

# Balanitis and balanoposthitis: a review

Sarah Edwards

**Objectives:** To give an overview of the literature on balanitis, with a special emphasis on infective causes.

**Method:** A data search was performed using the OVID CD plus Medline 1967-1995, using balanitis and balanoposthitis as textword search strategy. Specific subjects such as anaerobic infection, Zoon's balanitis were sought separately and subgroups combined. Original articles and abstracts were referenced to illustrate each condition. These were mainly English language articles, but included appropriate non-English language papers.

**Conclusions:** Balanitis is a common condition among genitourinary medicine clinic attendees, the cause often remaining undiagnosed. Many cases are caused by infection, with candida being the most frequently diagnosed. However, gardnerella and anaerobic infections are common, and there are a wide variety of other rarer infective causes. In addition irritant balanitis is probably a contributing factor in many cases. Balanitis which persists and in which the cause remains unclear warrants biopsy.

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Balanitis is defined as inflammation of the glans penis, which often involves the prepuce (balanoposthitis). It is a common condition affecting 11% of male genitourinary clinic attendees in one study and it can be a recurrent or persistent condition.<sup>1</sup> There is a wide variety of causes and predisposing factors; balanitis is more common amongst uncircumcised men possibly as a result of poorer hygiene and aeration or because of irritation by smegma.<sup>2</sup> Underlying medical conditions can also predispose to balanitis, which may be more severe. It has been reported as a source of fever and bacteraemia in neutropenic men,<sup>3</sup> and candidal balanitis may be especially severe in patients with diabetes mellitus.<sup>4</sup> In a series of 321 patients, the majority (185 patients) had an infective cause, although a greater proportion with mild disease had irritant or mechanical reasons for the inflammation.<sup>5</sup> Inflammation of the glans and prepuce may also provide a route for the acquisition of human immunodeficiency virus (HIV) infection.<sup>6</sup>

## Fungal infection

**Candidal balanitis** This is considered to be the most common cause of balanitis and is due to infection with candidal species, usually *Candida albicans*. It is generally sexually acquired although carriage of yeasts on the penis is common, being 14-18%<sup>7,8</sup> with no significant differences between carriage rate in circumcised or uncircumcised men. Symptomatic infection is more common in the uncircumcised male. Significantly more of the female partners of men carrying yeasts were found to have candidal infection.<sup>7</sup> Diagnosis may be on the clinical appearances alone, microscopy and/or culture. The sensitivity of microscopy varies with method of sampling, and an "adhesive tape" method has proven to

be more accurate than swabbing.<sup>9</sup> Infection may occur without sexual contact, usually in the presence of diabetes<sup>4</sup> of which it may be the presenting symptom, or after the use of oral antibiotics. Symptoms are of burning and itching of the penis with generalised erythema of the glans and/or prepuce which may have a dry glazed appearance, with eroded white papules and white discharge.<sup>10,11</sup> In diabetic patients the presentation may be more severe with oedema and fissuring of the foreskin, which may become non-retractile.<sup>4</sup> Treatment can be topical (for example clotrimazole<sup>4</sup>), or oral (such as with fluconazole<sup>12</sup>) but partners should be screened as they have a high rate of infection.<sup>7</sup>

**Pityriasis versicolor** This condition is caused by the yeast *Malassezia furfur*, and has an incidence of 0.5-1% of all skin disease in England, but up to 50% in tropical areas.<sup>13</sup> Genital involvement is uncommon and presents as discrete, circinate, finely scaling hypopigmented areas on the glans which fluoresce in Wood's light.<sup>13-15</sup> The lesions can be treated with topical antifungals.

## Anaerobic infection

The presence of anaerobes on the glans penis, particularly in the uncircumcised male has been associated with non specific urethritis (NSU) and balanitis.<sup>16</sup> In this study anaerobes were isolated in only 21% of healthy controls, but in 76% with balanoposthitis and 67% with NSU, whilst in those with both NSU and balanitis 95% had anaerobic bacteria, bacteroides species being the most common. The predominance of bacteroides strains in anaerobic balanitis has been found by others,<sup>17</sup> in a study of 104 patients with balanoposthitis, anaerobes were isolated in 29 cases. Most of these were mixed infections, but the commonest isolates

Department of  
Genitourinary  
Medicine,  
Addenbrooke's  
Hospital, Hills Road,  
Cambridge CB2 2QQ,  
UK

S Edwards

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were *B. melaninogenicus* (19 specimens) and other bacteroides species (27 specimens).

A severe erosive and gangrenous form of anaerobic balanitis (the fourth venereal disease of Corbus<sup>18</sup>) has been recognised for many years with the presence of anaerobes and fusobacterium spp. Anaerobes do not appear to cause genital ulceration,<sup>19</sup> but are found in genital ulcers of any aetiology, and in this situation the predominant strains are *B. assacharolytica* and *B. ureolyticus*.<sup>19-21</sup>

The features of anaerobic balanitis are superficial erosions, foul smelling subpreputial discharge, preputial oedema and inguinal adenitis. More minor forms also occur. Resolution is normally rapid with metronidazole treatment.

### Aerobic infection

*Gardnerella vaginalis* In unselected men the prevalence rate of *Gardnerella vaginalis* isolation is 7.2–8.0%<sup>22,23</sup> with a significantly higher isolation rate in men with balanoposthitis ( $p < 0.001$ ). The prevalence of *Gardnerella vaginalis* in non-candidal balanoposthitis is 31% and concomitant anaerobic infection is common (75% co-isolation of bacteroides spp by Kinghorn *et al*<sup>22</sup>). It is likely to be sexually acquired and partners of women with *Gardnerella vaginalis* have high isolation rates from the urethra<sup>24</sup> or urine.<sup>25</sup> Subpreputial carriage in consorts of women with *Gardnerella vaginalis* has not been studied specifically.

The symptoms of pure *Gardnerella vaginalis* balanitis are milder than those in anaerobic infection with irritation of the prepuce and glans penis, macular erythema and a fishy subpreputial discharge. As coinfection with anaerobes is common, this may represent the milder end of a spectrum of disease.

*Streptococci* Group B streptococci can be carried asymptotically in the adult genital tract, but are strongly associated with balanitis.<sup>26,27</sup> Rate of carriage varies between heterosexuals and homosexuals (16.6% in heterosexuals and 39.3% in homosexuals) although no balanitis occurred in the latter group.<sup>26</sup> Sexual transmission is unclear as there was no expected age differential in one study,<sup>26</sup> and in another meatal carriage was not proportional to promiscuity.<sup>28</sup> The clinical appearance is of nonspecific erythema with or without exudate,<sup>26,27</sup> but more rarely may extend to penile cellulitis if abrasions are present.<sup>29</sup>

Group A haemolytic streptococci have also been reported as causing balanitis. Most reports are of uncircumcised children who presented with erythematous, moist balanitis<sup>30,31,32</sup> where the mode of transmission appears to be autoinoculation from other sites. Pyoderma of the penis following fellatio has been reported, and in this case group A haemolytic streptococci were isolated from the coronal sulcus.<sup>33</sup> Penicillins or cephalosporins are effective in treatment.

*Staphylococcus aureus* This has infrequently been reported as causing a balanitis,<sup>34,35</sup>

although carriage is not strongly associated with symptoms.<sup>26</sup>

### Mycobacterial infection

*Tuberculosis* Scandinavian data suggest that genitourinary tuberculosis remains stable in western countries, despite a fall in the prevalence of pulmonary tuberculosis.<sup>36</sup> However, balanitis remains an uncommon presentation in Europe and the United States,<sup>37</sup> but is common in Japan<sup>38</sup> and countries where there is a high prevalence of tuberculosis.<sup>39</sup> It presents as a chronic papular eruption of the glans penis, which may be ulcerated, and heals with scarring. It is associated with a positive Mantoux test and histology shows tuberculoid granuloma formation with a characteristic absence of tubercle bacilli.<sup>39</sup> Penis tuberculides are thought to be due to the haematogenous spread of infection, and respond well to anti-tuberculous chemotherapy.<sup>38</sup>

*Leprosy* Involvement of the glans penis has been reported in leprosy alone<sup>40</sup> and in association with penis tuberculides.<sup>41</sup>

### Protozoal infection

*Trichomonas* *Trichomonas* can cause a sexually acquired superficial erosive balanitis<sup>2</sup> which may lead to phimosis.<sup>42</sup> There is a strong association with the presence of other infections. Histology of the lesions shows dense lymphocytic infiltration in the upper dermis.<sup>42</sup> The organism may be demonstrated in a wet preparation from the subpreputial sac. This condition responds well to treatment with metronidazole.

*Entamoeba histolytica* Cutaneous amoebiasis of the genitalia<sup>43</sup> occurs occasionally, and amoebic balanitis has been reported amongst uncircumcised men in New Guinea. It causes oedema of the prepuce with phimosis and discharge<sup>43</sup> and in these cases circumcision is helpful.<sup>2</sup> Despite rectal carriage of amoeba by homosexuals balanitis is rarely seen in Europe, but the high prevalence in New Guinea is thought to be due to sodomy.<sup>44</sup>

### Spirochaetal infection

*Syphilitic balanitis* Multiple circinate lesions which erode to cause irregular ulcers have been described in the late primary or early secondary stage.<sup>45</sup> A primary chancre may also be present. Spirochaetes are easily identified from the lesions.

*Non syphilitic spirochaetes* Ulcerative balanitis has been associated with infection by non-syphilitic treponemes of the borrelia group, and spirochaetes have been observed on dark field microscopy. This often coexists with other genital infection, and has been reported from Africa<sup>46</sup> and India.<sup>15</sup> In a study by Brams *et al*<sup>47</sup> fusiform bacteria and spirochaetes were seen in 51% of men and were associated with balanitis in the presence of pyogenic organisms.

### Viral infection

**Herpes simplex** In rare cases primary herpes can cause a necrotising balanitis,<sup>48</sup> with necrotic areas on the glans accompanied by vesicles elsewhere and associated with headache and malaise. This has been reported with herpes simplex virus types 1<sup>49</sup> and 2.<sup>48</sup>

**Human papillomavirus (HPV)** Papillomavirus may be associated with a patchy<sup>50</sup> or chronic balanitis,<sup>51</sup> which becomes acetowhite after the application of 5% acetic acid.<sup>50 52</sup> Acetowhite change has also been reported in non-HPV associated balanitis and has resolved on treatment.<sup>53</sup> HPV was identified in two studies—in the first in 56% of patient samples (of which 54% were oncogenic types) but only 26% of controls,<sup>52</sup> and the other revealed HPV6 in 4 out of 5 cases.<sup>51</sup>

### Balanitis xerotica obliterans

This is a descriptive term for a chronic scarring balanitis which was first described by Stuhmer,<sup>54</sup> and which is most commonly caused by lichen sclerosus et atrophicus. Other causes are rare and include pemphigus vulgaris and chronic nonspecific bacterial balanitis.<sup>55</sup>

**Lichen sclerosus et atrophicus** The association between balanitis xerotica obliterans and lichen sclerosus et atrophicus was made in 1944 by Laymon and Freeman<sup>56</sup> who described five patients with skin lesions as well as genital involvement. The main symptoms are pain, irritation, disturbance of sexual function,<sup>57</sup> or urinary symptoms<sup>58</sup> (including obstruction).<sup>59</sup> Rarely this can present as a recurrent bullous balanitis, with the development of painful blisters and ulceration which may be precipitated by local trauma.<sup>60</sup> The clinical appearance is of white plaques on the glans, often with involvement of the prepuce which becomes thickened and non-retractile. In active disease haemorrhagic vesicles may be seen. The changes only affect squamous skin, leaving atrophic areas which cause cicatricial shrinkage leading to urethral stenosis and phimosis.<sup>59</sup> The condition affects all ages and circumcision specimens from children with phimosis often show the characteristic histological appearances.<sup>61 62</sup> Histology initially shows a thickened epidermis, followed by atrophy and follicular hyperkeratosis. This overlies an area of oedema with loss of the elastic fibres and alteration in the collagen, which in turn overlies a perivascular band of lymphocytic infiltration. Haemorrhagic vesicles occur when the oedema causes detachment of the epidermis with capillary erosion and extravasation of blood.<sup>63</sup>

The course is chronic and relapsing, and although it may sometimes arrest, the areas of atrophy do not regress. Development of squamous cell carcinoma has been reported in patients with balanitis xerotica obliterans, both in areas of active and quiescent disease,<sup>64 65</sup> but malignant change appears to be less common than in lichen sclerosus et atrophicus in the female.<sup>65</sup>

Potent topical steroids usually control the symptoms, although occasionally intralesional steroids may be required.<sup>63 66</sup> Testosterone ointment has also been advocated.<sup>62</sup> If phimosis is present, circumcision may be required or meatotomy for meatal stenosis.<sup>67</sup>

**Pemphigus** This autoimmune bullous disorder may cause balanitis. Pemphigus vulgaris can cause the clinical picture of balanitis xerotica obliterans,<sup>55</sup> and pemphigus vegetans, a rare variant, is manifest by vegetating plaques. These usually occur in intertriginous areas but may affect the glans penis.<sup>68</sup>

**Zoon's (plasma cell) balanitis** This was first described by Zoon in 1952<sup>69</sup> and is a main differential diagnosis with erythroplasia of Queyrat. The lesions are well circumscribed and orange-red in colour with a characteristic glazed appearance and multiple pinpoint redder spots—"cayenne pepper spots".<sup>70</sup> Symptoms of pain, irritation and discharge occur.<sup>71</sup> Histological appearances are also characteristic with epidermal atrophy, loss of rete ridges, "lozenge keratinocytes" and spongiosis. A predominantly plasmacytic nature of the infiltrate is found subepidermally, which helps to differentiate this condition from others in which there is a non specific plasma cell infiltrate.<sup>70</sup> The aetiology is unknown although chronic infection with *Mycobacterium smegmatis* has been proposed as a cause.<sup>72</sup> The course is chronic and poorly responsive to topical treatment but it can resolve completely on circumcision.<sup>73 74</sup>

**Erythroplasia of Queyrat** This is a manifestation of carcinoma in situ which was described by Queyrat in 1911.<sup>75</sup> It has a characteristic red, velvety appearance with sharp margins, and a granular surface, usually occurring in the uncircumcised male over 40 years of age.<sup>63</sup> The lesions may be single or multiple, and if keratotic or indurated suggest the development of frank squamous cell carcinoma. There are various treatment options including 5 fluorouracil,<sup>76</sup> cryotherapy,<sup>77</sup> laser treatment,<sup>78</sup> or surgical excision.<sup>79</sup> Circumcision is recommended and close follow up advised.<sup>67</sup>

**Pseudoepitheliomatous, micaceous and keratotic balanitis** This rare condition of the glans penis was first described by Lortat-Jacob and Civatte in 1961.<sup>80</sup> The course is progressive initially causing phimosis, then the development of a tumour with a verrucous appearance, and a well demarcated white keratotic layer which covers the glans. Histologically the lesions show a hyperplastic, keratotic epidermis with a polymorphonuclear infiltrate.<sup>81</sup> Although originally considered to be benign, case reports suggest that the lesion may be locally invasive,<sup>82</sup> or synonymous with verrucous carcinoma.<sup>81</sup>

**Circinate balanitis** The commonest mucocutaneous manifestation of sexually acquired Reiter's syndrome, circinate balanitis occurs in 20–40% of cases.<sup>83</sup> The incidence in enteric

Reiter's disease is lower, and has only been noted in shigella associated disease.<sup>84</sup> It appears as greyish white areas on the glans which coalesce to form larger "geographic" areas with a white margin.<sup>62</sup> The histology shows spongiform pustules in the upper epidermis with parakeratosis, acanthosis and elongation of rete ridges. Dermal capillaries are enlarged and increased numbers are present together with a mononuclear cell infiltrate, and some evidence of extravasation.<sup>84</sup> These changes are similar to those of pustular psoriasis. Circinate balanitis may occur with or without other features of Reiter's syndrome—in one series 9 out of 17 patients had balanitis alone, although the association with HLA 27 occurred in 15 of the 17 patients.<sup>85</sup>

**Fixed drug eruptions** Fixed drug eruptions have a predilection for the glans penis, and are commonly related to therapy with antibiotics—especially tetracyclines<sup>86</sup> and sulphonamides. Other causes include salicylates, phenacetin, phenolphthalein and some hypnotics, although there are case reports of other less common causative agents, for example, Mandrax.<sup>88</sup> Lesions are usually well demarcated erythematous areas which may be bullous and subsequently ulcerated.<sup>63</sup> This can occur on the first exposure to a drug and repeated exposure will precipitate new lesions at the initial site (this can confirm the diagnosis).<sup>87</sup> However, tetracycline induced eruptions may not recur on challenge with doxycycline.<sup>88</sup> Most lesions will fade spontaneously without treatment, but may leave an area of residual hyperpigmentation. Occasionally treatment with topical, or rarely, systemic steroids may be required.<sup>63</sup>

**Irritant and allergic balanitides** Many balanitides are non-specific and no aetiological agent can be found. It has been suggested that these are often due to irritation, particularly if symptoms are persistent or recurrent. In one study of patients with persistent or recurrent problems 72% were diagnosed as irritant balanitis, and this was associated with a history of atopy and more frequent genital washing with soap.<sup>1</sup> Other series have found higher rates of infective agents,<sup>5</sup> although a large proportion of cases in one study remained undiagnosed.<sup>35</sup> It is likely that irritation plays some part in other balanitides. More severe reactions have been seen with topical agents, some of which may have been used for treatment. Dequalinium is known to cause a necrotic balanitis,<sup>89</sup> while titanium (that was previously thought to be biologically inert) may rarely cause a granulomatous balanitis.<sup>90</sup> Balanitis as an allergic reaction is very uncommon; rubber and its constituents are the most frequently described allergens,<sup>91</sup> although allergy to spermicidal lubricants are also well described.<sup>91</sup> There is a wide spectrum of clinical manifestations varying from balanitis to oedema of the whole penis extending to the groins. Treatment will depend on the severity of the reaction but patch testing and avoidance of the precipitant is required.

Many dermatological conditions may also have a predilection for the male genitalia. Psoriasis, lichen planus and seborrhoeic dermatitis are common and evidence of involvement at other sites should be sought. Dermatitis artefacta of the genitals has also been reported.<sup>94</sup> Balanitis may occur with both Crohn's disease<sup>95</sup> and ulcerative colitis.<sup>96</sup> Many balanitides prove difficult to diagnose<sup>35</sup> and any condition which persists despite simple treatment warrants further investigation. Penile biopsy is easy to perform and is useful in these cases.<sup>97</sup> In one series 60 patients with unresponsive penile dermatoses underwent biopsy, of whom 26% had a non specific dermatitis, 23% wart virus infection, and 15% lichen sclerosus. The original clinical diagnosis was confirmed in 33% of cases and the biopsy was not diagnostic in only 3% of cases.<sup>98</sup>

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