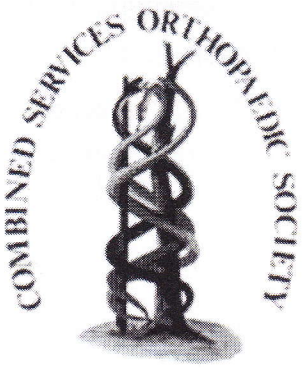
Combined Services Orthopaedic Society
Scientific Programme
8 May 2009



Combined Services Orthopaedic Society

Pandora Block, Fort Blockhouse

Scientific Programme

8 May 2009

The Combined Services Orthopaedic Society

President: Surgeon Rear Admiral M A Farquharson-Roberts QHS FRCS Royal Navy Rtd

Chairman: Colonel M P M Stewart QHS FRCS (Tr&Orth) L/RAMC

Treasurer: Lieutenant Colonel C M Hobbs FRCS (Tr&Orth) RAMC

Secretary: Major N Ward MRCS FRCS (Tr&Orth) RAMC

WELCOME

On behalf of the Combined Services Orthopaedic Society as your host for this year's meeting, I would like to welcome you to Fort Blockhouse, here on the South Coast, situated close to Portsmouth's Naval Dockyard. I believe our Society is particularly honoured this year by the presence of the ABC Travelling Fellows and visitors from the United States Defence Services. I hope you all find the meeting of interest.

Surgeon Commander Sarah A Stapley OStJ MB ChB FRCS (Tr&Orth) DM Royal Navy
Consultant Orthopaedic Surgeon
MDHU Portsmouth

The Combined Services Orthopaedic Society would like to thank the following members of the trade for their generous support of this scientific meeting:

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Extra Sponsorship has been provided by **Stryker UK** for our Instructional Course.

Combined Services Orthopaedic Society Meeting Scientific Programme:

Pandora Block, Fort Blockhouse

Friday 8 May 2009

0815-0845: **Registration**

0845: Welcome and Administration
Surgeon Commander Sarah Stapley Royal Navy

All papers strictly 8 minutes presentation followed by 2 minutes discussion

0850-1000: **Session 1 – Military Trauma**
Moderator: Wing Cdr Ian Sargeant

0850: Learning the lessons from Conflict: Prehospital Cervical Spine Stabilisation following Ballistic Neck Trauma
A Ramasamy, M Midwinter, P Mahoney, J Clasper

0900: Trauma Transfusion Requirement from Asymmetric Warfare in Afghanistan
DS Edwards, A Ramasamy, B Armstrong, D Hinsley, A Brooks

0910: Peripheral Nerve Injury in Combat Casualties from Iraq and Afghanistan
A Ramasamy, K Brown, W Eardley, J Etherington, J Clasper, M Stewart, R Birch

0920: Use of Topical Negative Pressure Therapy (TNPT) in Patients with High Energy Combat Wounds
J Penn-Barwell, CA Fries, LS Street, S Goonewardene, S Jeffrey

0930: Fracture Patterns Following Explosions
A Ramasamy, A Mountain, K Brown, M Stewart, I Gibb, J Clasper

0940: Limb Complications following Pre-Hospital Torniquet Use
J Clasper, K Brown, P Hill

0950: Outcome of Amputees in Relation to Military Service
S Dharm-datta, J Etherington, A Mistlin, J Clasper

1000-1045: **Coffee and Trade Stands – Please start Quiz**

1045-1135: Session 2 – General Orthopaedics
Moderator: Surg Cdr G Hill RN

1045: The Stanmore Experience of Custom-made Constrained Shoulder Prostheses in Salvage Surgery
D Griffiths, O Templeton-Ward, S Grange, S Lambert, I Bayley, M Falworth

1055: Prevalence and Impact of Back Pain on a Military Operation in Iraq
C Booth, R Shah

1105: Compliance in Self-administered DVT Prophylaxis in Orthopaedic Patients
N Ward, S Ladher, R Sharp

1115: CMI Pyrocarbon Hemiarthroplasty for Trapeziometacarpal Joint Arthritis
T Halsey, E Spurrier, J Jones, G Pathak

1125: ABC Fellow: KEVIN BOZIC: **The Impact of Direct to Consumer Advertising on Patient and Physician Behaviour in Orthopaedics**

11.35-12.30: Session 3 – Education in Orthopaedics
Moderator: Lt Col D Standley RAMC

1135: OCAP deployed on Operations
H Guthrie, D Edwards, C Fetherston, J McMaster

1145: Exposure and Experience in Trauma Surgery – Perceptions of United Kingdom Orthopaedic Trainees
W Eardley, D Taylor, P Parker

1155: Levels of Evidence in Research Presented at the Combined Services Orthopaedic Society Annual Meeting
T Bonner, A Mountain, J Clasper

1205: ABC Fellow: REX HAYDON: **STAT: A Novel Web-Based Tool for Assessing Resident/Fellow Procedural Competency**

1215: ABC Fellow: ERIC BOHM: **The Canadian Health Care System - Strengths and Challenges**

1230: Group Photograph – Fort Blockhouse Officer's Mess Patio
Buffet Lunch in Bar Area
Trade Stand

1415-1545: Session 4 – Lower Limb
Moderator: Surg Cdr T Coltman RN

1415: Dynamic Pressure Testing and Diagnostic Criteria for Chronic Exertional Compartment Syndrome in the UK Military Population
S Dharm-Datta, A Mistlin, P Hill, P Rosell

1425: Endoprosthetic Replacement in the Lower Limb – a Reconstructive Option Following Trauma
B Dean, E Moore, J Matthews, D Stubbs, D Whitwell, C Gibbons

1435: Birmingham hip Resurfacing – Function following Femoral Failure
R Gilbert, G Cheung, A Carrothers, J Richardson

1445: The Use of Cannulated Femoral Stems in the Treatment of Periprosthetic Fractures and Complex Revision Hip Arthroplasty
P Guyver, M Norton, A Cattell, G Barlett, D Fern

1455: Femoro-acetabular Impingement: Osteochondroplasty Using a Modified Anterolateral Approach without Trochanteric Osteotomy
J Singleton, K Gill, A Perry, J Hull

1505: Thermal Shrinkage for Anterior Cruciate Ligament Laxity Improves Knee Function
R Gilbert, A Carrothers, C Marquis, G Kanes, S Roberts, D Rees

1515: Constrained and Rotating Hinge Total Knee Replacements in the Treatment of Fractures Involving the Knee
C Fetherston, J Tice, P Chapman – Sheath

1525: Early Results of Posterior Arthroscopic Subtalar Fusion
J Turner, L Cannon

1535: ABC Fellow: WILLIAM MIHALKO: **The Fate and Function of the PCL in Cruciate Retaining TKA: A Retrieval Analysis**

1545-1630: Tea and Trade Stands

1630: Guest Lecture: Professor Rolfe Birch
Peripheral Nerve Injury
To be introduced by Col MPM Stewart

1700: Prizes and Address
Chairman: Col MPM Stewart L/RAMC

1715: Surgeon General
Lieutenant General L Lillywhite CB L/RAMC

1720:	**Annual General Meeting CSOS – Members only**
1800:	**Close**
1900:	**Evening Event**
1900-2000:	Drinks on Upper Gun Deck HMS Victory
2000-2300:	Dinner on board HMS Victory

Learning the Lessons from Conflict: Pre-hospital Cervical Spine Stabilisation Following Ballistic Neck Trauma

A Ramasamy, M Midwinter, P Mahoney, J Clasper

Royal Centre for Defence Medicine, Birmingham

Introduction

Current ATLS protocols dictate that spinal precautions should be in place when a casualty has sustained trauma from a significant mechanism of injury likely to damage the cervical spine. In hostile environments, the application of these precautions can place pre-hospital medical teams at considerable personal risk. It may also prevent or delay the identification of airway problems. In today's global threat from terrorism, this hostile environment is no longer restricted to conflict zones. The aim of this study was to ascertain the incidence of cervical spine injury following penetrating ballistic neck trauma in order to evaluate the need for pre-hospital cervical immobilisation in these casualties.

Methods

We retrospectively reviewed hospital charts and autopsy reports of British military casualties of combat, from Iraq and Afghanistan presenting with a penetrating neck injury during the last 5.5 years. For each patient, the mechanism of injury, neurological state on admission, medical and surgical intervention and cause of death was recorded.

Results

During the study period, 90 casualties sustained a penetrating neck injury. The mechanism of injury was by explosion in 66 (73%) and from gunshot wounds in 24 (27%). Cervical spine injuries (either cervical spine fracture or cervical spinal cord injury) were present in 20 of the 90 (22%) casualties, but only 6 (7%) actually survived to reach hospital. Four subsequently died from injuries within 72 hours. Only 1 (1.8%) of the 56 survivors to reach a surgical facility sustained an unstable cervical spine injury that required surgical stabilisation, however this patient died as result of a co-existing head injury.

Conclusion

Penetrating ballistic trauma to the neck is associated with a high mortality rate. Our data suggests that it is very unlikely that penetrating ballistic trauma to the neck will result in an unstable cervical spine in survivors. In a hazardous environment (e.g. shooting incidents or terrorist bombings), the risk/benefit ratio of mandatory spinal immobilisation is unfavourable and may place medical teams at prolonged risk. In addition cervical collars may hide potential life threatening conditions.

Trauma Transfusion Requirement from Asymmetric Warfare in Afghanistan

D S Edwards, A Ramasamy, B Armstrong, D Hinsley, A Brooks

Royal Centre for Defence Medicine, Birmingham

Introduction

UK military forces have been deployed in Afghanistan since 2006 as part of the International Stabilisation Assistance Force. The Operation is supported by a 50-bedded hospital. In 2007 the Defence Medical Services introduced a massive haemorrhage policy. In asymmetric warfare gunshot wounds (GSW), improvised explosive devices(IED) and mine injuries are prevalent and we hypothesized that they would require significant blood products.

Methods

Prospectively data collection from consecutive trauma resuscitations over 3 months (January to March 2008). Pre-hospital time points, mechanism of injury, injury distribution, injury severity score (ISS), new injury severity score (NISS), surgical procedures, blood product utilisation and outcome were recorded.

Results

115 trauma resuscitations were performed over the study period. Median pre-hospital time was 95 minutes (range 30-325), with median 64 minutes to the arrival of the Medical Emergency Response Team helicopter. The cause of injury was landmine (20), IED (31) and GSW (40); mean number of involved body systems was 1.4, 1.8 and 1.5 respectively and injured structures 2.8, 3.5 and 2.3 respectively (IED>GSW $p<0.05$). Mean ISS was 16, 16.8, 14.9 and NISS 18.7, 20.9, and 17.9 respectively. Blood transfusion was required in 3mine, 14 IED and 17 GSW casualties (mine<IED & GSW, $p<0.05$) with 10.6, 11.4, 13.9 units of blood transfused per casualty.

Conclusion

Injury severity for casualties is high with multiple injuries to body systems irrespective of mechanism. Anti-personnel mine injuries were significantly less likely to require transfusion. Large quantities of blood products were still required when necessary in all mechanisms of trauma. Therefore it is recommended that during the pre-hospital time the major transfusion protocol should be placed on stand-by.

Peripheral Nerve Injury in Combat Casualties from Iraq and Afghanistan

A Ramasamy, K Brown, W Eardley, J Etherington, J Clasper, M Stewart, R Birch

Defence Medical Rehabilitation Centre, Headley Court, Epsom, Surrey

Introduction

Over 75% of combat casualties from Iraq and Afghanistan sustain injuries to the extremities, with 70% resulting from the effects of explosions. Damage to peripheral nerves may influence the surgical decision on limb viability in the short-term, as well as result in significant long-term disability. To date, there have been no reports of the incidence and severity of nerve injury in the current conflicts.

Methods

A prospective assessment of United Kingdom (UK) Service Personnel attending a specialist nerve injury clinic was performed. For each patient the mechanism, level and severity of injury to the nerve was assessed and associated injuries were recorded.

Results

Fifty-six patients with 117 nerve injuries (median 2, range 1-5) were eligible for inclusion. This represents 12.9% of casualties sustaining an extremity injury. The most commonly injured nerves were the tibial (19%), common peroneal (16%) and ulnar nerves (16%). 25% (29) of nerve injuries were conduction block, 41% (48) axonotmesis and 34% (40) neurotmesis. The mechanism of injury did not affect the severity of injury sustained (explosion vs GSW, $p=0.53$). An associated fracture was found in only 48% of nerve injuries and a vascular injury in 35%. The presence of an associated vascular injury resulted in more severe injuries (conduction vs axonotmesis and neurotmesis, $p<0.05$). Nerves injured in association with a fracture, were more likely to develop axonotmesis ($p<0.05$).

Conclusion

The incidence of peripheral nerve injury from combat wounds is higher than previously reported. This may be related to increasing numbers of casualties surviving with complex extremity wounds. In a polytrauma situation, it may be difficult to assess a discrete peripheral neurological lesion. As only 35% of nerves injured are likely to have anatomical disruption, the presence of an intact nerve at initial surgery should not preclude the possibility of an injury. Therefore, serial examinations combined with appropriate neurophysiologic examination in the post-injury period are necessary to aid diagnosis and to allow timely surgical intervention. In addition, conduction block nerve injuries can be expected to make a full recovery. As this accounts for 25% of all nerve injuries, we recommend that the presence of an insensate extremity should not be used as an indicator for assessing limb viability.

Use of Topical Negative Pressure Therapy (TNPT) in Patients with High Energy, Combat Wounds - A Case Series

J Penn-Barwell, C Fries, L Street, S Goonewardene, S Jeffery

Royal Centre for Defence Medicine, Birmingham

Introduction

Topical Negative Pressure Therapy (TNPT) has gained increasing acceptance as a useful tool in wound management. Since 2002, the Royal Centre for Defence Medicine (RCDM) in South Birmingham has gained considerable experience with managing complex combat trauma with TNPT. The mainstay of managing high-energy combat wounds has changed little over the last century of conflict and remains early debridement, wound lavage, fracture stabilisation and delayed closure. Over the last 10 years the use of TNPT has proved to be a useful adjunct in promoting delayed primary and secondary closure, and is now common practise in the US and UK military medical services. There is however, little level 1 evidence to support the use of TNPT in military trauma.

Method

All military patients admitted to Selly Oak Hospital (SOH) between April 2007 and March 2008 that were treated with TNPT were identified, those whose notes were available were included.

Results

37 cases were included. There was a strong correlation between ISS, NISS, Antibiotic use during TNPT use and the total duration of secondary care. However, we found no correlation between delay to first TNPT application, the frequency or location of TNPT dressing changes and any of our surrogate markers of outcome.

Conclusion

TNPT is just one of a number of techniques for managing military high-energy injuries and should not be seen as an alternative to the established principles. High frequency of TNPT dressing changes is not supported by this research and this should be reflected in the clinical management of patients requiring prolonged TNPT.

Fracture Pattern Following Explosions

A Ramasamy, A Mountain, K Brown, M Stewart, I Gibb, J Clasper

Royal Centre for Defence Medicine, Birmingham

Introduction

The biomechanics of civilian fractures have been extensively studied with a view to defining the forces responsible e.g. bending, torsion, compression and crushing. Little equivalent work has been carried out on military fractures, although fractures from gunshot can be divided into direct and indirect. Given that the effects of blast can be sub-divided into primary, secondary, tertiary and quaternary, the aim of this study was to try to determine which effects of the blast are responsible for the bony injury. This may have implications for management and prognosis as well as prevention.

Method

We reviewed Emergency Department (ED) records, case notes, and all radiographs of patients admitted to the British military hospital in Afghanistan over a 6 month period (Apr 08-Sept 08) to identify any fracture caused by an explosive mechanism. In addition we reviewed all relevant radiographs from the same period at the RH Haslar who report all radiographs taken, and keep a copy of the images.

Early in the study it became clear that due to the complexity of some of the injuries it was inappropriate to consider bones separately and we used the term 'fracture zone' to identify separate areas of injury, which could involve from 1 – 28 bones. It also became clear that the pattern of injury differed considerably between patients in open ground, and those in houses or vehicles. These 2 groups were considered separately and compared.

Results

We identified 86 patients with fractures. The 86 patients had 153 separate fracture zones (range 1-6). 56 casualties in the open sustained 87 fracture zones (mean 1.55 fracture zones per casualty). 30 casualties in a vehicle or other cover sustained 66 fracture zones (2.2 per casualty). Of the casualties in the open 17 fracture zones were due the primary effects of blast, 10 a combination of primary and secondary effects, 30 due to secondary effects and 30 from the tertiary effects of blast. Of the casualties in vehicles we could not identify anyone with a fracture due to either the primary or secondary effects of blast, all 66 fracture zones appeared to be due to the tertiary effects.

Conclusion

In both groups there appeared to be a significant number of fractures, often with no break in the skin, caused by severe axial loading of the limb. This was possibly due to the casualty impacting against the ground, building or the inside of a vehicle, and this is a group of injuries we are now studying in greater detail.

Limb Complications Following Pre-hospital Tourniquet Use

J Clasper, K Brown, P Hill

MDHU Frimley Park Hospital, Camberley, Surrey

Introduction

It has stated that the application of a pre-hospital tourniquet could prevent 7% of combat deaths, but their widespread use has been questioned due to the potential risk from prolonged ischaemia, or local pressure. The debate centres on their ability to improve survival after major haemorrhage, versus the potential risk of limb loss. A recent US military prospective study on their use demonstrated improved survival when a tourniquet was applied, and reported that no limb was lost solely from tourniquet use. However, this study focused on early limb loss, with a median follow-up of only 7 days, and so could not consider later morbidity. The aim of this study was to investigate if the pre-hospital application of a tourniquet resulted in an increase in morbidity following significant ballistic limb injury.

Methods

We reviewed members of the UK armed forces who sustained severe limb-threatening injuries in Iraq and Afghanistan, and based on the presence or absence of a pre-hospital tourniquet a cohort study was then performed. Of the 23 lower limbs that definitely had a pre-hospital tourniquet applied it was possible to match 22 limbs with 22 that did not have a pre-hospital tourniquet. The injuries were matched for anatomical location, severity of the bony injury, initial surgical management, Injury Severity Score and Mangled Extremity Severity Score as much as possible.

Results

Of the 22 limbs with a pre-hospital tourniquet applied, 19 limbs had a least 1 complication. Of the 22 with no tourniquet applied, 15 had at least 1 complication ($p=0.13$). There were 10 limbs with at least 1 major complication in the pre-hospital tourniquet group but only 4 in the group with no tourniquet ($p=0.045$). There was no difference in the amputation rate.

The significant difference in the incidence of major complications is a concern, particularly as the difference was mainly due to a deep infection rate of 32% vs. 4.5%. Although there are a number of variables which could have influenced these small groups, such as choice of implant, method and timing of wound closure, the use of a cohort and a $p < 0.05$, does suggest the use of a pre-hospital tourniquet was a factor.

Conclusion

Although the use of pre-hospital tourniquets cannot be decried as a result of this study, there does remain the need to continually review their use, prospectively, to determine their risk/benefit ratio.

Outcome of Amputees in Relation to Military Service

S Dharm-datta, J Etherington, A Mistlin, J Clasper

Defence Medical Rehabilitation Unit, Headley Court, Epsom, Surrey

Introduction

Amputation is one of the most feared injuries in service personnel, particularly a worry that it will mean the end of their military career. The aim of this study was to determine the outcome, in relation to military service in UK military amputees.

Method

UK service personnel who sustain an amputation undergo rehabilitation and prosthetic limb fitting at DMRC Headley Court. This includes a realistic assessment of their employment capabilities, and they are graded by a Functional Activity Assessment (FAA). FAA ranges from 1 (fully fit) to 5 (unfit all duties). In addition the Short Form-36 Health Survey (SF-36) is completed on initial admission and at follow-up. We reviewed this information to determine the outcome of military amputees.

Results

We identified 53 casualties who had sustained amputations. 8 had sustained an upper limb amputation, 41 a lower limb amputation, and 4 had sustained both an upper and lower limb amputation. 9 patients (including 1 Reservist) have left the forces by medical discharge, with the remaining 44 continuing to serve. 32 of the 44 have returned to work, albeit at a lower level. 49 patients have FAA grades and are at least 6 months post-injury. No patients were graded as FAA 1, 8 as FAA 2 (Fit for Trade and fit for restricted General or Military Duties), 18 as FAA 3 (Unfit for Trade but fit for restricted General or Military Duties), 18 as FAA 4 (Unfit for all but Sedentary Duties) and 5 as FAA 5. All bilateral and triple amputees were FAA 4 or 5. Other injuries such as blindness, severe brain injury or mental health issues also increased the FAA. Of the 32 patients who have returned to work, 8 are FAA 2, 12 are FAA 3, 11 are FAA 4, and 1 has not been graded. SF-36 data was available in 40 patients, available as paired scores for 34. The mean time between SF-36 scoring was 6.7 months (range 0.2 – 17.4). The mean SF-36 scores for Physical Component Summary (PCS) increased from 34.40 (SD 9.3) to 42.06 (SD 11.1), with Mental Component Summary (MCS) 52.01 (SD12.9) remaining similar at 52.92 (SD 12.0). Pre- and post-rehabilitation PCS scores improved with rehabilitation ($p=0.0003$). MCS scores were similar in these patients to the normal population, 50 (SD 10). No differences could be found within the unilateral lower limb amputation group regarding amputation level (trans-tibial, through-knee disarticulation, trans-femoral) and SF-36 scoring. Furthermore due to the low numbers, no conclusion could be made comparing the unilateral lower limb amputation group with the bilateral lower limb group, the unilateral lower limb plus upper limb, the bilateral lower limb and upper limb (trilateral), and the isolated upper limb groups.

Conclusion

This study is the first to report the outcomes, with regards to return to work, of the UK military amputee population injured in Afghanistan and Iraq. There is an almost even distribution of FAA score between 2, 3, and 4 for those back at work. Level of amputation and SF-36 scores do not seem to correlate, partly due to other injuries sustained that confound the patients' perception of their health. SF-36 PCS scores increase significantly with rehabilitation, whilst MCS remain similar to the normal population.

The Stanmore Experience of Custom-made Constrained Shoulder Prostheses in Salvage Surgery

D Griffiths, O Templeton-Ward, S Grange, S Lambert, I Bayley, M Falworth

Royal National Orthopaedic Hospital, Stanmore, Middlesex

Introduction

Arthroplasty as a salvage procedure for cuff and glenoid deficiency poses major problems due to the limitations in treatment options and debilitating symptoms. We hypothesized that computer aided deigned and manufactured (CAD CAM) total shoulder arthroplasty, using a precisely fitted glenoid shell, can relieve the pain and poor function associated with irreparable rotator cuff pathology and severe glenoid deficiency in the shoulder.

Methods

Of the 127 cases so far performed, a prospective cohort study 79 consecutive subjects, with a mean 28.7 month follow-up, were evaluated by a single practitioner blinded to their group status. Outcome was assessed using a validated clinical shoulder scoring system and radiographic review.

Subjects

The subjects had a mean age of 58 (41-82) and their indication (where recorded) was mainly revision total shoulder replacement (62%) with some cases for primary osteoarthritis (12%) and rheumatoid arthritis (9%) and a proportion for other reasons (19%) including 1 re-revision case for dislocation.

Clinical follow-up was limited in this population (n=58, 73%) The 'CADCAM' group's mean SPONSA scores were relatively unchanged post surgery (47 to 42 $p=0.3$). The Oxford Shoulder scores improved significantly (15 to 33, $p<0.0001$). Most significantly, and by way of explanation, post surgery subjects recorded a reduction in the VAS (Pain) scores (6.6 to 2.9) $p<0.0001$). Patient satisfaction was generally good.

Radiographic review of the 79 cases revealed glenoid component screw breakage (4%, n=5) which is a moderate correlate of glenoid loosening ($r = 0.65$, $r^2 = 0.42$) and probably more accurate than radiographic lucent lines seen in 6% (n=7). Humeral lucency was seen in 10%, (n=8). These radiographic findings correlated well with the clinical findings.

Conclusion

Postoperative pain and function was significantly improved in subjects undergoing the 'CADCAM' technique of shoulder arthroplasty offering a consistent salvage option for situations where no alternative to glenoid reconstruction is feasible.

Prevalence and Impact of Back Pain on a Military Operation in Iraq

C Booth, R Shah

MDHU Peterborough, Cambridgeshire

Introduction

Back pain is common, with quotes of lifetime prevalence ranging from 50% to 80% and point prevalence of 15% to 30%. There is scarce data within the British Military.

Methods

A prospective observational study evaluated the prevalence of back pain and its impact on work in a deployed population on OP TELIC 13. 1000 questionnaires were distributed over 4 days, 768 were returned. Additionally, clinical data was collected from the ward, aero-medical, and physiotherapy dept for the period Sept 08- Feb 09

Results

Overall prevalence of back pain was 33.4% (257). A greater prevalence occurred in the combat arms (41.7%, $p=0.01$) and those of over 12 years service (44%, $p=0.004$). No statistical difference was found with rank, or BMI. 74 people (9.6%) had developed new onset back pain since deploying. Within the new pain group 10/74, (13%) were experiencing either 'some' or 'great' difficulty at work Recurrent pain occurred in 38.9% of the whole sample, with an increased prevalence in those of over 12 years service (58% $p<0.001$). Back pain constituted 23% (137/583) of the physiotherapy dept caseload, 6.6%, (25/378) of ward admissions and 0.04% (5/119) of aero-med patients.

Conclusion

This study shows that back pain is a major problem among deployed personnel, but can be managed with timely medical input, and is rarely the indication for aero medical evacuation. Adequate resources are required to maintain operational effectiveness. Further studies should be undertaken to assess if back pain persists after deployment.

Compliance in Self-administered DVT Prophylaxis in Orthopaedic Patients

N Ward, S Ladher, R Sharp

Nuffield Orthopaedic Centre, Oxford

Introduction

According to NICE Guidelines, some foot and ankle patients are, by definition, at high risk of DVT/PE. Despite NICE guidance, DVT recommendations are still controversial, and are being reviewed by the BOA to be more operation and context specific.

Method

One consultant at our institution therefore initiated a 6 week medical DVT prophylaxis regimen for all his post operative hind –foot surgery patients who were placed in plaster. From January 2007 to February 2008 we audited 97 hind-foot patients to measure their compliance rate, complications and DVT/PE rate.

Results

Compliance was excellent (97%) particularly with regard to LMWH, but only 70% had medication prescribed for the 6 weeks, and 3% developed at DVT.

Conclusion

Self administered LMWH is acceptable and compliance is excellent in post operative orthopaedic patients, but not necessarily effective.

CMI Pyrocarbon Hemiarthroplasty for Trapeziometacarpal Joint Arthritis

T Halsey, E Spurrier, J Jones, G Pathak

MDHU Peterborough, Cambridgeshire

Introduction

The CMI pyrocarbon implant is a unipolar arthroplasty for trapeziometacarpal joint arthritis which is implanted in to the thumb metacarpal. Previous case series have shown these implants provide significant pain relief and good patient satisfaction. We report the first cases of pyrocarbon hemiarthroplasty from Peterborough.

Methods

Seventeen cases in fifteen patients were retrospectively reviewed. The average patient age was 59.7 years (range 47-72). 7 patients were men and 8 were women. Five were discharged with good outcome at a mean of 11.5 months (range 6-19). One failed to attend follow up.

Results

Most patients in whom the implant survived were afforded good pain relief by the procedure and had a good functional range of thumb movement. Radiologically 8 implants were subluxed by at least 50%. One implant was revised after dislocation and loosening of the prosthesis which was associated with trauma. She made excellent clinical progress after revision of the prosthesis. One of the thirteen cases dislocated and was revised to a trapeziumectomy after 11 months.

Conclusion

Preliminary results suggest that this implant affords good pain relief and functional improvement in managing OA at the TMC joint. Longer term follow up will be required to correlate clinical and radiological outcomes.

OCAP deployed on Operations

H Guthrie, D Edwards, C Fetherston, J McMaster

UK Med Group, Camp Bastion, BFPO 792

Introduction

The Orthopaedic Competency Assessment Project (OCAP) is a validated system for assessment of competence in Orthopaedics. OCAP materials are increasingly used in the NHS. Defence Orthopaedic trainees now deploy for 6 weeks on Operation Herrick.

Methods

The senior author used OCAP induction and assessment materials with the 3 three trainees assigned to him at the United Kingdom Medical Facility at Camp Bastion, Afghanistan. Mini-CV and 'Military Trauma' Knowledge and Procedure Profiles were provided and learning agreements signed at an initial meeting. Interim and final meetings took place to review progress and update Knowledge and Procedure Profiles. Procedure Based assessments (PBAs) were also attempted during the attachments.

Conclusion

Afghanistan was ideal for training due to a significant trauma caseload, close one-on-one supervision and no working time directives. The use of induction and assessment materials with which trainer and trainees were already familiar gave structure and focus to training on deployment and allows the benefit of the deployment to be demonstrated.

Exposure and Experience in Trauma Surgery – Perceptions of United Kingdom Orthopaedic Trainees

W Eardley, D Taylor, P Parker

MDHU, Northallerton, Yorkshire

Introduction

Anecdotal concern exists over the ability of current UK trainees to manage complex orthopaedic trauma.

Method

A 15 item web-based survey sent to a sample of orthopaedic trainees. Power calculations deemed 222 responses from 888 trainees necessary to achieve a 5% error rate with 90% confidence limits.

Results

232 responses were received. For cases involving external fixation or intramedullary nailing, perceived confidence and training adequacy was high despite infrequent exposure. Perceived confidence and adequacy of training in complex trauma is significantly lower. Less than 20% of trainees have full confidence in their ability to debride and stabilize mutilating hand injuries. 35% of trainees lack confidence in their assessment of limb viability and 56% lack confidence in amputation for extremity trauma. 71% of trainees are not confident in the management of junctional trauma and 68% regard their training in this field as inadequate. With regard to advanced resuscitation using novel blood product combinations; 65% of trainees are lacking confidence and 44% perceive their training as inadequate. For simple fracture stabilisation, vacuum dressings, antibiotic prophylaxis and fasciotomy, trainee perceived confidence increased with time in training. This increase did not occur in more complex trauma cases.

Conclusion

Perceived confidence amongst orthopaedic trainees in the management of routine extremity trauma is high despite limited exposure and concerns over changes in surgical training. This is in marked contrast to that reported in complex trauma. For military trainees, the value of supervised training on military deployment to gain experience in such cases is now apparent.

Levels of Evidence in Research Presented at the Combined Services Orthopaedic Society Annual Meeting

T Bonner, A Mountain, J Clasper

Royal Centre for Defence Medicine, Birmingham

Introduction

The role of Evidence Based Medicine in modern surgical practice is to provide a framework for the integration of expertise, evidence and the biology of the individual patient. The research presented at the Combined Services Orthopaedic Society (CSOS) annual meeting is an important source of evidence which is used to support clinical decisions made about patients on military operations and in the NHS. The purpose of this study is to review the levels of evidence presented at this meeting since 2001.

Method

We reviewed all of the abstracts presented at the annual meetings of the CSOS between 2001-2008, and a single meeting of both the Society of Military Orthopaedic Surgeons (SOMOS) and the British Trauma Society (BTS). Basic science studies, animal studies, cadaveric studies, surveys and guest lectures were excluded. The research abstracts were coded by the lead author (TJB), according to the Oxford Centre for Evidence-based Medicine Levels of Evidence. A second author (AM) reviewed the coding of all abstracts to provide inter-observer reliability. Statistical analysis included a chi-squared test to compare the percentages of each level of evidence between the meetings and between each year of the CSOS meeting.

Results

We identified 140, 51 and 96 abstracts in the CSOS, SOMOS and BTS group respectively, which met the inclusion criteria. Level IV evidence accounted for 73.8%, 64.7% and 68.8% in the CSOS, SOMOS and BTS groups respectively. Level I evidence was uncommon at all three meetings representing 4.1%, 5.9% and 8.3% in the CSOS, SOMOS and BTS groups respectively. The chi-squared test did not demonstrate any statistical difference in the evidence levels between the three groups (X^2=11.63 (8df), p=0.17). There was no significant difference in the levels of evidence between years during the study period at the CSOS meeting.

Conclusion

The average level of evidence presented at the CSOS annual meeting compares favourably with other trauma meetings. The high proportion of level IV evidence presented at these meetings reflects the challenging task of performing research in trauma surgery. This challenge is further exacerbated in the military environment where operational commitments must be the priority. However, simple methods to strengthen research may involve the inclusion of control groups, prospective patient enrolment, standard treatment protocols, well-defined outcome measures, logistical support for good follow-up and use of patient-focused assessment tools. Co-ordination and focus of military orthopaedic research effort may advance the quality of research produced.

Dynamic Pressure Testing and Diagnostic Criteria for Chronic Exertional Compartment Syndrome in the UK Military Population

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Introduction

Since the recognition of chronic exertional compartment syndrome (CECS) of the leg as a cause of exercise-induced leg pain was made in the 1950s, there has been no universally accepted diagnostic pressure. A 1997 review found 16 papers from 1962 to 1990, which have differing diagnostic criteria. The threshold pressure used at DMRC Headley Court is based on the work of Allen and Barnes from 1986, where in a patient with a suitable history, a dynamic pressure in the exercising muscle compartment above 50mmHg is diagnostic.

Method

We present the data gathered at DMRC Headley Court during the first year of the new protocol on dynamic pressure testing, from May 2007. The new exercise protocol involved exercising patients using a representative military task: the combat fitness test (CFT) using a 15kg Bergen on a treadmill, set at 6.5km/h with zero incline. During this period, we performed 151 intracompartmental pressure studies in 76 patients. 120 were successful in 68 patients, with 31 technical failures. Patients complained of exercise-induced leg pain on performing the CFT and pointed to the muscles in either the anterior or deep posterior muscle compartments and these were exclusively tested with invasive studies. No patients complained of symptoms in the lateral or superficial posterior compartments and therefore neither were tested. The majority were performed in the anterior leg compartment (110 successful), with a few (9 successful) in the deep posterior compartment and there was only one complication with a posterior tibial artery puncture.

Results

The mean age of patient was 28.9 years (SD 6.7). In 119 compartment studies, the mean pressure was 97.8mmHg (SD 31.7). This data is normally distributed (Shapiro Wilk test, $W=0.98$ $p=0.125$).

Conclusion

In summary, we present the data using the CFT as the exercise protocol in patients who give a history compatible with CECS and have symptoms of leg pain during exercise. This data has a mean of approximately 100mmHg, which is double that of the diagnostic criteria of Allen and Barnes, who used running as the exercise protocol. The presence of a weighted bergen as well as the stride and gait pattern used during the loaded march may be contributory factors in explaining why the pressures are higher compared to other forms of exercise. Further work is ongoing with determining the intracompartmental muscle pressure in normal subjects with no history of exertional leg pain performing the CFT.

Endoprosthetic Replacement in the Lower Limb – A Reconstructive Option Following Trauma

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Introduction

Although originally designed to aid the management of primary malignant bone tumours, the indications for modular endoprosthetic replacement (EPR) have expanded to include complex periprosthetic fractures and failed internal fixation. The incidence of these challenging cases is increasing with an aged population. We reviewed retrospectively our experience with the use of EPR in patients who had undergone limb salvage following complex trauma presentations.

Methods

Between 2003 and 2008 twenty one patients underwent EPR following referral to the Oxford Sarcoma Service following lower limb trauma. The diagnoses are listed in Table 1.

Age: mean 71 years (range 44-87)
Previous surgical procedures: median 3 (range 0-11)

Diagnosis leading to EPR	Number	Mean postoperative score
A. Failed internal fixation - proximal femoral fracture	**8**	**71 (HHS)**
B. Periprosthetic fracture TKR	**7**	**80/64 (AKSS)**
C. Periprosthetic fracture THR	**2**	**62 (HHS)**
D. Failed internal fixation - proximal tibial fracture	**2**	**88/50 (AKSS)**
E. Distal femoral fracture (1 failed ORIF, 1 primary #)	**2**	**81/73 (AKSS)**

Table 1

Results

The mean Harris Hip Score was 89.5 (range 64-85). The mean American Knee Society Score was 82 (range 62-100) and the mean functional score was 62 (range 30-75). Complications included two cases of deep infection; one resulted in a two stage revision procedure, while the other retained the EPR following a washout.

Conclusion

EPR is an effective salvage procedure for failed trauma fixation and periprosthetic fractures. Immediate weight bearing and a good functional outcome can be expected in this difficult group of patients.

Birmingham Hip Resurfacing: Function Following Femoral Failure

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Introduction

Conversion of failed femoral components of total hip resurfacing to conventional hip replacement is reportedly a straightforward procedure. There is little published to qualify this and what is available suffers from small study numbers and various combinations pre and post-operative implants.

Method

Between 1997 and 2002, the Oswestry Outcome Centre prospectively collected data on 5000 Birmingham Hip Resurfacings (BHRs) performed by 141 surgeons, at 87 hospitals. To date 4526 have survived, 135 died and 165 are lost to follow-up. 174 have been revised, of which 60 were failures of the femoral component. We reviewed modes of failure and post-revision clinical outcomes in this sub-group.

Results

Isolated femoral component failure accounted for 60 hips (1.2%). 28 femoral neck fractures, 14 femoral head collapses, 13 femoral component loosenings, 3 avascular necroses (AVN), 1 femoral loosening followed by fracture and 1 dislocation. Mean time to revision surgery was 2.6years (1.8years for neck fracture; 3.4years femoral loosening, head collapse and AVN). All acetabular components were left in situ. At revision surgery 25 cemented, 25 uncemented and 10 unknown femoral prostheses were used with 56 BHR modular heads, 2 custom-made Exeter heads and 2 Thrust Plate heads. 47 patients completed outcome scores post-revision surgery. Median modified Harris Hip Score was 82 (IQ range=63-93) and Merle d'Aubigne score was 14 (IQ= 9.5-15) at a mean follow up of 3.9years post-revision. The 4526 surviving resurfacings had a median hip score of 96 (IQ=87-100) $p \leq 4.558 \times 10^{-8}$ and median Merle score of 17 (IQ=14-18) $p \leq 1.827 \times 10^{-7}$. Mean 7.0 years follow up. There was no difference in outcomes between cemented and uncemented revision components nor were there differences between fractured neck of femur and femoral loosening, head collapse or AVN.

Conclusion

Following revision of the femoral component to a conventional hip replacement, function is significantly worse than surviving resurfacings.

The Use of Cannulated Femoral Stems in the Treatment of Periprosthetic Fractures and Complex Revision Hip Arthroplasty

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Introduction

Periprosthetic Hip Fractures(PHFs) and Complex Revision Hip Arthroplasty(CRHA) consistently present challenging management decisions. Extramedullary devices alone or in combination with strut graft or long stem prosthesis revisions (cemented and uncemented) have all been described as treatment options. A long distal locked femoral stem provides an alternative allowing immediate stability for weight bearing without impaction bone grafting or external plate fixation and strut grafting. It has a lower risk of subsidence.

Methods

24 patients underwent a Cannulok Stem procedure from 2003-2008. Each was reviewed regularly following surgery with clinical examination and Hip scores (Oxford and SF12). The indications for device use, Vancouver classification if a periprostheic fracture, radiological evidence of union and complications were all recorded from medical and radiological records. The results were then compared to similar studies.

Results

The indications for Cannulok use were Periprosthetic fracture (50%), Infection with bone loss (12.5%), Revision for aseptic loosening (33.3%) and Subtrochanteric fracture post arthrodesis and metalwork removal (4.2%).

A 75% union rate was seen in periprosthetic fractures. There were 2 deaths, 2 deep Infections and 1 Superficial Infection. The 40mm offset stems resulted in 6 (25%) dislocations compared to 0% dislocations with the 45mm offset stem. In addition there was 1 femoral stem revision for subsidence (no distal locking screws used) and 1 acetabular revision. There was an average follow up of 20 months.

Conclusion

This study suggests that the Cannulok Plus femoral reinforcement stem is a potential alternative treatment option in PHFs and CRHA with acceptable complication rates.

Femoro-Acetabular Impingement: Osteochondroplasty Using a Modified-Anterolateral Approach without Trochanteric Osteotomy

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Introduction

Femoro-acetabular impingement (FAI) is an increasingly diagnosed cause of hip pain in young patients. It may progress to cause labral injury and chondral damage within the hip.

Surgery can be undertaken arthroscopically but is not universally available. Open approach to the hip with surgical dislocation, labral surgery and impingement lesion reduction is an acceptable alternative. Described by Ganz in 2001 the approach must conserve the postero-lateral blood supply to the femoral head and neck, to minimize the risk of Avascular Necrosis (AVN). Ganz recommended a sliding trochanteric osteotomy to widen access, and an anterior capsulotomy avoiding dissection postero-lateral to the femoral neck. To date there has been no published support for the Hardinge-type antero-lateral approach.

Method

We describe a series of 26 consecutive patients with FAI, all managed by open osteochondroplasty during 2008 via a modified anterolateral approach and capsule preserving exposure. Trochanteric osteotomy was not undertaken.

Results

The series contained 14 males and 12 females with mean ages of 33 and 29 respectively. Patients were assessed both clinically and using the Non Arthritic Hip Score (NAHS). Assessments were undertaken pre-op and at 8 and 16 weeks post-op. The mean NAHS pre-op was 54. This improved to 87 at 16 weeks. 77% of our patients achieved a NAHS of 75 or greater indicating a good or excellent result. Three patients had poor outcome and progression of osteoarthritic symptoms. There were no complications from the osteochondroplasty and all patients were Trendelenberg negative by 16 weeks.

Conclusion

We believe hip osteochondroplasty can be safely and effectively undertaken via an anterolateral approach, without trochanteric osteotomy.

Thermal Shrinkage for Anterior Cruciate Ligament Laxity Improves Knee Function

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Introduction

Radiofrequency thermal shrinkage of anterior cruciate ligament (ACL) laxity or partial injury is a relatively recent treatment. Studies have shown varied results with this technique but have had small study numbers and mixtures of both primary and reconstructed ACLs. We present our series of 109 patients.

Method

Between 1999 and 2008 our department performed radiofrequency thermal tightening on 109 patients with partial native ACL injury or ACL laxity. Fifty three patients completed both pre and post-operative evaluations at a mean follow-up of 20.5 months. Evaluation consisted of visual analogue pain scores, Tegner activity and Lysholm scoring.

Results

From the 110 patients that underwent thermal shrinkage for ACL instability 21 (19%) went on to require full ACL reconstruction. The decision to convert to full ACL reconstruction was made at a mean of 13 months (sd=12) following thermal shrinkage surgery. Comparing those who required ACL reconstruction with those who did not, we found those requiring reconstruction to be significantly younger. Mean = 25yrs vs. 31.5yrs. ($p \leq 0.002$)

Fifty three patients completed both pre and post-operative evaluations at a mean follow-up of 20.5 months. Following treatment there was a significant improvement in mean Lysholm scores from 64.4 to 79.5 ($p<8.42\times10^{-7}$) and pain scores 3.7 to 2.0 ($p<3.06\times10^{-6}$); however there was a reduction in patients' activity levels as assessed by Tegner score, from 6.65 to 6.0 ($p<0.019$).

Comparing those who required ACL reconstruction with those who did not, we found those requiring reconstruction to be have higher pre-operative level of activity (mean Tegner score = 7.3 vs. 6.5. ($p<0.047$)).

Conclusion

Radiofrequency thermal shrinkage of anterior cruciate ligament significantly improves knee function but may not be appropriate for younger patients or patients with high activity levels.

Constrained and Rotating Hinge Total Knee Replacements in the treatment of fractures involving the knee

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Introduction

The treatment of complex intra-articular fractures involving the knee has always proved challenging. The goals are to achieve satisfactory reduction, bony union and good functional outcome. Studies have investigated the outcome of various forms of treatment, including internal fixation and primary knee arthroplasty. In recent years there have been advances in technology bringing about more sophisticated implants such as pre-contoured peri-articular locking plates. Similar advances have been made in the production of constrained knee arthroplasty prostheses with the introduction of the Rotating Hinge Knee (RHK).

Method

The initial non-rotating hinged prostheses for total knee arthroplasty did not enjoy a good reputation. The cumulative survival rate has been quoted as 65% at 6 years, significantly lower than that of conventional stabilised prostheses. Therefore the use of such implants was restricted to complex primary or revision arthroplasty, and tumour surgery. Studies have been published advocating the use of hinged prostheses for distal femoral fractures in elderly patients. The average age in the most recent study was 82, of whom 42% had died within the first post-operative year.

This study is a case series of 16 patients with fractures who were treated with hinged knee replacements, a sub-group of whom were treated with RHK. Demographic and outcome data has been retrospectively collected. We discuss the indications, experiences and outcomes in the management of these patients. This study also stimulates debate about the use of RHK to treat fractures in a younger population.

Early Results of Posterior Arthroscopic Subtalar Fusion

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Introduction

A recognised treatment for severe sub-talar arthritis is joint fusion. This can be performed using a well established open technique or achieved through an arthroscopic approach. The aim of this retrospective study was to investigate the results of arthroscopic sub-talar arthrodesis performed by a single surgeon in our institution.

Methods

13 arthroscopic sub-talar joint fusions were performed over a 2 year period in patients presenting with isolated arthritis of the joint in question. All arthrodeses were carried out using two posterolateral portals and one posteromedial portal (?) and fixed with 2x single 7.0mm partially threaded cancellous screws. Outcome measures included the American Foot and Ankle (AFOS) score, time to union and post-operative complications.

Results

No patients were lost to follow-up. 12 out of 13 arthrodeses went onto clinical and radiological fusion. The AFOS score improved from 36 (range 32-50) pre-operatively to 75 (range 65-80) at final follow up. Complications included 1 non-union, 1 DVT and 1 superficial wound infection. 3 patients have had metalwork removed secondary to screw irritation.

Conclusion

The results of subtalar arthrodesis performed using an arthroscopic technique is comparable with an open approach and provides high patient satisfaction.