Delirium in hip fracture patients admitted from home is associated with adverse outcomes: *The IMPACT Delirium Study*

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INTRODUCTION

- Delirium is common in patients with an acute hip fracture
- Associated with adverse outcomes, including reduced mobility, prolonged hospital stay, increased mortality, and higher care requirements on discharge
- Local and national hip fracture guidelines now urge effective delirium detection and care
- Most studies of delirium in hip fracture patients have been performed in small, selected cohorts, often by research or specialist clinical teams
- Few studies in large, unselected populations using routine data
- Little is known about delirium on admission in patients from home, including prevalence and significance for prognosis and ongoing rehabilitation needs

STUDY AIM: to determine any associations of delirium in patients admitted from home with: (i) mortality at 30 and 180 days; (ii) total length of stay in acute and subacute care settings; (iii) need for post-acute inpatient rehabilitation, and (iv) readmission to hospital from home within 180 days

METHODS

- **Cohort study** based on the IMPACT Hip Fracture Audit, using prospectively-collected, retrospectively-validated clinical audit data
- **Inclusion**: all patients aged ≥50 years admitted from home* with an acute hip fracture to a single, high-volume orthopaedic centre between 01/03/2020-30/11/2021
- **Variables:** demographics, SIMD**, ASA grade, delirium status***, COVID-19 within 30 days
- **Outcomes:** mortality within 30 and 180 days, length of stay, requirement for post-acute rehabilitation, readmission within 180 days
- **Analysis:** differences between groups: independent t-test, Wilcoxon rank sum, chi-square test. Multivariable logistic regression to determine associations with outcomes.

** Determined by clinician review of contemporaneous clinical documentation*

***SIMD is an area-based measure of relative deprivation*

****Delirium status ascertained from contemporaneous 4AT scores recorded by clinicians in the ED or on admission orthopaedic ward*

RESULTS

Of 1340 patients (mean age 79.5 years; 72.1% female) admitted from home during the study period, 189 (14.1%) had delirium

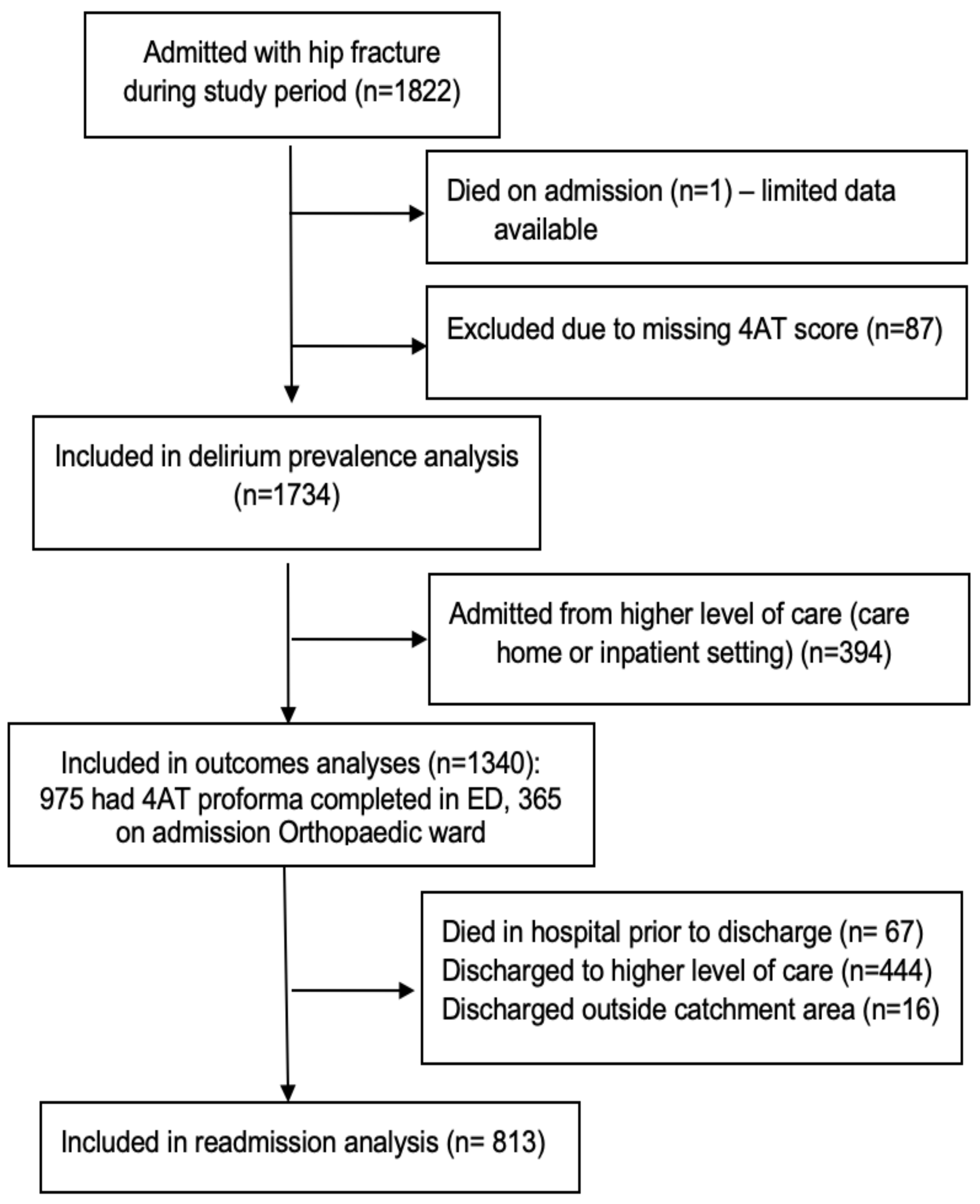

Figure 1. Study flowchart.

Variable	Whole cohort (n=1340)	Delirium (n= 189)	No delirium (n= 1151)	p-value***
AGE (years) (mean (sd))	79.5 (10.3)	82.9 (8.9)	79.0 (10.4)	<0.001
SEX (female (%))	968 (72.2)	129 (68.3)	839 (72.9)	0.218
SIMD* (quintile (%)) 1 (most deprived) 2 3 4 5 (least)	 168 (12.6) 297 (22.3) 221 (16.6) 236 (17.7) 412 (30.9)	 15 (7.9) 52 (27.5) 31 (16.4) 39 (20.6) 52 (27.5)	 153 (13.4) 245 (21.4) 190 (16.6) 197 (17.2) 360 (31.4)	0.078
ASA** GRADE (%) 1 (healthy) 2 3 4 5 (moribund)	 38 (2.8) 413 (30.8) 789 (58.9) 88 (6.6) 12 (0.9)	 1 (0.5) 22 (11.6) 136 (72.0) 23 (12.2) 7 (3.7)	 37 (3.2) 391 (34.0) 653 (56.7) 65 (5.6) 5 (0.4)	<0.001
COVID-19 (<30d) Positive	 53 (4.0)	 10 (5.3)	 43 (3.7)	0.415

*Scottish Index of Multiple Deprivation ** American Association of Anesthesiologists ***t-test for continuous (parametric) variables; Chi-square test for categorical variables

Table 1. Patient baseline characteristics according to delirium status ascertained on admission for patients admitted from home. Univariable analyses to assess difference between those with and without delirium for each variable. Delirium= 4AT ≥4.

Variable	Whole cohort (n=1340)	Delirium (n= 189)	No delirium (n= 1151)	p-value*
MORTALITY N(%) Within 30 days Within 180 days	63 (4.7) 197 (14.7)	21 (11.1) 54 (28.6)	42 (3.6) 143 (12.4)	<0.001 <0.001
DISCHARGE DESTINATION FOLLOWING ACUTE HOSPITAL STAY N(%) Own home Care home Rehabilitation facility Other acute care Died in hospital	829 (61.9) 37 (2.8) 363 (27.1) 44 (3.3) 67 (5.0)	62 (32.8) 10 (5.3) 82 (43.4) 9 (4.8) 26 (13.8)	767 (66.6) 27 (2.3) 281 (24.4) 35 (3.0) 41 (3.6)	<0.001
DISCHARGE TO POST-ACUTE REHABILITATION N(%)	444 (33.1)	101 (53.4)	343 (29.8)	<0.001
TOTAL LENGTH OF STAY IN INPATIENT FACILITIES Median no of days (IQR)	16 (9-36)	34 (16-66)	14 (8-31)	<0.001
	Patients discharged home in catchment area (n=813)	**Delirium (n= 61)**	**No delirium (n= 752)**	
READMISSION N(%) Within 30 days Within 180days	153 (18.8) 307 (37.8)	22 (36.1) 36 (59.0)	131 (17.4) 271 (36.0)	0.001 0.001

*Wilcoxon rank-sum test for continuous (non-parametric) variables; Chi-square test for categorical variables

Table 2. Patient outcomes according to delirium status as assessed on admission for patients admitted from home. Univariable analyses to assess difference between those with and without delirium for each variable. Delirium= 4AT ≥4.

In multivariable analyses, after adjustment for age, sex, SIMD, ASA grade and COVID-19 within 30days, **delirium was independently associated with higher mortality at 180 days** (OR 1.69, 95% CI 1.13-2.54; p=0.013), **requirement for post-acute inpatient rehabilitation (**OR 2.80, CI 1.97-3.96, p<0.001), **and readmission to hospital within 180 days** (OR 1.79, CI 1.02-3.15, p= 0.041)

CONCLUSIONS

- Delirium can be ascertained in a large, near-complete hip fracture population in routine clinical practice using a well-validated, easy-to-use assessment tool (4AT)
- One in seven patients admitted from their own home had delirium and this was associated with adverse outcomes in these patients
- Delirium assessment on admission using a tool such as the 4AT should be a mandatory part of standard care for all patients with an acute hip fracture
- Early assessment could guide prognostication, facilitate proactive onward care planning and be used to identify modifiable clinical risk factors

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