

# ROUNDUP<sup>360</sup>

## Trauma

### Nerve injuries of warfare

■ All war is a tragedy and yet medicine and surgery have learned so much from conflict over the centuries. This fact is perhaps no better highlighted than by a paper originating from a War Nerve Injury Clinic in **Epsom (UK)**. The authors describe 261 peripheral nerve injuries sustained in war by 100 consecutive servicemen and women in Iraq and Afghanistan. Their mean age was 26.5 years, the mean interval between injury and first review was 8.4 months and the mean follow-up was 20.5 months. The nerve lesions were predominantly focal prolonged conduction block/neurapraxia in 116 (45%), axonotmesis in 92 (35%) and neurotmesis in 53 (20%). They were evenly distributed between the upper and the lower limbs. Explosions accounted for 164 (63%); 213 (82%) nerve injuries were associated with open wounds. Two or more main nerves were injured in 70 patients. The ulnar, common peroneal and tibial nerves were most commonly injured. In 69 patients there was a vascular injury, fracture, or both at the level of the nerve lesion. Major tissue loss was present in 50 patients and amputation of at least one limb was needed in 18. A total of 36 patients continued in severe neuropathic pain.<sup>1</sup> This paper, which made both fascinating and horrifying reading to us at *360*, outlines the methods used in the assessment of these injuries. It also provides information about the depth and distribution of the nerve lesions, their associated injuries and

neuropathic pain syndromes. Perhaps our politicians should be sent a reprint, just to remind them there is nothing remotely sensible about war.

### Medical complications of earthquakes

■ Anyone who is the least bit interested or involved in natural disasters should find the paper from **Boston (USA)** compelling reading. Discussing the medical complications of earthquakes, the paper reminds us that more than 780,000 deaths have been caused by earthquakes in the last decade and that these natural disasters have directly affected a further two billion people. The epidemiology of earthquake-related injuries and mortality is unique for these disasters. Because earthquakes frequently affect populous urban areas with poor structural standards, they often result in high death rates and mass casualties with many traumatic injuries. These injuries are highly mechanical and often multisystem, requiring intensive curative medical and surgical care at a time when the local and regional medical response capacities have been at least partly disrupted. Many patients surviving blunt and penetrating trauma and crush injuries have subsequent complications that lead to additional morbidity and mortality. The most common earthquake-related musculoskeletal injuries are lacerations (65%), fractures (22%), and soft-tissue contusions or sprains (6%). Compound fractures can represent up to 54% of the total fracture

load, 36% of fracture patients have multiple breaks and 6% of fractures are complicated by neurovascular injury.<sup>2</sup> At *360* we found this paper humbling reading. Be sure to read it if you intend to form part of any disaster medical team.

### Measuring tissue pressures in compartment syndrome

■ Whether in an earthquake zone or not, compartment syndrome can be a very debilitating condition. Diagnosing and measuring it is not always easy. The reliability of measuring tissue pressures in this condition has been well presented by a paper from **Atlanta (USA)**. Although there is general agreement as to the pathophysiology and treatment of compartment syndrome and the importance of intramuscular pressure measurements, there are many methods described to obtain these measurements. Variations in experimental measurements using current electronic monitoring, needle, and catheter devices are enough to cause errors in clinical decision-making that can result in significant clinical consequences. Current unacceptable reliability has been reported with the use of bevel-tipped needles and the widely performed Whitesides' infusion technique. This was contrary to the authors' cumulative clinical and research experience with various methods when properly used, so they designed this study in order to clarify these problems. To eliminate comparative errors, they developed a laboratory compartment syndrome

model to allow simultaneous testing of different devices in the same area of fusiform muscle against increasing intramuscular pressure, while using the same transducer and monitor. Slit catheters, side-ported bevel-tipped needles, and 18-gauge bevel-tipped needles were compared with each other. The two Whitesides' methods (original and clinical) using a capillary meniscus and a mercury manometer were compared with a current electronic transducer method using identical 18-gauge bevel-tipped needles and capillary tubing of varying diameters. The side-ported needle, slit catheter, and 18-gauge bevel-tipped needle were found to measure equivalent pressure when compared statistically with each other in pairs. The original Whitesides' method using a 1.25-mm capillary tube and the digital transducer method using 18-gauge bevel-tipped needles were also found to measure equivalent pressure. The clinical Whitesides' method using plastic intravenous tubing of 3.0 mm internal diameter failed to produce an obvious capillary meniscus, thereby leading to diminished reliability in the measured pressure. The slit catheter, side-ported bevel-tipped needle, or an 18-gauge needle, when appropriately used with current monitoring by an electronic transducer, may be used clinically with confidence. When digital methods are not available, the original Whitesides' method using 1.25-mm glass capillary tubing is an accurate alternative but requires preplanning.

When only 3-mm tubing is available, this method is relatively useful, when electronic means are not available, by averaging several consecutive measurements.<sup>3</sup> 360 finds this a simple study, but an important one, particularly for those who work in the developing world.

### Plunging through the bone when drilling

■ We have all done it, or at least 360 hopes we are not in isolation. When we plunge through that bone while drilling, what might we have damaged on the other side? Researchers from **Bogotá (Colombia)** and **Davos, Fribourg and Lausanne (Switzerland)** realised that although this event was common, there was a general lack of information regarding a surgeon's performance in this skill. They thus created a study to determine the effect that using sharp or blunt instruments had on a drill bit's soft-tissue penetration, using a simulator. Surgeons taking part in an international trauma course were invited to participate. Two groups were defined: experienced and inexperienced surgeons. Candidates drilled 12 holes in the following order: three with a sharp drill bit in normal bone (SNB), three with a sharp drill bit in osteoporotic bone (SOB), three with a blunt drill bit in normal bone (BNB), and three with a blunt drill bit in osteoporotic bone (BOB). There were 37 participating surgeons, 20 experienced and 17 inexperienced. The mean plunging depths for SNB, SOB, BNB, and BOB were, respectively, 5.1 mm, 5.4 mm, 21.1 mm, and 13.9 mm for experienced surgeons and 7.6 mm, 7.7 mm, 22 mm, and 15.9 mm for inexperienced surgeons. For SNB and SOB, inexperienced surgeons plunged 2.5 mm and 2.3 mm deeper, respectively, than experienced surgeons. There was also a significant difference between sharp and blunt drill bits in all drilling conditions for both groups.<sup>4</sup> 360's conclusion? A sharp drill next time, please Sister. Plunging through and out the other side with a blunt drill

may harm the patient and we now have a paper to prove it.

### Bony nonunion and negative pressure therapy

■ We are not allowed favourite journals at 360, but if we were, near the top of the list would be one which was a forum for ideas and that might publish interesting and important theoretical papers that foster the diversity and debate upon which the scientific process thrives. Does such a journal exist? We think so, as within it appeared a recent paper on nonunion of bone from **Changsha (China)**. The publication, supported by hand-drawn images, reported that despite substantial advances in orthopaedic surgery being made, bony nonunion is still a matter of debate. The best options for its treatment have yet to be identified. Negative pressure therapy has already been successfully used in dealing with complex kinds of soft-tissue healing. Indeed, some studies show that negative pressure can induce mesenchymal stem cells to differentiate into osteoblasts and others suggest that there are some mesenchymal-like cells existing in nonunion tissue, which can be reactivated and transformed into osteoblasts in certain circumstances. The authors of this paper hypothesised that under negative pressure mesenchymal-like cells can be transformed into osteoblasts within the nonunion site. Negative pressure could reactivate mesenchymal stem cells that were in temporary hibernation, transforming them into osteoblasts, which would guarantee the seeds for bone formation.<sup>5</sup> Good idea. Time, perhaps, to take this hypothesis from theory to practice. Anyone for a real clinical trial?



### Surgery for the posteriorly dislocated hip – a long-term view

■ A traumatic posterior dislocation of the hip is a major injury by any standards. Yet how does it fare with surgical management, particularly when handled by a specialist trauma unit? Researchers from **Ioannina (Greece)** have studied this by reporting on 19 such injuries attending their level I trauma centre over a seven-year period. All had undergone acetabular fracture surgery. There were 17 male patients and two female, and the mean age of patient was 36 years. The mean follow-up was 18.5 years. At final follow-up, radiological outcomes were

excellent in six patients (31.6%), good in 11 (57.9%), and fair in two (10.5%). Clinical outcome was excellent in ten patients (52.6%), good in six (31.6%), and fair in three (15.8%). However, when an anatomical reduction had been achieved intra-operatively, excellent or good radiological and clinical results were shown in 100% and 87.5% of the patients, respectively.<sup>6</sup> Unsurprisingly, and supporting what many have long felt, 360 notes that this paper concludes that the adequacy of surgical reduction will determine the long-term outcome of surgically managed posterior hip dislocations associated with a posterior wall acetabular fracture. The better the reduction, the better the end result.

### Sliding screw or intramedullary nail for the trochanteric fracture?

■ From **Peterborough (UK)**, now long known for its expertise in handling the fractured femoral neck, comes a paper on the surgical management of trochanteric fractures. In a randomised trial involving 598

patients with 600 trochanteric fractures of the hip, the fractures were treated with either a sliding hip screw (n = 300) or a Targon PF intramedullary nail (n = 300). The mean age of the patients was 82 years. All surviving patients were reviewed at one year with functional outcome assessed by a research nurse blinded to the treatment used. The intramedullary nail was found to have a slightly increased mean operating time (49 minutes *versus* 46 minutes,  $p < 0.001$ ) and an increased mean radiological screening time (0.5 minutes *versus* 0.3 minutes,  $p < 0.001$ ). Operative difficulties were more common with the intramedullary nail. However, there was no difference between the implants for complications of wound healing or the need for post-operative blood transfusion. Medical complications were similarly distributed in both groups. There was a tendency to fewer revisions of fixation or conversion to an arthroplasty in the intramedullary nail group, although this was not significant. The extent of shortening, loss of hip flexion, mortality and degree of residual pain was similar in both groups. Meanwhile, the recovery of mobility was better for those treated with an intramedullary nail. In summary, both implants produced comparable results but there was a tendency to better return of mobility for those treated with the intramedullary nail.<sup>7</sup> Our view at 360? Choose the one with which you are most comfortable as we note the authors' findings that there were more operative difficulties with the intramedullary nail.

### Antegrade interlocking nailing for the distal femoral fracture

■ Moving down the femur to the supracondylar region, equal challenges exist. These have been highlighted by a paper from **Miraj (India)**, where surgeons reported on 30 patients (20 men, ten women) with a mean age of 48.7 years who underwent antegrade interlocking nailing for a distal femoral fracture. There were 23 patients who had closed fractures and seven who had open ones; six had

associated fractures of the forearm or tibia. For treatment, the affected leg was placed in an extension shoe for traction, and reduction was achieved with the help of percutaneous lag screws. The nail was inserted from the tip of the greater trochanter and centred in both anteroposterior and lateral planes. The nail was modified to have three screw slots in the mediolateral plane and one screw slot in the anteroposterior plane distally for stability in multiple directions. Post-operatively, early mobilisation and partial weight-bearing were allowed. The results showed a mean time to bony union of 13.1 weeks. The mean follow-up was 18.8 months, although three patients were lost to follow-up. The outcomes in the remaining patients were excellent in 20 and good in seven. The mean range of knee flexion was 106° and one patient developed a flexion deformity of 10°. All patients regained full quadriceps strength and no patient had ligamentous instability, nerve injury, superficial or deep infections, or implant failure. Three patients had malunion, which was located in the

metadiaphyseal segment and not intra-articularly. Consequently, there was no functional problem or shortening.<sup>8</sup> Impressive findings for this retrospective record review, we feel at 360. Antegrade interlocking nailing achieved good-to-excellent outcomes for distal femoral fractures.

### Gunshot wounds to the pancreas

■ Non-orthopaedic it may be but can you imagine how many gunshot wounds you would need to see in order to write a specialist paper on gunshot injuries to the pancreas? Well, surgeons from **Cape Town (South Africa)** have done it. This was a single-institution, retrospective review of an astonishing 219 such injuries sustained over a 33-year period. The median age of patient was 27 years and the majority were male (n = 205). The patients underwent 239 laparotomies, including drainage of the pancreas (169), distal pancreatectomy (59) and pancreaticoduodenectomy (11). Some 218 patients had 642 associated intra-abdominal and 91 vascular injuries. There were 43 (19.6%) who required

an initial damage control procedure. A total of 150 patients (68.5%) had 407 post-operative complications, a median of four complications each. The 46 patients (21.0%) who died had a median of three complications each. The median stay on the intensive care unit and in hospital was five and 11 days, respectively. That said, the longest stay was 255 days and the shortest was one. Multivariate analyses identified age, high-grade pancreatic injury, associated vascular injuries and the need for repeat laparotomy as predictors of morbidity. Age, shock on admission, need for damage control surgery, high-grade pancreatic injuries and associated vascular injuries were significant factors associated with death.<sup>9</sup> This paper impressed 360. Our solution? Body armour for our next visit to Cape Town makes sense.

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