

ROUNDUP³⁶⁰

Trauma

Pelvic fractures, thromboembolism and the Japanese

■ Venous thromboembolism is clearly a risk after pelvic and acetabular fractures. However, little is known about the incidence of this complication in the Japanese population. Work from **Kobe (Japan)** has attempted to reverse this. The authors took 46 Japanese patients with pelvic and acetabular fractures treated at their hospital over approximately seven years and analysed them retrospectively. For the first part of the study, screening for venous thromboembolism was performed by either contrast-enhanced computed tomography (CT) or ultrasonography (US), when the D-dimer value: 1) did not decline predictably, 2) still exceeded 20 µg/ml at five days after trauma and surgery, or 3) increased >20 µg/ml after a period of decline. For the second part of the study, contrast-enhanced CT and US were performed routinely irrespective of the D-dimer value. Physical prophylaxis was performed in all patients. The effects of the presence of pelvic and acetabular fractures, fracture types, accompanying injuries, and screening strategies on the incidences of venous thromboembolism and pulmonary thromboembolism were investigated. Overall, 19 patients (41.3%) were diagnosed with venous thromboembolism and ten (21.7%) with pulmonary thromboembolism. All were asymptomatic. Significantly higher incidences of venous and pulmonary thromboembolism were

observed compared with trauma patients without pelvic and acetabular fractures treated during the same period. No significant differences were observed in the incidences of venous and pulmonary thromboembolism and between pelvic and acetabular fractures or between patients with and without accompanying injuries. Compared with the previous screening strategy, the detection rates of venous and pulmonary thromboembolism were higher for the newer screening strategy; however, the difference did not reach statistical significance. The authors conclude that they should be vigilant for the high incidence of venous thromboembolism, and especially for pulmonary thromboembolism, in patients with pelvic and acetabular fractures in the Japanese population.¹ At 360 we clearly agree with this and at present do not screen everyone for venous thromboembolism in our practice but feel that this paper might indirectly be encouraging us to reconsider.

The displaced clavicular fracture – out with the knife

■ 360 has, for many years, treated displaced clavicular fractures conservatively, so a more recent trend to internally fix them has clearly made us doubt our methods. Consequently, a systematic review of the problem from **Ontario (Canada)** instantly appealed to us. As a Level I therapeutic study the authors reviewed randomised clinical trials of operative *versus* non-operative treatment of substantially displaced

midshaft fractures of the clavicle. They then pooled the functional outcome and complication rates to arrive at summary estimates of these outcomes. They included six studies (n = 412 patients). The nonunion rate was higher in the non-operatively treated patients (29 of 200) than it was in patients treated operatively (three of 212). The rate of symptomatic malunion was also higher in the non-operative group (17 of 200) than it was in the operative group (0 of 212). Operative treatment provided a significantly lower rate of nonunion and symptomatic malunion and an earlier functional return compared with non-operative treatment. However, there is little evidence at present to show that the long-term functional outcome of operative intervention is significantly superior to non-operative care.² Nonetheless, at 360 this review goes some way to make us feel we will have to alter our approach to the displaced clavicular fracture.

Nail or plate for the displaced fracture of the distal tibia?

■ Another dilemma for the trauma surgeon is the displaced, extra-articular fracture of the distal tibia. What is the ideal method of fixation? This has been looked at in a pilot trial from **Warwick (UK)**. In the UK, open reduction and internal fixation with locking-plates and intramedullary nailing are the two most common forms of treatment. Both techniques provide reliable fixation but both are associated with specific complications. There is little

information about the functional recovery following either procedure. The authors performed a randomised pilot trial to determine the functional outcome of 24 adult patients treated with either a locking-plate (n = 12) or an intramedullary nail (n = 12). At six months, there was an adjusted difference of 13 points in the Disability Rating Index in favour of the intramedullary nail. However, this was not statistically significant. A total of seven patients required further surgery in the locking-plate group and one in the intramedullary nail group. This study suggests that there may be clinically relevant, functional differences in patients treated with an intramedullary nail, rather than locking-plate fixation, for fractures of the distal tibia; there may also be differences in related complications.³ Further trials are clearly required to confirm the findings of this pilot investigation but good work so far by Warwick.

Snowboarding can be bad for you

■ For an August issue of this journal, it feels odd discussing winter sports but an interesting paper from **Burlington (USA)** on snowboarding injuries was attractive to us at 360. The authors recognised that participation in snowboarding as a winter sport is comparable with alpine skiing in respect of the demographics of the participants, risk of injury, and the variation in types of injuries sustained. Consequently, as a Level III case control study, they decided to examine the types of

snowboarding injuries and changes in injury patterns over time. They also sought to highlight important differences in injury patterns between snowboarders and alpine skiers as affected by age, experience, and gender. Data were collected on injured snowboarders and skiers in a base-lodge clinic of a ski resort in Vermont over 18 seasons (1988 to 2006) and included extensive information about injury patterns, demographics, and experience. Control data were also obtained during this period to provide information about the population at risk. The injury rates were assessed as mean days between injuries (MDBI). The MDBI for all injuries among snowboarders was 345 as compared with 400 for skiers (the lower the number, the higher the injury rate). The most common type of injury for snowboarders was a wrist injury (MDBI, 1258), while for skiers it was an anterior cruciate ligament (ACL) sprain (MDBI, 2332). Wrist injuries accounted for 27.6% of all snowboard injuries and 2.8% of skiing injuries, and ACL injuries comprised 1.7% of all snowboard injuries and 17.2% of skiing injuries. Among snowboarders, more wrist injuries, soft-tissue injuries of the shoulder, ankle injuries, concussions, and clavicular fractures were seen, while skiers had more ACL sprains, medial collateral ligament (MCL) sprains of the knee, lateral collateral ligament (LCL) sprains of the knee, lower extremity contusions, and tibial fractures. The trend analysis revealed an increased incidence of clavicular fractures and a decrease in MCL and ankle injuries among snowboarders over time. Skiers had a decrease in thumb metacarpophalangeal-ulnar collateral ligament injuries and MCL injuries over time. When examining the location of injury, 21.8% of snowboard injuries occurred in the terrain park compared with 6.5% of ski injuries. Injury rates in snowboarders have fluctuated over time but currently remain higher than in skiers. Wrist, shoulder, and ankle injuries are more common among snowboard-

ers, while knee ligament injuries are more common in skiers. Injured snowboarders were significantly younger, less experienced, and more likely to be female than injured skiers. The authors did not find any evidence that those who spend time in terrain parks are over-represented in the injury population.⁴ At 360 we found this to be a well-presented and well-written publication and likely to be of interest to many orthopaedic surgeons who, if we at 360 are anything to go by, have a hard-to-suppress obsession with the slopes in winter.

Predicting the outcome of lower leg blast injuries

■ Trying to predict the outcome of a blast injury to the lower limb is clearly difficult, as highlighted by a paper from **London, Birmingham, Epsom and Gosport (UK)**. The problem has been that because of the absence of clinical blast data, automotive injury data using the abbreviated injury score (AIS) has been extrapolated to define current North Atlantic Treaty Organisation (NATO) injury thresholds for anti-vehicle mine tests. The authors hypothesised that AIS, being a marker of fatality rather than disability, would be a worse predictor of poor clinical outcome compared with the lower limb-specific foot and ankle severity score (FASS). Using a prospectively collected trauma database, the authors identified UK Service Personnel who had sustained lower leg injuries from under-vehicle explosions over a three-year period. A full review of all medical documentation was performed to determine patient demographics and the severity of the lower leg injury, as assessed by both the AIS and FASS. Clinical endpoints were defined as: 1) need for amputation; or 2) poor clinical



outcome (defined as subsequent amputation or ongoing clinical problems). Statistical models were developed to explore the relationship between the scoring systems and clinical endpoints. The researchers identified 63 UK casualties (89 limbs) with a lower limb injury after an under-vehicle explosion. The mean age of the casualty was 26.0 years. At a follow-up of 33.6 months, 29.1% (26 of 89) required an amputation and 74.6% (67 of 89) had a poor clinical outcome. Only nine (14%) casualties were deemed medically fit to return to full military duty. The analysis revealed that both AIS = 2 and FASS = 4 could predict the risk of amputation, with FASS = 4 demonstrating

greater specificity (FASS 43% versus AIS 20%) and a greater positive predictive value (FASS 72% versus AIS 34%). In predicting a poor clinical outcome, FASS was significantly superior to AIS. Furthermore, a relationship could not be established between AIS and the probability of a poor clinical outcome.⁵ We are always saddened to read papers like this at 360 as, although brilliantly written and very worthwhile, they highlight the incredible damage and suffering created by modern warfare. All the same, there is no doubt that the authors have contributed greatly to our understanding of the likely outcome of these horrendous injuries.

Compressive external fixation for the displaced patellar fracture

■ From **Kabul (Afghanistan)** and **Providence (USA)** comes an interesting paper on the fixation of patellar fractures. Current methods, the authors highlight, are associated with hardware prominence, infection, and failure of fixation.

These complications require repeat surgical treatment, increase costs, and limit function. The authors thus investigated whether a novel device can effectively treat patellar fractures with few complications. They studied a consecutive series of patients with displaced patellar fractures and treated them with a technique known as compressive external fixation. This uses a device based on an external tensioned wire construct. Patients were allowed unrestricted movement and weight-bearing post-operatively and their outcomes were evaluated retrospectively. This was a Level V therapeutic study. The authors treated 84 patellar fractures (26 compound), with compressive external fixation. They performed 23 percutaneously. All the fractures united and the device was removed in the office at six weeks. At a mean follow-up of four years, 61 patients regained excellent movement, with a mean Insall knee score of 97 points. Minor complications presented in 11% of patients but these did not affect the overall outcome. Complications included minor wire irritation in 14 patients and one case of poor movement of the knee in a patient presenting with fibroankylosis of the joint. The authors conclude that treatment using the compressive external fixation technique is a safe and effective method of dealing with displaced patellar fractures. There are advantages over traditional forms of fixation, particularly should there be a poor soft-tissue envelope, or in salvage situations, or when in locations with limited resources. The method allows for rapid recovery, has few complications and no secondary surgery is needed.⁶ 360 rather agrees with the authors' conclusion that the use of compressive external fixation should be considered in the treatment of these injuries.

Broken hips in Morocco

■ The fractured femoral neck is clearly a huge global problem. We have highlighted in 360 before that its incidence seems to vary greatly in different parts of the world. This has

important implications for healthcare planning. So a recent paper from **Rabat (Morocco)** was clearly of interest to us, where the authors reported on the age-adjusted incidence of hip fractures in their province and attempted to forecast the number of hip fractures expected in Morocco up to 2030. To do this, they looked at all the hip fracture cases registered during the years 2006 to 2009 at all the public hospitals and private clinics with a trauma unit and/or a permanent orthopaedic surgeon across the province. Over this four-year period, 723 (54.3%) hip fractures were recorded in women and 607 (45.6%) in men. The age- and gender-specific incidence of hip fracture rose steeply with advancing age. Hip fractures occurred later in women (mean age 75.0 years) than in men (mean age 73.3 years). Their incidence was also higher in women than in men (85.9/100,000 person-years *versus* 72.7/100,000 person-years, respectively). The incidence remained globally stable over the study period. For the year 2010, there were 4327 hip fractures estimated in Morocco (53.3% in women). Assuming no change in the age- and gender-specific incidence of hip fracture from 2010 to 2030, the number of hip fractures is expected to increase progressively from 2308 to 4259 in women and from 2019 to 3961 in men.⁷ At 360 we feel that these types of data are invaluable for

all health systems, as planners do need some idea of what to expect. The hip fracture epidemic, in the middle of which we now stand, does not make for easy handling.

Spinal trauma in mainland China

■ Spinal trauma appears to be common and sometimes very distressing, yet its true incidence is not always known. A paper from **Beijing (China)** has been very helpful in this regard by determining the epidemiological characteristics of spinal trauma in mainland China. Until recently, data for this were simply unknown. The authors thus acquired data from the Chinese Database of Traumas. Patients with an ICD-9-CM coding of 805.x and 806.x (spinal column fracture with and without spinal cord injury) from 2001 to 2007 were identified. Variables assessed included patient demographics, aetiology, segmental distribution, and outcomes. A total of 82 720 patients with spinal trauma were identified, accounting for 4.6% of all trauma patients in the study period. Spinal cord injuries and fracture-dislocations accounted for 16.9% and 7.2% of spinal trauma and 0.7% and 0.3% of all traumas in the same period, respectively. The male-to-female ratio was 2.3:1. The data showed that 79.3% of spinal trauma occurred in patients between the ages of 20 and 60 years.

There was also an annual increase in incidence during the study period. A total of 64 630 patients (78.1%) had a definitive cause, with motor vehicle accidents identified as the leading factor (33.6%), followed by falls from a height (31.3%) and trivial falls (23.2%). The lumbar spine was most frequently involved (56.1%), followed by the thoracic spine (23.8%), cervical spine (17.8%), and sacrococcygeal vertebrae (2.4%). Fracture-dislocations occurred most frequently in the cervical and lumbar spines, whereas spinal cord injury occurred most frequently in the cervical and thoracic spines. Children younger than 10 years of age were prone to cervical spine injury, whereas adults older than 60 years were more prone to osteoporotic thoracic and lumbar fractures. The overall rate of conservative treatment (55.9%) was higher than that of operative treatment (44.1%), and the overall combined cure and improvement rates exceeded 90%. The male mortality rate was twice that of the female population. Injury to the lumbar spine was the most curable, whereas injury to the cervical spine had the worst prognosis and the highest medical costs.⁸ This study greatly impressed us at 360 as it offers huge numbers of patients and incredibly useful data when it comes to healthcare planning, public safety, and resource allocation.

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