The Role of Diagnostic Imaging Departments in the Identification of Osteoporosis

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INTRODUCTION

The National Health Service (NHS) faces a significant increase in fragility fractures putting pressure on acute and community services. Vertebral fractures are the most common osteoporotic fracture and the most predictive of subsequent hip fractures (1). The cost to the patient and the health service of hip fractures can be avoided if systems are designed which allow quick identification and management following vertebral fractures.

METHOD

The data has been taken over a 12 month period. All females aged 45 and above who attended Accident & Emergency for plain film imaging (PFI) of their pelvis were considered for this audit. Only patients with positive hip fractures *and* previous findings of osteopenia/bone demineralisation (BD) recorded on thoracic and/or lumbar spine plain film were counted. The aim of this audit was to establish how frequently Dual Energy X-ray Absorptiometry (DEXA) scans were carried out as a result of positive findings of osteopenia/BD on PF spinal reports in cases where there was no known history of the disease.

FINDINGS

- Over the 12 month period, 45 patients with previous findings of osteopenia/BD on PF sustained a fracture to their hip (44% right) (56% left).
- The average age of a hip fracture was 85. The youngest patient was 67 and the eldest was 96.
- Only 11% of patients who fractured their hip had a DEXA scan recommended after previous PF findings of osteopenia/BD.
- A DEXA scan was not performed in 60% of patients before or after spinal imaging despite having evidence of osteopenia/BD noted in their report.
- 8 out of 45 patients died after sustaining a hip fracture. Of these 8, 6 did not have a DEXA scan despite having osteopenia/BD noted on their previous spinal imaging.

DISCUSSION

Vertebral fractures are a powerful predictor of further fracture. Over 55% of patients with hip fractures have evidence of a previous spinal fractures. However, as the majority are undiagnosed, the opportunity to intervene and prevent the hip fracture is missed (2). Effective management of patients with osteoporotic vertebral fractures requires a cohesive approach across the entire fracture prevention pathway, with imaging departments being exclusively positioned to bring about extensive improvements (3).

IDENTIFICATION AND REPORTING OF VERTEBRAL FRACTURES

Vertebral fractures are most likely to be under-reported on imaging acquired for non-musculoskeletal indications (4). It is suggested that imaging departments establish local procedures to guarantee that the spine is routinely evaluated (in all relevant modalities) for the presence of a vertebral fracture. Depending on local policies, this may involve:

- Standard sagittal reformatting of images using bone algorithms
- Scrutiny of lateral views of the spine
- Raising awareness among reporting clinicians regarding the importance of vertebral fracture detection
- Training and continuing professional development (CPD) to increase confidence in the recognition of vertebral fractures
- Agreement between diagnostic imaging departments, referring clinical teams and trust management of reliable, fail-safe alert mechanisms in respect to vertebral fractures (3)(4)(5)

REPORTING TERMINOLOGY

Whenever any form of imaging that includes the spine is reported, the report should indicate that the spine has been evaluated. It is essential that the appearance of the vertebral bodies are described unambiguously. A vertebra may be described in one of three ways:

1. Vertebral fracture
- Additional information should be given describing the vertebral level(s) involved and the severity of the fractures.
- If previous imaging that includes the spine is available, this should be reviewed and compared to determine the timing of the fracture.

2. Non vertebral deformity
- If the cause of the deformity is clear, this should be described in the report. Common causes include degenerative change, Scheuermann's disease and Schmorl's nodes.

3. Normal (3)(4)(5)

The Royal College of Radiologists recommend actionable reporting. If a vertebral fracture is identified, the report should use alerts which flag to referring clinicians that there is a need for further assessment and management to reduce the patient's risk of further fracture (6). The presence of severe, multiple or recent spinal fractures indicates that the patient is a very high fragility fracture risk, requiring urgent evaluation. Standard phrases may be saved as short codes and inserted into reports. Examples include:

- Appearances suggest osteoporosis – the patient should be offered assessment in the Fracture Liaison Service.
- Appearances suggest osteoporosis. Further investigation and management to reduce the risk of further fracture is advised.
- Appearances suggest a high risk of fragility fracture – referral for DEXA scan / referral to the metabolic bone clinic is advised (3).

Fig 1. Basic cervical fracture of left femoral neck (7)

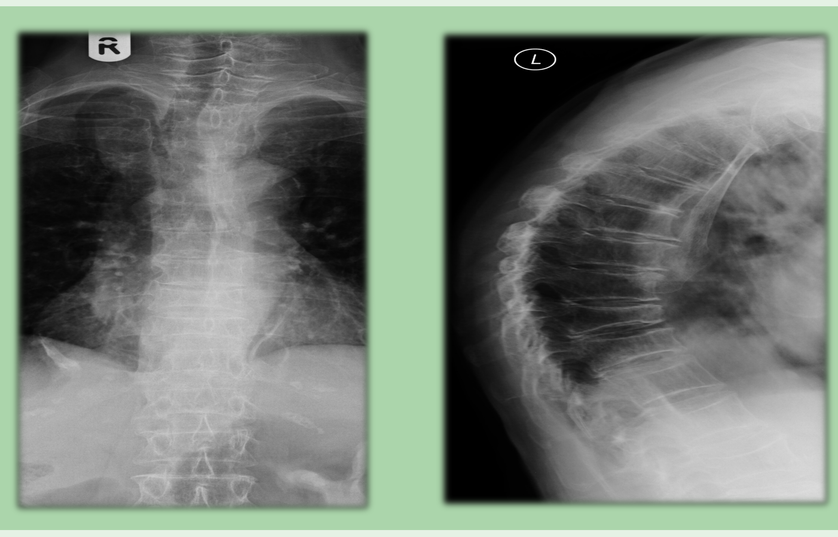

Fig 2. Wedging of the vertebral bodies of the mid and lower thoracic spine (7)

NHS RIGHTCARE PATHWAY: FALLS AND FRAGILITY FRACTURES

Right Care Pathways provide a national case for change and set of provisions to support local Health Economies to focus their improvement efforts where there is maximum opportunity to address variation, improve population health and contribute towards a sustainable health service. Clinical commissioning groups (CCGs) responsible for Falls and Fragility Fractures for their population should concentrate on the three areas for optimisation:

- Falls prevention
- Detecting and managing osteoporosis
- Optimal support after a fragility fracture

CCGs should work across the system to ensure that systems are in place to deliver the advanced interventions:

- Targeted case-finding for osteoporosis, frailty and falls risk
- Strength and balance training for those at low to moderate risk of falls
- Multi-factorial intervention for those at higher risk of falls
- Fracture liaison service for those who have had a fragility fracture (8)(9)

ADVANCED PRACTICE

Skill-mix initiatives have provided opportunities for radiographers to develop roles and achieve their potential, consequently contributing to radiographer retention rates and increased job satisfaction (10)(11). As radiographer role expansion is well established in other areas, it seems natural to consider opportunities in DEXA. As a result of increasing referrals and service development, there is a clear need to increase capacity for both image acquisition and reporting (11). Although DEXA has been available for more than 20 years, it is still regarded as relatively new technology in the United Kingdom (UK), since access has been limited due to a lack of availability and funding. As a result of this, the interpretation and reporting of DEXA by radiographers has only recently evolved and remains fairly uncommon (12). Given the increasing ageing population, this is a crucial area for development (13). Not all registered healthcare professionals have the knowledge, skills and experience to interpret DEXA results correctly and as a result of this, many scans are returned to referrers unreported. It is imperative therefore to ensure that those professionals involved in reporting have the appropriate processes of supervision, accountability and CPD in place when greater experience or expertise is needed. This will help adhere to Ionising Radiation (Medical Exposure) Regulations and best practice recommendations from professional bodies such as the National Institute for Health and Care Excellence, the National Osteoporosis Society and the Society and College of Radiographers (12)(14).

CONCLUSION

Around 79,000 people suffer hip fractures in the UK each year. Less than one third of patients make a full recovery and around 20% die within a year. By 2025, this is predicted to cost the UK economy £5.5 billion a year (15). As health professionals we are in an ideal position to identify and respond to both suspected and incidental findings of vertebral fractures. In conjunction with Fracture Liaison Services, this could prompt more referrals for DEXA and potentially reduce the number of hip fractures and subsequent hospital admissions with a huge financial saving.

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