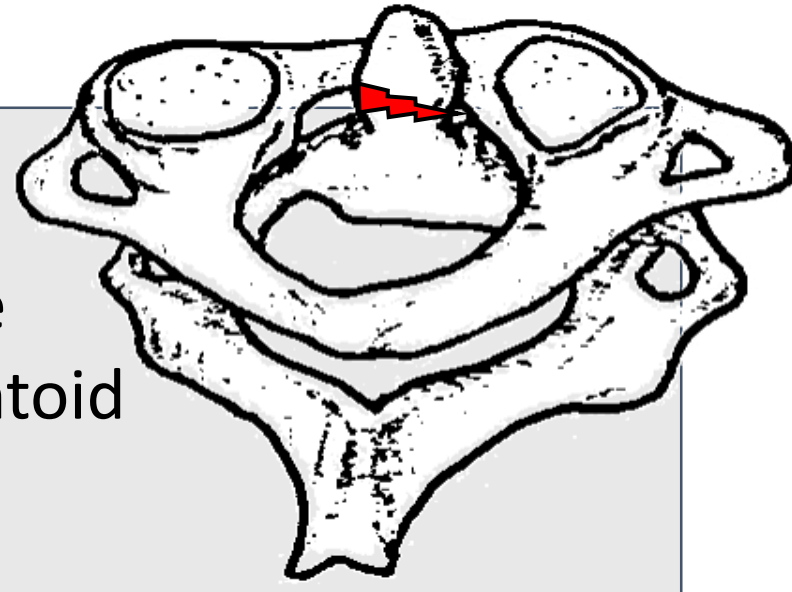


Cervical spine fractures in the elderly: are there missed opportunities for prevention?

Background

- The most common site of cervical spine (c-spine) fracture in the elderly is the odontoid process.
- C-spine fractures in the elderly result predominantly from ground level falls.¹
- Osteoporosis has been identified as an important predisposing risk factor.²
- Bisphosphonates have been proven to be effective at reducing fracture rates, and the associated morbidity and financial costs they would incur.³
- Previous research into osteoporosis-related spinal fractures has tended to focus on thoracic and lumbar vertebral compression fractures, but little is known about the role of fracture prevention in older patients who sustain c-spine fractures.



Objectives

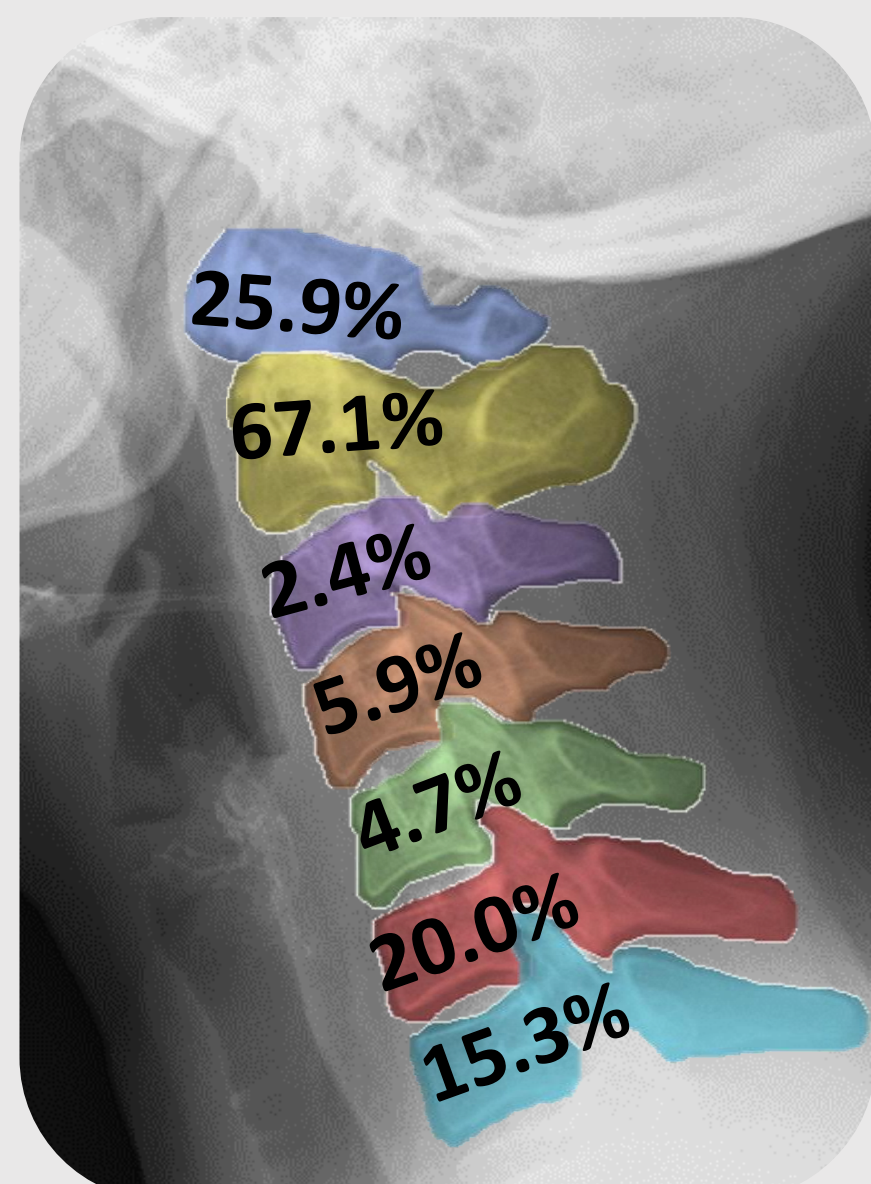
This study aimed to evaluate the management of older patients with c-spine fractures at the Royal Devon and Exeter Hospital (RD&E) and identify opportunities to reduce fracture rates.

Methods

A service evaluation was undertaken utilising a retrospective review of electronic hospital records at the Royal Devon and Exeter hospital, which has no Fracture Liaison Service (FLS), for patients aged 50 and over who sustained a c-spine fracture over a 4 year period. Patients were identified from CT c-spine reports positive for fracture on PACS.

Results

- Of the 85 patients identified, 120 vertebrae were fractured.
- Mean age 77 (± 12.70)
- C-spine fracture sustained from ground level fall: 61.2%
- The patients with only an upper cervical spine fracture (UCSF) (\bar{x} age 80.1 $\sigma \pm 11.9$) were significantly older ($p < 0.01$) than those with only a lower cervical spine fracture (LCSF) (\bar{x} age 70.7 $\sigma \pm 12.6$).
- There was a significant association between low trauma mechanism of injury and UCSF, and high trauma mechanism of injury and LCSF ($p < 0.05$).



Prior to c-spine fracture

Any fracture	35 (41.2%)
Vertebral fracture	17 (20.0%)
Reported radiographic osteopenia [Reported on day of c-spine fracture]	11 (12.9%) [4 more (17.6%)]
DXA	10 (11.8%)
Osteoporosis diagnosis	11 (12.9%)
On bisphosphonate	8 (9.4%)
Calcium vitamin D alone	7 (8.2%)

1 year after c-spine fracture

Subsequent fracture	5 (6.9%)
Hip	4
DXA	5 more
On bisphosphonate	1 more
Calcium vitamin D alone	7 more
Mortality at 12 months [At 3 months]	20.8% [11.8%]

Discussion

- Mortality rates are similar to those published in other studies.⁴
- Patients with c-spine fractures are less likely to be started on osteoporosis treatment than hip fracture patients.⁵
- Opportunities for intervention to reduce future fractures were missed after:
 - Previous low trauma fractures
 - Reports of radiographic osteopenia
 - Low trauma c-spine fractures
- Fracture prevention is not an integrated part of c-spine fracture care despite their association with osteoporosis in the elderly
- FLSs are cost-effective and successful at reducing fracture rates. An FLS has the potential to improve care in this group of patients.⁶

Conclusions

- It is important that c-spine fractures resulting from low trauma mechanisms of injury in elderly patients are recognised as fragility fractures and action is taken to reduce future fracture risk.
- Commissioning of an FLS is recommended.
- In the absence of an FLS, close working of clinical teams is needed to ensure action is taken to reduce fracture rates of cervical spine and other fractures.

1. Lomoschitz FM, Blackmore CC, Mirza SK, Mann FA. Cervical spine injuries in patients 65 years old and older: epidemiologic analysis regarding the effects of age and injury mechanism on distribution, type, and stability of injuries. *AJR American journal of roentgenology*. 2002;178(3):573-7.
 2. Kaesmacher J, Schweizer C, Valentinitzsch A, Baum T, Rienmuller A, Meyer B, et al. Osteoporosis Is the Most Important Risk Factor for Odontoid Fractures in the Elderly. *Journal of bone and mineral research : the official journal of the American Society for Bone and Mineral Research*. 2017;32(7):1582-8.
 3. National Institute for Health and Care Excellence (NICE). Bisphosphonates for treating osteoporosis. Technology appraisal guidance [TA464]2017 (updated 2018)
 4. Radovanovic I, Urquhart JC, Rasoulinejad P, Gurr KR, Siddiqi F, Bailey CS. Patterns of C-2 fracture in the elderly: comparison of etiology, treatment, and mortality among specific fracture types. *Journal of neurosurgery Spine*. 2017;27(5):494-500.
 5. Royal College of Physicians. National Hip Fracture Database annual report 2017. London: RCP; 2017.
 6. Gittos N, McLellan A, Cooper A, Dockery F, Davenport G, Goodwin V, et al. Effective Secondary Prevention of Fragility Fractures: Clinical Standards for Fracture Liaison Services. *National Osteoporosis Society*; 2015