

## The Value of Pathological Examination of the Foreskin Following Circumcision

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### Abstract

**Introduction:** We determined the clinical impact and value of routine histopathological examination of the foreskin following circumcision.

**Methods:** We performed a retrospective study of 225 consecutive adult circumcisions. Indications for circumcision were categorized as benign or malignant based on preoperative clinical evaluation. Histopathological results were similarly classified as benign or malignant. Preoperative clinical impression and postoperative histological diagnosis were compared and reported as concordant (in agreement) or discordant (in disagreement). The cost impact of histopathology examination was analyzed with respect to study findings.

**Results:** Of the 225 patients 209 (92.9%) had clinically benign disease on preoperative evaluation and 16 (7.1%) had foreskin lesions suspicious for malignancy. Mean age was 57.0 years (range 23 to 92). Patients were younger in the benign group than in the malignant group (56.5 vs 62.8 years,  $p = 0.018$ ). Black patients represented 65.8% of the study population and were similarly distributed between the 2 groups ( $p = 0.405$ ). There was no statistical difference in patient height, weight, body mass index or comorbidities between the 2 groups. Preoperative clinical impression and postoperative histological diagnosis were concordant in all 209 patients in the benign group. Of the 16 patients suspected to have malignant disease preoperatively 9 (56.2%) had malignancy and 7 (43.8%) had benign disease on histopathological examination.

**Conclusions:** Routine histological examination of a foreskin specimen in the absence of clinical suspicion for malignancy appears to have diminished benefit in the setting of benign preoperative indications. Omitting this traditional practice in patients with benign surgical indications may positively impact health care costs without compromising quality of care.

**Key Words:** penis; circumcision, male; foreskin; pathology; health care economics and organizations

### Abbreviations and Acronyms

AVAMC = Atlanta Veterans Affairs Medical Center

BXO = balanitis xerotica obliterans

LSA = lichen sclerosus et atrophicus

SCC = squamous cell carcinoma

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Adult circumcision is a commonly performed urological procedure. In the Veterans Health Administration, the largest health care system in the United States serving more than 7 million veterans, approximately 2,700 adult circumcisions are performed annually.<sup>1</sup> With more than 118 million male adults 18 years old or older in the United States an estimated 45,000 adult circumcisions are performed annually.<sup>2</sup> The most common indication for adult circumcision is phimosis or paraphimosis, followed by recurrent balanitis and posthitis as well as social, cultural, personal and religious reasons.<sup>3</sup> Given these indications, nonmalignant, inflammatory lesions represent the majority of foreskin pathology.<sup>4</sup> In contrast, penile cancer is rare and only 1 of 5 cases involve the foreskin.<sup>5</sup> Foreskin malignant diagnoses are often clinically suspected and/or apparent before circumcision. The majority of circumcision specimens are benign and yet it remains standard practice to request pathological examination on all foreskin specimens without considering the preoperative clinical impression.

The primary objective of our study was to determine the clinical impact of routine histopathological examination of the foreskin after circumcision. Specifically we examined the yield of clinically unsuspected, new histological diagnoses that would impact clinical decisions and management. The secondary objective was to outline the potential cost savings related to omitting unnecessary pathological examination.

## Materials and Methods

The study was approved by the institutional research boards at Emory University and AVAMC. This retrospective study of 225 consecutive adult circumcisions was performed at AVAMC in the 9-year period of 2006 to 2014. All procedures were done with the patient under local penile block anesthesia in an outpatient setting as described previously.<sup>6</sup>

Demographic, clinical and laboratory information was obtained on all patients, including age, race, height, weight, body mass index, comorbidities, indications for circumcision, physical examination findings and histopathology results. Preoperative indications were categorized into 2 groups based on preoperative history and physical examination. Group 1 included nonmalignant benign indications such as phimosis, paraphimosis, inflammation (balanitis and posthitis), and social, cultural, personal and religious reasons. The presence of concomitant features suspicious for malignancy excluded patients from group 1 and moved them into group 2. Group 2 included lesions suspicious for malignancy based on clinical history and physical examination.

All foreskin specimens underwent standard histopathological preparation and examination. Specimen preparation

included fixation with 10% formaldehyde, paraffin wax tissue blocking, and subsequent hematoxylin and eosin staining on glass slides. Board certified pathologists performed the histopathological examination. To facilitate comparative analysis between the preoperative and postoperative diagnoses the final histopathological results were similarly categorized into benign and malignant diagnoses. Benign pathology results were categorized as normal foreskin, inflammation (acute or chronic) and/or fibrosis. Malignant results included any pathological findings consistent with cancer, including carcinoma in situ.

The preoperative and postoperative diagnoses were analyzed and compared. The 2 groups were analyzed using the Student t-test with a 2-tailed distribution and unequal variance. The result of each individual case was allocated to being concordant (similar preoperative clinical and histological diagnoses) or discordant (dissimilar preoperative clinical and histological diagnoses). The cost of histopathological examination of each circumcision specimen was based on the 2014 Medicare reimbursement schedule. Medicare reimbursement for CPT code 88304 (level III surgical pathology gross and microscopic examination) includes a technical component of \$31.88 and a professional component of \$11.46 for a total of \$43.34.<sup>7</sup>

## Results

Analysis included a total of 225 adult circumcisions. Of the 225 patients 209 (92.9%) had clinically benign disease on preoperative evaluation and 16 (7.1%) had lesions suspicious for malignancy. Mean age was 57.0 years (range 23 to 92) and patients were younger in the preoperative benign group than in the preoperative malignant group (56.5 vs 62.8 years,  $p = 0.018$ ). Benign preoperative indications included phimosis in 161 of 209 patients (77.0%), paraphimosis in 20 (9.6%), inflammation (balanitis and/or posthitis) in 53 (25.4%) and penile discomfort in 18 (8.6%). A third of the patients (68 of 209) requested circumcision for hygienic, social, cultural and/or religious reasons.

Black men represented 65.8% of the study population and were similarly distributed between the 2 groups ( $p = 0.405$ ). There was no statistical difference between the 2 groups in height, weight, body mass index or comorbidities (table 1).

All 225 consecutive circumcision specimens underwent routine histopathological examination postoperatively. Of the 209 specimens with benign preoperative indications histopathological results included normal foreskin without documented pathology in 38%, inflammation in 53% and/or fibrosis in 26%. Additionally 5 foreskin specimens

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