Hip fracture risk profiles in older Indigenous Australians

Michelle M Y Lai and
Nicholas G Waldron

To the Editor: Although Indigenous males are twice as likely and Indigenous females are half as likely to report being diagnosed with osteoporosis compared with their non-Indigenous counterparts,[1] data on the interracial differences in osteoporotic risk factors are limited.

Our study of 276 patients attending a tertiary hip fracture unit in Western Australia over a 5-year period is the first to report differences in common risk factors for hip fracture between Indigenous and non-Indigenous patients. Our data showed a lower likelihood of vitamin D deficiency and polypharmacy but higher likelihood of diabetes mellitus, renal disease and alcohol use among Indigenous patients with hip fracture compared with non-Indigenous patients.

Using the local orthogeriatric database, we identified 46 Indigenous and 230 randomly selected non-Indigenous patients aged ⩾ 45 years who were transferred to a hip fracture unit following surgery for a minimal-trauma fracture at Royal Perth Hospital from July 2005 to June 2010. High alcohol use was defined as alcohol intake exceeding guideline recommendations,[2] and polypharmacy as the use of more than five medications. We used a laboratory cut-off of 25-hydroxyvitamin D (25-OHD) < 50 nmol/L to indicate a low vitamin D level. Indigenous status was self-reported during admission.

We compared data for Indigenous and non-Indigenous patients using the Mann–Whitney *U* and Pearson χ^2 tests. We used logistic regression (SPSS version 17; SPSS Inc, Chicago, Ill, USA) to examine the association between Indigenous status and the predictor variables.

Our study was exempted as a quality assurance activity from formal ethics review by the Royal Perth Hospital Ethics Review Committee and the Western Australian Aboriginal Health Information and Ethics Committee.

Risk factors among the two groups are shown in the Box. The most common risk factors among Indigenous patients were antihypertensive use, high alcohol use and diabetes. In the final multivariate model,

Associations between hip fracture and risk factors in Indigenous patients compared with non-Indigenous patients at Royal Perth hospital, July 2005 – June 2010

Variable	Indigenous ($n = 46$)	Non-Indigenous ($n = 230$)	P*	Crude OR	Adjusted† OR (95% CI)
Continuous (mean [SD])					
Age at hip fracture‡ (years)	81.4 (9.1)	82.3 (9.4)	0.58	0.99	1.03 (0.96–1.10)
25-OHD level (nmol/L)	59.9 (30.2)	40.9 (18.6)	< 0.001	–	–
Categorical (no. [%])					
Women	29 (63%)	161 (70%)	0.35	1.11	2.52 (0.51–12.31)
Non-metropolitan	42 (93.3%)	38 (16.6%)	< 0.001	70.37	70.32(14.43–342.59)
Low vitamin D level§	15 (38.5%)	142 (69.6%)	< 0.001	0.27	0.26 (0.07–0.91)
Prior fracture	9 (19.6%)	52 (22.6%)	0.65	0.83	0.42 (0.09–1.90)
High alcohol use¶	19 (41.3%)	10 (4.3%)	< 0.001	15.5	13.25 (1.89–92.92)
Diabetes mellitus	21 (45.7%)	41 (17.8%)	< 0.001	3.87	8.19 (2.02–33.18)
Renal disease	16 (34.8%)	21 (9.1%)	< 0.001	5.31	6.12 (1.29–29.05)
Polypharmacy**	18 (39.1%)	137 (59.6%)	0.01	0.44	0.17 (0.04–0.72)
Antihypertensive use	26 (56.5%)	118 (51.3%)	0.52	1.23	2.75 (0.70–10.76)

25-OHD = 25-hydroxyvitamin D. OR = odds ratio. * Mann-Whitney U or Pearson χ^2 test. Level of significance: $P < 0.05$. † Multivariate logistic regression. ‡ Minimal-trauma fracture. § 25-OHD level < 50 nmol/L. ¶ Alcohol intake exceeding guideline recommendations.[2] ** > 5 drugs. ◆

Indigenous patients with hip fracture were significantly more likely to have diabetes and renal disease and to report high alcohol use, but significantly less likely to have a low vitamin D level and polypharmacy, after adjustment for age, sex and rural residency.

These well described risk factors contribute to fracture risk through two mechanisms: falls and secondary osteoporosis. Diabetes-related complications such as visual impairment, stroke and peripheral neuropathy can increase fracture risk.[3] In renal dysfunction, osteoporosis is related to cortical thinning and uraemic osteodystrophy.[4] Excessive alcohol intake at a young age among Indigenous people may affect peak bone mass.[5] The effect of alcohol on liver cirrhosis, cognition, falls due to intoxication and peripheral neuropathy may contribute to fracture risk.

Risk stratification will be more robust if these results can be cross-validated in other institutions.

Acknowledgement: We thank Associate Professor Christopher Beer, University of Western Australia, for his comments on the study.

Michelle M Y Lai, Geriatrician[1]
Nicholas G Waldron, Geriatrician[2]
1 Royal Perth Hospital, Perth, WA.
2 Armadale Kelmscott Memorial Hospital, Perth, WA.
m.lai@pgrad.unimelb.edu.au

1 Australian Institute of Health and Welfare. A snapshot of osteoporosis in Australia 2011. Canberra: AIHW, 2011. (AIHW Cat. No. PHE 137; Arthritis Series No.15.)
2 National Health and Medical Research Council. Australian guidelines to reduce health risks from drinking alcohol. Canberra: Commonwealth of Australia, 2009.
3 Janghorbani M, Feskanich D, Willett WC, Hu F. Prospective study of diabetes and risk of hip fracture: the Nurses' Health Study. *Diabetes Care* 2006; 29: 1573-1578.
4 Ersoy FF. Osteoporosis in the elderly with chronic kidney disease. *Int Urol Nephrol* 2007; 39: 321-331.
5 Malik P, Gasser RW, Kemmler G, et al. Low bone mineral density and impaired bone metabolism in young alcoholic patients without liver cirrhosis: a cross-sectional study. *Alcohol Clin Exp Res* 2009; 33: 375-381. ❑