

Abdominal hernias: a clinical review of their assessment and management in the Naval Service

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Abstract

Hernias are a relatively common occurrence in the armed forces community and may affect an individual's fitness for duty and impact on operational capability, particularly in specialist occupations. Their early identification and management will allow appropriate treatment and minimise any impact on operational capability. This article aims to summarise the assessment and management of simple hernias and considers occupational considerations in their management for personnel serving in the Royal Navy and Royal Marines.

Introduction

A hernia is defined as "...a protrusion of a viscus, or part of a viscus, through an abnormal opening in the walls of its containing cavity." (1). The term "viscus" used in this classic definition alludes to any of the contents of the abdominal cavity. The hernia 'neck' is the point where the hernia crosses the anatomical defect. This is the narrowest point of the hernia and therefore the most common site of obstruction or strangulation of the hernia contents. Hernias may be classified as congenital or acquired and may be primary, secondary or recurrent. They may occur at various anatomical locations in the abdomen and trunk with lifetime risk varying by sex and anatomical site. The most common hernias, particularly in the younger population, are inguinal, epigastric, umbilical and femoral hernias (Fig.1). Population statistics with regard to incidence and prevalence of hernias are considered unreliable due to a lack of standardised assessment and diagnosis of hernia (2). Inguinal hernias are by far the most common and the prevalence of inguinal hernia across all age groups has been estimated to be as high as 19% (3). Femoral hernias are considerably less common than inguinal hernias and are more frequently seen in females, particularly multiparous women (2).

Hernias have been a notable human affliction for some time. The earliest documented reference to their existence comes from ancient Egypt (4). Advances in the surgical management of hernias developed as understanding of human anatomy increased, particularly after the publication of *Hernia* (1804), a monograph by Sir Astley Paston Cooper detailing the anatomy of the groin (5). The adoption of antisepsis, the development of anaesthetics, laparoscopic surgery, and prosthetic meshes, have all contributed to the improvement in long-term success of surgical management.

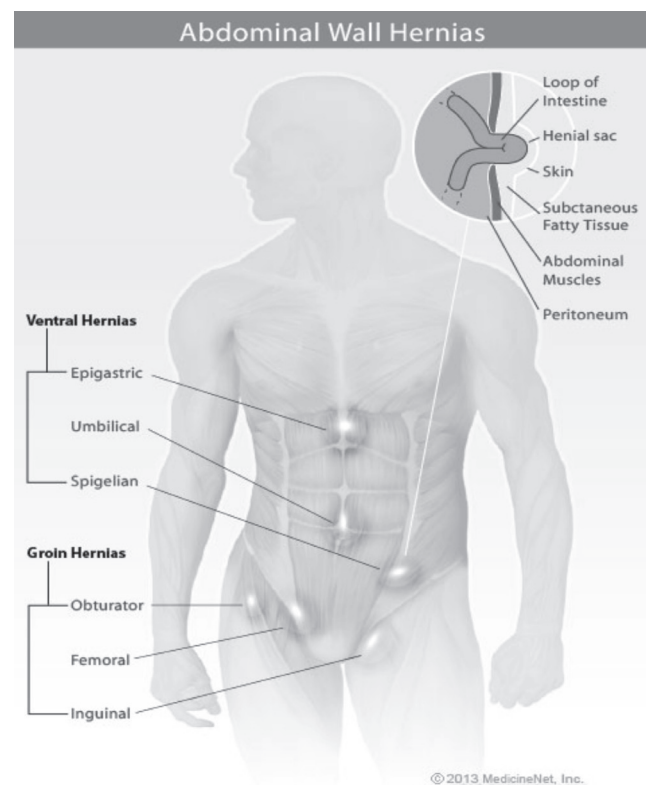


Fig 1. Common anatomical sites of abdominal hernias (19).

The factors that pre-dispose to the development of hernias can generally be divided into two groups: those that increase the intra-abdominal pressure and those that weaken anatomical structures. Factors that increase intra-abdominal pressure, for example, heavy lifting or chronic cough, can cause excessive strain on pre-existing areas of weakness. Hernias are particularly common in people

with connective tissue disorders, such as Ehlers-Danlos or Marfan’s syndromes, but the vast majority occur in patients without such conditions (6). It is postulated that people who sustain frequent and recurrent hernias may have a degree of abnormality of collagen synthesis, but it is not normal practice to test specifically for connective tissue disorders in such cases (7). If identified early, appropriate steps can be taken to manage the hernia, and the patient will most likely make a full recovery and return to the original functional state. Misdiagnosis or delay may result in hernias presenting as emergencies, with complications such as obstruction or strangulation.

This paper aims to provide an overview of the diagnosis and management of simple abdominal wall hernias with special considerations for military personnel. There are many types of hernia that occur, but this paper will concentrate on the commonest, as these are most likely to be found in the military population.

Clinical presentation and diagnosis

Electively, hernias commonly present initially with a palpable or visible lump that may be accompanied by pain (8). Reducibility of the lump is the ability of the hernia to either spontaneously, or with manual pressure, return back through the anatomical defect from which it arises and, therefore, to temporarily ‘disappear’. Alternatively, the patient may present as an emergency with complications.

The history taken should include the natural history of any lump, risk factors (e.g. chronic cough, previous surgery or connective tissue disorder), worsening of symptoms and the onset of obstructive symptoms if present. Examination

should concentrate on a thorough palpation of the painful area to identify the hernia and characterise its position correctly, according to Figure 1. Congenital umbilical hernias are more common in people of afro-Caribbean origin and these ethnic groups should be examined with particular care to avoid missing a clinically significant hernia (9). Sizeable hernias may spread over a large area but the most important aspect of successful characterisation of the hernia is the position from which it arises; this can be accurately identified by reducing the hernia where possible. If the hernia is not easily felt then the patient should be asked to cough or perform a Valsalva manoeuvre while the symptomatic area is palpated. Alternatively, the patient can be examined while standing up in order to make the hernia more prominent. Femoral and inguinal hernias may be differentiated clinically; the former originate infero-lateral to the pubic tubercle, and the latter arise supero-medial to it.

Once a lump is identified its nature should be clarified. A ‘cough impulse’ is the name given to the sensation that the lump temporarily enlarges or becomes more prominent when the patient coughs or strains. Hernias classically possess a cough impulse. A lump without an impulse may indicate an alternate pathology, such as an enlarged lymph node that may need further investigation. As a hernia is described as a protrusion of tissue, it is often possible to push the tissue back to its correct position, known as ‘reducing’ the hernia. Table 1 describes the natural history of hernias.

Reduction of a strangulated hernia caused by a narrowing in the hernia sac in addition to the pressure at the hernia neck can result in a situation where a hernia has been

Reducible	The contents of the hernia can pass freely in and out of the structural defect with minimal difficulty.	A lump that arises and disappears – patient may experience occasional discomfort	S I M P L E C O M P L E X
Irreducible/incarcerated	The contents of the hernia cannot be returned to the abdomen but the contents are otherwise healthy.	A lump that does not disappear – may cause some discomfort	
Obstructed	The bowel within the hernia has become blocked by the hernia itself, but remains otherwise healthy.	A lump that typically does not disappear, accompanied by abdominal pain, distension or vomiting	
Strangulated	The contents of the hernia have an inadequate blood supply and gangrene will ensue if the hernia is not adequately treated.	A very painful lump that does not disappear and that is associated with abdominal pain, pyrexia, tachycardia and tachypnoea	

Table 1. The natural history of abdominal hernia .

clinically reduced but the contents experience continuing vascular compromise resulting in ischaemia or infarction. This reduction en masse may result in a worsening clinical picture despite successful hernia reduction. Therefore only a surgical specialist should attempt to reduce a painful hernia.

Once a hernia occurs it may adhere to surrounding tissues or the contents may become so bulky that the hernia is no longer reducible. If the hernia is not easily reducible, then the hernia should not be forcibly compressed as this will cause discomfort and is seldom helpful. Occasionally, patients may present with pain suggestive of a hernia, but with no demonstrable lumps on examination. Imaging using ultrasound, CT, MRI or herniography may be of benefit, but in these cases a specialist surgical opinion should be sought first (10).

Alternatively, patients may present with symptoms of hernia obstruction or strangulation. Obstruction occurs when the hernia contains intestine that, due to mechanical compression at the hernia neck, becomes blocked. These patients will present with the cardinal signs of obstruction-vomiting, abdominal distension, colicky abdominal pain and occasionally constipation. Patients presenting with an exquisitely tender lump along with signs of systemic inflammatory response, such as tachycardia, tachypnoea, hypo- or hyperthermia, may have developed a strangulated hernia. A strangulated hernia describes a hernia where the blood supply to the hernia contents becomes interrupted, most commonly by pressure at the hernia neck. This leads to ischaemia of the hernia contents (normally intestine) and, if not corrected, to infarction. The toxins released by infarcted hernia tissue will, unchecked, lead to significant morbidity or even death.

Clinical management

Hernias result from an anatomical defect and therefore, cure can only be successful if this defect is corrected surgically. Symptomatic relief may be achieved from resting and the use of orthotic supports, such as trusses, but these are not long-term solutions, may cause additional complications and are not part of standard UK practice. Simple, uncomplicated hernias may initially be treated conservatively, but over time they will inevitably enlarge and surgery is ultimately required. Small hernias with minimal symptoms may not require urgent specialist attention. In such cases where the patient is deployed it may not be necessary to compromise operational capability by repatriating the patient immediately, unless they have a specialist occupation that is limited by the presence of a hernia. Such patients should be discussed with the medical chain of command or designated surgical specialist. If the hernia continues to enlarge and cause symptoms, or restricts duties, then the option to repatriate the patient for treatment can be revisited. In such cases the chain of command should be involved at an early stage in order to allow contingency planning for medical evacuation.

Complex hernias (see table 1) require urgent specialist assessment. If available, the patient should be referred to the local military or approved civilian surgical specialist for assessment. If deployed at sea without an organic surgical capability, the need for urgent evacuation within operational constraints should be communicated to Medical Division at Navy Command Headquarters. The patient should be managed empirically until surgical input is available, by keeping them nil by mouth, using intravenous fluids to maintain hydration. Criteria for urgent medevac would include the signs of obstructed or strangulated hernias listed above.

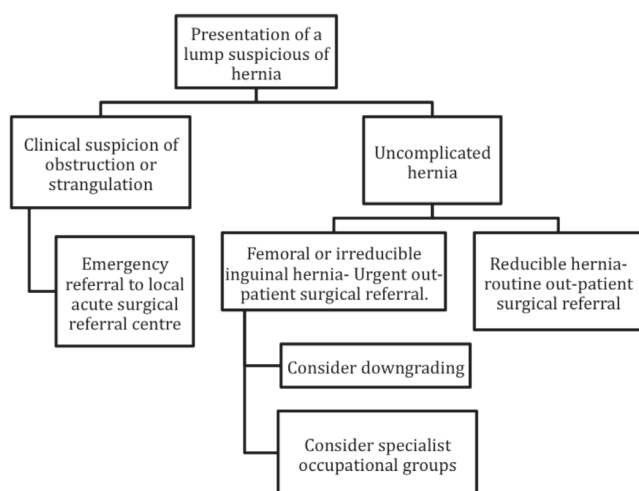


Fig. 2. Algorithm for the management of hernia while ashore.

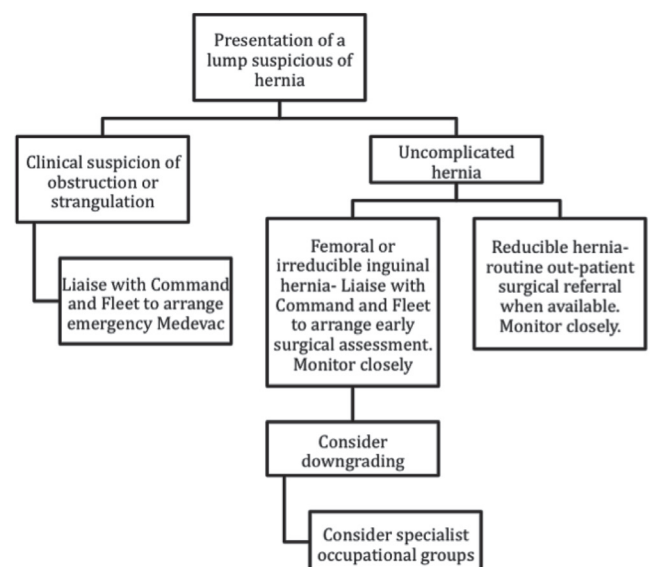


Fig. 3. Algorithm for the management of hernia while afloat.

Historically, there is some concern regarding the safety of aeromedical evacuation in patients with obstructed hernias. During pressurised flight, cabin pressure will fall below one atmosphere, dependent on altitude and, according to Boyle's Law, as the pressure on a vessel decreases the volume will increase proportionally; up to 30% on a standard flight profile (11). In the case of an obstructed hernia this may result in distension and eventual perforation of the obstructed segment (12). There are very few reported cases of intestinal perforation due solely to altitude and it is difficult to establish whether there is a legitimate case for concern (13). A study on burst pressure of bowel anastomosis found that it would be unlikely for a flight in an aircraft pressurised to 8000 feet to disrupt a bowel suture line and concludes that there would be no absolute contra-indication for aeromedical evacuation of a sick patient (11). Some *in vitro* studies have been performed on the pressure required to disrupt healthy bowel but these findings are not easily interpreted with respect to flight profile and altitude (14).

A decision on the safety of any flight would have to be considered by the medical staff involved, in consultation with the Royal Air Force Aeromedical Evacuation Service. A low altitude flight profile would be one option to limit the risk of barotrauma, but this would have to be balanced against logistics and safety. Algorithms for the management of hernias that present either afloat or ashore are shown in Figures 2 and 3.

Surgical treatment

Standard UK practice is to repair hernias using synthetic or biological meshes to reinforce the area of weakness and prevent recurrence. Both traditional open and laparoscopic (keyhole) surgical repair are widely available in the National Health Service for inguinal hernia repair; laparoscopy offers more speedy recovery and return to work by around seven days compared to an open operation (15). Epigastric and umbilical hernias are most commonly repaired with open surgical procedures where the anatomical defect is sutured closed or, if the defect is large, a mesh is used.

Patients presenting with obstructed or strangulated hernias will ultimately have their hernias repaired in the same fashion, but may require larger abdominal operations including the possible removal of sections of intestine that have been affected by the hernia. These patients may have prolonged hospital stays and higher morbidity, and will correspondingly require a longer period of recuperation.

Occupation considerations in the Naval Service

Joint Service Publication (JSP) 950 provides guidance on employment standards for the Armed Forces. Entry standards describe the level of health that should be met for a person to be considered for entry into the UK Armed

Forces (16). A para-umbilical hernia that does not restrict function is not considered significant and individuals may be graded P2 Medically Fully Deployable (MFD). Any other hernia will render a candidate Medically Not Deployable (MND) until the hernia has been surgically corrected and a full recovery has taken place. Individuals with repaired and soundly healed hernias may be graded P2 if they can tolerate activities expected in military training or service over a course of three months. Entry candidates with repaired incisional hernias should be referred for specialist advice, initially to the single service Consultant Advisor in General Surgery, reflecting the complex and heterogeneous nature of these hernias (16).

The Handbook of Naval Medical Standards (BR1750a) describes medical standards that must be fulfilled for individuals to be selected for specialist occupations. The presence of an abdominal hernia would render an individual unfit to continue in service diving or submarine operations until it has been adequately repaired (17).

Individuals presenting *de novo* will most commonly present to their primary care physician. A decision on restricting duties at this stage is at the physician's discretion, but decisions will take any operational impact and likelihood of emergency presentation into account. JSP 950 does not offer specific guidance on managing hernias presenting while in service (16). Individuals deployed away from complex healthcare provision, such as Royal Marines and submariners, may not be considered safe to deploy and may be appropriately restricted to duties in the UK only (in harbour or ashore only). All individuals should be given guidance when and how to seek advice if their hernia deteriorates.

Patients who become symptomatic and present while deployed should be initially assessed by their Medical Officer. (MO) Patients presenting as emergencies should be evacuated to appropriate local facilities or repatriated using the Aeromedical Evacuation Service. Patients with simple hernias may be monitored, placed on restricted duty or repatriated at an appropriate point, at the discretion of the MO. Figures 2 and 3 show treatment algorithms for the management of hernias encountered while afloat or ashore.

Time to recovery and return to work are of paramount importance following hernia surgery. It is generally accepted that patients undergoing hernia mesh repairs require a period of time for the mesh repair to attain its peak level of strength. If the repair is stressed before this point there is an increased risk of failure of the repair and subsequent recurrence. Therefore, patients are advised to undergo a period of rest to allow the mesh to 'bed in' and attain maximum strength. The optimum period of rest is not known, but current advice is to avoid heavy lifting or

strenuous exercise for three weeks, and otherwise resume normal activities when the patient feels able (18).

An early return to work with light duties may be a preferable option, but it should be stressed that every effort should be made to avoid early recurrence of the hernia due to early exercise or strenuous work. Subsequent operations to fix recurrent hernias are generally less satisfactory and the risk of future recurrence increases (18). It is more cost-effective for the Naval Service, and preferable for the patient, to avoid future recurrence as much as possible by avoiding too early a return to strenuous duties. A very small proportion of hernia repairs may be so complex that patients never recover to the point where they are able to resume service duties. Their primary care physician should refer them to an

occupational health specialist for further guidance.

Conclusions

Successful management of abdominal wall hernias depends on early identification and appropriate referral. The clinical assessment, initial management and appropriate referral of patients with hernias is well within the grasp of MOs and senior Medical Assistants. Occupational considerations should be borne in mind to minimise disruption to military operations, but appropriate and timely definitive hernia management will optimise outcomes for the patient and the Naval Service.

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