The management of testicular masses and acute scrotal pain

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Abstract
Within military primary care patients may present with testicular masses or acute scrotal pain. The aim of this article is to examine, by means of case studies, the differential diagnosis, treatment and clinical considerations in managing patients in the military environment.

Introduction
The trained strength of the UK Armed Forces on 1 January 2014 was 152,440 of which 90.1% was male.1 These patients may present to primary care with a testicular mass (which may be incidental) or acute scrotal pain. They will require a thorough history and examination in order to plan immediate care and secondary care referral. It is important to identify the emergency conditions associated with high morbidity and possible mortality that require urgent referral: testicular torsion, acute epididymo-orchitis, strangulated hernia and testicular cancer. Benign testicular and scrotal masses, such as hydroceles, varicoceles and spermatoceles, can often be managed within the primary care setting, with routine secondary care referral as necessary.2

History and examination
In order to assess testicular masses and acute scrotal pain it is vital to take a full history and perform a clinical examination. A thorough history is critical in the assessment of the patient and will assist in formulating a diagnosis. The duration, severity and speed of onset of the pain can indicate the nature of the pathology. For example, sudden onset of severe pain is common in testicular torsion, whereas there may be a more gradual onset of testicular pain in epididymo-orchitis. The case studies described below highlight the key features that assist in the differential diagnoses for these conditions.

Associated symptoms should also be explored; these include urinary tract symptoms and urethral discharge, associated parotid swelling and a history of nausea and vomiting. A sexual health history should be included as part of the assessment.

Examination of the patient is critical. Understandably, patients presenting to a healthcare provider with a testicular mass are often anxious, so a suitable environment and the offer of a chaperone should be considered for these consultations.

The testis should be examined for position within the scrotum, orientation of lie and tenderness. Moreover, size should be assessed and any lumps should be described in terms of consistency, smooth or rough surface and whether the lump is arising from the testis or other scrotal contents; the characteristics will assist the clinician in the diagnosis. A full abdominal examination is essential, including examination for inguinal and cervical lymphadenopathy. Trans-illumination with a torch can be helpful to demonstrate a hydrocele, but caution should be exercised in determining the cause of any hydrocele. If a hernia is suspected the patient is best examined lying and standing, and the cough impulse should be checked.

Concerning features or “red flags” in the presentation and examination should help the clinician in decision-making as regards initial treatment or the need for urgent specialist referral. The clinician should have a low threshold for suspecting testicular torsion, particularly if the patient is under 30 years old and has acute, painful scrotal swelling. Testicular cancer is most commonly seen in the male population between 20-40 years old, highlighting the importance of its consideration in the military population.

Table 1 provides a summary of the pertinent points from the history and examination for each diagnosis, and the key management points and prognosis on each condition.
Table 1. Summary of Testicular Masses and Acute Scrotal Pain assessment: key aspects of history, examination, management and prognosis.

<table>
<thead>
<tr>
<th>DIAGNOSIS</th>
<th>KEY HISTORY</th>
<th>EXAMINATION</th>
<th>MANAGEMENT OPTIONS</th>
<th>PROGNOSIS</th>
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<tbody>
<tr>
<td>Testicular torsion</td>
<td>- Severe, unilateral testicular pain</td>
<td>- Tender testis</td>
<td>- Surgical intervention with detorsion - immediate referral for surgical assessment</td>
<td>- Survival rates for testicle drop from 80-100% if operated on within 6 hours of torsion</td>
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<td>- Nausea and vomiting</td>
<td>- Tenderness may be retracted upwards and swollen</td>
<td>- In extremis an attempt may be made to detors the testicle (see section on testicular torsion)</td>
<td>- If surgery is delayed &gt;24 hours salvage rates drop to 10%</td>
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<td>- Waking from sleep or during sporting activity</td>
<td>- Epididymis may be felt in anterior position</td>
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<td>- Pain can ease (falsely reassuring)</td>
<td>- Cremastatic reflex usually absent</td>
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<td>- Urethral discharge and dysuria</td>
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<td>- May be associated with swollen parotid glands in (mumps orchitis)</td>
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<td>- Gynaecomastia</td>
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<td>- Pain or dragging discomfort in scrotum</td>
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<td>- Non tender swelling or nodule on one testicle</td>
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<td>- A new lump on a testicle</td>
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<td>- Assessment of mass</td>
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<td>- Trans-illumination assessment for reactive hydrocoele</td>
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<td>- Abdominal, chest and lymph nodes should be examined for any evidence of metastasis.</td>
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<td>Hydrocele</td>
<td>- Painless swelling of scrotum</td>
<td>- Painless enlarged scrotum</td>
<td>- Simple hydrocoele requires no investigation</td>
<td>- Recurrence after surgery in 1% of cases</td>
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<td>- May report dragging, fullness or heaviness</td>
<td>- Standing may enlarge swelling</td>
<td>- USS can be used to differentiate if in doubt</td>
<td>- 2.5% of cases there are complications - bleeding, infection and pain</td>
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<td>- History for:</td>
<td>- Neck of spermatic cord should be palpable above the swelling</td>
<td>- If symptomatic then can be referred for surgery</td>
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<td>a) injury,</td>
<td>- May trans-illuminate</td>
<td>- Needle aspiration (with covering antibiotics) is not routinely advised – specialist advice should be sought if this is considered</td>
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<td>b) infection,</td>
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<td>c) trauma,</td>
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<td>d) post radiotherapy,</td>
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<td>e) nephrotic syndrome</td>
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<td>f) heart failure</td>
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<td>Varicocele</td>
<td>- Pain or dragging discomfort in scrotum</td>
<td>- 95% left sided</td>
<td>- Asymptomatic简单 bilateral varicoceles need no further investigation.</td>
<td>- Open or laparoscopic ligaton has a &gt;90% success rate</td>
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<td>- “Bag of worms” in scrotum</td>
<td>- Should be examined standing where veins more likely to dilate, usually replaced lymphatic</td>
<td>- US can be used to investigate both testicular and abdominal if any suspicious features.</td>
<td>- Treatment for male infertility is contentious with no routine treatment recommended by NICE at present</td>
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<td>- May present with infertility</td>
<td>- May be transmitted cough impulse</td>
<td>- Specialist advice/referal:</td>
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<td></td>
<td>- Any symptoms suggestive of renal or retroperitoneal tumours including:</td>
<td>- Valsalva manoeuvre may increase dilatation</td>
<td>a) Right sided varicocele</td>
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<td>sudden onset of varicoceles</td>
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<td>- Simple varicoceles can be managed with embolization, open or laparoscopic</td>
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<td>c) Age &gt;40yrs</td>
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<td>excision are rendered pain free</td>
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<td>d) If tense when lying down</td>
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Table 1. Summary of Testicular Masses and Acute Scrotal Pain assessment: key aspects of history, examination, management and prognosis.
NICE testicular swelling guidance and red flags

- If testicular torsion is suspected an immediate specialist referral should be made.
- If testicular cancer is suspected, the patient should be referred under the 2-week pathway to a urologist. If in a position to do so, a serum alpha-fetoprotein (AFP), lactate dehydrogenase (LDH) and human chorionic gonadotrophin (HCG) levels, should be requested whilst awaiting an urgent urology appointment.
- Arrange an urgent ultrasound scan (USS) of the scrotum if any of the following apply:
  - It is not evident whether the scrotal swelling is testicular or extra-testicular.
  - The body of the testis cannot be distinguished.
  - A hydrocoele is detected in a man 20–40 years of age (being the at-risk age group for testicular cancer).

The USS report should give guidance as to the pathology, and this will help determine whether onward referral is necessary, and indeed the urgency of this.

Management of testicular masses in a military environment

Military personnel may present with scrotal pain or swelling in a range of challenging environments. Initial treatment and investigation, as well as onward referral, is straightforward in the fully staffed Medical Centre with ready access to local facilities. However, in remote or hostile environments, the geographical and situational influences need to be considered for effective clinical decision-making and determination of the need for medical evacuation.

The “must not miss” diagnoses and case studies

For each of the diagnoses there will be an explanation of the condition, highlighting and discussing keys points for the history, examination, management and prognosis. A fictional case study will highlight an example of how each scenario could be managed in a military setting.

Testicular torsion

Unfortunately, the diagnosis of testicular torsion can be difficult. Even for the specialist in the hospital environment it may be difficult to differentiate between acute epididymoorchitis and torsion. This is an important clinical issue because the result of a missed torsion is loss of the testicle. With a normal contralateral testicle the long-term impact of this outcome is minimal. However, the potential hormonal, fertility, and psychological effects should not be underestimated. This situation is complicated in the military setting, as urgent medical evacuation with its operational consequences may involve significant resources. Focussing on the key points of the medical history and examination laid out below will assist in decision-making when faced with this problem.

History

Around 1 in 4000 males under 25 are affected. Patients present with sudden onset of severe, unilateral testicular pain, which is often associated with nausea and vomiting. Pain may come on at any time, waking the patient from sleep or during sporting or physical activity. There is often associated lower abdominal pain. After several hours pain may ease, although this should not be taken as reassurance as it may represent a sign of early necrosis. Patients often think, owing to the pain, that they may have knocked the testicle; the clinician should not find false reassurance in this, which often distracts from an accurate diagnosis.

Examination

The clinical findings during examination of a testicular torsion can be variable and therefore an accurate history is vital. However, the testis is almost invariably exquisitely tender, which often makes detailed examination difficult. The anatomy may appear fairly normal but the testis may be swollen and high-riding. Often, in late presentations, there may be associated scrotal oedema and erythema. Depending on the degree of torsion, the epididymis may be felt in an anterior position, although this may be masked by swelling and degree of torsion. The cremasteric reflex is usually absent in testicular torsion. This reflex may be elicited by lightly stroking the superior and medial aspect of the thigh: a normal response is where the cremaster muscle immediately contracts and pulls up the ipsilateral testis. In 90% of patients with torsion, urinalysis will be normal, whereas those with epididymitis will often have pyuria.

Management

If clinical suspicion is high, then surgical intervention should not be delayed by investigations. In selected cases, ultrasound with integrated colour Doppler may show the presence or absence of intra-testicular blood flow. This can help when used judiciously alongside a good history and clinical examination. However, blood flow may still
be detected in testicular torsion and, if clinical findings suggest torsion, surgery should not be delayed.² Definitive surgical management consists of scrotal exploration, detorsion and 3-point fixation with a non-absorbable suture. The contralateral testis is also fixed in order to prevent a contralateral torsion.² In the event of a lack of surgical facilities an attempt can be made to detorsion the testicle by lifting and rotating it on the pedicle. Torsion usually occurs by a medial rotation and therefore the testis should be externally rotated to de-tort (as in opening the pages of a book). If this fails, detorsion in the opposite direction can be tried. If manual detorsion is successful the patient should feel immediate relief: however, surgical exploration and bilateral fixation will still be required.²⁴

**Prognosis**
If the blood supply is restored to the testicle within 6 hours it can be salvaged in 80-100% of cases. Salvage rates drop to 10% if surgery is delayed beyond 24 hours of testicular pain.⁹ Spermatogenesis may be impaired even in the event of successful detorsion, and fertility may be affected in the event of the loss of a testis, although some studies have shown that the contralateral testis may afterwards produce more spermatozoa.¹⁰

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**Case study 1**
An 18-year-old Able Seaman, deployed at sea undertaking Basic Operational Sea Training off the Devon coast, presents to his Leading Medical Assistant (LMA) complaining of sudden intense left testicular pain which is making him feel nauseated. He has no history of fever. On examination the testis is swollen and tender, and the cremasteric reflex is absent. It feels as if the testes are elevated. His urine is negative on dipstick testing. The confident LMA suspects a testicular torsion and briefs the Commanding Officer that the patient needs to be evacuated to the nearest hospital as quickly as possible. He is evacuated by helicopter two hours later. On arrival at the local hospital the patient is seen by the on-call surgical team in the Emergency Department and undergoes a successful de-torsion of his testicle, and bilateral orchidopexy. He is downgraded to the ship and undergoes a successful de-torsion of his testicle whereas in epididymitis the blood flow may be increased. Moreover, ultrasound will also show an enlarged testicle, abscess formation or hydrocele. When considering a diagnosis of mumps, serology for Immunoglobulin G and Immunoglobulin M should be taken. The antibiotic regime should be determined by evidence of acute or chronic infection. Antibiotics

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**Epididymo-orchitis**

**Clinical presentation**
Epididymitis is inflammation of the epididymis, orchitis is inflammation of the testis and epididymo-orchitis is a combination of both. It most commonly occurs in men aged 18-35 years. Presentation is usually with pain and swelling of gradual onset, with or without urethral discharge, dysuria and systemic symptoms of fever and general malaise. However, symptoms often develop acutely over hours, mimicking testicular torsion. The infection may be secondary to sexually-transmitted infections including *Neisseria gonorrhoea* and *Chlamydia trachomatis*.¹¹ However, the most common cause in younger and older age groups, with significant age cross-over, is urinary tract infection with common uro-pathogens such as *Escherichia coli*.¹¹ Mumps orchitis should be considered where scrotal swelling is associated with a non-specific viral illness or classical parotid gland swelling. Mumps orchitis occurs in up to 40% of post-pubertal males who are diagnosed with mumps.¹² A patient will typically present with a history of a gradual onset of testicular pain, associated fever in 25% of cases, and sometimes urethral discharge and urinary symptoms.

**Examination**
Clinical signs can vary significantly from minor erythema, swelling and epididymal tenderness to a large, hot, grossly swollen scrotum. Elevation of the scrotum may relieve symptoms, and the cremasteric reflex is usually present. Presentation is bilateral in 5-10% of cases.¹³ There is a palpable swelling of the epididymis starting with the tail at the lower pole of the testes and spreading to the upper pole, which may also involve the testicle. However, in more severe cases, with gross swelling and associated oedema, differentiation of structures within the scrotum is not possible. In some cases a reactive hydrocele may be present, and occasionally abscess formation leads to a soft fluctuant area. Urinalysis will demonstrate pyuria or bacteriuria in 50% of cases.¹³

**Management**
Acute scrotal pain and swelling in a young man should be treated as testicular torsion until an alternative diagnosis is confirmed. When epididymo-orchitis is suspected a urine dipstick should be checked for evidence of infection (positive for nitrites).¹³ First-catch urine for *chlamydia* NAAT (nucleic acid amplification test), midstream specimen of urine (MSU) and urethral swabs, if available, should be collected prior to starting antimicrobial therapy in order to identify the organism causing the infection. If the patient is systemically unwell blood cultures should be taken to ensure that the correct antimicrobial treatment is given. Colour Doppler ultrasound scan is sometimes useful. Torsion demonstrates reduced blood flow to the affected testicle whereas in epididymitis the blood flow may be increased. Moreover, ultrasound will also show an enlarged testicle, abscess formation or hydrocele. When considering a diagnosis of mumps, serology for Immunoglobulin G and Immunoglobulin M should be taken.

Empirical treatment should be given to all patients with epididymitis before blood and urine culture results are available. The antibiotic regime should be determined by the history and likely pathogen, with the course determined by evidence of acute or chronic infection. Antibiotics
should be continued for a minimum of ten days to two
weeks.\textsuperscript{14,15} The British Association of Sexual Health and
HIV (BASHH) provides up to date antibiotic guidelines for
epididymo-orchitis.\textsuperscript{14} BASHH recommends that contact
tracing should be considered in patients with a likely
sexually-transmitted pathogen.\textsuperscript{14}

\textbf{Prognosis}

Pain, swelling and systemic symptoms should start
to improve within 12 hours of starting appropriate
antimicrobial treatment. In some cases physical activity
may exacerbate symptoms, so the patient may need initial
bed rest and analgesia, followed by a period of light duties.
Scrotal elevation and supportive underwear may improve
symptoms.\textsuperscript{14} Mild symptoms may persist for several weeks
and can be managed with light duties and appropriate
analgesia. Chronic epididymitis may persist secondary to
a severe episode of acute inflammation, with frequent mild
attacks and persisting chronic discomfort. There may be
fibroplasia, which leads to scarring and a palpable lump
in the scrotum. Mumps epididymo-orchitis can lead to
testicular atrophy; of those with bilateral mumps orchitis,
13\% suffer reduced fertility.\textsuperscript{16}

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\textbf{Case study 2} & \textbf{Inguinal hernia} \\
\hline
A 38-year-old Leading Hand Chef presents to his
Medical Officer (MO) after two weeks at sea. He
complains of worsening swelling and discomfort in his
scrotum over the past week, and discloses that he had
multiple unprotected contacts with sex workers when
last in port. His urine is positive for nitrites on dipstick
but he is apyrexial. The MO examines him and notes
a present cremasteric reflex and a painful and palpable
swelling of his right testicle. The pain is relieved by
supporting the testicle. The MO suspects epididymitis
and arranges a course of antibiotics and pain relief; he
also recommends supportive underwear. The patient’s
duties are adjusted so that he does not have to spend
long periods standing in the galley. The MO organises
follow-up via the Ship’s Agent at a Sexual Health Clinic
when next in port. The course of treatment initiated by
the MO is successful, testing from the Clinic reveals no
other pathogens and the patient is able to return to his
normal duties. The ship’s company receives a Sexual
Health brief before the next port call. & \textbf{Clinical presentation} \\
Inguinal hernia is an important differential diagnosis for
acute scrotal pain and scrotal mass. The hernia is at risk
of being incarcerated, whereby it cannot be reduced into
the abdominal cavity on examination. There is also the risk
of strangulation, in which the blood supply and lymphatic
drainage of the hernia sac are compromised, leading
to ischaemia and potential necrosis. This is a rare but
important surgical emergency. Strangulation of the hernia
has been reported to occur in up to 5\% of cases.\textsuperscript{17}

\textbf{Examination}

A thorough abdominal and genital examination is always
required to differentiate between a scrotal lump and a
hernia. If the lump is palpable within the scrotum, the
key test is whether it is possible to feel the spermatic cord
above the lump. If this is the case, the lump is arising
from the scrotum (e.g. hydrocele).\textsuperscript{15} If it is not possible
to feel a neck or get above the mass it is a hernia arising
from the abdomen, extending down along the inguinal
canal. A strong cough impulse or expansion of the mass
points towards hernia, although a cough impulse may be
transmitted into a large scrotal mass. The patient should be
examined standing and lying down; this can help elicit a
diagnosis, specifically to determine the important point of
whether the hernia is reducible or tender.\textsuperscript{15,18} An irreducible
tender hernia suggests incarceration or strangulation and
should be referred for urgent surgical assessment.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{Figure2.png}
\caption{An indirect inguinal hernia descending into the
scrotum.}
\end{figure}

\textbf{Management}

Diagnosis is often clear on clinical examination but can be
confirmed with ultrasound assessment if uncertain. A small
reducible hernia does not require urgent surgery. However,
episodes of pain and tenderness are indications to intervene.
Furthermore, any suspicion of strangulation should warrant
urgent surgical exploration.\textsuperscript{18}
Case Study 3
Six weeks before deployment a 26-year-old Leading Hand, a keen weight-lifter, presents to his Medical Assistant (MA). He has noticed some discomfort in his groin after a weight-training session and noted a swelling that was more obvious when standing up or straining on the toilet. The MA refers him to an MO who diagnoses a reducible inguinal hernia, with no evidence of strangulation. The MO refers him to hospital for surgery, and he undergoes successful inguinal hernia repair. He is given three weeks sick leave post-op and a further three weeks of light duties; review at six weeks with intention to discharge MFD. He subsequently rejoins the ship during the deployment.

Testicular cancer
Clinical presentation
Testicular cancer is the most common cancer in men aged 25–49 in the UK, and 84% of cases are reported to occur between the ages of 15–49 years. Patients usually present with a painless swelling or nodule on one testicle. This swelling cannot be separated from the testis. Some patients may present with a dull ache or heavy sensation in the lower abdomen. A history of minor trauma is not uncommon but usually represents a clinical distraction, as patients think back to determine a cause for the new lump they have just found. An important risk factor for testicular cancer is testicular mal-descent, even when treated with orchidopexy during childhood. Approximately 10% of cancer is testicular mal-descent, even when treated with orchidopexy during childhood.20,21 Approximately 10% of patients present with gynaecomastia secondary to beta-human chorionic gonadotropin (bHCG) production.22,23 Another rare but acute presentation is breathlessness and haemoptysis secondary to metastatic disease from choriocarcinoma of the testis.23

Around 95% of testicular cancers are germ cell tumours (GCTs).24 The remaining 5% are derived from gonadal stromal cells and include Leydig and Sertoli cell tumours, although there are a number of other rare and metastatic cancers that may also present as a scrotal mass.25 Approximately 40% of GCTs are seminomas, with the remainder classified broadly as non-seminiferous germ cell tumours (NSGCT), which are teratomas (20–25%), embryonal (15–10%), yolk sac (10%), and choriocarcinoma (1%).25 Metastatic spread of testicular cancer follows the lymphatic drainage pathway of the spermatic cord directly to the retroperitoneal lymph nodes and not via the inguinal lymph nodes; therefore it may not be possible to palpate any positive nodes on examination. The sites most commonly affected by distal metastasis include the liver, lungs, bone and brain.24

Staging of testicular cancer is complex and there are several systems commonly used to help guide treatment decisions and predict prognosis. The TNM classification of malignant tumours is used for pathological description of disease: ‘T’ describes the size of the original (primary) tumour and whether it has invaded nearby tissue; ‘N’ describes nearby (regional) lymph nodes that are involved, and ‘M’ describes distant metastasis (spread of cancer from one part of the body to another). However, specialists often use a staging system which is more relevant for treatment groups. Stage I refers to disease confined to the testis. Stage II disease involves the testis and retroperitoneal or para-aortic lymph nodes. Stage III disease involves testis and metastases beyond retroperitoneal and para-aortic nodes. A further staging system has been developed by the International Germ Cell Cancer Collaborative Group (IGCCCG). This puts together factors relating to the extent of disease, metastatic spread and tumour marker level to stratify risk into good, intermediate and poor groups. This is a useful system to predict prognosis and guide treatment options.

Examination
The testes and scrotum should be palpated and evaluated for masses and tenderness. Any mass should be assessed for its position (epididymal, scrotal or testicular); characteristics (cystic or solid); if it is poorly or well circumscribed, and whether it has a uniform or heterogeneous feel. The chest should be examined looking specifically for gynaecomastia, as 30% of patients with Leydig cell tumours present with this. The scrotum should be transilluminated, as a reactive hydrocele may be present with testicular cancer. Transillumination can be achieved by holding a pen torch to the scrotal mass: a hydrocele will demonstrate a soft red glow, while a solid mass such as a tumour will not transmit any light. Examination of the abdomen, chest and lymph nodes should seek any evidence of metastases.24

Management
When testicular cancer is suspected the patient should be referred for specialist urological advice under the NHS two-week cancer pathway. Where timely access to primary care ultrasound is possible, it is useful to arrange a diagnostic scan, although this should not delay referral. If deployed overseas, an ultrasound can be delayed until facilities are available. Further pre-operative investigations include tumour markers: serum alpha-fetoprotein (AFP), human chorionic gonadotropin (HCG) and lactate dehydrogenase (LDH).25 Tumour markers are important staging and prognostic indicators used for treatment planning and follow up. A staging chest, abdominal and pelvic Computed Tomography (CT) scan should be undertaken prior to or shortly after radical orchidectomy.25 If there is an abnormal contralateral testis, semen cryopreservation (sperm banking) is possible prior to surgery. However, if the testis is normal, sperm banking can be delayed until after surgery, but should be undertaken prior to any potential chemotherapy. A prosthetic testis can be placed at the time of radical inguinal orchidectomy. Stage I tumours may be managed by surgery and observation or by single-cycle
Hydroceles may also arise in the canal of Nuck or in the spermatic cord. In the adult population they may present following local injury (including torsion), infection, tumours and radiotherapy, or from conditions causing generalised oedema (nephrotic syndrome or heart failure).

Examination
The typical presentation is a painless enlarged scrotum. The patient may report a sensation of fullness, heaviness or dragging. Standing may enlarge the size of the swelling and, dependent on size, the testes may or may not be palpable. The neck of the cord is palpable above the swelling which, when very large, may trans-illuminate well in a darkened room. Failure to be able to delineate the testis, tenderness on palpation or internal shadows on trans-illumination warrant further investigation with ultrasound in the first instance. In an uncomplicated hydrocele, there are no systemic symptoms. However, infection or trauma can cause acute complications.

Management
For simple hydroceles, investigation is not always necessary unless there is a doubtful diagnosis or a possible underlying cause. However, ultrasound is useful as an aid in the differential diagnosis of hydrocele, large epididymal cyst and inguinoscrotal hernia. Furthermore, ultrasound is helpful in ruling out underlying causes such as tumour or chronic inflammation. If the hydrocele is causing no symptoms, no treatment may be necessary. However, young active servicemen often experience discomfort or a heavy sensation after sport or physical activity, even with small hydroceles. Needle aspiration is not advised in patients fit for surgery, as fluid usually re-accumulates quickly and there is a significant risk of infection. Definitive specialist advice should then be sought at the earliest opportunity as to the best onward management.

Prognosis
Definitive surgery involves everting or plicating the tunica vaginalis, thus obliterating the potential space around the testis where fluid accumulates. Surgery is carried out as a day case. Complications arise in 2-5% of cases and usually occur as a result of bleeding, infection and pain. Recurrence of a hydrocele after surgery is uncommon and occurs in around 1% of cases, but is more likely after treatment of a large hydrocele. Patients should be placed on sick leave for one week and on light duties for a further two weeks post-operatively.
Clinical Varicocele

Clinical presentation
A varicocele is an abnormal dilatation of the pampiniform venous plexus and internal spermatic vein.\textsuperscript{20} The incidence is high at around 20% of men, although most are asymptomatic. 95% of varicoceles are left-sided, probably because the left gonadal vein drains into the renal vein at right angles, as opposed to the right gonadal vein which drains obliquely into the vena cava, resulting in relatively higher left-sided venous pressures.\textsuperscript{31,32} The commonest presentation is of pain or a dragging discomfort. However, varicoceles have been implicated as a cause of infertility in approximately 35-50% of men with primary infertility and up to 81% of men with secondary infertility;\textsuperscript{31} thus, patients may present with infertility and an incidental diagnosis of varicocele. Rarely, a secondary varicocele can be caused by compression or obstruction of the testicular vein by renal or retroperitoneal tumours.\textsuperscript{33} Investigation of symptomatic varicocele with an acute history or suspicious associated symptoms should therefore include abdominal ultrasound in the first instance.

Examination
The patient should be examined lying and standing. The scrotum on the side of the varicocele will often hang lower than the normal side. This is typically the left side (80-90%), but in some cases is bilateral (35-40% - this may be picked up only on ultrasound).\textsuperscript{34} Dilatation and tortuosity of the veins will usually increase on standing and reduce on lying flat. The classic finding is that the dilated veins feel like a ‘bag of worms’. There may be a transmitted cough impulse and by performing the Valsalva manoeuvre the dilation may increase.

Management
Asymptomatic, small left-sided varicoceles need no further investigation or onward referral.\textsuperscript{35} However, considering the potentially serious causative pathology, abdominal ultrasound or specialist advice should be considered in the case of the following: right-sided varicocele, sudden onset, age greater than 40 years or if the varicocele remains tense when lying down. For symptomatic varicoceles, initial treatment is usually by endovascular embolisation. Open or laparoscopic surgical ligation is reserved for recurrent cases, with a greater than 90% success rate.\textsuperscript{36}

Treatment of male factor infertility is contentious. There is good evidence that surgical correction improves sperm count, but less evidence to support that treatment increases pregnancy rates.\textsuperscript{37} A 2012 Cochrane review found that the number needed to treat to achieve one successful pregnancy was 17, but study quality was sub-optimal.\textsuperscript{37} Therefore, The National Institute for Health and Care Excellence (NICE) does not recommend routine treatment at present.\textsuperscript{38}

Case study 6
A 19-year-old RM sees his Unit MO with a heavy feeling in his scrotum, which can ache at times while standing on parade. The MO examines him and finds that the left side of the scrotum feels like a “bag of worms”, particularly marked when the patient performs the Valsalva manoeuvre. The RM is self-conscious about this and asks for a referral for a surgical opinion to explore the possibility of treatment. He is referred routinely and undergoes embolisation as a day case four months later. His symptoms resolve and no further treatment is required.

Epididymal cyst (spermatocele)

Clinical presentation
Epididymal cysts or spermatoceles represent the most common scrotal lump with which patients present. They usually present as a painless scrotal cystic mass in the upper pole of the epididymis and are separate from the testes. It is a common condition most frequently found in middle-aged men.\textsuperscript{3} Congenital lesions may be found and are related to the remnants of testicular and epididymal development. The cysts may cause discomfort and the patient is often concerned about possible cancer.

Examination
A spermatocele is typically located superior and posterior to the testis, and may be freely moveable, fluctuant and trans-illuminating if large enough. It should be possible to get above the mass, at which point it is usually easily distinguished from a hydrocele. However, a very large cyst may mimic a hydrocele. If there is clinical doubt, an ultrasound scan should be arranged to confirm the diagnosis.

Management
If the patient remains asymptomatic no treatment is necessary, but if the cyst causes pain or discomfort routine
referral to a surgeon can be made for consideration of excision. Typically, if the cyst is the size of the testicle the patient is more likely to present for removal.

_Prognosis_

The prognosis is excellent from a spermatocelectomy, and in the cases where there is excision for an uncomfortable spermatocele, 94% of patients were rendered pain free.39

**Case study 7**

A 23-year-old Sub Lieutenant attends, concerned that he has testicular cancer having felt a mass following a Testicular Cancer Campaign on board his ship. His MO examines him to find a non-tender mobile cyst separate to the testis. He reassures the young officer and advises him to monitor it and re-attend if it changes or gets larger. The patient re-attends two weeks later, still anxious and concerned, and the MO arranges a non-urgent ultrasound to confirm the diagnosis and a surgical review to discuss options of management.

**Conclusion**

In the military population testicular masses and acute scrotal pain are common. The challenge for medical personnel is to differentiate time-critical diagnoses requiring emergency surgery from cases where patients may require either conservative or non-urgent surgical management. Taking a comprehensive history, undertaking an appropriate examination and considering differential diagnoses allow a sensible and safe management plan to be made. If in doubt the clinician should seek advice or consider diagnostic assets available to help aid the diagnosis.

Experience of managing patients in each of the diagnostic groups will assist in developing confidence and knowledge. In some military environments this may be challenging but the clinician should weigh up the consequences of delayed evacuation against the potential seriousness of the case in front of them.

**References**

Clinical


36. Cassidy D. Varicocele surgery or embolization: which is better? Can Urol Assoc J 2012;6(4):266-8


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