PHYSIOLOGICAL PARAMETERS	3	2	1	0	1	2	3
Respiration rate	≤8		9–11	12–20		21–24	≥25
Oxygen saturations	≤91	92–93	94–95	≥96			
Any supplemental oxygen		Yes		No			
Temperature	≤35.0		35.1–36.0	36.1–38.0	38.1–39.0	≥39.1	
Systolic blood pressure	≤90	91–100	101–110	111–219			≥220
Heart rate	≤40		41–50	51–90	91–110	111–130	≥131
Level of consciousness				A			V, P, or U

Fig 2. Illustrates how an unwell SCI patient with autonomic dysreflexia will not trigger on the NEWS system. Reproduced with permission.[1] NEWS = National Early Warning Score.

of ≤4 excluding unwell patients), were calculated from the results.

Sensitivity was 63% for the tetraplegic patients and 35% for the paraplegic patients. Therefore, the NEWS system missed 37% of observation records for the tetraplegics who were unwell (main pathology being autonomic dysreflexia) and 65% of observation records for the paraplegics who were unwell (variety of pathologies including a pulmonary embolus and viral illness).

Specificity was 37% for the tetraplegic patients and 100% for the paraplegic patients. Therefore, the NEWS system incorrectly triggered urgent clinical reviews in 63% observation records of well tetraplegics (due to temperature, heart rate and blood pressure) and 0% of observation records of well paraplegics.

In conclusion, disruption to the autonomic nervous system in tetraplegic and high paraplegic patients alters baseline physiology and reaction to illness which impacts on the NEWS sensitivity and specificity. Therefore, in order to highlight this, we recommend an explicit caveat for patients with SCI, as there is for COPD. ■

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Reference

1 Royal College of Physicians. *National early warning score (NEWS): standardising the assessment of acute illnesseverity in the NHS.* Report of a working party. London: RCP, 2012.

Osteoporotic vertebral fractures in older patients

Appropriate attention is directed at the urgent diagnosis and management of vertebral fractures (with or without spinal cord or nerve root compression) secondary to trauma or primary malignant/metastatic vertebral bone infiltration, reflecting the potentially devastating consequences of delay. However, similar clinical practice does not always pertain in the diagnosis and proactive management of older patients with suspected osteoporotic vertebral fractures (OVFs). In fact, OVF prevalence is unknown because most fractures do not come to the attention of clinicians;[1] a population-based US study showed that almost two-thirds of OVFs were undetected.[2] However, OVFs are a commonly seen complication of primary or secondary osteoporosis[3] which affects up to 2.5 million people in England and Wales.[1] OVF prevalence increases with age and is higher in women. In Europe, an annual incidence has been estimated at 1% for women and 0.6% for men aged 50–79 years.[4]

A cycle of nihilism and lack of urgency exists in relation to the OVFs, and the urgent attention paid to diagnosis and management in traumatic spinal or malignant fractures is often not applied to OVFs. Clear pathways regarding which clinician or specialty maintains overall responsibility for the diagnosis and management of older patients with OVFs are often lacking, particularly in district hospital settings where spinal surgeons do not maintain a visible presence. Delayed diagnosis and absent proactive management predisposes to suboptimal non-surgical management methods with resulting recurrent hospital admissions, poly-pharmacy with narcotic analgesics (poorly tolerated in older patients), decline in function and eventual loss of independence. OVFs can also lead to spinal deformity that may be associated with decreased pulmonary function and gastrointestinal problems.[5,6] All these factors eventually result in increased morbidity and mortality.[1] The suffering of older patients with OVFs could be alleviated by breaking the cycle of negativity which feeds into lack of prompt diagnosis and urgency in pursuing alternative management. The recommendations of NICE TA279 should move practice in the right direction. The guideline recommends vertebroplasty (VP) and balloon kyphoplasty (BKP) in selected patients, as alternative minimally invasive management, mostly done under local anaesthesia.

VP and BKP without stenting are viable alternative management strategies for older patients with OVFs if they meet the following criteria:

- have severe ongoing pain after a recent, unhealed fracture of the vertebra spine despite optimal pain management
- pain confirmed to be at the level of the fracture by physical examination and imaging.

VP and KBP involve the injection of cement into the fractured vertebra body (VP) or into an inflatable balloon inserted in the fractured vertebra body (BKP). Both techniques aim at stabilising and strengthening the vertebra body, but BKP has the added advantage of restoring vertebra body height and correcting angular deformity.[3] The main complication from VP and BKP is cement leak, which can lead to pulmonary embolism in cases of intravascular leak. The rate of this complication is variable and dependent on the expertise of the interventionist. The leak rate may be as low <1%.

VP and BKP may be performed by orthopaedic and neurosurgeons but are increasingly done by interventional radiologists and pain management physicians. Clinicians, especially those involved in the care of older patients, are best placed to engage with these specialists in delivering the best possible multidisciplinary care for older patients with OVFs. Even though controversies exist regarding the evidence on the effectiveness of these procedures, there is widespread acceptance (in appropriately selected patients undergoing this procedure undertaken by experienced interventionists) of better outcomes in relation to pain relief, function, cost effectiveness and mortality benefits.

In summary, OVFs are prevalent in older patients, but remain underdiagnosed and undertreated. Non-surgical management is appropriate in certain cases but VP and KBP offer viable treatment options in appropriately selected patients, and appropriate assessment pathways should be introduced. ■

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References

2 National Institute for Clinical and Care Excellence. *Percutaneous vertebroplasty and percutaneous balloon kyphoplasty for treating osteoporotic vertebral compression fractures* (TA279). April 2013. Available online at www.nice.org.uk/guidance/ta279/resources/guidance-percutaneous-vertebroplasty-and-percutaneous-balloon-kyphoplasty-for-treating-osteoporotic-vertebral-compression-fractures-pdf [Accessed 22 June 2015].

3 Cooper C, Atkinson EJ, O'Fallon WM, Melton LJ 3rd. Incidence of clinically diagnosed vertebral fractures: A population-based study in Rochester, Minnesota, 1985–1989. *J Bone Miner Res* 1992;7:221–7.

4 Anselmetti GC, Bernard J, Blattert T *et al.* Criteria for the appropriate treatment of osteoporotic vertebral compression fractures. *Pain Physician* 2013;16:E519–E530

5 European Prospective Osteoporosis Study (EPOS) Group, Felsenberg D, Silman AJ *et al.* Incidence of vertebral fracture in Europe: results from the European Perspective Osteoporosis Study (EPOS). *J Bone Miner Res* 2002;17:716–24.

6 Harrison RA, Siminoski K, Vethanayagam D, Majumdar SR. Osteoporosis related kyphosis and impairments in pulmonary function: a systematic review. *J Bone Miner Res* 2007; 22:447–57.

7 Miyakoshi N, Kasukawa Y, Sasaki H, Kamo K, Shimada Y. Impact of spinal kyphosis on gastroesophageal reflux disease symptoms in patients with osteoporosis. *Osteoporosis Int* 2009;20:1193–8.