

# Zoon's balanitis with mucinous metaplasia: A case report and review of literature

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Received 28 November 2012; revised 31 December 2012; accepted 12 January 2013

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## ABSTRACT

**Mucinous metaplasia of the squamous epithelium of the glans penis is very rarely seen in the setting of Zoon's balanitis. We report a case of 40 year old male with a past medical history of paroxysmal nocturnal hemoglobinuria, status-post allogeneic hematopoietic cell transplantation from an HLA-matched sibling 6 years prior to evaluation, complicated by oral and cutaneous chronic graft-versus-host disease. Mucinous metaplasia was confirmed by PAS and Mucin stains, and plasmacytosis was confirmed by immunohistochemistry for CD138 and MUM1 markers. Kappa and Lambda immunostains revealed a polyclonal pattern. The etiology of zoon's balanitis as well as the significance of mucinous metaplasia in these setting are unclear and need to be further investigated.**

**Keywords:** Bone Marrow Transplant; Squamous Cell Carcinoma; Erythroplasia of Querat; Graft versus Host Disease

## 1. INTRODUCTION

Zoon's balanitis is an idiopathic, benign condition affecting the male genitalia that often presents as a solitary, persistent plaque on the glans penis of uncircumcised, middle-aged or older men. Mucinous metaplasia of the squamous mucosa in Zoon's balanitis is exceedingly rare—only seven cases occurring in elder men have been re-

ported in the English literature [1-4], and the pathogenic association between the two processes is unknown.

## 2. PATIENT'S INFORMATION AND METHODS

A 40-year-old Nepalese, uncircumcised male presented with a history of dryness of the glans penis for the previous two years with associated loss of skin over the affected area. The lesion had been treated with clobetasol ointment with intermittent improvement. His past medical history includes allogeneic hematopoietic stem cell transplantation from a 6/6 HLA-matched sibling for paroxysmal nocturnal hemoglobinuria 6 years prior. On examination, a non-healing, shiny, well-demarcated erythematous plaque affecting the glans penis and distal shaft was seen (**Figure 1(a)**). The clinical differential included erythroplasia of Querat, squamous cell carcinoma, and chronic graft-versus-host disease.

Immunohistochemistry: Paraffin embedded tissue sections (5 µm) were deparaffinized through xylene and graded alcohols. Immunohistochemical staining for CD138 (Oxford, UK, 1:10), MUM1 (Perugia, Italy, 1:2), Kappa (Dako, 1:32,000), Lambda (Dako, 1:32,000), IgG4 and IgG (Dako, 1:16,000), CD3 (Novacastra, UK, 1:30) and CD20 (Dako, 1:80) was performed following heatinduced epitope retrieval using target retrieval solution, low pH (DAKO) [5]. Slides were incubated in Triswith 3% goat serum for 15 min and then incubated for 1 to 2 h at room temperature with primary antibody. Detection was carried out using an automated slide stainer (DAKO; Autostainer) with a horseradish peroxidase/3,3'-diaminobenzidine polymer-based detection system (DAKO; Envision+).

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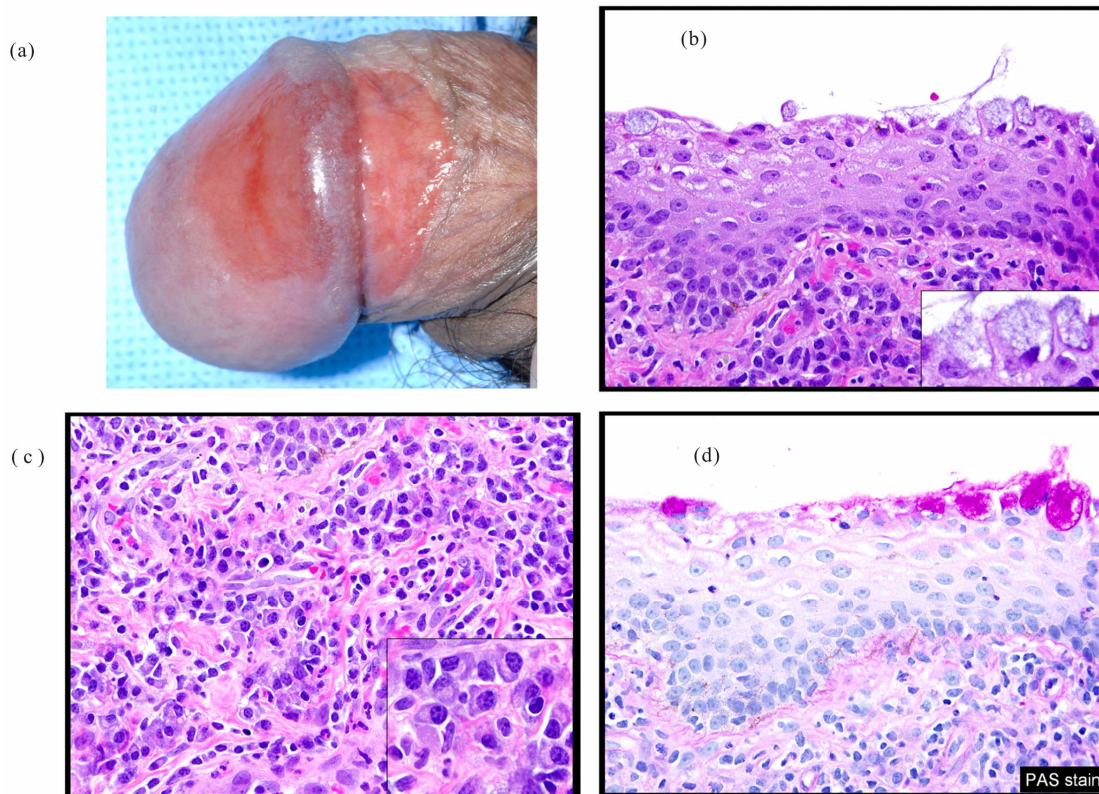
### 3. RESULTS

A punch biopsy from the glans penis revealed a band like dense inflammatory infiltrate with plasma cells in the superficial dermis. Foci of goblet cells within the nonkeratinizing squamous epithelium, consistent with mucinous metaplasia, were observed (**Figure 1(b)**). Marked plasmacytosis in the superficial mucosa was noted (**Figure 1(c)**). The presence of goblet cells was confirmed by positive cytoplasmic staining for PAS (**Figure 1(d)**), Colloidal iron, Mucicarmine, and Alcian-blue (data not shown). Special stains including GMS, PAS, and Warthin Starry were negative for fungal organisms and Spirochetes (data not shown). Histologic features diagnostic of squamous cell carcinoma were not observed. Immunohistochemistry for CD20, CD3, CD138, MUM1, Kappa, Lambda, IgG and IgG4 was performed. Marked plasmacytosis was highlighted by the CD138 and MUM1 stains (**Figures 2(a)-(b)**). Kappa and Lambda stains showed a polyclonal pattern (**Figures 2(c)-(d)**). There were some CD20 and CD3 positive B and T cells admixed with plasma cells. Eighteen IgG4 positive cells/high power field were identified with an IgG4/IgG less than 30%.

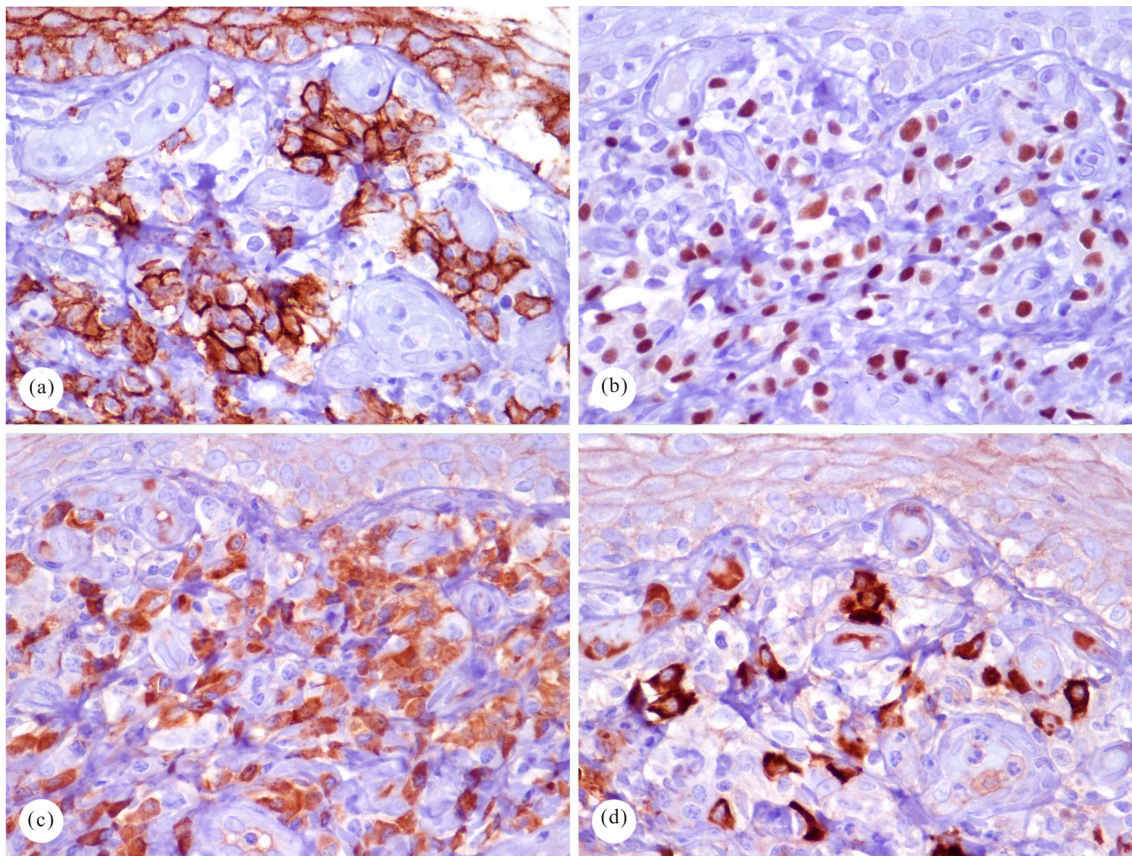
### 4. DISCUSSION

Zoon's balanitis, also known as balanitis circumscripta-plasmacellularis or plasma cell balanitis, is an idiopathic condition characterized by a heavy stromal inflammatory infiltrate composed of mainly plasma cells. Although circumcision is curative in most of cases of Zoon's balanitis, other therapeutic options including laser ablation, imiquimod, and topical calcineurin inhibitors have also been described [5,6]. In the present case, the patient was treated with clobetasol ointment with limited improvement, followed by tacrolimus 0.1% ointment with partial improvement.

Mucinous metaplasia of the squamous epithelium of glans penis is very rarely seen in the setting of Zoon's balanitis. To our knowledge by "Pubmed" search of "metaplasia" and "balanitis", only seven cases are reported in the English literature (**Table 1**), with this being the 8th reported case. The current patient is the first reported case following allogeneic hematopoietic stem cell transplantation and is also remarkable for the young age of onset compared to the previously reported cases. Polyclonal pattern of plasmacytosis is the main infiltrating pattern with some IgG4 cells identified. The



**Figure 1.** Gross appearance of Zoon's balanitis prior to biopsy. There is a shiny, well-demarcated erythematous plaque affecting the glans penis and distal shaft (a). H&E section of the biopsy from glans penis showing goblet cells at the surface of the non-keratinizing squamous epithelium ( $\times 200$ , (b)) and patchy plasma cell infiltrate at the superficial dermis ( $\times 200$ , (c)). PAS stain highlights many goblet cells at the surface of squamous epithelium ( $\times 200$ , (d)).



**Figure 2.** Immunohistochemical studies. CD138 (×400, (a)) and Mum1 (×400, (b)) highlights the plasma cells in the dermis. (c) and (d), Kappa (×400, (c)) and Lambda (×400, (d)) stains demonstrate a polyclonal plasma cell infiltrate in the dermis.

**Table 1.** Summary of reported cases with Zoon’s balanitis and mucinous metaplasia.

Case	Age (yr)	Duration	Anatomic location	Underlying disease	References
1	65	1 mo	Glans penis and prepuce	Myotonic dystrophy	Val-Bernal <i>et al.</i> [1]
2 - 5	80	Unknown	Glans penis and prepuce	Unknown	Fang <i>et al.</i> [2]
6	55	6 ms	Glans penis only	None	Ruiz-Genao <i>et al.</i> [3]
7	65	6 yr	Glans penis and prepuce	Rosacea	Tong <i>et al.</i> [4]
8	40	2 yr	Glans penis and prepuce	HCT*	Current case

\*HCT: Hematopoietic cell transplantation.

clinical information, serology, and the IgG4/IgG ratio do not support an IgG4 related disease. Although mucinous metaplasia is a benign process, Zoon’s balanitis is often clinically suspicious for malignancy, and the clinical differential may include squamous cell carcinoma in situ, superficial spreading melanoma, and epidermotropic metastases<sup>1</sup>. The histopathologic findings of Zoon’s balanitis, may also overlap with other inflammatory or neoplastic conditions affecting the glans penis [7]. Clinical-Pathologic correlation is essential to establish the diagnosis.

In conclusion, Zoon’s balanitis with mucinous met-

aplasia is an exceedingly rare benign condition whose etiology, pathogenesis and clinical significance remain to be elucidated.

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