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Research paper

Fracture risk and bone health following a stroke are inadequately considered by physicians: A UK survey of practice



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ABSTRACT

Background: Osteoporotic fragility fractures and stroke disease are both common. Fracture risk is substantially increased following a stroke. Fracture risk assessment tools are available (e.g. FRAX/Qfracture); however, stroke guidelines provide little advice. We aimed to determine current practice amongst UK stroke physicians regarding assessment and management of bone health in patients following a stroke.

Methods: An anonymous web-based survey was emailed to all 140 NHS consultant stroke physicians registered with the British Association of Stroke Physicians (BASP) from November 2013 to April 2014. Multiple choice questions determined current usual practice.

Results: Almost all (98.5%) reported working in NHS trusts with no specific post-stroke bone health guidance. Fewer than 1/6 were fully aware of post-stroke fracture risk; most underestimated risk. Less than 1/10 regularly assessed bone health post-stroke, in contrast 78.1% regularly assessed falls risk. Despite this, 89.5% who assessed falls risk did not continue to consider fracture risk. None routinely used FRAX or Qfracture; many were unaware of these tools. Only 3% regularly initiated anti-resorptive medication to reduce post-stroke fracture risk, 45.2% never considered the impact of phenytoin on bone health if prescribed for post-stroke epilepsy.

Conclusions: We found marked heterogeneity in the approach of UK stroke physicians to the assessment of fracture risk and management of bone health in stroke patients with overall under-appreciation of fracture risk and low levels of assessment. Our findings support the need for clear guidelines regarding fracture risk assessment and bone health in patients who have experienced a stroke.

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1. Introduction

Stroke disease is a major cause of morbidity and mortality with over 1.1 million strokes occurring annually across Europe [1]. The annual estimated economic cost of stroke in Europe is €27 billion, with more people surviving strokes more than half of stroke survivors are left with a degree of disability or dependency [2]. Furthermore, over 3.5 million fragility fractures are sustained across Europe each year and this number is increasing as the prevalence of osteoporosis increases [3]. Fracture risk is quoted to be increased two to fourfold in those surviving a stroke, compared to age-matched controls [4]. Hip fractures are particularly common

within the first year following stroke, with a greater propensity to fracture on the paretic side, and lead to poorer outcomes than in a non-stroke population [4–8]. Immobility, impaired nutrition and medication adherence as well as certain medications prescribed more commonly within a stroke population (e.g. anticonvulsants) contribute to increased bone fragility post-stroke [6]. In addition to increased bone fragility, falls are more common within a stroke population increasing the likelihood of a fracture being sustained.

In the UK, the National Institute for Health and Care Excellence (NICE) provide guidance to improve health and social care; they recommend assessing fracture risk in all adults aged >50 years with risk factors including ‘immobility, e.g. due to neurological disease’ [9]. NICE supports the use of fracture risk assessment tool such as FRAX [10] and Qfracture [11]; however, fracture risk assessment currently remains unaddressed in UK stroke management guidelines [12–14]. This is in contrast to European guidance which does specify the need to address falls risk reduction through

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Table 1
NHS stroke physician's self-reported assessment and management of bone health and falls in patients admitted with stroke.

When considering the last 6 months of practice	Never N (%)	Rarely N (%)	Sometimes N (%)	Regularly N (%)	Always N (%)
How frequently did you assess future bone health?	12 (16.4)	30 (41.1)	24 (32.9)	7 (9.6)	0
How frequently did you assess future falls risk?	2 (2.7)	3 (4.1)	11 (15.1)	44 (60.3)	13 (17.8)
How frequently did you initiate a new prescription for calcium and vitamin D supplementation?	5 (6.8)	30 (41.1)	31 (42.5)	6 (8.2)	1 (1.4)
How frequently did you initiate a new prescription for vitamin D supplementation (without calcium)?	20 (27.4)	38 (52.1)	14 (19.2)	1 (1.4)	0
How frequently did you initiate a new prescription for an anti-resorptive medication (e.g. Alendronate)?	16 (21.9)	30 (41.1)	25 (34.2)	2 (2.7)	0
What best describes your practice when measuring vitamin D levels in patients admitted with a stroke?	19 (26)	34 (46.6)	18 (24.7)	2 (2.7)	0
How frequently did you recommend the use of hip protectors?	53 (72.6)	12 (16.4)	7 (9.6)	1 (1.4)	0
How frequently did you consider osteoporosis when planning whether to discharge a patient on a new prescription of phenytoin?	33 (45.2)	17 (23.3)	12 (16.4)	8 (11)	3 (4.1)

a multi-disciplinary intervention as well as considering bone strengthening medication [15]; however, fracture risk assessment is not currently mentioned within these European stroke organization guidelines.

We aimed to survey UK stroke physicians and determine current practice when assessing fracture risk and managing bone health in patients admitted to National Health Service (NHS) hospitals with a diagnosis of stroke.

2. Methods

2.1. Study design

The British Association of Stroke Physicians (BASP) has 701 members, of whom 140 are registered as NHS stroke consultants. A web-based survey was constructed using the University of Bristol Online Survey template [16] (Appendix A) distributed by BASP to these 140 consultants, aiming to ascertain physician's current usual practice and asked physicians; their duration and location of work as a consultant, whether guidelines existed within their hospital for assessing bone health and fracture risk in stroke patients; their knowledge of the impact stroke has on fracture risk; their usual practice when assessing and managing various aspects of bone health and future fracture and falls risks post stroke; and their level of confidence when prescribing specific osteoporosis treatments following a stroke. All questions were mandatory and users could not move onto the next question or submit the completed survey until all questions had been answered. BASP approved the conduct of this survey. BASP sent reminders up to 3 times over 5 months (November 2013–April 2014). Responses were anonymous, identifiable only by geographical region of practice.

2.2. Statistics

Data were cleaned and checked for consistency; categories were condensed where appropriate. Descriptive statistics are presented as mean (SD: standard deviation) for continuous and count (percentages) for categorical variables. Categorical variables were cross-tabulated; the Chi-squared (χ^2) test used to assess the strength of associations.

3. Results

3.1. Geographical area

In total 73 (52%) consultant stroke physicians completed the survey. Geographical areas of practice were spread across England,

Scotland and Northern Ireland; we received no responses from Wales (Appendix B).

3.2. Current bone health management guidelines

Only 2 (1.5%) physicians worked in an NHS hospital which had a bone health guideline for patients surviving stroke. The majority of physicians (63 [86%]) worked in hospitals with no formalized guideline; the remainder were unsure.

3.3. Impact of stroke on fracture risk

Fracture risk increases two to four fold following a stroke [4–8]; whilst 10 (13.7%) physicians were aware of this, the majority (42 [57.5%]) underestimated fracture risk (Appendix C).

3.4. Assessment and management of future bone health and falls

Physicians were asked to consider, over the previous 6 months, how often they had assessed future bone health in stroke patients admitted to hospital (Table 1). The majority (42 [57.5%]) stated they rarely or never considered this. No physicians always assessed future bone health but 7 (9.6%) reported doing so regularly. Falls risk assessment was better addressed: the majority (57 [78.1%]) always or regularly assessed falls risk post-stroke; however, of these 51 (89.5%) did not then go on to regularly assess fracture risk. Only 2 physicians (2.7%) stated they never assessed falls risk in their stroke patients.

3.5. Prescription of osteoporosis medications

Overall 7 (9.6%) physicians regularly prescribed calcium and vitamin D supplementation to patients post stroke. Vitamin D levels were checked and replacement prescribed regularly by only 2 (2.7%) physicians. Almost half (35 [47.9%]) never or rarely initiated a new prescription for calcium and vitamin D supplementation, and fewer still initiated a new prescription for vitamin D supplementation alone (58 [79.5%]). 27 (36.9%) physicians sometimes or regularly initiated new anti-resorptive medications; 16 (22%) had never done so. Most (53 [72.6%]) rarely or never measured vitamin D levels. The majority (53 [72.6%]) had never recommended hip protectors.

The impact of phenytoin on bone health was poorly appreciated; 33 (45.2%) reported never considering its effect on bone health, only 11 (15.1%) regularly or always considered its impact. Knowledge of post-stroke fracture risk was strongly associated with consideration of osteoporosis when prescribing phenytoin ($P < 0.001$).

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