



Trauma Free Papers

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RANDOMISED TRIAL OF FURLONG UNCEMENTED HEMIARTHROPLASTY VERSUS CEMENTED HEMIARTHROPLASTY FOR 400 PATIENTS

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Continued controversy exists between cemented versus uncemented hemiarthroplasty for an intracapsular hip fracture. To assist in resolving this controversy, 400 patients were randomised between a cemented polished tapered stem hemiarthroplasty and an uncemented Furlong hydroxyapatite coated hemiarthroplasty. Follow-up was by a nurse blinded to the implant used for up to three years from surgery.

Results indicate no difference in the pain scores between implants but a tendency to an improved regain of mobility for those treated with the cemented arthroplasty (1.2 score versus 1.7 at six months, $p = 0.03$). There was no difference in early mortality but a tendency to a higher later mortality for the uncemented implants (29% versus 24% at one year, $p = 0.3$). Later peri-prosthetic fracture was more common in the uncemented group (3% versus 1.5%). Revision arthroplasty was required for 2% of cemented cases and 3% of uncemented cases. Surgery for an uncemented hemiarthroplasty was five minutes shorter but these patients were more likely to need a blood transfusion (14% versus 7%). Three patients in the cemented group had a major adverse reaction to bone cement leading to their death.

These results indicated that a cemented stem hemiarthroplasty give marginally improved regain of mobility in comparison to a contemporary uncemented hemiarthroplasty. An uncemented hemiarthroplasty still has a place for those considered to be at a high risk of bone cement implantation syndrome.

Disclosure: Nothing to disclose.

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PREDICTING HUMERAL SHAFT FRACTURE NONUNION: THE RADIOGRAPHIC UNION SCORE FOR HUMERAL FRACTURES (RUSHU)

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Background: The primary aim of this study was to develop a reliable, effective radiological score to assess humeral shaft fracture healing - the radiographic union score for humeral fractures (RUSHU). The secondary aim was to assess whether the six-week RUSHU was predictive of eventual nonunion.

Methods: Initially 20 randomly-selected patients with radiographs taken six weeks following a humeral shaft fracture were identified from a trauma database and scored by three observers, based on the radiographic union scale for tibial fractures system. After refinement of RUSHU scoring criteria, a second group of 60 patients with six-week radiographs (40 union and 20 nonunion) were scored by two blinded observers.

Results: After refinement the inter-observer intraclass correlation coefficient (ICC) was 0.79 (95% confidence interval (CI) 0.67 - 0.87), indicating substantial agreement. At six weeks post-injury, patients who went on to unite (median RUSHU = 10) had a significantly ($p < 0.001$) higher score than those who developed nonunion (median RUSHU = 7). A RUSHU cut-off of < 8 was predictive of nonunion (area under the curve = 0.84, 95% CI 0.74 - 0.94). Sensitivity was 75%, specificity 80%, positive predictive value 65% and negative predictive value 86%. Patients with a RUSHU < 8 ($n = 23$) were more likely to develop nonunion than those with a RUSHU ≥ 8 ($n = 37$, odds ratio 12.0, 95% CI 3.4 - 42.9). If all patients with a RUSHU < 8 underwent fixation, the number of procedures needed to avoid one nonunion would be 1.5.



Conclusions: The RUSHU is reliable and effective in identifying patients at risk of humeral shaft fracture nonunion at six weeks post-injury.

Implications: The RUSHU requires external validation but has the potential to reduce the morbidity associated with the delayed treatment of a humeral shaft fracture nonunion.

Disclosure: Nothing to disclose.

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STABLE ANKLE FRACTURES DO NOT NEED PLASTERS, NON-WEIGHT-BEARING INSTRUCTIONS NOR REPEAT IMAGING

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Background: Stable ankle fractures are extremely common, yet their definition and management varies. Our department agreed on the definition of "stable" according to AO groups: A1.2, A1.3 and B1.1, based on best evidence, and adopted the following guidelines in 2014.

Patients with a suspected stable ankle fracture were placed in a boot from the emergency department (ED) and allowed weight-bearing as tolerated (WBAT). Fracture clinic was booked no later than two weeks post-injury and patients only received further imaging in the form of weight-bearing "stress" radiographs if there was clinical suspicion of instability. Otherwise they continued as before until a final clinical review at six weeks.

Methods: We conducted a pilot audit in 2015. Initially B1.2 fractures were included but excluded as four out of 11 patients required surgical fixation. Following this, guideline posters were produced for display in ED and fracture clinic and education sessions were run in both areas. We re-audited in 2018.

Results: There were 18 fractures in the pilot study. None required conversion to surgery. From ED, only 11% of patients were placed in a boot with 89% going in a backslab. They were all kept non-weight-bearing. 89% of patients received further imaging post-diagnosis (average: three repeat radiographs per patient). At clinic, 35% were managed in a boot, with 57% allowed to WBAT.

There were 63 patients in the second audit loop. None required conversion to surgery. 97% of patients were placed in a boot and 94% allowed to WBAT from ED. 41% of patients had repeat radiographs (average: 0.6 per patient). 87% of patients continued in a boot with 94% allowed to WBAT from clinic. This change in practice resulted in significant cost savings to the department.

Conclusions: Stable ankle fractures can be safely managed with early weight-bearing in a boot without repeat imaging.

Disclosure: Nothing to disclose.

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TOTAL HIP REPLACEMENT FOR HIP FRACTURE: WORTH WAITING FOR?

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Background: Total hip replacement (THR) for hip fracture is increasingly common under the National Institute for Health and Clinical Excellence (NICE) guidelines for displaced intracapsular fractures. However, some units may struggle to offer surgery by a suitably-experienced surgeon within 36 hours of admission (ie day of admission or the following day). The aim was to assess the effects of surgical waiting time on outcomes after THR for hip fracture.

Methods: A fracture outcomes research database search identified all inpatients undergoing THR for displaced intracapsular hip fractures in Northern Ireland's regional trauma centre from January 2011 to October 2017.



Patients with pathological fractures, admission over a week post-injury, or inadequate follow-up, were excluded. Analysis by 2x2 contingency tables was performed for waiting times by 12-hour or 24-hour groupings.

Results: All operations prior to October 2016 had adequate follow-up. Two hundred and sixty-two cases were included, 257 surviving to one year. Pre-injury, 97% could walk without assistance, 91% required no walking aids, and 94% achieved a full Barthel (functional) score.

Mortality at one year (1.9% overall, 3.3% among ASA 3 patients) was statistically unrelated to time to theatre.

Among patients surviving one year, 91% maintained or improved their mobility (less assistance, or similar assistance but fewer aids). Reduced mobility was statistically unrelated to time to theatre. Surgery more than 24 hours after admission was associated with reduced function at one year ($p = 0.049$). However, after excluding patients delayed due to being unfit for surgery, no association between waiting time and functional loss was identified.

Conclusions: Under the NICE guidance, THR for hip fracture provides good survival and maintenance of mobility and function, even if delayed beyond 36 hours from admission.

Implications: Delays beyond 36 hours, such as to facilitate surgical expertise, may be justifiable as this does not appear detrimental to outcomes in these patients.

Disclosure: Nothing to disclose.

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HINDFOOT NAIL AND PRIMARY CLOSURE FOR THE MANAGEMENT OF OPEN ANKLE FRACTURES IN THE ELDERLY POPULATION: A NEW TREATMENT ALGORITHM

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Background: Ankle fractures are an increasing burden with the NHS and a major part of the workload of a trauma surgeon, with rates reported at nine percent. The elderly population in the UK are increasingly active with higher functional demands which has led to an increasing rate of fragility fractures of the hip, distal femur and ankle. These factors combined have resulted in an increased healthcare burden but has also led to ever increasing patient expectation. Skeletal stabilisation is often needed in fragility fractures to enable early mobilisation and reduce the rate of complications from immobility.

The acute management is well defined for the young, but the complexity of these cases is greater in geriatric patients due to the presence of poor soft tissue quality, osteoporotic bone, and comorbidities that increase morbidity and mortality.

Study Design and Methods: Retrospectively all open ankle fractures in patients aged over 65 at a level 1 major trauma centre in the last five years were reviewed

Results: Thirty-four patients were identified in a five-year period. The mean patient age was 83.1 years. Twenty-three patients were treated with hindfoot nail. Twenty patients underwent primary closure of their traumatic wounds and three underwent primary split skin graft. There was one delayed split graft for a wound breakdown and one delayed amputation after delayed transfer from a regional unit.



Conclusions: We present the largest series within the literature of elderly open ankle fractures managed without local or free tissue flaps for soft tissue management. By achieving primary wound closure early, often on the day of initial presentation in combination with the use of the hindfoot nail to allow full weight bearing, early rehabilitation can occur, a factor we know is key in the recovery of elderly patients from fractures, as shown by the hip fracture model.

Disclosure: Nothing to disclose.

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ORTHOPLASTIC RECONSTRUCTION OF GRADE IIIB OPEN TIBIAL FRACTURES USING DEVITALISED CORTICAL SEGMENTS. THE BRISTOL EXPERIENCE 2014-2018

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Background: Open tibial fractures are devastating injuries requiring combined orthoplastic decision making. At initial debridement, the surgeon can be faced with large bone fragments devoid of soft tissue, with convention being excision to avoid infection. We aimed to determine if orthoplastic reconstruction using mechanically relevant devitalised bone (ORDB) was associated with an increased infection rate in type IIIB open tibial shaft fractures.

Methods: Retrospective comparative cohort study of 113 patients, over a four-year period in a level 1 trauma centre. The primary outcome measure was deep infection rate and the number of operations. The secondary outcomes were nonunion, infection associated flap failure, isolated flap failure and overall complication rate. A binary logistic regression model was utilised for primary and secondary outcomes. We assumed a priori that p values of less than 0.05 were significant.

Results: Median age was 42.9 years (IQR 37) with a median follow up of 1.7 year (IQR 0.9). Forty-four patients had ORDB as part of their reconstruction, with the remaining 69 not requiring this. Eight patients (8/113, 7.1%) developed a deep infection (ORDB 1/44, non-ORDB 7/69). This was not significant ($p = 0.119$). The median number of operations was two. Sixteen operations (16/223, 7.2%) were reoperations as a result of complications. Two of these operations (2/16, 12.5%) were in patients who underwent ORDB. There was no association between reoperation and ORDB ($p = 0.389$). There was no statistical difference in secondary outcomes between groups.

Conclusions: This study suggests that mechanically relevant devitalised bone fragments appear safe to be used in the definitive reconstruction of these injuries when this is undertaken in a single sitting as part of an effective orthoplastic approach.

Implications: Use of this technique in an appropriate orthoplastic set-up can avoid iatrogenic bone defects and multiple operative procedures for type IIIB open tibial shaft injuries.

Disclosure: Nothing to disclose.

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TRENDS AND RISK PROFILES OF KNEE DISLOCATIONS: AN EVALUATION OF THE NATIONAL TRAUMA DATA BANK

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Aims: Knee dislocations (KDs) are potentially devastating injuries, leading to loss of function or limb in often young patients. We aim to determine the relative incidence and risk factors for KDs presenting to North American level I and II trauma centers.

Methods: The National Trauma Data Bank (NTDB) was retrospectively interrogated identifying KDs between 2010 and 2014 to derive relative incidence. KDs were stratified by age, sex, Injury Severity Score (ISS), Glasgow Coma Scale (GCS), drug and alcohol use, injury mechanism, open vs closed KD, vascular injury and fracture. Each co-variate was tested against different mechanisms of injury, using chi-squared tests and risk adjusted analyses to derive risk factors for KD. The calculations were done for secondary outcomes (vascular and neurological injuries, compartment syndrome, amputation, and mortality). Statistical significance was $p < 0.01$.

Results: A total of 6,454 KDs met inclusion criteria (18/10,000 admissions). KDs occurred most commonly amongst men, aged 20 - 39, with ISS score 1 - 14 and following MVCs. A vascular investigation performed in 29%, with injury documented in 15% of KDs and 10.8% receiving a vascular procedure. Associated fractures were observed in 41.4% of KDs. Open injuries in 13.6%. Neurological injury documented in 6.2%, compartment syndrome in 2.7%, amputation in 3.8% (> 50% had vascular injury) and 2.8% died. MVC was the most common mechanism of injury ($p < 0.001$), significantly more common in young, male patients, associated with higher ISS and lower GCS, especially when drugs or alcohol were involved ($p < 0.0001$). Being male, having a vascular injury or open KD were all risk factors for compartment syndrome, amputation and neurological injuries.

Conclusions: KDs are rare injuries, but their relative incidence may be increasing. Young, male patients involved in MVCs are risk factors for KDs and their associated injuries, such as neurological injuries, amputations and compartment syndrome. Vascular injury occurs in around 15%.

Disclosure: Nothing to disclose.

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WHAT'S IMPORTANT TO ME AND HOW DO I DECIDE? PATIENT EXPECTATIONS AND DECISION MAKING FOLLOWING TIBIAL TRAUMA; A QUALITATIVE STUDY

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Background: In the UK, recent legal judgements have fundamentally altered the practice of consent. A supported decision making model is now strongly recommended, challenging pre-judgement of patient wishes and expectations amongst healthcare professionals. This has lead us to question our understanding of patient decision making in the management of their injuries.

Methods: Adult patients presenting with tibial fractures to our unit were approached for interview and consented if in agreement. Patient case notes were reviewed to obtain details of injury, demographics and the process of consent and information transfer. A series of opening questions were constructed following iterative discussion with patients who were not part of the study group. Semi-structured interviews were conducted exploring the research themes by two team members who had no involvement in the patient's clinical care. Recursive thematic analysis was carried out according to the methods of Braun and Clarke.

Results: Ten study participants were recruited and completed the interviews with sufficient data for analysis. Record keeping on consent and information transfer was generally poor. The following common topics were identified by thematic analysis.

Priorities when considering treatment options:

- 1) Mobility
- 2) Influence of the doctor
- 3) Social and occupational functioning.



Patient expectations during treatment:

- 1) Recovery
- 2) Long-term outcome.

Conclusions: These data suggest that patients place considerable emphasis on what the clinician feels is the best treatment and they focus on potential complications. Despite records of informed consent, patients expressed expectations of full recovery that may be unrealistic. Patients expect outcomes in terms of mobility, function and quality of life similar to their pre-injury levels.

Disclosure: Nothing to disclose.