

ROUNDUP³⁶⁰

Spine

MRI of no benefit in follow-up of lumbar disc prolapse

■ The correlation between MRI findings and clinical signs and symptoms in spinal patients is known to be controversial due to the high rate of false positives and the potential to confuse an already clouded clinical picture. That said, MRI remains the gold standard investigation for all spinal conditions. While the role in diagnosis is mildly contentious (especially when symptoms don't fit), the role in follow-up is even more controversial. Investigators who are part of the Spine Intervention Prognostic Study Group from **The Hague (The Netherlands)** set about determining the diagnostic value of MRI as part of their randomised controlled trial (Level I evidence). Diagnostic tools are rarely included in RCT protocols so our ears pricked up, here at 360, when we first heard about this study. They compared patients who underwent surgery with those who had conservative management for sciatica and lumbar disc herniation. Patients were followed up with serial MRI scans and a favourable result was defined as a patient with complete resolution of symptoms by one year. MRI scans were reported for the presence and size of a disc herniation and receiver operating characteristic (ROC) curves constructed to establish the prognostic accuracy of the MRI scores on outcome. By one year of follow-up, 84% of the patients in the study were able to report a favourable outcome and disc herniation was visible on

MRI in about a third of both groups (35% favourable, 33% unfavourable). In patients with a disc herniation 85% had a favourable outcome, and 83% without also had a favourable outcome. There was no prognostic value in post-operative MRI scanning in this group of patients and the AUC of the ROC curve was 0.48 (random chance).¹ This extremely robust study establishes that the administration of a post-operative MRI scan is of absolutely no value in evaluating outcome or prognostication.

Gunshot injury to the spinal cord

■ One of the most catastrophic injuries in terms of long-term post-traumatic disability is that of the gunshot injury to the spinal cord. Despite the devastating consequences and well-developed trauma systems in many modern healthcare economies where gunshot injury is relatively common, there is little data concerning the management of such injuries, with most management protocols based on the much more common blunt cord injuries. Researchers in **Philadelphia (USA)** set about establishing the evidence basis for management of spinal gunshot injuries with the aim of establishing differences in prognosis with other types of spinal injury, the role for steroid treatment and the benefits and complications associated with surgical intervention. The researchers noted that there was a general lack of evidence available, but that the evidence which does exist suggests that gunshot injuries

are severe and the worst prognosis is seen with complete injury, regardless of intervention. There is no current evidence for the use of steroids, however, there is evidence to support decompression and bullet retrieval in selected patients (those with incomplete lesions and cordae equina symptoms) at the cost of a higher complication rate.² It is clear from the quality of evidence reviews undertaken by the study team that although there are a few studies with which to inform practice, there are very few high quality studies and those that do exist exhibit considerable heterogeneity. This is certainly an area for further research; even a good quality review of a large trauma registry would add considerably to what is known on the topic.

Depressing back pain

■ Thus far in 360, we have drawn the attention of our readership to a fair number of psychological and psychosocial papers exploring the link between back pain and depression. It's almost enough to get us down! Exploring yet another aspect of the complex interaction between mental health, depression and back pain symptoms, researchers in **Okayama (Japan)** aimed to establish the effects of chronic pain, disability and mental health state. They designed a study exploring this relationship with 151 patients, 122 of whom completed depressive index questionnaires (self-rating depression scale SDS), back pain severity scores (Visual Analogue Scale (VAS)), and disability indices (Japanese Orthopaedic

Association Score (JOA), and Roland-Morris disability questionnaire (RDQ)). In common with other studies, the researchers identified a high rate of depression (77%), of whom half were severely depressed. Interestingly, however, although there was no difference in the duration of symptoms between the groups, there was a significantly higher pain score between the severely depressed (VAS = 70), mildly depressed (VAS = 52) and non-depressed (VAS = 14) cohorts.³ The investigators established that in their cohort the depressive indices correlated with both VAS, JOA and RDQ scores, indicating that the level of depression affected, or was affected by, the severity of lumbar back pain symptoms. What is again unclear from this work is the causation; we appear (despite the large number of papers on the topic) absolutely no nearer to knowing if the back pain causes the depression or if the back pain makes the depression seem worse.

Floating dural sack sign

■ In an intriguing paper published in a radiology journal, radiologists in **Yamagata (Japan)** propose a 'floating dural sack sign' seen as a "hyperintense band or rim around the spinal dural sac on axial T2-weighted images" as a highly sensitive sign for CSF leak. The research team investigated 101 patients with an orthostatic headache in 11 hospitals, of whom a combination of brain MRI scans (n = 89), MR myelography (n = 86) and axial T2-weighted spine MRI (n = 70) were undertaken. The clinical diagnosis of CSF leak was

established in 14 patients and the dural sack sign was seen on 17 scans (13 with CSF leak and four without), giving a sensitivity and specificity of 93% compared with the much lower sensitivity (21.4%) but higher specificity (100%) of MRI myelography.⁴ We would tend to agree with the authors and will be scrutinising our post-decompression scans for a 'floating dural sack' at the first hint of a misplaced decompressive rongeur.

Short segment fixation at ten years

■ Researchers in **Chiba (Japan)** have reported on a ten-year follow-up series of patients following short segment fixation following thoracolumbar burst fractures. Although only a small series, the research team, rationalising that the long-term outcomes are not known, have reported on 12 patients with thoracolumbar burst fractures and associated incomplete neurologic deficit treated with short segment fixation. All patients subsequently had their implants removed a year after surgery and the results are reported at a minimum of ten years. All patients were treated with indirect reduction, using a posterior pedicle screw construct and transpedicular grafting to the fractured vertebral body. The patients were found to have improvement in sagittal alignment (regaining 19° of lordosis), although 4° was lost over the subsequent decade. A single patient reported occasional moderate pain, three minimal pain and eight no pain. No adjacent segment disease was seen at the ten-year follow-up MRI scan and flexion extension views revealed a mean 12 degrees motion at the adjacent segments.⁵ This study supports the practice of short segment fixation. The investigators have been able to demonstrate (albeit in a small series) no significant loss of fixation and that the limited segment fusion allows for maintenance of adjacent segment motion and mobility.

Earlier return to play safer than previously thought

■ We always find it difficult in the

office deciding when professional athletes are safe to return to play. While there is plenty of evidence to support return to work post-operatively in a range of conditions, there is little evidence for professional athletes. Surgeons in **Pittsburgh (USA)** have attempted to put to bed some of the controversy surrounding return to contact sports and professional athletes following anterior cervical spine decompression and fusion (ACDF). The authors report a series of professional contact athletes who had undergone an ACDF following a traumatic cervical spine injury. In this retrospective review (Level IV evidence), 15 patients all presented initially with neuropraxia, complicated in eight with cervical radiculopathy, and two with signal changes in the cord. The majority of patients (n = 14) also had signs of cervical stenosis and loss of peri-cord CSF signal. The surgical team took an aggressive approach to return to play and allowed all athletes to return to play when they had a normal neurological exam and radiological criteria were suggestive of early fusion. In the majority of cases (n = 13) this was between two and 12 months (mean six months) following surgery.⁶ The athletes in this series suffered no neurological disability and no problems following the return to play decision. Eight patients were still involved in professional sports at final follow-up. The pragmatic view taken by these authors seems to be sensible to us.

Infection in diabetic spinal patients

■ In what must be a record month for our Japanese spinal surgical colleagues, they are yet again leading the way in spine surgery. Investigators in **Konan (Japan)** this time turned their beady eyes on diabetic spinal patients. Diabetes is a known risk factor for poor outcome in nearly all branches of surgery and has been particularly implicated in excess risk of infection. While it is known that diabetes per se is an infection risk, there is little evidence picking apart which diabetic parameter

is most closely linked to infection risk. The research team assembled a cohort of 110 diabetic patients undergoing spinal instrumentation and carefully recorded a range of parameters and monitored them for post-operative surgical site infections (SSI). Univariate and multivariate analyses were performed to establish the relative risk of infection. There was a post-operative SSI incidence of 10% (n = 11) and of all the factors



screened for proteinuria (a marker of diabetic nephropathy and advanced diabetes), operative time and estimated blood loss were found to be predictive of infection with univariate analysis while further multivariate analysis demonstrated proteinuria to be the single biggest predictor of SSI with an odds ratio of 6.3. The investigators have used sophisticated statistical techniques to identify proteinuria to be predictive of surgical site infection in spinal patients while the level of glycaemic control is not. The researchers suggest that perhaps in patients with signs of diabetic nephropathy, a higher threshold for surgery and minimally invasive techniques would be most appropriate to attempt to ameliorate the excess risk. Here at 360 HQ, we were also interested to learn a less emphasised finding of the study that pre-operative glycaemic control had no impact on likelihood of infection. Given this observation we wonder if time spent pre-operatively optimising glycaemic control may not be indicated.⁷

Dynesis: no advance

■ Dynesis, or syndamic stabilisation is a posterior instrumentation system that was introduced to allow for controlled movement of the posterior elements and hence reduce some of the drawbacks of fusion. Like many new systems it gained popularity, particularly with early encouraging reports in the medical literature. The system was conceived to preserve motion at all treated levels and thereby reduce adjacent segment disease and post-operative stiffness. Surgeons in **London (UK)** designed a retrospective comparative series (Level III evidence) to establish the longer-term outcomes of the Dynesis system which are still very much unproven. A case series of 32 Dynesis patients was compared with a comparator group of 32 posterior fusion patients treated at the same institution. Outcomes were assessed using a VAS scale for back and leg pain and the Oswestry disability index (ODI). Surgery was successful at relieving back and leg pain in both cohorts with significant improvements in VAS scores and the ODI scores. There were, however, some differences between the groups, with significantly lower satisfaction levels in the Dynesis group (69% versus 88%) and poorer VAS back pain scores.⁸ Based on this longer-term outcome series perhaps Dynesis can be seen as a less controversial option, but it also appears to be a less successful option than straightforward posterior instrumented fusion.

REFERENCES

1. el Barzouhi A, Vleggeert-Lankamp CL, Lycklama à Nijeholt GJ, et al. Magnetic resonance imaging in follow-up assessment of sciatica. *N Engl J Med* 2013;368:999-1007.
2. Sidhu GS, Ghag A, Prokusi V, Vaccaro AR, Radcliff KE. Civilian gunshot injuries of the spinal cord: a systematic review of the current literature. *Clin Orthop Relat Res* 2013;(Epub ahead of print) PMID: 23479233.
3. Tetsunaga T, Misawa H, Tanaka M, et al. The clinical manifestations of lumbar disease are correlated with self-rating depression scale scores. *J Orthop Sci* 2013;(Epub ahead of print) PMID: 23443204.

4. **Hosoya T, Hatazawa J, Sato S, et al.** Floating dural sac sign is a sensitive magnetic resonance imaging finding of spinal cerebrospinal fluid leakage. *Neurol Med Chir (Tokyo)* 2013;53:207-212.
5. **Toyone T, Ozawa T, Inada K, et al.** Short-segment fixation without fusion for thoracolumbar burst fractures with neurological deficit can preserve thoracolumbar motion without resulting in post-traumatic disc degeneration: a 10-year follow-up study. *Spine (Phila Pa 1976)* 2013;(Epub ahead of print) PMID: 23615381.
6. **Maroon JC, Bost JW, Petraglia AL, et al.** Outcomes following anterior cervical discectomy and fusion in professional athletes. *Neurosurgery* 2013;(Epub ahead of print) PMID: 23615099.
7. **Satake K, Kanemura T, Matsumoto A, Yamaguchi H, Ishikawa Y.** Predisposing factors for surgical site infection of spinal instrumentation surgery for diabetes patients. *Eur Spine J* 2013;(Epub ahead of print) PMID: 23612899.
8. **Haddad B, Makki D, Konan S, et al.** Dynesys dynamic stabilization: less good outcome than lumbar fusion at 4-year follow-up. *Acta Orthop Belg* 2013;79:97-103.
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