Predictors of excess mortality following a clinical vertebral fracture: a population-based cohort study

P-319

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Introduction

Previous studies have shown an increased mortality risk after a vertebral fracture (VF) but we have limited information about the factors associated with such excess risk.

Aims

We estimated mortality rates in the 3 years following a vertebral fracture and identified key predictors of 1-year mortality following a VF.

Material and methods

- Population-based cohort study
- The SIDIAPq Database contains clinical information from primary care, hospital admission records, and pharmacy invoice data for >2 million patients (30% of the population) in Catalonia, Spain.
- Participants:
  - Subjects aged >50 years old registered on 01/01/2007.
  - Those sustaining a VF in the study period (2007-2009) were included for the study of predictors of mortality.
  - Those with a diagnosis of cancer were excluded.
- Main outcomes were incident VF and all-cause mortality following a VF in 2007-2009.
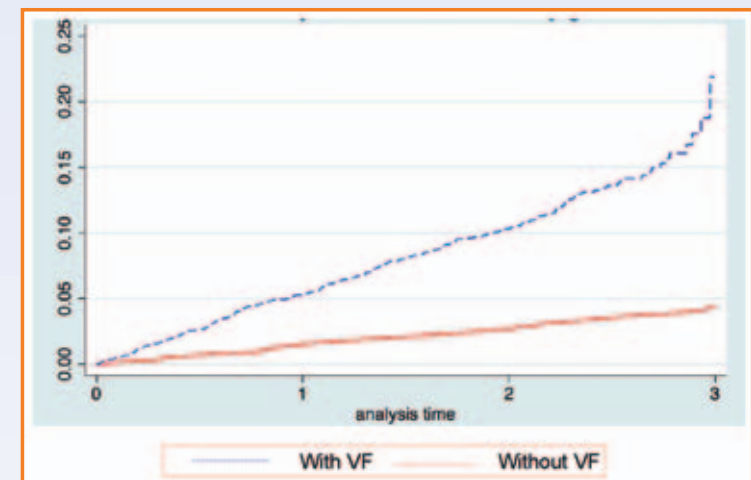
- Statistics: Cox regression was used to calculate mortality according to VF status after adjustment for age, gender, glucocorticoids uses (GCU) and Charlson co-morbidity index (CCI). We used backwards stepwise logistic regression to identify predictors of 1-year (post-VF) mortality from a pre-defined list: age, gender, body mass index, smoking, alcohol drinking, GCU, and the individuals co-morbidities included in the CCI. We tested discrimination and calibration using ROC curves, and Hosmer-Lemeshow (HL) test.

Results

I- Baseline characteristics:

	With VF	Without VF
N subjects aged >50 years old	4,13	815,722
♀; n (%)	2,853 (69.1)	435,988 (53.4)
Age; mean ± SD	75.0 ± 11.4	67.0 ± 12.1
BMI; mean ± SD	28.5 ± 4.8	28.8 ± 4.8
Smoking; n (%)	423 (12.7)	130,649 (22.5)
Alcohol users; n (%)	637 (21.9)	141,482 (31.1)
GCU; n (%)	422 (10.2)	34,288 (4.2)
CCI >2; n (%)	510 (12.3)	91,966 (8.8)
N subjects without diagnosis of cancer	3,905	785,158

II- Mortality rates, incidence and HR:

- 302 (**7.7%**) patients with VF died in the study period; Incidence: **58.3/1,000 person-years**.

- 35,492 (**4.5%**) without VF died in the study period; Incidence: **16.1/1,000 person-years**.

- Adjusted HR of **2.23** [95% CI, 1.99-2.49]

III- Kaplan-Meier mortality estimates:

IV- Key predictors of 1-year mortality:

KEY IDENTIFIED PREDICTORS*	Odds Ratio	95% CI
MALE GENDER	3.13	2.14 – 4.57
AGE		
50 to 55	REF	
>80 to 85	2.47	0.91 - 6.69
>85 to 90	5.19	1.93 - 13.92
>90	8.45	3.13 - 22.82
GCU	2.56	1.60 - 4.09
MILD LIVER DISEASE	2.25	1.03 - 4.91
CEREBROVASCULAR DISEASE	1.89	1.14 - 3.14

Area under the ROC curve of 0.85, and a HL p=0.74.

Conclusions

Patients suffering a VF are at a double risk of death in the up to 3 years following the fracture. Age, gender, GCU, and a history of stroke or mild liver disease are key predictors of 1-year post-VF mortality. These predictors may inform the management of patients sustaining a VF to reduce the associated mortality.