

ROUNDUP³⁶⁰

Spine

Hyperostotic spine in injury

x-ref Children's orthopaedics, Trauma

■ Patients with diffuse idiopathic skeletal hyperostosis (DISH) are a bit of an unknown quantity. Although the pathology, skeletal abnormalities and prognosis are well-known, there is little information out there to guide treatment of a DISH patient with other pathology. Clinicians in **Würzburg (Germany)** set out to establish what, if anything, the added complications of a DISH spine were when thoracolumbar injuries were sustained.¹ They designed a large nine-year retrospective review with the aims of clarifying the epidemiology, traumatic mechanism and injury characteristics in hyperostotic spines. In addition they sought (within the confines of a retrospective study design) to establish short-term outcomes. Like most retrospective studies, the study team reviewed clinical charts and radiographic imaging (often including computerised tomography scans) for all patients identified as having a thoracolumbar injury in the setting of a diagnosis of DISH. The authors were able to identify twenty patients with 23 episodes of trauma over the nine-year period. The overwhelming majority of injuries affected either the thoracic spine (n = 12) or thoracolumbar junction (n = 10), with a single injury to the lumbar spine. The majority of injuries were reported as having occurred after a high-energy impact (with forced hyper extension

then flexion) and this resulted in an equal distribution of vertebral body and disc injuries. Around a quarter of patients experienced neurological compromise and, in general, two segments of stabilisation was enough. The authors point out in their conclusions that although little is known about this problem, in the setting of an aging population with generally better function, 'silver trauma' is going to be increasingly important. Interpreting spinal injury within the settings of DISH changes is going to become an ever-more increasing problem, and characterisation of such injury patterns is important.

App based back pain control

x-ref Research

■ There has never been such a march onwards in the pace of technological innovation as has been seen in the past few years. It is now possible to do everything online (even find a date and obtain a medical consultation) and that trend has been moving towards mobile devices as consumers are becoming more and more phone- and tablet-driven. Researchers in **Eugene (USA)** set out in a novel randomised controlled trial to establish if innovative use of these technologies could be harnessed to deal with the slightly tricky topic of non-specific lower back pain.² Perhaps imagining a utopian future where their spinal clinics were not packed full of 'bonkers' back patients, the research team examined the use of the 'FitBack'

app which is based loosely around the American College of Physicians (ACP) and American Pain Society (APS) recommendation for over four weeks of multidisciplinary input. The App works to provide a self-tailored strategy to manage and prevent non-specific low back pain episodes. The research team recruited just shy of 600 patients, all of whom were screened for organic pathology and then randomised to one of three groups. Patients were either managed using either the FitBack App, an email-based correspondence programme (eight emails detailing the use of six internet based resources) or a control group. Outcomes were assessed at baseline, two and four months following recruitment. The raft of assessments administered by the research team included measures of pain, physical, behavioural and work outcome measures. The results really were interesting. Patients experienced better outcomes in the FitBack group compared with both the email-based group and the control group. Patients were over 60% more likely to report current back pain in either of the other two groups when compared with the FitBack group at the final four months of follow-up. This is a fascinating study which we were delighted to read here at 360. The use of this type of adaptive technology is able to provide high levels of input. Perhaps in conditions like this, the sense of empowerment associated with managing one's

own healthcare improves outcomes in addition to the information and exercises provided.

Interspinous process devices should be avoided in claudication

x-ref Research

■ There are a few randomised controlled trials of two comparative and alternate interventions that yield a 'definitive' answer. The nature of surgical intervention is that the differences in effect size of two comparable treatments is unlikely to yield a definitive answer one way or the other. Despite this potential drawback, they are the most useful of randomised controlled trials when they yield a definitive answer. With this in mind, a trial team from **Leiden (the Netherlands)** set out to unpick the tricky question of interspinous process devices (IPD) in the treatment of lumbar claudication.³ With the potential attractive option of offering a 'functional' decompression with less inherent risk than a simple decompression, these devices have proven to be a popular concept with patients and surgeons alike. The flip side of the coin of course is the concern that, if effective, they may erode through the transverse processes, or that without an open decompression they may not achieve appropriate decompression and symptomatic relief. The research team report a two-year follow-up of a randomised controlled trial with stratification by centre. The randomised trial was via opaque envelope and the

patients and outcome assessors were blinded (although of course the surgeons could not be). Patients were recruited across five centres and outcomes were assessed with the Zurich Claudication Questionnaire at two years of follow-up. The study team recruited 159 patients (80 with an IPD and 80 to bony decompression). Using functional assessment at two years for the primary outcome measure, the two treatments were equivocal. However there were differences in the reoperation rate for failed surgery in favour of the bony decompression (33% *versus* 8%). Interestingly, there was also a difference in the long-term outcomes in terms of Visual Analogue Scale (VAS) pain scores (36 mm *versus* 28 mm), again in favour of the bony decompression group. This study represents the best quality of available evidence concerning the treatment of lumbar spinal stenosis with IPD or standard decompression. There are no differences in outcome between the two approaches at two years, however very strong arguments can be made that the IPD is an inferior approach. With more operations required to reach the same PROMS outcome, and poorer long-term pain scores, here at 360 we have been steadily consigning our IPD sets to the rubbish bin.

Robot assisted pedicle screws: fad or advance?

x-ref Research

■ One of the perennial problems with instrumentation of the lumbar and thoracic spines is the adequate placement of pedicle screws. Misplaced screws can cause neurologic compromise, or even aortic injury. Although experienced surgeons have no difficulties in placing pedicle screws, there is still a reported incidence of misplaced screws, and for trainees and junior surgeons, this rate is even higher. One potential solution is the use of either computer-guided or robot-assisted surgery. Researchers in **Seoul (Korea)** have

designed an elegant randomised controlled trial to establish what, if anything, the benefit of robot assisted pedicle screw fixation is.⁴ Patients presenting with spinal stenosis and undergoing posterior lumbar instrumented fusion (PLIF) were randomised to either a robot-assisted method or standard pedicle screw placement. The results of this trial were supportive of both methods. Although there were more screws that breached the cortex of the pedicle in the robot-assisted group (4 *versus* 7), there were no differences discernible using the CUSUM test method in quality between the groups. It seems that like computer guidance for joint replacement, there are few differences in outcomes between the two methods. The robot-assisted surgery does however offer the potential advantage that it can be used in minimally invasive surgery safely.

Vancomycin antibiotic power in spinal surgery

■ In the constant battle against peri-operative infection there are a number of strategies that have been taken, including the use of systemic and local antibiotics. There are some differences of opinion over the use of topical antibiotics in the spine as there are conflicting clinical studies. A review team in **Chicago (USA)** set out to clarify matters and clear up any confusion with an excellent review of the literature surrounding the practice of local adjunctive application of vancomycin powder.⁵ The authors included 18 studies of the 671 initially identified from their search strategy. The level of evidence was somewhat mixed, with a single randomised controlled trial, 13 comparative studies and four case series reported. Despite the controversies surrounding the use of meta-analysis including comparative studies, the research team decided to persevere anyway. They estimated the odds of deep infection to be 0.23 with the vancomycin powder, a finding

that was repeated when superficial and deep infections were considered together (odds ratio 0.43). The evidence presented in this review would certainly support the practice of routine use of topical vancomycin in patients undergoing routine spinal surgery. The safety profile on the surface looks to be acceptable, however there is little in the way of long-term data to quantify the potential effects on antibiotic resistance.

What to do with that burst fracture?

x-ref Trauma

■ Thoracolumbar burst fractures are amongst the most common injuries to the spinal column and although many different algorithms have been proposed for selecting different treatment strategies (most based on classification systems such



as that of Denis aiming to predict which fractures are stable and which are not), there is little in the way of objective evidence to support operative over non-operative treatment. A trials team in **Boston (USA)** has added a significant piece to the jigsaw with their contribution of long-term follow-up of an RCT comparing non-operative with operative treatment of burst fractures without neurological deficit.⁶ Their study has been previously reported (at four years) showing no differences between the operative and non-operative groups. The trial concerns 47 patients treated over a six year period, all with a stable thoracolumbar burst fracture and no

neurological defect at presentation. Patients were randomised either to fusion or orthosis and results were reported using the VAS pain scale, Oswestry disability index and SF-36 quality of life score. This report concerns 18 years of follow-up for 37 of the original cohort (19 operative and 18 non-operative). Despite the expected loss to follow-up and longer reporting time (which in most studies tends to reduce differences between interventions), the non-operative group were performing significantly better than the operative group at this follow-up. Visual analogue pain scores were better (40 mm operative *versus* 15 mm non-operative) as were the Oswestry disability index (20 operative *versus* 2 non-operative). This study (despite its now small size, so likely underpowered nature) does come down firmly in favour of non-operative treatment for stable burst fractures. This is interesting on two counts – that there were no differences at four years suggests this is due to the longer-term effects of fusion on the spine – and given that some patients were treated in body casts, given the age of the study many of the perceived disadvantages of non-operative treatment are now no longer relevant.

Increasing complexity of spinal fractures in major trauma pathways

x-ref Trauma

■ The ongoing maturation of the United Kingdom major trauma system (the only national centrally-designed network aimed at designing care for treating severely injured patients) continues to shed light on injury patterns, best practice and evolving standards of care as the system develops. With two pathways of care at most Major Trauma Centres (MTC), those locally presenting and those transferred in from other trauma centres, comparisons can begin to be made. Researchers in **London (UK)** have evaluated the first two years of their own MTC to establish if there are any differences in the presentation and nature of

spinal fractures occurring between the two different pathways.⁷ In the two years of their retrospective study, there were 134 patients admitted with a spinal fracture (split 50:50 between the MTC and local pathway). The MTC patients had a different demographic being predominantly male and younger (mean age 48.8 years) when compared with their locally presenting counterparts with a 50:50 gender split and an older age (mean age 58.1 years). The injury patterns in themselves were also characteristically different, with a higher proportion requiring surgical intervention (62.7% versus 56.7%), more likely to be cervico-thoracic injuries, and unstable fractures were therefore more common. The overall complexity of these patients was significantly higher with an additional four days required in hospital.

Vitamin D and spinal fractures

x-ref Trauma, Research

■ Vitamin D deficiency is currently a trendy topic. In recent years the link between vitamin D deficiency

and fragility fractures has been one of renewed and ongoing research interest, particularly in hip fractures. Recent research has established that vitamin D deficiency is not only a significant risk factor for fragility fracture, but also that it impairs subsequent fracture healing. Amazingly given the frequency of fragility fractures of the spine, there is little research investigating any potential link to vitamin D. The authors of this study from **Glessen (Germany)** set out to establish the serum levels of 25-hydroxyvitamin D (25-OH D) in patients presenting with vertebral fragility fractures, compare them to a control population, and finally establish any seasonal variation.⁸ Their study cohort consisted of 246 patients presenting with vertebral fractures and a control population of 392 patients with back pain and no insufficiency fractures. The major findings of their study were (as perhaps could easily have been predicted) a difference in vitamin D levels between those patients presenting with

fracture and those with simple back pain. There was also a significant link found between obesity, nicotine use and diabetes mellitus. The spotlight on vitamin D and its link to fragility fractures will continue for the foreseeable future. Establishing causal links is important, but perhaps more important will be the potential for public health interventions. Osteoporosis, vitamin D and bisphosphonates are much studied, but the emphasis in the past has very much been on calcium and bisphosphonates, perhaps to the detriment of our patients?

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