2008 UK National Guideline on the Management of Balanoposthitis

Clinical Effectiveness Group
British Association for Sexual Health and HIV

Introduction and Methodology

Scope and Purpose

The main objective is to aid recognition of the signs and symptoms and complications of penile skin conditions which may present in Genitourinary Medicine clinic attendees.

This guideline concentrates on a selected group of conditions, which may be managed by Genitourinary Physicians, either alone or in conjunction with other specialists. It is not intended as a comprehensive review of the treatment of all balanitis. It is aimed primarily at people aged 16 years or older presenting to Genitourinary Medicine clinics.

This guideline offers recommendations on the diagnostic tests and treatment regimes needed for the effective management of balanoposthitis and includes the following penile conditions:

- Candidal balanitis
- Anaerobic balanitis
- Aerobic balanitis
- Lichen sclerosus
- Zoon's (plasma cell) balanitis
- Psoriasis
- Circinate balanitis
- Irritant / allergic balanitides
- Fixed drug eruptions
- Premalignant conditions:
  - Erythroplasia of Queyrat
  - Bowen's disease
  - Bowenoid papulosis

Stakeholder involvement

This guideline was reviewed by the Clinical Effectiveness Group of BASHH and their comments incorporated.

Rigour of Development

The guideline has been updated by reviewing the previous guideline and medical literature since its publication.

Aetiologies

Balanoposthitis often presents to Genitourinary Medicine clinics. Balanitis describes inflammation of the glans penis, posthitis, inflammation of the prepuce. In practice both areas are often affected and the term balanoposthitis is then used. It is a common condition affecting about 11% of male genitourinary clinic attendees. It is a collection of disparate conditions with similar clinical presentation and varying aetiologies affecting a particular anatomical site. (see table 1). Balanitis is uncommon in circumscised men. In many cases preputial dysfunction is a causal or contributing factor.

Table 1. Range of factors causing balanitis

Infectious	**Dermatoses**	**Miscellaneous**
Candida albicans	Lichen sclerosus (balanitis xerotica obliterans)	Trauma
Trichomonas vaginalis	Zoon's balanitis	Irritant
Streptococci (Group A and B)	Psoriasis	Poor hygiene
Anaerobes	Circinate balanitis	Pre-malignant conditions: • Bowen's disease • Bowenoid papulosis • Erythroplasia of Queyrat
Gardnerella vaginalis	Lichen planus	
Staphylococcus aureus	Immuno-bullous disorders	
Mycobacteria	Contact allergy	
Entamoeba histolytica	Fixed drug eruption	
Syphilis	Stevens- Johnson syndrome	
Herpes simplex virus		
Human papillomavirus		

Other, rarer dermatoses are not included in this chart.
Infections may be secondary to primary inflammatory dermatoses.

What's New?

New sections	Management of psoriasis	Mild to moderate steroids as first line treatment
	Other conditions for consideration	Alternative diagnoses and suggestions for appropriate referral to Dermatology
More detail added	Circinate balanitis	Relates to section on psoriasis
	Premalignant conditions	More detail on all the premalignant conditions including the use of imiquimod as a potential treatment
	Zoon's balanitis	Warning regarding use of topical tacrolimus

General Management of the Patient with Balanitis

Clinical Features

Symptoms

Presenting symptoms:

- Local rash - may be scaly or ulcerated
- Dyspareunia and soreness
- Itch
- Odour
- Inability to retract the foreskin
- Discharge from the glans / behind the foreskin
- The time course of the condition can be very important in making the diagnosis e.g. Herpes simplex virus is usually an acute episode in contrast to the more chronic course of some of the dermatoses.

Associated symptoms:

- Rash elsewhere on the body
- Sore mouth
- Joint pains
- Swollen / painful glands
- General malaise

Signs

Genital:

- Colour change
  - Erythema
  - Leukoplakia
  - Purpura
- Textural change
  - Scaling
  - Sclerosis

- Ulceration
- Fissuring
- Crusting
- Exudate
- Oedema
- Odour
- Phimosis

General:

- Lymphadenopathy (local or general)
- Non-genital rash
- Oral signs including ulceration
- Arthritis

Complications

- Phimosis
- Meatal stenosis
- Malignant transformation

Diagnosis

- Balanitis is a descriptive term covering a variety of unrelated conditions, the appearances of which may be suggestive but should never be thought to be pathognomonic and biopsy is often needed to exclude pre-malignant disease
- Descriptions of the typical appearances of certain balanitides are given separately in the management section.
- The following investigations and flow chart are intended to aid diagnosis in cases of uncertainty.
    - Sub-preputial swab for *Candida spp* and bacterial culture - should be undertaken in most cases to exclude an infective cause or superinfection of a skin lesion or dermatosis
    - Urinalysis for glucose - appropriate in most cases but especially if candidal infection is suspected.
    - Culture for *Herpes simplex* virus - if ulceration present.
    - Dark ground examination for spirochaetes and syphilis serology / Treponemal pallidum (TP) PCR- if an ulcer is present.
    - Culture /wet prep for *Trichomonas vaginalis* - particularly if a female partner has an undiagnosed vaginal discharge
    - Screening for other sexually transmitted infections (STIs) - particularly screening for *Chlamydia trachomatis* infection / Non specific urethritis if a circinate-type balanitis is present
    - Dermatology opinion for dermatoses and suspected allergy
    - Biopsy - if the diagnosis is uncertain and the condition persists[1,2]

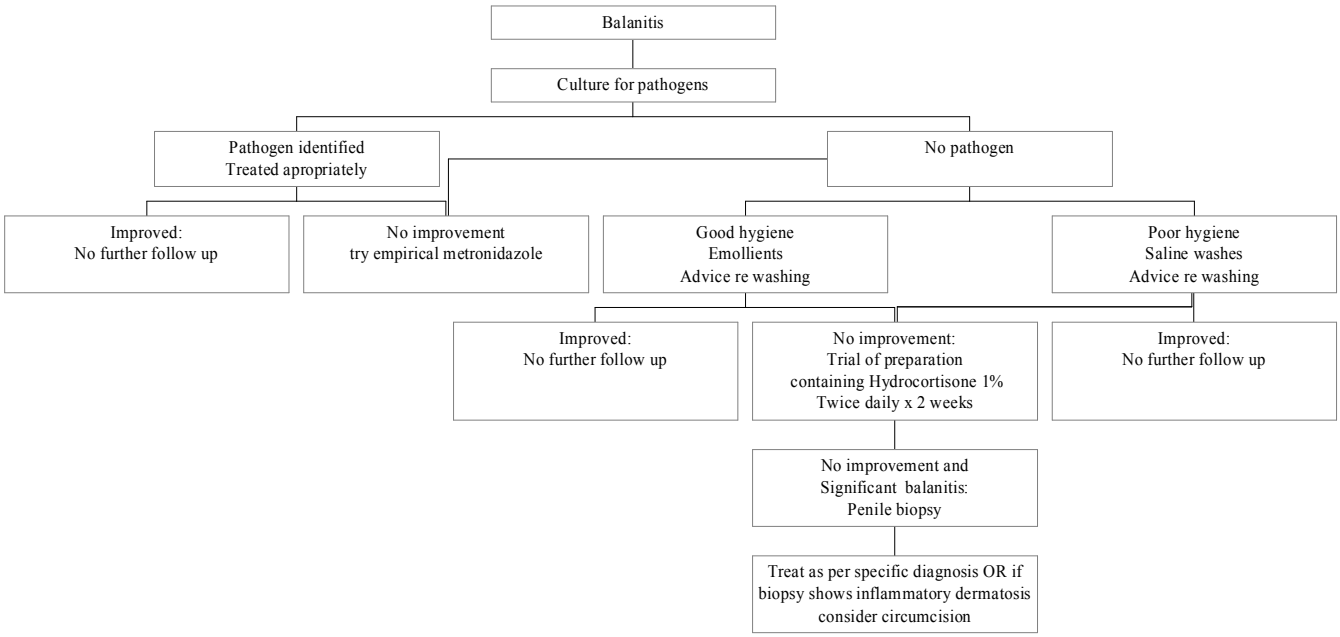
Management

Balanitis is a clinical diagnosis and covers a range of heterogenous conditions. The recommendations for management are therefore given on an individual basis.
The aims of treatment are to diagnose and treat sexually transmitted disease, to minimise sexual dysfunction, to minimise urinary dysfunction, to exclude penile cancer and to treat pre-malignant disease.

General Advice

- Avoid soaps while inflammation is present[3]
- Advise about effect on condoms if creams are being applied
- Patients should be given a detailed explanation of their condition with particular emphasis on the long-term implications for their health (and that of their partner where a sexually transmissible agent is found)

Table 2. Flow chart for management of non specific balanitis[4]



Infective balanitides

Candidal balanitis

Aetiology

- *Candida spp*

Clinical Features

Symptoms

- rash, with soreness and/or itch

Signs

- Appearance: blotchy erythema with a small papules which may be eroded, or dry dull red areas with a glazed appearance.

Diagnosis

- Sub-preputial culture

Management

Recommended regimens

- Clotrimazole cream 1%[5] (Ib,A)
- Miconazole cream 2%[6] (IIa,B)

Apply twice daily until symptoms have settled.

Alternative regimens

- Fluconazole 150mg stat orally[5](Ib, A)- if symptoms severe
- Nystatin cream[5] 100 000units/gm - if resistance suspected, or allergy to imidazoles (IIa,B)
- Topical imidazole with 1% Hydrocortisone - if marked inflammation is present (IV, C)
  - Although there has been an increase in reports of drug resistance in serious candidal infection there is no new evidence pertaining to treatment of candidal balanitis

Sexual partners

There is a high rate of candidal infection in sexual partners who should be offered screening.

Follow up

Not required unless symptoms and signs are particularly severe or an underlying problem is suspected.

Anaerobic infection[7]

Clinical Features

Symptoms

- Foul smelling discharge, swelling and inflamed glands

Signs

- Appearance: preputial oedema, superficial erosions, inguinal adenitis. Milder forms also occur.

Diagnosis

- Sub-preputial culture (to exclude other causes)
- Swab for *Herpes simplex* virus infection if ulcerated

Management

Recommended regimen

- Metronidazole 400mg twice daily x 1 week (IV, C) The optimum dosage schedule for treatment is unknown.

Alternative regimen

- Co-amoxiclav 375mg three times daily x 1 week
- Clindamycin cream applied twice daily until resolved

These treatments have not been assessed in clinical trials (IV, C).

Aerobic infection.

Clinical Features

- Non specific balanitis

Diagnosis

- Sub-preputial culture
- *Streptococci Group A, Staphylococcus aureus* and *Gardnerella vaginalis* have all been reported as causing balanitis. Other organisms may also be involved.

Management

Depends on the sensitivities of the organism isolated.

- *Herpes simplex virus*
- *Trichomonas vaginalis*
- *Syphilis*

} Diagnosis and Treatment — As per specific guidelines

Specific balanitides

These may be recognised either by clinical appearance but where any doubt exists this should be confirmed on biopsy.

Lichen sclerosus: also known as lichen sclerosis et atrophicus and balanitis xerotica obliterans (BXO).

Aetiology

An inflammatory skin condition possibly of autoimmune pathogenesis[8]. The condition occurs in all ages. It is responsible for 12.1% of surgical cases of preputial pathology in a paediatric surgery department[9].

Clinical Features

Symptoms

- Itching, soreness, splitting, haemorrhagic blisters, dyspareunia, problems with urination.
- May be asymptomatic.

Signs

- Typical appearance: white patches on the glans, often with involvement of the prepuce. There may be haemorrhagic vesicles, purpura and rarely blisters and ulceration. Architectural changes include blunting of the coronal sulcus, phimosis or wasting of the prepuce, and meatal thickening and narrowing.

Complications

- Phimosis
- Urethral stenosis
- Malignant transformation. The magnitude of this risk is uncertain but in a prospective study of penile carcinoma 28% had histological changes of lichen sclerosus (BXO)[10]

- Extra-genital disease can occur. In contrast with females perianal disease is uncommon.

Diagnosis

- Typical clinical features
- Biopsy: this initially shows a thickened epidermis which then becomes atrophic with follicular hyperkeratosis. This overlies a band of dermal hyalinisation with loss of the elastin fibres, with an underlying perivascular lymphocytic infiltrate. Biopsy is the definitive diagnostic procedure and should only be carried out by experienced practitioners. The choice of the area biopsied is important both in terms of the risks of surgery and in getting an adequately representative sample. Remember that biopsy is only a small sample and may miss more serious pathology. Histological interpretation can be difficult and needs clinico-pathological correlation.

Management

Recommended regimens

- Potent topical steroids[11] (e.g. clobetasol proprionate or betamethasone valerate) applied once daily until remission, then gradually reduced. Intermittent use (e.g. once weekly) may be required to maintain remission. A double-blind study in children showed response to topical mometasone furoate particularly in early cases without scarring[12]. (Ib,A)
- Secondary infection should be treated

Alternative regimens

- Circumcision[13] if phimosis develops (IV,C) and in treatment resistant cases.
- Surgery for meatal stenosis (meatoplasty, urethroplasty or laser vaporization have been used (IV,C)

N.B. These procedures may be required for specific complications, but treatment of the underlying skin disease will still be required.

Follow up

- Patients requiring potent topical steroids for disease control should be followed up regularly.
- The frequency of follow up will depend on the disease activity and symptoms of the patient, but all patients should be advised to arrange review by a doctor at least annually in view of the risk of malignant transformation.
- In addition patients should be advised to contact the general practitioner or clinic if the appearances change. (IV, C)

Zoon's (plasma cell) balanitis

Aetiology

Zoon's balanitis is a disease of older men who are uncircumcised. It is thought to be due to irritation, partially caused by urine, within a 'dysfunctional prepuce'.

Clinical Features

Symptoms

- Change in appearance. Rarely bloodstained discharge.

Signs

- Clinical appearance is variable and includes well-circumscribed orange-red glazed areas on the glans with multiple pinpoint redder spots - "cayenne pepper spots".

Diagnosis

- Clinical features, however clinical distinction from other inflammatory and pre-malignant conditions is difficult and biopsy is advisable.
- Biopsy: early cases show epidermal thickening but this is followed by epidermal atrophy, at times with erosions. There is epidermal oedema (often mild) and a predominantly plasma cell infiltrate in the dermis with haemosiderin deposition and extravasated red blood cells[14].

Management

.

Recommended regimens

- Circumcision - this has been reported to lead to the resolution of lesions[15] (IV, C)
- Topical steroid preparations - with or without added antibacterial agents e.g. Trimovate cream, applied once or twice daily.[16] (IV,C)
- Hygiene measures

Alternative treatments

- CO_2 laser - this has been used to treat individual lesions[17]. (IV,C)
- Although topical tacrolimus has been reported in the treatment of Zoon's balanitis[18] (IV,C) there are serious concerns about risk of malignancy with the use of topical calcineurin inhibitors.

Follow up

- Dependent on clinical course and treatment used, especially if topical steroids are being used long term.
- In cases of diagnostic uncertainty penile biopsy should be performed. The appearances of pre-malignant disease can be very similar. It should be remembered that there are cases where even biopsies fail to identify pre-malignant disease.[19]

Psoriasis

Clinical Features

Symptoms

- Often the change in appearance is the sole symptom. Soreness or itching can occur.

Signs

- Typical appearance. In the circumcised male psoriasis on the glans is similar to the appearance to the condition elsewhere with red scaly plaques. In the uncircumcised scaling is lost and the patches appear red and glazed.

Diagnosis

- The key to the diagnosis is to look for the presence of psoriasis elsewhere. However some patients have psoriasis confined to the penis
- Biopsy may be necessary particularly in the glazed pattern of psoriasis which can look similar to pre-malignant conditions and other inflammatory conditions. The typical appearances include parakeratosis, acanthosis with elongation of rete ridges. There are collections of neutrophils in the epidermis. Maceration and secondary infection can modify appearances.

Management

- Emollients
- Mild to moderate topical steroids (with antibiotic and antifungal if needed)
- Topical calcitriol
- Avoid strong coal tar as it increases risk of genital cancers.

Circinate balanitis

Aetiology

This inflammatory condition occurs in Reiter's disease – a post infective syndrome triggered by urethritis or enteritis in genetically predisposed individuals. It consists of skin problems, joint problems and ocular problems with other systems affected more rarely. There is overlap with psoriasis in some cases. It has been reported in association with HIV infection.

Clinical Features

Signs

- Typical appearance: greyish white areas on the glans which coalesce to form "geographical" areas with a white margin. It may be associated with other features of Reiter's syndrome but can occur without

Diagnosis

- On clinical appearance in association with other features of Reiter's syndrome
- Biopsy: spongiform pustules in the upper epidermis, similar to pustular psoriasis.

Management

Further Investigation

- Screening for STIs. Syphilis can give rise to similar features.[20]

Recommended Regimen

- See under 'Psoriasis'
- Treatment of any underlying infection

Alternative Regimens

- In some cases treatment may not be required.
- More potent topical steroids may be required in some cases.

Sexual partners

- If an STI is diagnosed the partner(s) should be treated as per the appropriate protocol.

Follow up

- May be needed for persistent symptomatic lesions.
- Any associated findings should be followed up as per appropriate guidelines.

- Irritant / allergic balanitides

Aetiology

Symptoms can be associated with irritants, such as more frequent genital washing with soap, a history of atopy, which may suggest immediate hypersensitivity such as to latex in condoms, or exposure of topical agents suggesting delayed hypersensitivity. In a very small number of cases a history of a precipitant may be obtained.

Clinical Features

Signs

- Typical appearance: eczematous reaction of variable severity. Appearances range from mild erythema to widespread oedema of the penis.

Diagnosis

- Patch tests and intradermal skin tests: referral to a dermatologist is useful if allergy is suspected.
- Biopsy: eczematous with spongiosis and non-specific inflammation.

Management

General Advice

- Avoidance of precipitants - especially soaps.[3]
- Emollients - applied as required and used as a soap substitute.[3]

Recommended Regimen

- Hydrocortisone 1% applied once or twice daily until resolution of symptoms. (IV, C)
- Topical steroids may need to be combined with antifungal and antibiotics

Follow up

Not required, although recurrent problems are common and the patients need to be informed of this.

Fixed drug eruptions

Aetiology

- An uncommon condition but the penis is one of the more commonly affected areas of the body precipitants include tetracyclines, salicylates, paracetomol, phenolphthalein and some hypnotics. Rarely a fixed drug eruption can occur when the sexual partner has taken the drug and it is assumed the toxic component of the drug is passed through vaginal fluid.[21]

Clinical Features

Signs

- Typical appearance: lesions are usually well demarcated and erythematous, but can be bullous with subsequent ulceration. As the inflammation settles the skin becomes brown.

Diagnosis

- History: a drug history is essential, as is a history of previous reactions occurring in the same site.
- Typical appearance
- Rechallenge: This can confirm the diagnosis but can precipitate more severe reactions and should only be done with fully informed consent of the patient.
- Biopsy: Hydropic degeneration of the basal layer and epidermal detachment and necrosis with pigmentary incontinence.

Management

- Condition will settle without treatment
  - Topical steroids - e.g. mild to moderate strength twice daily until resolution.[22] (IV, C)
  - Rarely systemic steroids may be required if the lesions are severe.

Follow up

- Not required after resolution
- Patients should be advised to avoid the precipitant.

Pre-malignant Conditions

Erythroplasia of Queyrat

Aetiology

This is a pre-malignant condition affecting the penis, usually the glans, prepuce or meatus. It is estimated that up to 30% of cases progress to invasive cancer. It is suggested it is triggered by co-infection with multiple types of papilloma virus.[23]

Clinical Features

Signs

- Typical appearance: red, velvety, well-circumscribed area on the glans. May have raised white areas, but if indurated suggests frank squamous cell carcinoma.

Diagnosis

- Biopsy: essential **-** squamous carcinoma in situ.

Management

Recommended Regimen

- Surgical excision - Local excision is usually adequate and effective.[24] (IV, C). Mohs' surgery can increase cure rates.

Alternative Regimens

- Fluorouracil cream 5%[25] (IV, C)
- Cryotherapy [26](IV, C)
- Imiquimod 5% cream (IV,C) unlicensed indication
- Photodynamic therapy (IV,C)

Follow up

- Obligatory because of the possibility of recurrence. Minimum of annual appointments.

Bowen's Disease

Aetiology

- This is also cutaneous carcinoma in situ

Clinical Features

Signs

- Scaly, discrete, erythematous plaque.

Complications

- Up to 20 % will develop into frank squamous carcinoma.

Diagnosis

- Biopsy is essential (as the appearance can be variable).

Management

Recommended regimen

- Local excision,

Alternative regimens

- Imiquimod cream[27] (IV,C) unlicensed
- Photodynamic therapy[28] (IV,C)
- Laser resection
- 5 Fluorouracil cream.

Follow up

- Obligatory because of the possibility of recurrence. Minimum of annual appointments.

Bowenoid papulosis.

Aetiology

- Another form of carcinoma in situ, this is linked to HPV infection particularly with type 18. .

Clinical Features

Signs

- Lesions range from discrete papules to plaques which are often pigmented

Complications

- Development of squamous cell carcinoma

Diagnosis

- Biopsy is essential

Management

Recommended regimen

- Local excision,

Alternative regimens

- Imiquimod cream[29] (IV,C) unlicensed indication
- Cryotherapy (IV,C)
- laser resection (IV,C)
- 5 Fluorouracil cream (IV,C)
- Some lesions will regress spontaneously. (IV, C)

The premalignant conditions form a continuum within Penile Intraepithelial Neoplasia (PIN), but vary in clinical presentation and natural history.[30]

Other skin conditions

A range of other skin conditions may affect the glans penis. These include lichen planus, seborrhoeic dermatitis, erythema multiforme and immuno-bullous disorders including pemphigus and dermatitis artefacta.[31]

A dermatologist's opinion should be sought for diagnosis and management of these conditions

Auditable Outcome Measures.

- Biopsy where balanitis persists >6 weeks despite simple treatment.[1, 2] Target 80%

Conflict of Interest.

None.

Evidence Base.

A Medline search was performed from 2000 onwards, using Keywords - Balanitis, Balanoposthitis, Penile dermatoses, and specific terms in respect of each condition. A search of the Cochrane database was also performed. Related articles were also checked.

Qualifying statement

The recommendations in this guideline may not be appropriate for use in all clinical situations. Decisions to follow these recommendations must be based on the professional judgement of the clinician and consideration of individual patient circumstances and available resources.

All possible care has been undertaken to ensure the publication of the correct dosage of medication and route of administration. However, it remains the responsibility of the prescribing physician to ensure the accuracy and appropriateness of the medication they prescribe.

Authors and Centre

Sarah Edwards, Sue Handfield-Jones. West Suffolk Hospital, Bury St Edmunds

Acknowledgements

We are grateful to Dr Chris Bunker for his helpful comments.

Membership

Clinical Effectiveness Group: Chairman, Keith Radcliffe (BASHH), Imytaz Ahmad-Jushuf (BASHH); Mark FitzGerald (BASHH); Dr Guy Rooney (BASHH), Dr David Daniel (BASHH National Audit Group), Dr Neil Lazaro (RCGP), Dr Gill McCarthy (BASHH)

Bibliography

Christopher B. Bunker. Male Genital Skin Disease. Elsevier Saunders

References.

1. Arumainayagam JT, Sumathipala AHT. Value of performing biopsies in genitourinary clinics. Genitourinary Medicine 1990;66:407.
2. Hillman RJ, Walker MM, Harris JRW, Taylor-Robinson D. Penile dermatoses: a clinical and histopathological study. Genitourinary Medicine 1992;68:166-169
3. Birley HDL, Walker MM, Luzzi GA et al. Clinical features and management of recurrent balanitis: association with atopy and genital washing. Genitourinary Medicine 1993;69:400-403.

4. Mallon E, Hawkins D, Dinneen M, Francics N, Fearfield L, Neson R, Bunker C. Circumcision and genital dermatoses. Arch Dermatol 2000;136:350-354.
5. Stary A, Soeltz-Szoets J, Ziegler C, Kinghorn GR, Roy RB. Comparison of the efficacy and safey of oral flucanoazole and topical clotrimazole in patients with candidal balanitis. Genitourinary Medicine 1996;72:98-102.
6. Forster GE, Harris JRW. Double blind therapeutic trial in balanitis – miconazole and nystatin. Eur J Sex Transm Dis. 1986;3:81-83.
7. Ewart Cree G, Willis AT, Phillips KD, Brazier JS. Anaerobic balanoposthitis. BMJ 1982;284:859-860.
8. Oyama N, Chan I, Neill SM et al. Autoantibodies to extracellular matrix protein 1 in lichen sclerosus. Lancet 2003;362:118-23.
9. Yardley IE, Cosgrove C, Lambert AW. Paediatric pathology: are we circumcising enough? Ann R Coll Surg Engl 2007:89;62-5.
10. Pietrzak P, Hadway P, Corbishley CM, Watkin NA. Is the association between balanitis xerotica obliterans and penile carcinoma underestimated? BJU Int. 2006:98;74-6.
11. Dahlman-Ghozlan K, Hedblad MA, von Krogh G. Penile lichen sclerosus et atrophicus treated with clobetasol diproprionate 0.05% cream: a retrospective clinical and histopathological study. J Am Acad Dermatol 1999;40:451-457.
12. Kiss A, Csontai A, Pirot L, Nyirady P, Merksz M, Kiraly L The response of balanitis xerotica obliterans to local steroid application compared with placebo in children J Urol 2001:165;219-20
13. Liatsikos EN, Perimenis P, Dandinis K, Kaladelfou E, Barbalias G. Lichen sclerosus et atrophicus. Findings after complete circumcision. Scan J Urol Nephrol 1997;31:453-456.
14. Weyers W, Ende Y, Schalla W, Diaz-Cascajo C. Balanitis of Zoon: a clinicopathologic study of 45 cases Am J Dermatopathol. 2002:24:459-67
15. Kumar B, Sharma R, Ragagopalan M, Radothra BD. Plasma cell balanitis: Clinical and histological features - response to circumcision. Genitourinary Medicine 1995;71:32-34.
16. Tang A, David N, Horton LW. Plasma cell balanitis of Zoon: response to Trimovate cream. In J STD AIDS 2001:12;75-8.
17. Retamar RA, Kien MC Chouela EN Zoon's balanitis: presentation of 15 patients, 5 treated with a carbon dioxide laser. Int J Dermatol 2003:42;305-7.
18. Roe E, Dalmau J, Peramiquel L, Perez M, Lopex-Lozano HE, Alomar A. Plasma cell balanitis of zoon treated with topical tacrolimus 0.1%: report of three cases. .J Eur Acad Dermatol Venerol 2007:21;284-5.
19. Davis-Daneshfar A, Trubeb RM. Bowen's disease of the glans penis (erythroplasia of Queyrat) in plasma cell balanitis. Cutis 2000:65;395-8.

20. Kishimotot M, Lee MJ, Mor A, Abeles AM, Solomon G, Pillinger MH. Syphilis mimicking Reiter's syndrome in an HIV-positive patient. Am J Med Sci 2006:332;90-2.
21. Zawar V, Kirloskar M, Chuh A. Fixed drug eruption – a sexually inducible reaction? Int J STD AIDS 2004:15;560-3.
22. Braun-Falco O, Plewig G, Wolff HH, Winkelman RK, eds. Dermatology. Berlin: Springer-Verlag, 1991. p553.
23. (Wieland U, Jurk S, Weissenborn S, Krieg T, Pfister H, Ritzkowsky A. Erythroplasia of Querat: Co-infection with cutaneous carcinogenic human papillomavirus type 8 and genital papillomaviruses in a carcinoma in situ. J Invest Dermatol 2000:115;396-401)
24. Mikhail GR. Cancers, precancers and pseudocancers on the male genitalia: A review of clinical appearances, histopathology, and management. J Dermatol Surg Oncol 1980;6:1027.
25. Goette DK, Elgart M, De Villez RL. Erythroplasia of Queyrat: treatment with topically applied fluorouracil. JAMA 1975;232:934
26. Sonnex TS, Ralfs IG, Delanza MP et al. Treatment of Erythroplasia of Queyrat with liquid nitrogen cryosurgery. Br J Dermatol 1982;106:581-584.
27. Peris K, Micantonio T, Fargnoli MC, Lozzi GP, Chimenti S. Imiquimod 5% cream in the treatment of Bowen's disease and invasive squamous cell carcinoma. J Am Acad Dermatol. 2006;55(2):324-7. .
28. Axcrona K, Brennhovd B, Alfsen GC, Gierckskу KE, Warloe T .Photodynamic therapy with methyl aminolevulinate for atypia/carcinoma in situ of the penis. Scand J Urol Nephrol. 2007 Jun 21;:1-4
29. Goorney BP, Polori R. A case of Bowenoid papulosis of the penis successfully treated with topical imiquimod cream 5%. Int J STD AIDS. 2004;15(12):833-5
30. Schellhammer PF, Jordan GH, Robey EL, Spaulding JT. Premalignant lesions and nonsquamous malignancy of the penis and carcinoma of the scrotum. Urologic Clinics of North America. 1992;19:131-142.
31. Edwards S. Balanitis and balanoposthitis: a review. Genitourinary Medicine 1996;72:155-159.

This document is the second update of the original article:
Edwards SK. National guideline for the management of balanitis. Clinical Effectiveness Group (Association of Genitourinary Medicine and the Medical Society for the Study of Venereal Diseases). Sex Transm Infect. 1999 Aug;75 Suppl 1:S85-8.

The first update can be viewed on
http://www.bashh.org/guidelines/2002/balanitis_0901b.pdf