



British Association of Urological Surgeons (BAUS) consensus document for the management of male genital emergencies - testicular trauma

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Male genital emergencies relating to the penis and scrotum are rare and require prompt investigation and surgical intervention. Clinicians are often unfamiliar with the management of these conditions and may not work in a specialist centre with on-site expertise in genitourethral surgery. A series of consensus statements have been developed by an expert consensus comprising British Association of Urological Surgeons (BAUS) Section of

Andrology and Genitourethral Surgery together with experts from units throughout the UK. Testicular trauma requires prompt investigation and treatment in order to prevent the development of subfertility or hypogonadism. This series of consensus statements provide guidance for UK practice.

Keywords

testicle, trauma, rupture, haematoma, scrotum

Introduction

Male genital emergencies relating to the penis and scrotum are rare and require prompt investigation and surgical intervention. Clinicians are often unfamiliar with the management of these conditions and may not work in a specialist centre with on-site expertise in genitourethral surgery. As a consequence of a previous consultation relating to the management of urological injuries following pelvic trauma, the BAUS Section of Andrology and Genitourethral Surgery (AGUS) decided to develop a series of consensus statements for genital emergencies that would provide a resource for clinicians to help manage these emergencies in an appropriate and safe manner, and within the framework of the UK healthcare system.

Methods

The BAUS AGUS Executive Committee are an elected group of experts in the field of andrology. The committee formatted a series of consensus statements relating to genital emergencies that were to be used by clinicians within the UK. As the conditions are rare and unsuitable for randomised trials, a

meta-analysis was not deemed to be suitable and the recommendations were therefore developed by an expert consensus, existing guidelines from the European Association of Urology (EAU) and American Urological Association (AUA), UK best practice, and data from large case series (Level 4 Evidence, Oxford Centre for Evidence-Based Medicine).

A meeting was convened in January 2017 whereby urological surgeons based in urology units allied to UK trauma centres, as well as those offering a specialist andrology service, were invited to a joint meeting with the BAUS AGUS Executive Committee to discuss the proposed consensus statements that were then modified to reflect urological practice in specialist centres, as well as non-specialist centres.

The final statements were then sent to all the members of BAUS Council, comprising 36 members, for final approval. The final consensus statements were then modified based on this feedback and were then subject to BAUS AGUS final approval.

The consensus statements provide guidance for the management of four conditions: priapism, penile fracture,

penile amputation, and testicular trauma. Each one will be published separately.

Background

Testicular trauma is uncommon and rarely necessitates surgical intervention. Injuries are divided into either blunt or penetrating. Testicular injuries can also occur secondary to incorrect surgical-site marking or following revision inguinoscrotal surgery. Severe testicular injuries require prompt surgical exploration and repair to preserve both endocrine and exocrine function. Prolonged or delayed management results in a higher risk of infection, testicular atrophy, and necrosis. A delay in repair may result in impaired spermatogenesis and reduced endogenous testosterone.

Assessment

- 1 Assess patients following the Advanced Trauma Life Support (ATLS) guidelines, checking for other injuries and managing life-threatening injuries first.
- 2 Resuscitate and stabilise the patient.
- 3 Ensure adequate analgesia before clinical examination.
- 4 Examine the penis, scrotum and perineal areas, checking for penetrating injuries and note the presence and degree of scrotal swelling or haematoma.
- 5 If blood is present at the urethral meatus consider a coexisting urethral injury.

BAUS Recommendation

The patient should be stabilised and adequate analgesia given. Once stable, the genitalia can be examined ensuring that the degree of swelling is documented compared to the contralateral side.

Imaging

- Ultrasonography (US) is non-invasive and provides accurate imaging of the scrotal contents.
- Doppler studies give an indication of the perfusion within the testicle and the integrity of the vascular hilum.
- Areas with impaired blood flow indicate either an intra-testicular haematoma or non-viable testicular tissue.

BAUS Recommendation

US of the scrotum is the recommended imaging modality for testicular trauma.

Management of Blunt Testicular Trauma

- 1 Blunt trauma is often unilateral and can be managed conservatively in most cases.
- 2 The absence of scrotal swelling or haematoma does not preclude a testicular injury.

- 3 Arrange urgent scrotal US to assess the testicle and scrotal contents.
- 4 The presence of a large haematoma or haematocoele indicates significant injury to either the testicle or para-testicular structures and exploratory surgery is recommended to salvage the testicle and reduce postoperative complications.
- 5 Disruption of the tunica albuginea on US indicates a testicular rupture.
- 6 If the tunica albuginea is intact on US, and the haematoma is small then conservative therapy using a scrotal support, analgesia, and anti-inflammatory medication is recommended.
- 7 In cases of testicular rupture with large tunical tears, prompt exploration and surgical repair is required.
- 8 If there is an expanding haematocoele or haematoma then surgical exploration is recommended.

BAUS Recommendation

Early scrotal exploration and testicular repair is necessary for testicular rupture and large haematocoeles. It is also indicated in expanding haematomas or if there is no improvement after 72 h of conservative treatment.

Intra-testicular Haematoma Without Tunical Breach

- 1 Small intra-testicular haematomas with only mild-to-moderate pain require conservative treatment only.
- 2 Repeat US should be performed within 48 h to assess progression.
- 3 Exploration should be considered in large intra-testicular haematomas with severe pain or those that continue to expand.

BAUS Recommendation

Exploration is recommended in all large or expanding intra-testicular haematomas and in patients with severe pain. Repeat US should be performed within 48 h in patients treated conservatively (Fig. 1).

Management of Penetrating Scrotal Injuries

- 1 Manage coexistent life-threatening and serious injuries first.
- 2 Determine the entry and exit sites of the penetrating wound.
- 3 Arrange urgent scrotal US to assess the testicles and scrotal contents.
- 4 Scrotal exploration is usually necessary to determine the severity of the injury, washout of the wound, and to control intra-scrotal haemorrhage.
- 5 If the tunica albuginea is breached, debridement of non-viable seminiferous tubules and primary closure of the tunica albuginea should be performed.

- 6 Give a tetanus booster if the patient is not up to date or is uncertain of their tetanus status.
- 7 Give broad spectrum antibiotic therapy as per local microbiology guidelines (usually penicillin based unless there is a penicillin allergy).

BAUS Recommendation

For penetrating injuries, scrotal exploration is usually necessary to determine the extent of the injury, perform adequate washout and control intra-scrotal haemorrhage (Fig. 1).

Degloving Injury and Blast Injuries to the Scrotum

- 1 Testicular injuries may be associated with loss of the scrotal skin.
- 2 Ensure that there is no underlying testicular injury by performing scrotal US.
- 3 Necrotic tissue should be debrided and vigorous saline washout should be performed before attempting primary closure.
- 4 Primary closure of the remaining scrotal skin after cleaning and debriding non-viable skin can be performed.
- 5 Skin grafting may be required where there is extensive scrotal skin loss.
- 6 Seek input from the local plastic surgery unit when there is inadequate scrotal skin to allow closure.
- 7 Testicles can be left exposed with daily moist saline dressings until granulation tissue forms and a meshed split-thickness skin graft can be applied at a later date.

BAUS Recommendation

Early debridement and washout of the wound should be performed with involvement of plastic surgeons if primary closure is not possible.

Genital Mutilation

- 1 Most commonly due to self-mutilation.
- 2 Patient often has a psychiatric history.
- 3 Most cases involve men attempting to self-castrate.
- 4 If patients present early and the testicles are viable, replantation may be considered within 12 h.
- 5 Replantation should be performed in specialist centres where microvascular surgical skills are available.

BAUS Recommendation

If replantation is possible, then early referral to a specialist centre should be arranged. If replantation is not possible, then consider sperm cryopreservation either directly from the testicle or from an ejaculated sample. Patient should have adequate psychiatric support if necessary.

Testicular Dislocation

- 1 Occurs when a testicle has been moved from its orthotopic position.
- 2 Usually occurs secondary to blunt trauma, where the testicle is displaced to the superficial ring or superficial pouch.
- 3 Indirect inguinal hernias and atrophic testicles are predisposing factors.
- 4 Early manual closed reduction should be attempted.
- 5 Surgical exploration and fixation should be performed if closed reduction is unsuccessful.

BAUS Recommendation

If manual reduction is not possible then early surgical exploration of the inguinal region with testicular fixation should be carried out.

Wrong Testicle Amputation

- 1 Rare but potentially catastrophic e.g. wrong testicle at orchidectomy, re-do inguinoscrotal surgery.
- 2 Consider medicolegal, fertility, and endocrine issues, especially if the contralateral testicle is abnormal or absent.
- 3 Microvascular replantation should be carried out within 4 h.
- 4 Ensure early involvement of surgeons with microvascular surgery experience and re-anastomose vascular structures first, followed by the vas deferens.
- 5 Liaise with fertility units to cryopreserve sperm.
- 6 Testicular prostheses should not be placed in the acute setting.
- 7 Broad-spectrum antibiotics should be continued postoperatively.
- 8 Loss of a single testicle should not affect long-term sexual function, libido, or fertility, if the contralateral testicle is functioning normally.
- 9 If the injured testicle is salvaged, the patient should be warned of possible delayed testicular atrophy.

BAUS Recommendation

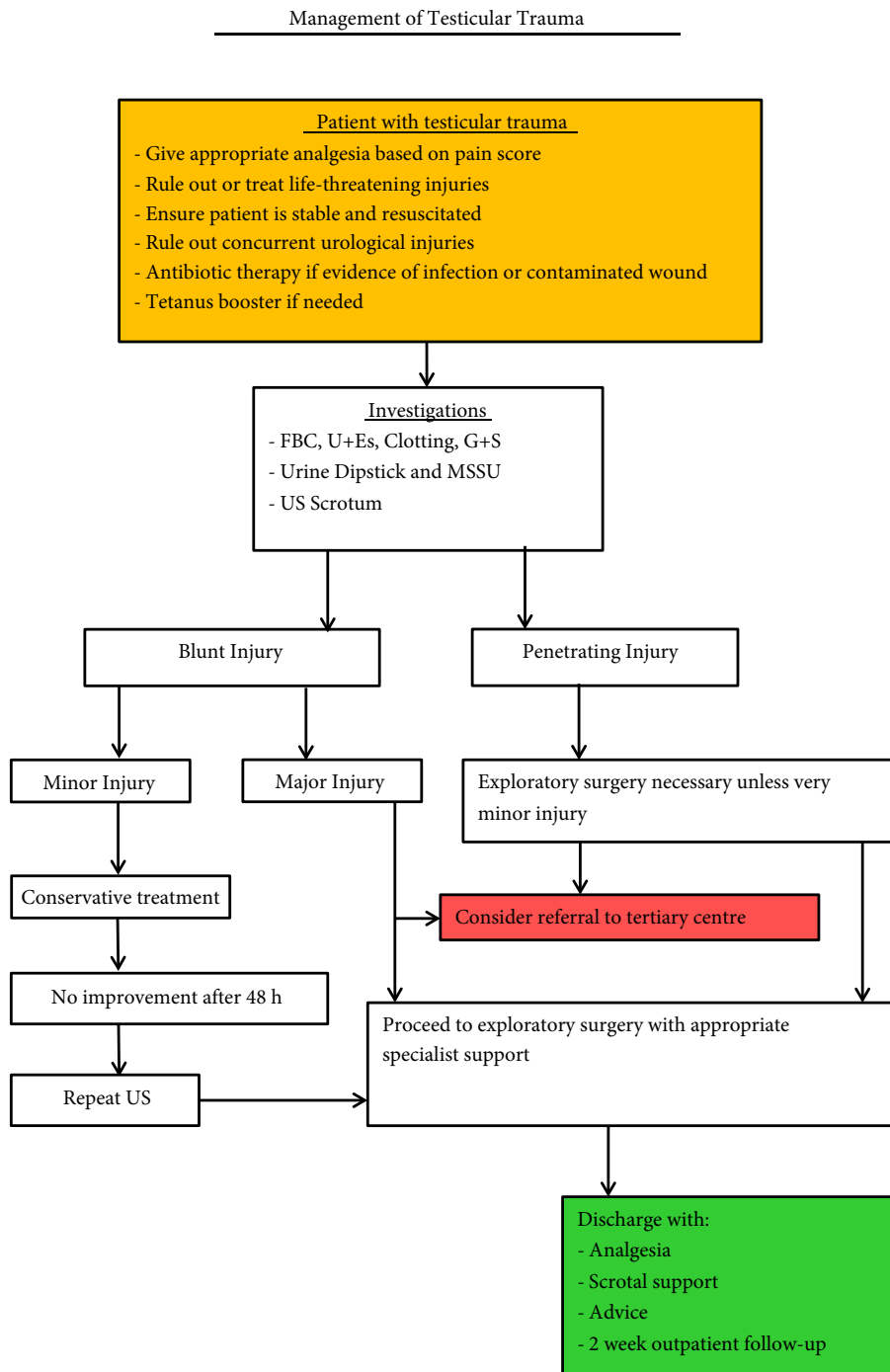
For iatrogenic injuries, the priority should be testicular replantation if possible with the support of microvascular surgeons. Sperm cryopreservation should be considered if the testicle cannot be salvaged.

Technical Points for Scrotal Exploration after Trauma

Indications for scrotal exploration include the following:

- 1 Uncertainty in the diagnosis.
- 2 Clinical findings consistent with testicular injury.

Fig. 1 Management of testicular trauma. FBC, full blood count; U+Es, urea and electrolytes; G+S, group and save; MSSU, mid-stream specimen of urine.



- 3 Disruption of the tunica albuginea.
- 4 Expanding or large haematocoeles.
- 5 Absence of blood flow on US with Doppler studies.

Operative management:

- 1 Debridement of necrotic or devitalised tissue.
- 2 Copious saline irrigation if the wound is contaminated.

- 3 Ensure meticulous haemostasis.
- 4 Closure of the tunica albuginea with absorbable sutures – 4/0 polyglactin.
- 5 If testicular viability uncertain, wrap with warm saline-soaked gauze for 5 min to improve the blood flow.
- 6 Sharply incise the tunica albuginea – brisk red bleeding signifies adequate blood flow.

- 7 Return of dark fluid is indicative of testicular infarction – orchidectomy may be required.
- 8 If testicle is ruptured, debride non-viable or extruded seminiferous tubules.
- 9 Cover large defects with a patch of tunica vaginalis if primary closure is not possible.
- 10 Place a corrugated drain at the end of the procedure.
- 11 Close the dartos layer and scrotal skin using absorbable sutures (3/0 polyglactin for the dartos and 4/0 polyglactin for the skin).

Postoperative Management

- 1 Commence broad spectrum antibiotics until discharge and after discharge in cases of contaminated wounds.
- 2 Discharge with oral antibiotics, analgesia, and scrotal support.
- 3 Advise ice packs to the groin area, and bed rest.

Conservative Treatment

- 1 Scrotal support.
- 2 Analgesia including NSAIDs.
- 3 Ice packs.
- 4 Bed rest for 24–48 h.
- 5 If associated epididymitis or UTI is suspected administer appropriate antibiotic therapy.
- 6 Failure of medical management after 48 h of observation warrants re-imaging of the scrotum with US and Doppler studies.

Follow-up

- 1 The patient should be reviewed in 1–2 weeks.
- 2 Expect scrotal swelling to settle within 4 weeks.

- 3 Repeat US may be considered to assess resolution of injury or in patients with abnormality on examination.

Indications for Referral to Specialist Units

- 1 Associated complex urological injury.
- 2 Salvageable testicular amputation requiring micro-vascular support.
- 3 Major injury requiring reconstruction.
- 4 Patients requiring sperm cryopreservation.

Conflict of Interest

None.

Appendix 1 Consensus Committee

BAUS Section of Andrology and Genitourinary Surgery Executive Committee. Additional members: Alvaro Bazo – Nottingham University Hospitals NHS Trust. Suzanne Biers – Cambridge University Hospitals NHS Foundation Trust. Roland Donat – Western General Hospital. Ahsanul Haq – Lancashire Teaching Hospital NHS Foundation Trust. Oliver Kayes – Leeds Teaching Hospitals NHS Trust. Raj Nigam – Royal Surrey County Hospital. Raj Persad – University Hospitals Bristol NHS Foundation Trust. David Ralph – University College London Hospital NHS Trust.

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Abbreviations: AGUS, Andrology and Genitourinary Surgery; US, ultrasonography/ultrasound.