

Utility of supine lateral radiographs for assessment of lumbar segmental instability in degenerative lumbar spondylolisthesis

■ The correct diagnosis of dynamic instability in the spine can, in some circumstances, alter surgical management through leading the surgeon to fuse motion segments rather than performing a decompression alone. The traditional investigation used to establish instability has been the comparison of standing flexion and extension radiographs. A study from **New York, New York (USA)** has set out to investigate whether supine lateral radiographs are more effective at revealing a spondylolisthesis when compared with standing neutral and bending images.¹ These authors hypothesize that in a supine position, the lumbar muscles are more relaxed and an anterolisthesed segment is more likely to reduce when compared with the standing position. The authors performed a diagnostic study to assess the overall diagnostic value of supine radiographs against the more commonly utilized standing and flexion films. The investigators evaluated supine radiographs in addition to standard flexion/extension films in a cohort of 59 patients, all with a symptomatic degenerative spondylolisthesis. They found that the mean movement between flexion/extension films was 5.53% (SD 4.11) in the lateral supine view, whereas with flexion/supine films it was 7.83% (SD 4.67), a significant difference that reflects a more accurate test. As a result, the authors suggest that the supine lateral radiograph should be performed instead of the extension film, as it is more likely to detect segmental instability. The reality of spinal practice would seem to confirm this. Most units will follow a third radiological protocol, which the authors do not mention: perform

only a flexion film. Most patients will have had a (supine) MRI; perhaps the MRI/flexion film can be compared instead, and this extra radiograph can be omitted entirely.

Predictive factors of positive online patient ratings of spine surgeons X-ref

■ The presence of online ratings of spine surgeons has been previously discussed in 360. This interesting study from **Providence, Rhode Island (USA)** further explores what factors predict positive online ratings.² The authors analyzed the ratings of 250 spine surgeons listed on three websites: www.healthgrades.com, www.vitals.com, and www.ratemds.com. The overall physician/patient satisfaction ratings were assessed and correlated with individual patient comments. The authors organized patient comments into one of three categories: professional competence, bedside manner, and practice characteristics. The authors hypothesized that the surgeons with greater experience and more reviews would have demonstrably better ratings and, furthermore, that surgical competence would be the major determinant of rating scores. The results show that surgeons with better ratings had significantly better trust, scheduling, staff, helpfulness, and punctuality but significantly less experience. Trustworthiness was defined by the study as a patient's confidence in a physician's intent and actions, along with their communication and compassion. Linear regression analysis with rating scores revealed only three statistically significant relationships: greater trustworthiness, lower experience, and fewer negative comments on surgeon's professional competence. The study found that of the comments based on staff and practice characteristics, most were based on negative and not positive

experiences. With regard to the surgeons, most comments centred on communication and bedside manner; however, only negative comments on professional competence significantly predicted ratings. This study neatly highlights what patients value: namely communication, bedside manner, and building a trusting doctor-patient relationship. The role of a surgeon's practice staff is also important in ensuring a smooth patient experience. This may be advantageous to surgeons who are earlier in their career and who have a smaller case load, as they may have more time to spend with each patient or may be more attuned to the softer side of clinical work, particularly given the emphasis in recent medical education on improving communication skills.

Lumbar discectomy is associated with higher rates of lumbar fusion

■ Lumbar fusion is acknowledged by most spine surgeons as a likely future sequela to a discectomy for lumbar disc herniation. Disc herniation suggests mechanical failure of the intervertebral disc and it stands to reason that, with time, this spinal segment will show an increased likelihood of degeneration and consequent back pain, which can be treated with lumbar fusion. While clearly not a certainty, most surgeons recognize this 'pattern of degenerative change'. The authors of this study from **Chicago, Illinois (USA)** have set out to see whether this sequence does occur and what the increased risk of a fusion is in the setting of prior discectomy.³ The authors retrospectively examined a massive cohort of 200 000 patients who had undergone a discectomy ten years previously using a healthcare research database. These were then compared with a control population of patients who had been

allocated an ICD-9 code consistent with conditions including lumbago, lumbar spondylosis, and radiculopathy, and who were followed up but had not undergone a discectomy. The lumbar fusion rates after a discectomy ranged from 1.69% (one year post-discectomy) to 8.50% at ten years. When the two groups were compared, the overall fusion rate was 12.50% for the discectomy group and 4.19% in the non-discectomy group. Not only was this significant, but it also meant that patients who had undergone a discectomy were 2.97 times (95% confidence interval 2.86 to 3.10) more likely to have a fusion than those with a different lumbar diagnosis in the absence of discectomy. The authors suggest that this rate would be much higher if compared with a population of those who did not have a lumbar diagnosis. The authors claim that this is the first study to demonstrate the long-term risk of subsequent fusion surgery following a discectomy. It provides useful information that can be used when consenting a patient for a discectomy, so that realistic expectations can be set, and so that patients are aware of the long-term likelihood of further surgery. However, it is important to recognize that this is a cross-sectional, not longitudinal, study and as such there is scope for incorrect associations. As with all registry studies, it suffers from the difficulties of determining causal relationships.

Degenerative spondylolisthesis: the core issue

■ Degenerative spondylolisthesis (DS) and the consequent spinal stenosis is a problem in our ever-ageing population, particularly in female patients. Why this is the case has been debated for some time, with hypotheses ranging from hormonal effects and pregnancy to ethnicity,

spinopelvic and lumbosacral parameters, and facet joint morphology. One theory that has gained some traction is that DS is due to a failure of torsional resistance of the lumbar spine, 95% of which comes from the anterior abdominal wall musculature. If this is the case, then conditions that influence the quality of these muscles, such as multiparity or divarication, could be associated with the establishment of DS. To investigate this hypothesis, a group from **Adelaide (Australia)** have carried out an observational cohort study of 205 patients presenting to a single surgeon in a single centre with low back pain or sciatica due to DS.⁴ Patients with previous lumbar surgery, infection, tumour, or fracture (including lytic spondylolisthesis) were excluded. Each patient had clinical assessment of the integrity of their linea alba, ventral abdominal hernia scars, and waist circumference at the umbilicus. Where additional imaging was required as part of the patient's assessment (such as MRI or CT), radiological investigation of the anterior abdominal wall was also undertaken. The authors found that DS was not associated with height, body mass index, or waist size. There was a strong association between being female and having DS, and women with DS were more likely to have been pregnant at some point than not. More than 70% of women with DS had undergone previous abdominal surgery, and although there was an association between linea alba weakness and DS, this only reached the conventional level of significance in women. Overall, this study is supportive of a potential aetiology for DS involving abdominal wall stability, and as a result also supportive of a potential effective treatment. We don't know from this investigation how the facet joints, paraspinal musculature, or any transitional segments influence the findings, and this needs further work to ensure no confounding. However, although the authors do not speculate about whether treating

anterior abdominal wall deficits would be effective, certainly the results support further investigation in this direction.

Blocks to nerve root blocks

■ Radiculopathy is a common presentation to family doctors, as well as to outpatient and inpatient services. Overall, there is a lifetime prevalence of 4% to 5% of radiculopathy due to lumbar disc prolapse, which is likely to increase as the population grows and obesity becomes more commonplace. In most patients, a conservative treatment plan is effective, with resolution of approximately 95% occurring within six weeks in most simple cases. That does, however, leave some patients troubled by persisting symptoms that require intervention. In most cases, either nerve root injection or surgery are considered. Steroid injections, through their reduction of perineural inflammation, are usually effective and can save the patient the risks and recovery associated with discectomy. Trials have shown that this treatment is cost-effective and has an efficacy of up to 80%, but we have little idea of who is likely to do well with injections, and who is likely to require further, perhaps more invasive, treatment. A group from **Tamil Nadu (India)** have investigated this problem using a prospective observational cohort methodology.⁵ The authors studied 91 patients with lumbar disc prolapses who were eligible for the study and consented to injection, and followed them to one year. Patients were excluded for a range of reasons, including the presence of cauda equina syndrome, chronic radiculopathy (more than three months), bilateral symptoms, disc above L3/4, spondylolisthesis, and trauma. Injections were carried out in a standard manner using the radiological 'Scottie dog' technique; 2 ml of 0.5% bupivacaine and 80 mg of triamcinolone were infiltrated following 1 ml of radiopaque contrast into the nerve root. This was followed by three weeks of 75 mg



pregabalin every night. The group benefitted from 100% follow up, and reported that, overall, 75.8% of patients showed good relief at one year, which is in line with other literature. The remainder required surgical treatment in the intervening period. Having sensory symptoms, a higher pre-injection Oswestry Disability Index (ODI), a higher post-injection ODI, and a 'white collar' job were associated with significantly less symptom relief from injection. Furthermore, the authors explained that having a 'splash' pattern of contrast, where the radiopaque material disperses around the nerve root in an irregular manner, was also associated with poor symptoms relief. Most significant, however, was the presence of a lumbar transitional vertebra, with these patients having very limited relief. There are some factors to consider before building these findings into practice. Patients were offered injections after three weeks of pain, rather than a longer period, and were all prescribed pregabalin. There are, of course, cultural differences to be borne in mind as well, but it seems that this useful study may contribute to predicting who is likely to do well after this simple and safe intervention, and who might benefit from earlier surgical treatment.

Psychological and emotional distress in adolescent idiopathic scoliosis patients

■ Adolescent idiopathic scoliosis (AIS) is a complex problem, not just

for the treating surgeon, but for the patient and their families. The list of demands on a young patient's life is long: repeated hospital visits, radiological investigations, braces, physiotherapy, dressing clinics, complications, and so on. Unsurprisingly, the effect of these on a young person's psychological state is thought to be significant. In order to better inform our care of these complex patients, and to help us understand what impact our treatment plans have on them, a group from **Los Angeles, California (USA)** have investigated the psychological state of patients being treated for AIS.⁶ In this study, 92 patients and 92 parents completed a validated psychological questionnaire (the Behavioural Assessment System for Children, Second Edition, or BASC-2). Patients were eligible if they were aged between 12 and 21 years, had a diagnosis of AIS, and consented to inclusion. One parent was also asked to complete their portion of the BASC-2 questionnaire. Patients were stratified based on their treatment plan (bracing, observation, or surgery), by Cobb angle, and by age. Questionnaires were administered before brace application, preoperatively, or in the early phase of conservative care. Each treatment group had approximately 30 patients within it. Across all groups, 31.5% of patients reported clinically significant psychological difficulty. There was no difference between the various treatment groups, Cobb angle sizes, or ages, although Cobb angle was higher in those treated surgically. Surprisingly, in those patients who did record psychological difficulty, 66% of their parents were unaware of their child's problems, showing that it is under-recognized even by those closest to the patient. Anxiety and depression were the difficulties reported most often, and patients tended to cope through introversion, suggesting a mechanism for under-recognition of difficulties when not explicitly explored. The authors note that the incidence of psychological

problems reported in this study is similar to that of children undergoing heart transplants, and that it seems to be the diagnosis alone, rather than the severity or treatment, that is responsible. Regarding the methodology, the study uses a small sample, which has implications for interpretation, and it does not compare the outcomes with a control group. However, it does make for interesting reading, and certainly suggests a way that we might improve our care for these lifelong patients.

Are repeated injections worthwhile?

■ Papers reported in this issue of 360 have outlined how to pick winners for nerve root injections. Although the vast majority of these injections are successful, there are a proportion that will not be. In the lumbar spine, many will move directly on to decompression following one or two injections; however, things are not as simple in the cervical spine, where at cord level there is a higher risk of more significant complications.

This paper from **Zürich (Switzerland)** asks the question, if a single epidural steroid injection has been only partly effective or if patients have recurrent radicular pain, would a second injection help? This series attempts to answer that question by prospectively following 102 patients after an epidural injection (in 57 patients for lumbar symptoms and in 45 patients for cervical symptoms). Those patients who required a second injection were then prospectively followed for a year to establish what the outcomes were. Outcomes were assessed with the usual battery of patient-reported outcome measures; in this case, pain was scored using a visual analogue scale (VAS), functional outcomes were scored with a spinal score (Oswestry Disability Index or the Neck Pain and Disability Index), and health-related quality of life was scored using the 12-Item Short-Form Health Survey (SF-12). Despite the reasonable numbers in the initial series, this paper is actually based on the results of the 17 patients who required a second lumbar epidural

and seven patients who required a second injection for cervical spine symptoms. The outcomes were satisfactory in all but one patient, who underwent a subsequent microdiscectomy, with an average VAS score for leg pain of 8.8 mm and for arm pain of 6.3 mm one year after the second injection. This paper adds some information in the poorly explored area of second epidural injections for intractable arm and leg pain. It suggests that it is not an unreasonable course of action to offer patients a second injection, and that those patients can reasonably be expected to do well a year following this injection most of the time. The problem here, of course, is the small numbers. Where the paper headlines with 102 patients, the repeat epidural group for cervical symptoms is just seven patients, and drawing any firm conclusions from such a small subgroup would be cavalier at best.

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Trauma

X-ref For other Roundups in this issue that cross-reference with Trauma see: *Foot & Ankle Roundup 6; Wrist & Hand Roundups 1 & 3; Shoulder & Elbow Roundups 1 & 5; Research Roundup 1.*

Assessment instability after isolated SER fractures X-ref

■ These authors from **Seoul (South Korea)** have stuck their proverbial oar in with the ongoing debate surrounding assessment of stability in ankle fractures.¹ There has been much written, debated, and argued about in regard to the supination-external rotation (SER) injury, and specifically which ones are unstable. Some units advocate weight-bearing films, some promote

gravity stress views, and the majority probably assess the medial side for pain and signs of deltoid ligament injury. The focus of this study was on the diagnosis of radiological instability. Taking the external rotation stress test as the 'gold standard' for diagnosing ankle instability, the authors enrolled 37 patients in their study and set about examining the diagnostic value (sensitivity, specificity, likelihood ratio, and post-test probability of instability) against the external rotation stress test. The candidate tests were clinical findings (medial tenderness, swelling, and ecchymosis), the gravity stress test, and MRI; these were all tested against the external rotation stress view. The findings are interesting. Overall the

gravity stress view appeared most accurate, with a positive likelihood ratio (LR) of 5.71 and a negative ratio of 0.33. This alone was not enough to shift the pre-test probability of instability in their study, and the authors suggested a combination of either clinical findings (1.45 to 2.54 positive LR; 0.25 to 0.70 negative LR) or MRI scanning (3.05 positive LR; 0.53 negative LR). In short, this study finds that a combination of any two of the tests are required to reach the diagnostic accuracy of the external rotation stress test. There is, of course, much debate on whether the external rotation stress test is really the gold standard in the first place. If you believe in it for diagnosis of ankle instability, then you can replace it

with a gravity stress test and clinical findings – if you don't then you are no further forwards.

ORIF versus ORIF and subtalar arthrodesis in calcaneal fractures

■ The calcaneal fracture continues to elude researchers with no clear single answer. The recent UK-Heal fracture trial tells us that open reduction and external fixation (ORIF) does not prevent subtalar arthrosis – but we kind of knew that already. The volume of work from Rick Buckley in Calgary tells us that some patients may benefit from fixation, but you have to pick your winners. Aside from these two large trials, there is a plethora of smaller studies looking