

## Ketamine in scoliosis surgery **X-ref**

■ Scoliosis surgery is amongst the most invasive and significant surgery undertaken in the paediatric population. The risks of this surgery are significant, including most of the potential heart sink complications, however thankfully these are rare. What is far more common is a turbulent post-operative period. Often undertaken in adolescent females, the scoliosis correction carries with it a certain burden of intense post-operative care which can be made more difficult by poor analgesia. In a well-conducted randomised controlled trial, investigators from **Tokyo (Japan)**<sup>1</sup> recruited 36 patients, all adolescents undergoing scoliosis surgery. Patients were randomised to either a combined intra-operative and post-operative ketamine infusion (2° µg/kg/min) run for 48 hours after surgery or infusion of an equal volume of saline. Anaesthetic regime was standardised and supplementary analgesia was administered with a patient-controlled analgesia pump. The primary outcome measure was morphine utilisation in the 48 hours following surgery, with secondary outcomes of pain scores, sedation scales, anti-emetic consumption and complications of analgesia. From a methodology point of view, the blinding of the nurses and patient to the treatment regime adds a lot of strength to the results here, and the outcomes are fairly clear. The patients randomised to the ketamine group had lower post-operative morphine requirements and lower anti-emetic use. All of the other secondary outcome measures were identical. This would certainly seem to be a simple intervention that can be used to reduce the incidence of morphine use, making patients more comfortable. We wonder if it may also be suitable for use in accelerated discharge pathways in other forms of spinal

surgery. Better pain control, we know, reduces length of stay and improves outcomes.

## Teriparatide in osteoporotic spinal fractures **X-ref**

■ Despite the frequency of osteoporotic fractures of the vertebral column (similar in incidence and morbidity to hip fractures), there are surprisingly few high-quality studies on this subject that make it into the general consciousness. We were delighted here at 360 to come across this randomised controlled trial evaluating the benefit (or otherwise) of teriparatide injections in reducing the incidence of fracture. In an innovative study, researchers in **Southampton (UK)** used a combination of RCT methodology and included an adjustment using the validated FRAX tool for baseline fracture probability to establish the effect of teriparatide on vertebral fracture risk.<sup>2</sup> The study included a cohort of 1637 patients, all of whom were post-menopausal women who were allocated to either placebo, teriparatide 20 µg or teriparatide 40 µg daily. The likelihood of ten-year fracture incidence was estimated using the FRAX model, and the incidence of actual fracture rates compared with the FRAX-estimated fracture rates were used to compute the effect teriparatide had on actual fracture incidence. The predictive ten-year risk of fracture covered a wide range of incidence (between 2.2% and 67.2%) and the teriparatide groups had a lower adjusted risk of fracture for both non-vertebral (37% decrease in relative risk) and low energy vertebral fractures (66% relative decrease in risk). The authors were able to establish that the same and a similar-sized effect were seen when both BMD was excluded from the FRAX prediction, and when baseline risk was adjusted for hip fracture the interactions were the same. This study adds to the increasing volume

of weight supporting the use of teriparatide. The only issue with it is that the inconvenience of daily injections can make this sort of treatment difficult for patients to tolerate when competing therapies can offer an annual infusion or a weekly dosing.

## Trabecular metal in the spine?

■ The enthusiasm for trabecular metal (usually made from tantalum) remains unabated, with surgeons enjoying the novelty, flexibility and potential for simplicity of addressing bone defects in large joint arthroplasty. Slightly unusually, spinal surgeons have been a little late to the party and have only recently been getting to grips with the potential benefit that trabecular metal cages may offer in spinal fusion operations. In the only randomised controlled trial to our knowledge, here at 360, evaluating the use of trabecular metal cages in PLIF with or without pedicle screw fixation, investigators from **Sint-Niklaas (Belgium)** randomised patients undergoing decompression and fusion for degenerative disc disease using either a standalone cage, or in combination with pedicle screw instrumentation.<sup>3</sup> The study included 80 patients, all presenting with low back pain and a single-level degenerative disc. Outcomes were assessed at long term (six years), with stable fusion as the primary outcome measure (assessed as evidence of a stable fusion on flexion and extension radiographs). Secondary measures also reported included clinical evaluations at regular intervals and administration of the Oswestry Disability Index, VAS score for low back pain and an SF-36 quality of life score. Eighty patients were recruited into the study, and at final six-year follow-up there were comparable levels of stable fusion in each group (94% in the cage alone group vs 97% in the posterior instrumentation group). There were

no significant differences in improvement in VAS pain scores, fusion rates or SF-36 scores. Certainly, based on the results presented here one could argue that the need to add additional posterior fixation may be circumvented if tantalum metal cages were used. It would be nice to see some large series data to establish what the complication rates associated with this approach might be. A study of 40 patients doesn't really give enough information in incidence of complications to make a comparison, however, these results do in themselves look promising.

## Revision surgery a SPORTing chance?

■ The Spine Patient Outcomes Research Trial (SPORT) was a large prospective trial that examined, amongst other things, outcomes after discectomy. There has been an ongoing trickle of useful papers related to SPORT, and this latest report from investigators in **New York (USA)** is no exception.<sup>4</sup> This study set out to examine the longer-term outcomes for patients undergoing lumbar discectomy and laminectomy for lumbar disc prolapse. SPORT is an unusual study in that it included both randomised and observational cohorts, and for the purposes of this study - as the focus was reoperation rates - all patients who underwent surgery for lumbar spine stenosis were included. Their follow-up was to a mean of eight years following surgery, and the results of a total of 810 patients are presented here, of whom 15% underwent reoperation by the final follow-up. This is a significant re-intervention rate. However, looking slightly more carefully at the figures, 25% of these were for complications (3.75% incidence) with an incidence of recurrence of 9.3%. Factors associated with further surgery included younger patients, however, those with comorbidities (smoking,

diabetes, obesity and depression) were not at higher risk of further surgery.

### The course of degenerative lumbar spondylolisthesis

■ Lumbar degenerative spondylolisthesis is one of the most common spinal disorders in the Japanese population and presents a challenging problem for intervention, with a difficult evaluation surrounding the decision to operate. In patients with progressive degenerative lumbar spondylolisthesis, clearly early surgical intervention is to be preferred. Researchers in **Wakayama (Japan)** have published a highly informative longitudinal cohort study tracing the natural history of lumbar degenerative spondylolisthesis in the community over a 15-year period.<sup>5</sup> Their study reports on the 15-year follow-up of 200 participants in a rural community in Japan. All participants were over the age of 40 and index and follow-up radiographs were obtained 15 years apart. The overall baseline prevalence of lumbar degenerative spondylolisthesis was 10% with the majority of cases at L4. The incidence of new slip over the 15-year period of the study was 15% and the follow-up radiographs demonstrated a prevalence of 22.5%. The predictors of slip progression in this observational study were of younger age (less than 60 years), female sex and dysmorphic facets. Patients with these factors at baseline should be

treated with a lower threshold for early stabilisation. Due to the difficulties of reduction of a chronic slip and the ongoing symptoms patients may experience, early intervention when progression is likely seems to be a sensible course of action.

### Hip or lumbar spine a common conundrum X-ref

■ Distinguishing between hip, knee and lumbar spine pain can be tricky. Certain patterns of spinal claudication can present in an identical pattern to both. However, perhaps even more tricky is establishing what the clinical course is likely to be when different diagnoses are co-existent. From the patient's perspective the problem is simple: they wish to lose the pain that is limiting their walking. What we don't really have a handle on, however, is the results of lower lumbar spine pain and the impact it has on clinical outcomes following total hip arthroplasty (THA) for degenerative hip disease. A study team in **Rostock (Germany)** have set their minds to unpicking precisely this question.<sup>6</sup> Their prospective study was designed to investigate the influence of lumbar spinal disease on both the pre- and post-operative health-related quality of life scores in patients undergoing total hip replacements. The study concerned the outcomes of a relatively modest 42 patients, all undergoing cementless THA who were a mixture

of patients with co-existent spinal pathology (13 patients), and without (29 patients). As would be expected in a study of this nature, a range of outcome measures including the Harris hip score, WOMAC OA score and SF-36 quality of life score, was



administered to both groups. A straightforward subgroup analysis was undertaken to establish the comparative outcomes of both groups. While both groups showed a clear improvement in outcomes compared with pre-operative scores, there was a clear impact of lumbar spinal pathology demonstrated. The study showed that while pre-operatively there were no differences in the hip-specific scores, the SF-36 in the lumbar spine group was poorer and at each post-operative assessment, those with lumbar spine pathology were outperformed by those without. A salutary lesson in

patient selection. This study supports the practice of undertaking THA in patients with co-existent lumbar spine pathology but, based on the compromised functional results, clinicians should perhaps 'under-promise and over-deliver'.

### REFERENCES

1. Minoshima R, Kosugi S, Nishimura D, et al. Intra- and postoperative low-dose ketamine for adolescent idiopathic scoliosis surgery: a randomized controlled trial *Acta Anaesthesiol Scand* 2015;59:1260-1268.
2. Harvey NC, Kanis JA, Odén A, et al. FRAX and the effect of teriparatide on vertebral and non-vertebral fracture. *Osteoporos Int* 2015;26:2677-2684.
3. Van de Kelft E, Van Goethem J. Trabecular metal spacers as standalone or with pedicle screw augmentation, in posterior lumbar interbody fusion: a prospective, randomized controlled trial. *Eur Spine J* 2015 Sep 11. (Epub ahead of print)
4. Leven D, Passias PG, Errico TJ, et al. Risk factors for reoperation in patients treated surgically for intervertebral disc herniation: a subanalysis of eight-year SPORT data. *J Bone Joint Surg [Am]* 2015;97-A:1316-1325.
5. Enyo Y, Yoshimura N, Yamada H, Hashizume H, Yoshida M. Radiographic natural course of lumbar degenerative spondylolisthesis and its risk factors related to the progression and onset in a 15-year community-based cohort study: the Miyama study. *J Orthop Sci* 2015 Aug 21. (Epub ahead of print)
6. Ellenrieder M, Bader R, Bergschmidt P, Fröhlich S, Mittelmeier W. Coexistent lumbar spine disorders have a crucial impact on the clinical outcome after total hip replacement. *J Orthop Sci* 2015. (Epub ahead of print)

## Trauma

**X-ref** For other Roundups in this issue that cross-reference with **Trauma** see: **Foot Roundup** 6, 7, 8; **Hand Roundup** 4, 9; **Shoulder Roundup** 3, 4, 6; **Paeds** 1, 3.

### Delay to surgery in hip fracture x-ref Hip

■ Much progress has been made in the care of hip fracture patients over the last decade, but there may be more to do. While this is admittedly a

retrospective study, these Danish surgeons (**Copenhagen, Denmark**) have looked again at the confusing topic of delay to surgery for hip fracture patients.<sup>1</sup> This retrospective analysis of 3517 patients accessed from the Danish Fracture Database was designed to examine if the outcomes of hip fracture surgery were dependent on timing of surgery following injury. The overall mortality in

this cohort was in line with other contemporary studies, with 380 deaths at 30 days (10.8%) and 90-day mortality was 17.4%. The authors established that, in their study at least, the risk of 30-day mortality increased with surgical delay of more than 12 hours (OR 1.45). Also associated with increased mortality were: having a trainee surgeon perform the procedure, being a male patient, and having a higher

ASA. Although these results make intuitive sense, there does not appear to really be an appropriate level of adjustment for confounders in this group and it may be that all this is reporting is selection bias.

### Hexapod fixators in the management of hypertrophic tibial nonunions

■ Nonunion is more common in the tibia than in many other bones