

ROUNDUP³⁶⁰

Trauma

Thromboprophylaxis not required in lower limb fractures

x-ref Hip, Knee, Ankle

■ The willingness of clinicians to prescribe thromboprophylaxis for almost any indication has its roots in the large, drug company-funded studies that heralded the new age of ‘clot aware’ surgeons, physicians and, most importantly, patients and healthcare policy makers. These (mostly) non-inferiority studies powered by venographically proven DVT (usually asymptomatic) have been controversial to say the least. What has, however, been lacking is any high quality evidence to the contrary in diagnoses where inferences are being drawn from arthroplasty studies. This is exactly what we have here. The research team in **Toronto (Canada)** have drawn together an impressive multicentre, randomised placebo-controlled trial, testing dalteparin 5000 U against placebo with the end point of clinically relevant DVT (either symptomatic VTE or visible deep thrombus on duplex Doppler scan). This study was stopped after the recruitment of 265 patients and interim analysis. The take home message is that there was no significant risk reduction in the dalteparin group, and that the end point used here of clinically relevant DVT yields event rates less than one tenth of those reported with the venographic end points. We would side with the authors of the study here – that treatment decisions are made on the basis of symptomatic or

deep DVT on duplex scan and that as this has replaced venography as the gold standard diagnostic criteria for DVT, this should be used as the end point in all future studies.¹ The authors conclude that in their study the overall incidence of DVT in patients with a surgically repaired, isolated tibia, fibula, or ankle fracture was much lower than previously reported (1.9%) and that as there was no difference in incidence rates between groups in their study, one could easily conclude that thromboprophylaxis really is not indicated in these cases.

Subclinical thyroid dysfunction and fracture risk: moving the boundaries in fracture

x-ref Hip, Research

■ There has been a renewed interest in bone health in recent years. With a spate of publications concerning the important role vitamin D has on bone health, hip fracture and recovery, other biological risk factors for fracture and poor outcome have become much in vogue. One of those factors is ‘subclinical thyroid dysfunction’ i.e. minor stages of thyroid insufficiency. The review team based in **Bern (Switzerland)** set out to establish what the evidence was to support the current thinking that subclinical thyroid dysfunction may have a bearing on fracture incidence. They performed a very thorough literature review of all language publications and included data from prospective cohort studies and above that contained thyroid function data,

and data pertaining to subsequent fracture incidence. There were 13 trials that met the inclusion criteria with a truly multinational cohort. The study team defined subclinical hyperthyroidism as TSH < 0.45 mIU/L and subclinical hypothyroidism as TSH > 4.50 mIU/L, both with normal serum thyroxine levels. Outcomes in terms of fractures were subdivided into hip, spine and non-spine fractures with a primary outcome of hip fracture.² The study reports the results of 70 298 patients who were included in the study with an incidence of subclinical hypothyroidism of 5.8% and subclinical hyperthyroidism of 3.2%. The authors conducted an age- and sex-adjusted analysis and established that the hazards ratio for hip fracture was 1.36 in the subclinical hyperthyroid group and 1.28 for any fracture. This relationship was inversely correlated with TSH levels. There was no association between hypothyroid states and fracture risk seen in this analysis. As more and more is known about bone metabolism and fracture risk, there is further scope to intervene in high-risk groups by correcting risk factors. An excess risk of over 30% for hip fracture should be taken seriously by primary care physicians and public health doctors. Perhaps the elderly population should undergo routine screening for thyroid functions.

Posterior wall fractures refined

x-ref Hip

■ Often dismissed as ‘just a posterior wall fracture’, and in some

centres with fixation attempted by arthroplasty rather than pelvis and acetabular surgeons, the humble posterior wall fracture can be a tricky little beast to understand. The difficulty is in establishing which of the myriad of potential fracture patterns is associated with hip instability. In the setting of documented dislocation or large fractures extending into the dome, decision making is easy – fixation yields better results. The difficulty arises with smaller fractures, atypical patterns or lip fractures, some of which are stable and some not. Many larger centres advocate the use of EUA to be sure which are stable and which are not.³ Trauma surgeons in **Seattle (USA)** have gone one better and retrospectively reviewed their own series of 185 consecutive patients with isolated unilateral posterior wall (OTA 62-A1) fractures. Their study was designed specifically to establish the determinants of hip stability in this fracture pattern. All of their patients underwent EUA under fluoroscopic control to establish stability, and the study team collated numerous radiographic measures with the aim of quantifying those patients in whom the fracture was likely to be unstable. Their series included 116 stable and 22 unstable hips with the cranial exit point of the fracture being the most important determinant of stability, rather than the size of the fracture fragment. Around a quarter of their unstable hips in fact had fracture fragments smaller than the traditional 20%

cut-off, with stable hips on average having over 9 mm of bone between the cranial exit point and the dome of the acetabulum while the unstable fractures have around a 5 mm cut-off. Although intuitive, this is a highly useful series quantifying an observation that will surprise few experienced trauma surgeons. However, some figures on which to 'hang your hat' may well reduce OR time and needless anaesthetics in those fractures likely to be stable.

Neurological injury and acetabular fracture surgery x-ref Hip

■ Acetabular fracture surgery carries with it some not insubstantial risks, including damage to the sciatic nerve. Often having been contused at the time of injury, the sciatic nerve is widely considered to be particularly vulnerable during the Kocher approach for acetabular fracture surgery. In one of the largest series of cases reported in the literature, surgeons from **Boston (USA)** report the outcomes (from a neurological injury perspective) of 137 operatively treated acetabular fractures, all with neurological injuries treated in eight trauma centres. All patients were followed up to six months, and clinical examination and patient-reported outcome scores were undertaken. The series consisted of 137 patients (101 male, 36 female) with an average age of 42 years (range 17 to 87).⁴ The patients had a 57% incidence of pre-operative neurological injury, with 19% being iatrogenic (present immediately post-surgery) and 24% developing during the post-operative course. Neurological injury (unsurprisingly) was most commonly associated with posterior column involvement. The study team fairly clearly established that peripheral neurological injury in operatively treated acetabular fractures occurs most commonly in the sciatic nerve distribution with L5 root level deficits and this pattern has only a 26% chance of full recovery.

Posterior tibial plateau fixation x-ref Knee

■ The posterior shear fracture of the lateral tibial plateau has been an overlooked fracture in the past. Although posterior approaches are nothing new in knee or trauma surgery, there has been a resurgence of interest in posterior approaches that are medially based and sometimes gastrocnemius sparing. These approaches are not new and rely on mobilisation of gastrocnemius and popliteus laterally from a medial-based 'L' or straight incision. This has been popularised for the most part by surgeons in China and the Far East, where moped accidents result in injury to the fully flexed knee and



not only lateral shear fractures, but also true posterior column fractures which cannot be addressed in any other way. One of the unanswered questions, however, is not whether these fractures technically can be fixed, but whether we should be fixing them.⁵ In one of the larger series to date, authors from **Shanghai (China)** report their experience of 95 patients with tibial plateau fractures. Their report focuses on the incidence and type of complications, along with functional and quality of life scores at over four years of follow-up. In all, the total complication rate was just 4.2% (4 of 95), and at final follow-up the mean Hospital for Special Surgery score was 96.1. Although this is impressively high, a perhaps more telling result is the

reported range of 80-100 points. There was a single incidence of popliteal artery and gastrocnemius artery injury. The authors concluded (like the vast majority of trauma surgeons in regular practice) that the posterior reversed L-shaped approach allows for visualisation of posterior column tibial plateau fractures and that the longer-term clinical results are promising, with low reported complication rates.

Tibial plateau fractures in the longer term x-ref Knee

■ Constraint and stability are concepts that are perhaps under-utilised in decision making surrounding intra-articular fractures. Where all joints are obviously congruent at their contact point, some joints such as the knee and shoulder are biomechanically less constrained joints, and as such it seems likely that restoration of the stability (ligaments) is more important than restoration of the articular surface. In other joints (such as the hip and elbow) the counter is true. With highly conforming and constrained architecture, it seems likely that imprecision in the joint reduction will be poorly tolerated. Although this conventional wisdom is widely accepted, there is little supporting long-term contemporary evidence. Authors from **Maastricht (The Netherlands)** have reviewed the long-term clinical outcomes of 71 patients from an initial cohort of 96. Cases were first operated on between 2004 and 2010. All patients presented with fractures of the tibial plateau and underwent operative fixation. Osteoarthritic changes were oddly determined based on a one-year radiograph, rather than at a longer-term follow-up, and as such perhaps the interpretation of results with regard to radiographic osteoarthritis might be taken with a small pinch of salt. Functional outcomes were, however, assessed with a contemporary Knee injury and Osteoarthritis Outcome Score (KOOS).

This group of Dutch patients did not achieve functional results as impressive as those the Chinese population reported earlier, with median KOOS scores of around 90% for pain and daily living, but just 75% for sport and quality of life. There was no significant relationship between early radiological characteristics of osteoarthritis and functional outcome.⁶ This paper does, despite its flaws, support the current thinking surrounding tibial plateau fractures, with early radiographic signs of degeneration not necessarily relating to poorer functional outcomes.

Comprehensive orthogeriatric care and hip fracture x-ref Hip

■ Great strides have been made across the globe, evaluating and improving quality of care for patients with hip fractures worldwide. Incentivised tariffs, comprehensive care programmes and perhaps surprisingly most importantly, clinicians acting as 'clinical champions' pushing forwards their own brand of 'comprehensive geriatric care'. All of the programmes focus around joint decision making, senior medical and surgical review and timely surgery. They emphasise the quality of care and, in some healthcare settings (such as the NHS), include financial incentives for high quality care. Although these measures have been supported by audit data suggesting a fall in mortality, where these systems have been put in place there has been up to this point no 'gold standard' randomised controlled trial evidence to support a wholesale change in healthcare priorities. Perhaps this is due to the difficulties of randomising patients to comprehensive packages of care. Researchers in **Trondheim (Norway)** have surprised us all here at 360 with perhaps one of the trickiest of randomised studies to achieve. They report their experience of comprehensive orthogeriatric care in patients who were

living independently at the time of their fall. Patients were randomised after inclusion to either standard 'orthopaedic management', or management on a geriatric ward with a comprehensive package of care. Their study took two years to complete and included patients who were independently living and able to walk 10 m or further prior to their fracture. As would be expected, this study could not be blinded and the primary outcome measure was the Short Physical Performance Battery (SPPB) administered at four months. The study team had to screen 1077 patients to recruit the 397 patients included in the study. As would perhaps be expected, there was a moderate loss to follow-up, chiefly due to death of the participants. At the final four-month follow-up, 174 comprehensive geriatric care and 170 orthopaedic care patients remained. There was a statistically significant difference in mobility at this follow-up point, with a difference in the SPB of 0.74 points (4.38 vs 5.12) in favour of the comprehensive geriatric care model.⁷ It is fascinating that a combined model of 'orthogeriatric' care designed essentially to reduce mortality and morbidity

associated with hip fracture should be so effective in improving mobility in a sustained manner.

Compartment syndrome: in the eye of the beholder? [x-ref Research](#)

■ Diagnosis of compartment syndrome is tricky – there is little agreement between studies as to what the actual incidence following tibial fracture actually is, and this likely represents variation in application of diagnostic criteria rather than true variations in incidence. The arbitrary values settled on by the Edinburgh group of a perfusion pressure of 30 mm Hg are widely accepted, but with capillary pressures of around 10-14 mm Hg they don't make scientific sense. Often the orthopaedic surgeon relies on compartment pressure monitoring systems, and a variety of commercially available probes are used. One piece of the diagnostic jigsaw we have never seen assessed is the effect the variation in use of these instruments might have on diagnosis of compartment syndrome. In a deceptively simple but clinically important cadaveric study, investigators from **Asheville (USA)** set out to establish what the measure-

ment accuracy of the instruments were. The study team set up four cadaveric specimens as a model of compartment syndrome and using the Stryker pressure probe system, 38 physicians were tasked with measuring the pressures. Just under a third of pressure measurements were made using correct technique, with a third of clinicians making 'catastrophic errors' in technique. Alarming, of the 30% of measurements made with the correct technique, just 60% were within 5 mm Hg of the known leg compartment pressures. These accuracy figures dropped to 42% for measurements where a minor error was made, and just 22% when a catastrophic error had been committed.⁸ Although the authors conclude that regular education is required, in light of their findings we question the diagnostic value of the system at all. Given the known difficulties that diagnosis poses, adding a test with just 60% accuracy when administered correctly probably does nothing but cloud the issue.

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