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Trauma pain – a military perspective

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Abstract

This paper outlines the system developed by the United Kingdom's Defence Medical Services to manage the pain associated with combat trauma from the point of wounding, through repatriation back home to rehabilitation and eventual discharge from the Forces, whenever that may be. The system is founded upon the principles of integration and sustainability and this article includes discussion of both clinical and non-clinical components.

Keywords

Acute pain, chronic pain, pain management, pain measurement, phantom limb

Introduction

If asked 'what is pain?' many military personnel will answer, 'It is fear and weakness leaving the body, Sir' without a moment's hesitation. Whether they believe it or not, when they are being run up a hill carrying a full holiday's luggage allowance on their back, is between them and their burning thighs. Whilst this response gives no indication of the pain that soldiers experience, it gives an indication of the culture in which soldiers exist. Pain is considered part of the challenge; it is how you become fitter, stronger and better.

The population of Her Majesty's Armed Forces differs from the civilian population in many ways. There are approximately 100,000 regular personnel, of which 9.7% are female and 7.1% are from black and minority ethnic groups, and the majority of personnel are aged between 19 and 40 with less than 2% over 50 years of age.¹ These demographic differences do not change the physiology of pain, and the available treatments for both acute and chronic pain remain the same for both military and civilian populations. This article will outline how the pain of battlefield injuries is currently managed by the Defence Medical Services (DMS) from the point of wounding to the point of leaving the services and becoming a civilian; this may cover thousands of miles and many months of care. The importance of treating pain is not considered here as it is assumed to be recognised by the reader.

Acute pain

Scoring pain

Scoring a patient's pain is the first step in treating it. Over the length of the casualty's care a single 0–3 numerical pain score is encouraged² and any score of more than 1 is taken as indicating a treatment failure.³ Certainly, this may be augmented with other specific scores (Brief Pain Inventory, SF-36, SF-12, Oswestry Pain Scales, EQ-5D, etc.), but the 0–3 is the basic starting block.

Prehospital analgesia

One of the consequences of the last 10 years of conflict has been that the number of survivors of significant trauma is greater than has previously been experienced.⁴ Historically, battlefield injuries have been thought not to hurt greatly. Indeed, it has been suggested that the pain of combat trauma is less than would be expected by a civilian with a similar injury.⁵ This is now not thought to be the case since a recent survey of

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the recollection of pain at the point of injury showed 54% had severe pain and 14% moderate pain; 22% had no memory of the event, which suggests that these figures could be greater at the point of wounding.⁶

The cornerstone of the DMS battlefield pain management remains the morphine autoinject.⁷ This is a spring-loaded syringe that delivers 10 mg (in 0.7 mL) of intramuscular (i.m.) morphine to the thigh or upper arm (or the thumb of the administrator if held upside down).⁸ Unlike many other nations that allow these to be carried only by nominated individuals, these are issued to all British soldiers and everyone is trained in their use (medical advice is required in the presence of a reduced level of response, difficulty breathing or a head injury) and how to document its administration (using a permanent marker to the forehead to write 'M' and the time of administration).

It is known that 10 mg morphine i.m. will have an analgesic efficacy similar to 1 g paracetamol or 400 mg ibuprofen, so it is unlikely to remove all pain, although morphine can of course be repeated.⁹ Other agents that are available depend upon the experience of the provider, but further morphine remains the mainstay and, if appropriate, non-steroidal anti-inflammatory drugs (NSAIDs), paracetamol and weak opioids are available. Medical officers have ketamine while 400 µg fentanyl 'lozenges' have been trialled and are currently being introduced.

Pre-hospital transfer

Transfer from the point of wounding to the hospital at Camp Bastion varies according to the severity of the injury, the availability of assets, the tactical situation and the ability of the different types of helicopter to land near the casualty. The gold standard is the Medical Emergency Response Team (MERT). This is a Chinook helicopter with two resuscitation bays on board and a doctor with pre-hospital and airway experience, normally an anaesthetic or emergency medicine consultant. The analgesia administered on board varies between individual doctors but normally includes opioids and ketamine, although the fentanyl lozenge is becoming more popular.

Despite being one of the most difficult environments in which to address acute pain, a small survey comparing pain scores during a period of MERT transfers showed an improvement from 20 out of 23 casualties with a pain score of 2/3 or greater (87% failure) to 4 out of 19 casualties (21% failure) by the end of the flight.

Field hospital

The agents available for acute pain relief in the field hospital are essentially the same as for a civilian patient

in the National Health Service. One of the differences is the recommendation that casualties with significant nerve injuries, including amputation, should be started on pregabalin and amitriptyline as soon as possible after injury.

As a result of the nature of the current injuries where limb involvement is common, there is a desire to make great use of regional anaesthetic techniques. These have become significantly easier since the development of robust portable ultrasound machines; the traditional peripheral nerve stimulator relies on an intact musculoskeletal system distal to the site of stimulation. Continuous peripheral nerve catheters and, if conditions allow, epidurals are invaluable.^{10,11} Naturally, other than infections there are two significant concerns. The first of these is masking a compartment syndrome, but we have an understanding with our surgical colleagues that if such a situation is likely to occur, elective prophylactic fasciotomies are encouraged.¹²

The second concern is the coagulopathy associated with major trauma. For peripheral nerve catheters we follow the guidance of the Association of Anaesthetists of Great Britain and Ireland, but it is particularly worrying in bilateral lower limb amputees with epidurals since many of the traditional signs of an epidural haematoma will be missing. As a result, we have developed the '4 and No More Rule' designed to increase the vigilance of the medical staff.¹³

We will consider an epidural infusion to be established in 4 hours. The initial sensory level (if any) and motor function should be recorded in the patient's notes (on an anaesthetic record). Thereafter:

1. An awake patient should be assessed every 4 hours.
2. At each assessment the nurse should ask 4 questions:
 - i. Is there an increase in motor block?
 - ii. Is there back pain?
 - iii. Is there an increase in/development of a sensory level?
 - iv. Are there any other new abnormal/unexpected symptoms, i.e. bladder/bowel issues or increased pain in a previously comfortable limb?
3. If there is a positive answer to any one of the 4 questions, call the anaesthetic specialist registrar as per 'S4 pain call' agreement. While awaiting a response, **STOP THE INFUSION**.
4. Repeat the examination by the specialist registrar 4 hours after the infusion is stopped. If there is no improvement or further deterioration in neurology, the patient needs **EMERGENCY MRI (if possible)**.

Aeromedical transfer to UK

The field hospital's Acute Pain Team, in communication with the aeromedical team, ensures that analgesia is optimised prior to handing over the casualty to the retrieval team. This is in the knowledge that the repatriation of patients will, by definition, involve moving the patient, with any number of accelerations and decelerations and prolonged vibration that will exacerbate pain as well as increase the risk of dislodging local anaesthetic catheters.¹⁴ During this time it is very hard to make major changes to an analgesia regime. However, the nursing and medical staff of the RAF's strategic repatriation service undergo training to minimise the risks of significant pain during this phase of the casualty's care. This includes anticipating events that are likely to exacerbate pain, such as take-off and landing, and altering analgesia accordingly.

Royal Centre for Defence Medicine

The Royal Centre for Defence Medicine (RCDM), based at Queen Elizabeth Hospital in Birmingham, is the primary receiving unit for British military casualties. On arrival, a casualty's injuries and pain score are assessed and an immediate and long-term plan is made for their pain control. This plan may cover multiple admissions over many months.

Casualties are reviewed on a daily basis by the military pain team. This consists of military nurses led by a civilian consultant nurse, and has input from anaesthetic consultants. There is also input from a senior physiotherapist and a senior pharmacist. Although the importance of good pain management is not the sole reserve of this team, it is understood to be of importance to all clinicians.

Chronic pain management

From RCDM casualties will be assessed at the Defence Medical Rehabilitation Centre (DMRC), currently at Headley Court. Unsurprisingly, the rehabilitation of injured service personnel is fundamental to their management; after life saving, everything is geared to optimising rehabilitation. A significant component of their assessment will include their pain and analgesic requirements and, if necessary, will result in a referral to the Clinical Nurse Specialist (Pain) at DMRC, who may recommend referral on to the pain clinic.

By this stage persistent pain is not often a problem and most casualties are more keen on reducing their medication than escalating it. Again, this flies in the face of received wisdom where there has been a thought that persistent opioid use may become common in this population. This is a condition that has its own name – 'Soldier's Disease' – that was coined after the American

Civil War (1861–1865), although even this is being questioned.¹⁵ In a survey conducted at DMRC there was no evidence of continued inappropriate analgesic use.¹⁶

The pain clinic at DMRC has one very clear aim: to optimise pain management in an attempt to optimise rehabilitation. If the clinic's interventions will not do this, and thus not help keep an individual employed within the military, this has to be recognised early and must have an effect on the treatments proposed. In many senses, it is an 'occupational pain clinic'.

Other assets available to the pain clinic at DMRC include the peripheral nerve injury clinic, which has worked wonders for many of the neuropathic pains. However, in cases resistant to surgical and pharmacological interventions, referrals are made for consideration of neurostimulation: peripheral, spinal cord or deep brain.

Mental health issues

Again, while the received wisdom is that all casualties have post-traumatic stress disorder (PTSD), the prevalence of PTSD is said to be about 4% following deployment to Iraq or Afghanistan, although it is by no means the most common mental health issue found in veterans of conflict, with alcoholism and depression more likely.¹⁷ The civilian PTSD rates by comparison are less clear, but a lifetime prevalence in one study is quoted as 7.8%¹⁸. However, the existence of PTSD is always asked about, although most casualties freely volunteer it during the history-taking. The pain clinic is not the place to embark on treatments for this any more than treating any of the myriad of other comorbid conditions we meet. Fortunately, within DMRC we have a centre for mental health issues that is expert in managing these conditions and with whom the pain clinic maintains good communications.

Support to primary care

Until recently, pain clinics were provided in some of the larger garrison areas. The aim was to reduce travel burden and expenses for individuals and to provide support for primary care in these areas. Where possible, these took place with experts in rehabilitation, emphasising the importance of the occupational aspect. However, in recent months, with the changes in operational tempo, these clinics have been phased out, although the clinicians are still available for advice.

Non-clinical components

Together with undertaking regular audits, the issues of research and education are felt to be intrinsic to the

development of the military approach to pain. True clinical trials in the military environment are difficult to conduct, so, instead, much has been done to use existing information and translate this to the military situation.^{19,20} Education has many nodes to it. The education of patients is vital, about both their medication and the nature of their pains; it is particularly important for amputees who are experiencing phantom sensations to learn that this is normal and to be expected. This process of pain management education starts during their basic military training, when personnel are trained to use the morphine autoinjects. However, for those who are injured it will change in content and is initiated at RCDM, but will continue at DMRC, aiming to make the patients experts in their own pain management.

Another educational node is that of the healthcare providers themselves. Within the courses that DMS staff may undertake prior to deployment pain represents a significant and recurring component. The Military Operational Surgical training course includes lectures on analgesic techniques in use in Camp Bastion and practical sessions simulating the insertion of peripheral nerve catheters.²¹ There are also two separate hospital exercises during which the entire field hospital is simulated in a full-scale mock-up of the hospital in Camp Bastion for 3 days. During this time analgesia plans will have to be made for the simulated casualties and pain ward rounds are conducted on a daily basis.

When doctors join the army they undertake the Postgraduate Medical Officers course. Originally this course involved minimal training in pain management. It was, however, recognised that new or junior doctors understandably lacked confidence and experience in trauma pain management, and yet these were the doctors closest to the front line and acutely injured soldiers. On this course they now receive more than one day's training on pain, both acute and chronic. The 'Pain Day' includes lectures but is largely based around group sessions with open discussions about analgesia in current military trauma scenarios. The discussions are led by doctors who have recently returned from operational deployments and are backed up by experienced anaesthetists or emergency department practitioners.²² Given how little training in pain most UK doctors receive,²³ let alone that specific to trauma and prehospital care, this is a development of which we are proud.

Structure

The final aspect to consider is possibly the most important: the structure of the pain services. Pain is

currently 'owned' by the Department of Military Anaesthesia and Critical Care (DMACC), but all service personnel are required to have an understanding of it, even if only to know the rules around morphine autoinject administration. Within the DMACC pain is represented by the Military Pain Special Interest Group, which is made up of military and civilian physicians, nurses, physiotherapists and pharmacists of all services representing the entire chain of care from the point of wounding back through rehabilitation and back to primary care. This group meet three or four times a year to discuss the clinical, audit, research and educational issues that have been discussed in this article. Having this group has been central to the developments that have been witnessed, particularly over the last 10 years. Indeed, although the military has a few tools that are not available to its civilian colleagues, it has had to develop a pain service where each aspect is integrated with the one that follows, over thousands of miles, and one that can be sustained over the involvement of regularly changing clinicians with many degrees of interest and expertise.

Summary

At the present time, although battlefield injuries are significantly painful, problems with persistent pain following trauma are, thankfully, relatively uncommon among British military casualties. Whether these results are a consequence of the aggressive management of pain provided within an integrated and sustainable system, the early and robust nature of rehabilitation, the fact that healthcare providers take pain seriously or just something to do with the nature of the casualties themselves is unclear. Often the answer is to be found in all of these factors.

But what can the National Health Service learn from this? First of all, this should provide an idea of what veterans of the recent conflicts will have been through prior to discharge from the service, and this may be of value to those healthcare professionals who will meet them in the future. The second point is to act as a spur to change the disjointed way in which trauma pain is traditionally managed; silos of excellence make providers feel good but may not be the best for the individual patient.

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Conflict of interest

The author declares that there is no conflict of interest.

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