ROUNDUP360

Trauma

Xref *For other Roundups in this issue that cross-reference with Trauma see: Hip & Pelvis Roundup 7; Foot & Ankle Roundups 1 and 5; Wrist & Hand Roundup 5; Spine Roundup 6; Oncology Roundup 2; Children's Orthopaedics Roundups 1 and 3; Research Roundups 3 and 4.*

Is it safe to primarily close dog bite wounds? Xref

Dog bite injuries to the hand and extremities are known to have a high infection rate due to the relative richness of bacteria in the dog's mouth. Common practice in many units throughout the world is to initially treat dog bite injuries with dressings, antiseptic, and, if not deep, leave open to heal by secondary intent. Reasoning that perhaps there was no reason behind leaving the wound open (after all, if a wound is properly irrigated and clean it should be possible to close it), investigators in **California (USA)** set up a randomised controlled trial (Level I evidence) to establish if it really is necessary to leave dog bites open, or if they can be closed primarily. Their study included 168 patients and all had sustained dog bite injuries. Initial management was identical with patients receiving antibiotics and high-pressure irrigation and povidone antisepsis. Investigators randomised 168 consecutive patients with dog bite injuries to primary wound closure (82 patients) *versus* leaving the wound open (86 patients). Patients were randomised to either primary suture wound closure or treatment with dressings. The primary outcome measure was the incidence of wound infection, and secondary outcomes were collated with regards to wound appearance (visual analogue score).[1] The overall infection rate was 8.3%. There was no difference in the infection rate between the primary sutured and the non-sutured group. The cosmetic appearance of the sutured wounds was significantly better (mean visual analogue scale score 1.74) compared with the wounds that were left open (mean score 3.05) ($p = 0.0001$). There was a lower rate of infection in wounds treated within eight hours of injury (4.5%) compared with those treated after 8 hours (22.2%). The authors concluded that primary suturing of wounds was desirable, as the cosmetic results were better and the risk of infection was not increased compared with leaving the wound open.

Conservative transfusion evidence based in hip fracture surgery

Blood products are a finite and expensive resource. Although safe from blood borne diseases, blood transfusion is a far from benign intervention. Electrolyte disturbance, type mismatch and development of autoimmunity are all relatively common problems following transfusion. In a frail group such as the hip fracture population it is essential to ensure that when transfusion does occur it is appropriate, although there is currently little evidence to support at what threshold this should be. Here at *360*, we welcome a study from **Peterborough (UK)** examining the safest threshold for blood transfusion. Patients following their hip fracture surgery were randomised to either a restricted (transfusion only when symptomatic) or standard transfusion policy (Hb fell to between 8.5-9.5 g/dl-1). Patients aged over 60 years who had undergone hip fracture surgery were included in the study. The study team were able to recruit 200 patients to the study. The chief finding was that there was no statistically significant difference in the mortality, hospital stay, recovery of mobility or complications between the two groups at one year.[2] This study confirms other recent studies examining conservative transfusion thresholds, and supports the guidelines of reducing the transfusion threshold to 8.0g/dl.

Tibial nonunion is devastating to quality of life

Despite the well documented disabling effects of tibial nonunion in studies looking at polytraumatised patients, BMP utilisation and anecdotal reports, there are no formal health- related quality of life studies evaluating the health economic burden of tibial non-union. Authors in **Houston (USA)** set to fill this gap in the literature and evaluated 237 consecutive patients with 243 tibial shaft nonunions, an impressive number, and the largest study on tibial nonunion to our knowledge. The study was a retrospective series and disability was assessed using the SF-12 and AAOS Lower Limb Core Scale (average 52.0). These patients had poor outcomes indicative of severe disability in physical and mental wellbeing, as well as a substantial detrimental effect on limb function. These scores indicate that the impact of tibial shaft fracture nonunion on physical health was comparable with the reported impact of end-stage hip arthrosis and worse than that of congestive heart failure. The physical component summary of the Short Form (SF)-12 averaged 27.4 ± 6.7, indicating an extremely disabling effect on physical health. The mental component summary score of the SF-12 averaged 42.3 ± 7.1, indicating a substantial detrimental effect on mental health.[3] This study helps to remind us that tibial shaft nonunions are significantly disabling chronic health problems. Having this baseline value is important since, increasingly, we will be required to show the impact of our treatments on health-related quality of life.

Sexual dysfunction after traumatic pelvic fracture

Major traumatic injury such as a pelvic fracture can be associated with a myriad of psychosocial problems. Injuries associated with pelvic fractures include urethral and genital injuries. The combination of major pelvic injury, urogenital injury and post-traumatic psychosocial injury is likely to result in significant sexual dysfunction. It is therefore somewhat surprising that there is very little published on this topic. Surgeons in **Leeds (UK)** conducted a prospective cohort study of sexual

dysfunction after pelvic fracture. The authors prospectively evaluated a cohort of 80 patients (48 males and 32 females) with a median age of 46 ears (19 to 65 years) who had sustained a traumatic pelvic fracture. They administered the international index of erectile function (IIEF), female sexual function index (FSFI) and the EuroQol-5D questionnaire to evaluate their sexual function- and health-related quality-of-life outcome at at least 12 months after their surgery. The assessments occurred at a median 36 months after injury (12 to 96 months).[4] Remarkably, the investigators found that all domains of both the female and male sexual function were significantly decreased, as was their overall quality of life in the group as a whole. Sexual dysfunction was identified in 43.8% of the female and 52.1% of the male patients and perhaps less surprisingly sexual dysfunction was shown to be an independent risk factor for decreased quality of life after injury. Regression analysis identified that urinary tract injuries and open surgical treatment were independent risk factors for sexual dysfunction while male gender, abdominal injury, pelvic fracture severity, pain, and sexual dysfunction were identified as significant independent risk factors for decreased quality of life. While many of us may be uncomfortable asking our patients about their sexual function, it is important to identify these problems and promptly engage the appropriate multidisciplinary providers, including urological, gynaecological, and psychiatric consultations.

Hemiarthroplasty versus fixation in displaced femoral neck fractures Xref

■ Despite the relative frequency of the condition and the high associated morbidity and mortality, there are precious few well conducted randomised controlled trials on which to base treatment decisions in hip fracture surgery patients. Researchers are swamped in difficulties surrounding consent and follow-up in a frail and often demented population, concerns from relatives about elderly patients being 'experimented upon', and the overstretched services that often care for these patients has sadly resulted in a less than perfect body of evidence on which to make treatment decisions. Researchers in **Stockholm (Sweden)** have, however, managed to plug one of the knowledge gaps and performed a prospective randomised controlled trial comparing open reduction and internal fixation (ORIF) with unipolar hemiarthroplasty in a small group of 60 patients with displaced femoral neck fractures. Their study was designed to only include patients who were suffering from severe cognitive dysfunction but were able to walk before their fracture. The rationale behind the study was that, given the relatively high complication rates associated with hemiarthroplasty in this patient group, fixation may be a better option. Patients were reviewed at four, 12, and 24 months after the fracture. The study outcome measures included complication rates and re-operation, a measure of hip function (Charnley score) and health-related quality of life (EQ-5D). Of the 60 patients enrolled into the study, eight (14%) required re-operation; seven in the ORIF group and one dislocation requiring repeat surgery in the hemiarthroplasty group. The health-related quality of life (EQ-5D index score) was significantly lower in the ORIF group compared with the hemiarthroplasty group at 12 months (P = 0.03). There was no difference in hip function, general complications (wound infections, pressure ulcers, deep vein thrombosis), or mortality between the two groups.[5] Despite the relatively small size of the study population, the authors were able to conclude that hemiarthroplasty provides a safe option with better health-related quality of life and less risk for re-operations compared with ORIF in severely cognitively impaired patients sustaining a displaced femoral neck fracture.

Silver VAC dressings "Gold Standard" in massive wounds Xref

■ Management of the severe soft-tissue loss and contamination associated with high-energy trauma, infection and tumour surgery can be challenging. The VAC negative pressure wound therapy system has been adopted by surgeons in many disciplines and has become a staple of orthopaedic and trauma wards. The system provides a continuous or intermittent negative pressure and much of the benefit comes from the ability of the open cell foam to promote granulation tissue and extract contaminated exudate. Researchers in **Birmingham (USA)** have been using VACs to assist in the management of their severe soft-tissue defects for some time, and switched dressings from the standard VAC dressing to a 'silver' negative pressure dressing. They designed a study based on their historic series of patients to establish the benefit (or otherwise) of the newer silver dressing. Their study was a retrospective case comparison series (Level III evidence) and they used outcome measures of length of hospital stay, number of surgical debridements and the likelihood of wound closure. Between 2003 and 2010 the researchers treated 42 patients with a massive soft-tissue defect. The first 26 patients received VAC alone, and the final 16 VAC and silver dressing. Although this was a historic contiguous case series (which means other interventions were not necessarily standardised), there were marked differences between the groups. Average hospital length of stay significantly improved with the change of dressing (19 days *versus* 7.5 days) and length of overall stay also fell significantly (33 days *versus* 14.3 days). This improvement was mirrored (as would be expected) in the average number of operative debridements (7.9 to 4.1).[6] Despite the significant potentials for bias inherent in this kind of study design (it is unlikely that the dressing type was the only thing to change in a seven-year period), the silver dressing does show early potential and may be a suitable subject for future randomised controlled trials.

Dual plating for talar neck fracture Xref

■ Talar neck fractures have a reputation for poor outcomes and difficult surgery. The unique morphology and blood supply to the talus means that any displaced fracture is likely to compromise the blood supply to one fragment and therefore the outcome. Achieving an acceptable outcome is reliant on excellent surgical technique and respect for the soft tissues but is dependent on the initial injury pattern and displacement more than any surgical factor (see F&A abstract 1). There is, however, little evidence to support the use of any particular surgical approach and there is little evidence in particular to support the use of dual plating. Surgeons in **Sichuan (China)** have reported the outcomes of 31 cases, all presenting with closed displaced talar neck fractures. These were all treated with emergent reduction and stabilisation with k-wires with interval definitive fixation through a dual approach and dual plating. The research team were able to report their outcomes to 25 months using the AOFAS hindfoot score, patient satisfaction and SF-36. Their technique yielded an extremely low rate of soft- tissue complications

(only two patients) and all fractures healed without complication by 14 weeks. As would be expected, there was a significant rate of post-traumatic arthritis at around a third (n = 10) and a further 21% (n = 6) suffered AVN of the talus.[7] Despite the enthusiasm the authors express for their double plating technique, the long-term outcomes are no better than those reported elsewhere in the literature (and indeed in this edition of *360*). It may well be that the die is firmly cast at the time of injury and in many circumstances all the surgeon can do is stave off the inevitable.

Syndesmosis and fibular length easiest errors in ankle fracture surgery Xref

■ Despite being one of the most common injuries to present to accident and emergency rooms across the world, the humble ankle fracture can present a tricky little injury to treat. With a range of complexities and numerous variations in the fracture pattern, not everything always goes according to plan in the operating room. Recognising this hidden complexity and wishing to understand more why things sometimes go wrong, surgeons in **Helsinki (Finland)** undertook a retrospective review of nearly ten years' worth of patients in order to establish those predictors of early failure of fixation. The research team undertook a review of over 5100 ankle fractures treated operatively over a ten-year period. Of the 5123 patients included in the study, there was a 1.6% (n = 79) rate of early revision surgery for malreduction. The review team conducted a retrospective case-matched study by matching these patients to an equal number of age- and sex-matched patients to establish what the radiographic predictors were for the need for further surgery. The study team identified that the most common indication for re-operation was syndesmotic malreduction in around 60% of patients (n = 47). These were due most commonly to fibular malpositioning; other indications for re-operation were fibular shortening and malreduction of the medial malleolus.[8] The review team were able to identify some risk factors for malreduction which included fracture dislocation and associated posterior or medial malleolar fractures. Early revision surgery was successful in the majority of cases (84%). The study team warn that ankle malreduction is most commonly caused by errors related to syndesmotic reduction or failure to restore fibular length, but on the bright side these errors can usually easily be corrected with early reintervention.

Dual mobility: stable as a rock in fracture Xref

■ The combined orthopaedic literature currently supports improved functional outcomes in a select group of patients with THR, as opposed to hemiarthroplasty, following a neck of femur fracture. Despite originating from different centres with different populations, the various randomised controlled trials all come to the same conclusion: there are slightly improved functional outcomes at a slightly increased complication rate. The majority of units, for this reason, offer THR to those patients who present as fit and well with no mental or mobility limitation. However, this is at a cost of an increased risk of dislocation. Surgeons in **Viborg (Denmark)** wonder if they can have their cake and eat it. Reasoning that dual mobility cups offer increased stability (although there are some concerns about the second articulating surface and how that may affect the long-term wear profile) and may allow for improved functional results without the higher risk of dislocation in the neck of femur population, they trialled this intervention in a group of fractured neck of femur patients. The surgical team conducted a comparative case series utilising two cohorts of patients presenting to the treating hospital. Those presenting prior to 2009 were operated with a bipolar hemiarthroplasty, while those after this were treated with dual mobility cups. The study population consisted of 171 bipolar hemiarthroplasties (mean age 84.1) and 175 dual mobility cups (mean age 75.2) with a primary study outcome measure of either dislocation or re-operation between the two groups. The study team identified a lower re-operation rate in the dual mobility cup group as compared to the bipolar hemiarthroplasty group (32/171 *versus* 16/175) and a lower dislocation rate (25/171 *versus* 8/175). Both of these differences were statistically significant.[9] The opportunity to use a total hip prosthesis without the added risk of increased complications makes the dual mobility cup an attractive option in treatment of neck of femur fracture patients. The lower life expectancy and lower functional demands potentially offset the concerns that many surgeons have about using the dual mobility system in osteoarthritis - certainly something that should probably be investigated with a randomised controlled trial.

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