0.6%), enterocutaneous fistula formation 52 (11.4%) vs 8 (1.7%), superficial wound infection 215 (47.3%) vs 91 (20.3%), ligature fistula 13 (2.8%) vs 7 (1.5%), mean length of 29.4 ± 7.8 vs 45.3 ± 11.6. Conclusion: Our results showed that single layer closure of the perforated ileum due to typhoid enteric perforation with peritonitis in children was effective by reducing complication rates.

Key Words: Children, single layer closure, typhoid enteric perforation

INTRODUCTION

Typhoid fever is a severe multisystemic infection caused by Salmonella typhi and occasionally Salmonella paratyphi. Typhoid enteritis is endemic in areas with poor socioeconomic facilities, including poor clean water supply and sanitary systems.[1-3] Typhoid infection is acquired by the faeco-oral route. Severe typhoid fever with enteric involvement perforates leading to serious surgical complications with high morbidity and mortality.[4-7] Peritonitis follows typhoid enteric perforation.[8] Management of typhoid enteric perforation is surgically challenging. There are various surgical treatment options for typhoid enteric perforation[8-12] but the superiority of any one procedure over the other remains controversial.[8] However, simple, quick and less traumatic surgical procedure is advocated in the treatment of typhoid enteric perforation.[10] This study reviewed single versus double-layer intestinal closure in the surgical management of typhoid intestinal perforations in children in our centre.

MATERIALS AND METHODS

Nine hundred and two children 902 with peritonitis secondary to typhoid enteric perforations were enrolled into the study prospectively from September, 2007 to April, 2012 at the Department of Surgery, Children Surgical Unit of Murtala Muhammad Specialist Hospital, Kano in Northern Nigeria.

All the admitted patients were operated by one surgical team of the unit that included a pediatric surgeon, a principle medical officer, senior medical officers and medical officers.

Upon admission, after routine clinical investigations; patients were adequately resuscitated for fluid and electrolytes imbalances including intravenous administration of antibiotics. Anaemic patients were transfused appropriately. Negative nitrogen equilibrium was evaluated and managed by administering IV Astymine® or Mekoamine® as we do not have facilities for total parenteral nutrition in our centres. Nasogastric tubes were inserted for decompression and urethral catheter for urine output monitoring.
