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Foot & Ankle

X-ref For other Roundups in this issue that cross-reference with Foot & Ankle see: Research Roundup 5; Trauma Roundup 1.

Safety of the posteromedial approach for fixation of the posterior malleolus X-ref

■ Direct reduction and fixation of the posterior malleolus fracture is increasing in popularity in the United Kingdom and throughout the world. Proponents argue that an anatomical reduction can only be achieved through the posterior approach, that accurate reduction of the posterior shear fragment may be more important than we first thought, and that, in many units, the traditional anteroposterior lag screw no longer suffices. Literature to date has focused mostly on the safety of the posterolateral approach, and a number of papers have been published that have described this technique, which is now becoming the standard of care. A group of surgeons from **Bristol (UK)** have now reported on their experience of using the posteromedial approach.¹ This was used for fixation of the Haraguchi type 2 posterior malleolar fracture. They present a review of a series of 15 cases, describing the surgical approach and fixation technique, along with a review of the accuracy of reduction and the incidence of complication. The accuracy of reduction was assessed using postoperative plain radiograph and not CT, a potential limitation of this study. The authors found no wound complications in any of their patients. There was a single patient with paraesthesia in the medial aspect of the foot, which was transient. At final follow-up, the authors report a median Olerud and

Molander score of 72 and anatomical reduction in ten, with a median step of 1.2 mm in the remaining five patients. The authors conclude that this is a safe approach for fixation of the Haraguchi type 2 posterior malleolar fracture. They report a low complication rate when utilizing this approach and achieve good visualization of the medial component of this fracture. This paper certainly adds to the growing evidence base to support the increasing trend towards direct visualization and fixation of the posterior malleolar fracture. The choice between posterolateral and posteromedial will, of course, depend on fracture type. Those patterns that involve the posterolateral portion of the posterior malleolus will likely be technically easier through a posterolateral approach, as the posterior fibres of the syndesmosis tend to rotate the fragment in that direction, while those that are extended medial malleolar fractures will likely be best addressed from the posteromedial approach.

The potential benefits of a CT scan for the posterior malleolar fracture

■ Staying with the highly topical posterior malleolar fracture, this paper from **Los Angeles, California (USA)** caught our eye here at 360.² There has been an increased interest in surgical fixation of the posterior malleolus when addressing the unstable ankle fracture. Surgeons now commonly perform posterior approaches to this fracture for direct visualization of the fragments and subsequent internal fixation. However, although practice is changing, there are still several matters left 'unresolved' – in this

case, the need, or otherwise, for CT scanning in these fractures. There are two papers in the literature that recently examined the benefits of preoperative CT scan for surgical planning of this fracture. In the first paper, from **Los Angeles, California (USA)**, a group of surgeons performed an interesting investigation to try to establish the effect of a CT scan on the surgeon's understanding of the fracture pattern and subsequent pre-surgical planning. The authors identified 25 patients from a total cohort of 376 ankle fractures involving the posterior malleolus, all of whom had preoperative radiograph and CT imaging. In a random order, the plain radiograph imaging was presented to three fellowship-trained orthopaedic surgeons (two trauma, one foot and ankle). The following questions were asked: 1) Is the posterior malleolar fracture simple or complex, where 'simple' refers to an intra-articular split only, and 'complex' refers to impaction, comminution, or intra-articular debris? 2) Does the fracture require direct visualization and articular reduction? 3) If the fracture requires direct visualization and articular reduction, what operative approach and patient positioning would be used at the time of surgery? In random case order, the images from axial, coronal, and sagittal CT scans were then reviewed by the same surgeons and the same questions were asked. To ensure reproducibility, the same images were reviewed on a second occasion by the same surgeons, at least six weeks apart. Overall, 20% of the fractures (n=5/25) were classified as complex on plain radiographs but determined to be

simple on CT imaging. In eight of 25 fractures, the examiners failed to identify a complex pattern on plain radiograph where there was evidence of impaction or comminution on CT. The fracture classification was changed in 56% of cases (14/25) based on CT findings. There was a change in the decision to visualize directly and reduce the articular surface of the posterior malleolar fracture in four of the 25 cases. However, participants changed their operative approach and patient positioning in 44% of cases (11/25) based on the review of the CT imaging. The authors readily accept that there are limitations within their study design. Among these, they comment that routine use of CT scanning was not commonplace in their unit, meaning a potential selection bias towards the more complex cases for this study. The study was also underpowered to detect a statistically significant difference in fracture pattern or preoperative management plan. All this said, this study provides some food for thought, as cross-sectional imaging is becoming increasingly available and newer protocols have reduced radiation dosage. Perhaps surgeons should be considering CT scanning for patients who require operative fixation of their posterior malleolus.

Effect of CT on management plan in malleolar ankle fractures

■ In a similar study, a group of surgeons from **Delhi (India)** have reported a second paper examining the role of CT imaging in malleolar fractures.³ This was a prospective study of 56 consecutive patients



presenting to their emergency department with at least one fractured malleolus. All fractures were imaged with plain radiograph out of plaster and CT scans. In this cohort series, there were 22 unimalleolar fractures, 20 bimalleolar fractures, and 14 trimalleolar fractures. All fractures were reviewed by two orthopaedic consultants and one senior resident. A management plan was made on the basis of the plain radiograph imaging alone, and then a further plan was requested after review of the CT imaging. In similar findings to the previous study, the authors identified that, in 13 of the 56 cases, the management plan changed once the CT had been reviewed. In four cases, this involved the identification of an additional fracture that was not seen on the original radiographs but was believed to warrant fixation. In eight cases, a different operative approach or incision was planned. There were no changes in patient positioning. Of the 13 cases identified as having a posterior malleolar fragment, six underwent a change in the management plan after evaluation of the fracture on the CT scan. This second paper also highlights the potential benefit of CT imaging in periarticular ankle fractures. Interestingly, it shows that, of the cases where a change in management plan was made as a consequence of the CT, six involved the posterior malleolus. The authors explain that these cases were changed from nonoperative to operative fixation after review of the CT scans. The results of these studies

certainly reinforce the importance of CT imaging in certain ankle fracture patterns. Both papers add to the growing evidence to support its use in certain circumstances. Nonetheless, further work is certainly needed to clarify the exact role of CT imaging for these fractures – in particular, to define precisely in which circumstances it is helpful not only to guide the surgical management of these cases, but potentially to improve outcomes.

Peripheral block of the foot and ankle

■ Regional anaesthesia has come to the fore in recent years, promising improved patient satisfaction, reduced postoperative pain relief requirements, and, in some settings, lower complication rates. The authors of this study from **Sao Paulo (Brazil)** have set out to establish the potential benefits of regional anaesthesia in the foot and ankle in terms of postoperative pain control.⁴ The authors report a prospective randomized single-blinded controlled trial evaluating analgesic effect, with pain intensity as the endpoint, using the visual analogue scale (VAS). Participants were randomized to either spinal anaesthesia alone or spinal anaesthesia in combination with an ankle block. In this rather small trial of 59 feet, which is essentially a pilot study, patients in the intervention group received peripheral nerve block in the foot and ankle (7.5 mg/ml ropivacaine). The authors then went on to follow up the patients by telephone, recording postoperative pain intensity and the timing of onset of pain. In short, the authors established that the duration of postoperative analgesia (i.e. the timing of onset of postoperative pain) was longer in the intervention group. The outcomes of pain intensity were no different on the first and second postoperative days. This is an interesting study in that, even with a very small sample size, the authors have been able to demonstrate

an increase in the postoperative ‘pain-free period’, even though they did not demonstrate a reduction in postoperative pain intensity. There is potentially a significant issue here with power, and the authors of this study should look to use these data to undertake a formal power calculation and a larger study.

A different look at regional anaesthesia

■ There is a new epidemic sweeping North America – that of the ‘social addict’ – with large numbers of patients obtaining prescriptions of strong opioid analgesics from their healthcare providers and either taking them themselves or selling the tablets on to others. Due to the vagaries of the healthcare system in the United States, in particular, it is possible in many states to obtain multiple prescriptions from different doctors for the same problem, leading to overprescribing. There is evidence that the epidemic of drug-related deaths is at least in part due to medically prescribed opioids, not just ‘black-market’ drug imports. This tide is slowly starting to turn as healthcare providers introduce a series of checks and balances to reduce the chances of dual or overprescribing. One of the focuses of recent years has been the ‘right-sizing’ of postoperative pain medications. This study from **New York, New York (USA)** is essentially a rather straightforward audit of 84 patients who all underwent foot and ankle surgery under spinal anaesthesia, supplemented with popliteal blocks.⁵ The authors set out to establish how many postoperative ‘pain pills’ were needed by the patient population. All patients received either 40 or 60 single doses of opioid analgesia (of various types), a three-day supply of ibuprofen, and antiemetics. The outcome of the study was a patient-reported survey of this population at days 3, 7, 14, and 56, which documented whether they were still taking narcotics, the quantity of pills consumed, whether

refills were obtained, their pain level, and their reason for stopping opioids. On average, patients consumed 22.5 opioid pills (95% confidence interval (CI) 18 to 27), and had achieved a visual analogue scale (VAS) pain score of 4 by the third postoperative day. Just over half of patients had stopped taking analgesia by the third postoperative day, although 3% were still taking opioids at 56 days following surgery. Clearly, from this simple study it is possible to see that patients are being overprescribed analgesia following foot and ankle surgery, with a dosage of 30 individual analgesic tablets recommended by the study team.

Still a STAR at five years

■ Total ankle arthroplasty has been increasing in frequency of use, and with some reasonable evidence now to support longer-term outcomes, it is starting to become more widely regarded as a reliable option that maintains movement and may have better functional outcomes than an arthrodesis. However, even in the most ardent of supporters, doubts remain about its true longer-term outcomes. There are few long-term follow-up series, and the inclusion of ankle arthroplasty relatively recently, along with the low numbers implanted, has meant we cannot really turn to the registries for guidance with regard to its long-term outcomes. The Scandinavian Total Ankle Replacement (STAR) system is one of the total ankle arthroplasties with the longest follow-up data available, and includes a three-piece mobile-bearing design. Authors from **Redwood City, California (USA)** report implant survivorship in their prospective cohort series at 15 years of follow-up.⁶ Patient outcomes were also reported, although only for a subset of the 84 patients included in the main study. The study cohort all underwent total ankle arthroplasty with a STAR prosthesis in the period 1998 to 2000, and authors report

metal component (not bearing prosthesis) survival as their primary outcome measure. At 15 years of follow-up, the Kaplan–Meier calculated survival was 73%. The clinical scores were only available in a disappointing but understandable 29% of patients (n=24). There was a single patient who was reported as requiring a subtalar fusion for symptomatic adjacent joint arthritis, while exchange of the polyethylene bearing for fracture was required in three patients. Although the data is to be interpreted with care, given the restrictions in the size of the groups, the authors report that American Orthopaedic Foot & Ankle Society (AOFAS) scores improved from a mean of 39.6 points, preoperatively, to a mean of 71.6. However, around half of patients with retained implants required at least a single additional surgical procedure. Although these results are from a relatively small series, there are a number of interesting take-home messages given here. The authors' figures would suggest that, if a STAR ankle is *in situ* at nine years, the chances are it will survive

to 15. With an overall survival of 73% at 15 years, total ankle arthroplasty can now be considered to be a long-term option for the majority of patients.

Charcot deformity and the hindfoot nail X-ref

■ Hindfoot Charcot deformity poses a somewhat difficult problem. The traditional teaching for Charcot foot is to avoid surgery if at all possible, which is a reasonably successful strategy in the mid- and forefoot, but in the hindfoot is much more difficult to do. This is because the degenerative process associated with Charcot disease results in deformities of the hindfoot and ankle that are often not suitable for nonoperative management. This group in **Vienna (Austria)** have evaluated the options of hindfoot nailing with a retrograde nail as a treatment for Charcot arthropathy.⁷ They report the use of hindfoot nails (two varieties, but both straight nails with a compression component) in 19 feet (18 patients), all undergoing hindfoot arthrodesis for Charcot arthropathy. The authors sought to establish

what results can be expected with this approach in terms of both limb salvage and complication rates. Their series reports the outcomes at just over 3.5 years with an impressive limb salvage rate of 84% (n=16/19). Limb loss was, in all three cases, due to established osteomyelitis. The authors report reasonable functional outcomes, with significant improvements in the American Orthopaedic Foot and Ankle Society (AOFAS) score (71 vs 25), the Foot Function Index (FFI) (87 vs 161), visual analogue scale (VAS) score (1.9 vs 6.1), and various items of the Foot and Ankle Outcome Score (FAOS) (pain, 39 vs 81; activities of daily living, 50 vs 74; quality of life, 25 vs 56). Overall, this series is representative of the Charcot population, with a large number of smokers, diabetics, and patients with preoperative ulceration. On the whole, the results of hindfoot nailing appear to be reasonably good. There are relatively frequent complications reported in this series, as one would expect; however, the limb salvage rate was excellent, and this represents a successful treatment for a difficult problem.

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Wrist & Hand

Can we improve stiffness after distal radial fractures? X-ref

■ Stiffness is a problem we often encounter after distal radial fractures, and it can lead to significant pain and disability for the patient. In many large joints, a capsular release is undertaken if conservative measures fail, and this is sometimes combined with release of ligamentous structures. What is a relatively accepted procedure in the knee, shoulder, and elbow is far from being proven or accepted in the wrist. This is partly due to a perception among many surgeons that there is little that can be done to alleviate stiffness in the

wrist, as extensive releases risk joint instability and our desire to 'first do no harm' is usually an overriding one. It has previously been confirmed that supination stiffness can be improved with a volar distal radioulnar joint (DRUJ) capsular release.¹ This paper from **Stanford, California (USA)** and **Duke, North Carolina (USA)** provides a reassuring account of the two centres' experiences with release of the volar capsule of the radiocarpal joint for extension stiffness.² The authors describe the outcomes of 11 patients, all with post-traumatic loss of extension following treatment of a

distal radial fracture with a volar locking plate. The patients all underwent operative intervention, consisting of removal of the volar locking plate and releases. The releases were a flexor carpi radialis tenolysis and a subperiosteal release of the capsule as it attaches to the radius; only the volar extrinsic ligaments were divided. Patients were followed to a mean of 4.5 years and demonstrated significant improvements in range of motion and Disabilities of the Arm, Shoulder and Hand (DASH) scores. Importantly, there were no signs of wrist or carpal instability on plain film radiography or fluoroscopy. It

seems, therefore, that the technique of volar ligamentous release does not universally lead to the feared consequences of carpal instability, and may ultimately become a more accepted part of the armamentarium for this not uncommon problem. It is probably the case here that the use of extensive ligamentous releases is offset by pre-existing contracture that prevents complete instability.

Is dorsal plating really that bad?

■ Is dorsal plating of the radius really that much more troublesome than volar plating? The original