



Impact of Neurodegenerative Conditions on Distal Radius Fracture Incidence in Geriatric Populations

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INTRODUCTION

Rising prevalence of neurodegenerative conditions common in geriatric populations, such as Alzheimer’s disease (AD) and Parkinson’s disease (PD), calls for urgency to characterize common injuries in these populations for adequate targeted injury prevention. Distal radius fracture (DRF) is the most common fracture from a fall on an outstretched hand. While DRF is common in elderly populations due to age-related motor decline, the current study hopes to evaluate effects of neurodegenerative conditions on DRF risk in the elderly.

METHODS



- Data was collected from Epic Cosmos, a community collaboration of health systems representing over 227,000,000 patient records from over 1,301 hospitals and 28,600 clinics.
- All patients with an encounter between 12/7/2013 and 12/6/2023 at least 60 years of age at the time of the encounter (n=67,338,053) were included and assorted based on presence or absence of common neurodegenerative conditions among the geriatric population and DRF diagnoses using documented ICD-10 codes, as outlined in **Table 1**.
- The Alzheimer’s & Dementia Registry was also queried using Epic Cosmos for a more general comparison between geriatric patients with and without the most common neurodegenerative conditions.
- Using features intrinsic to Epic Cosmos, incidence of a documented comorbid DRF diagnosis code after the age of 60 was measured, and 99% confidence intervals were recorded in **Table 2**.

Diagnosis	ICD-10 Code(s)	N
Distal Radius Fracture	S52.5 (428 unique codes)	553,257
Alzheimer’s & Dementia Registry	---	3,292,801
Alzheimer’s Disease	G30.9	1,173,943
Frontotemporal Dementia	G31.0	55,102
Lewy Body Dementia	G31.83	93,020
Normal Pressure Hydrocephalus	G91.2	94,348
Huntington’s Disease	G10	8,909
Parkinson’s Disease	G20	764,255

Table 1. Patient Population Assorted by Diagnosis

	DRF Incidence	Odds Ratio	P-Value
Alzheimer’s & Dementia Registry	1.7% ± 0.018%		
Not on Registry	0.563% ± 0.002%	3.0929	<0.0001***
Alzheimer’s Disease	1.9% ± 0.033%		
NO Alzheimer’s Disease	0.596% ± 0.003%	3.2583	<0.0001***
Frontotemporal Dementia	1.6% ± 0.139%	1.1800	<0.0001***
Lewy Body Dementia	1.6% ± 0.106%	1.1985	<0.0001***
Normal Pressure Hydrocephalus	1.4% ± 0.100%	1.3407	<0.0001***
Huntington’s Disease	1.3% ± 0.315%	1.4318	<0.0001***
Parkinson’s Disease	1.2% ± 0.037%	1.5731	<0.0001***
Frontotemporal Dementia	1.6% ± 0.139%		
NO Frontotemporal Dementia	0.619% ± 0.002%	2.6615	<0.0001***
Lewy Body Dementia	1.6% ± 0.106%	1.0156	0.3579
Normal Pressure Hydrocephalus	1.4% ± 0.100%	1.1361	0.0016 **
Huntington’s Disease	1.3% ± 0.315%	1.2134	0.0241
Parkinson’s Disease	1.2% ± 0.037%	1.3331	<0.0001***
Lewy Body Dementia			
NO Lewy Body Dementia	0.618% ± 0.002%	2.6229	<0.0001***
Normal Pressure Hydrocephalus	1.4% ± 0.100%	1.1187	0.0015 **
Huntington’s Disease	1.3% ± 0.315%	1.1947	0.0313
Parkinson’s Disease	1.2% ± 0.037%	1.3126	<0.0001***
Normal Pressure Hydrocephalus	1.4% ± 0.100%		
NO Normal Pressure Hydrocephalus	0.618% ± 0.002%	2.3438	<0.0001***
Huntington’s Disease	1.3% ± 0.315%	1.0680	0.2463
Parkinson’s Disease	1.2% ± 0.037%	1.1734	<0.0001***
Huntington’s Disease	1.3% ± 0.315%		
NO Huntington’s Disease	0.619% ± 0.002%	2.1909	<0.0001***
Parkinson’s Disease	1.2% ± 0.037%	1.0987	0.1545
Parkinson’s Disease	1.2% ± 0.037%		
NO Parkinson’s Disease	0.612% ± 0.003%	2.0166	<0.0001***

Table 2. Relative DRF Incidence between Studied Conditions

RESULTS

- Patients listed in the Alzheimer’s & Dementia Registry had a significant, 3-fold increase in DRF incidence after the age of 60 (1.7% ± 0.018%) compared with those not listed (0.563% ± 0.002%).
- Alzheimer’s disease (AD) (1.9% ± 0.033%) was associated with significantly higher DRF incidence than Parkinson’s disease (PD) (1.2% ± 0.037%), Huntington’s disease (1.3% ± 0.315%), frontotemporal dementia (1.6% ± 0.139%), Lewy body dementia (1.6% ± 0.106%), and normal pressure hydrocephalus (1.4% ± 0.1%).
- Each condition listed was associated with a significantly higher DRF incidence than those without the condition.

CONCLUSION

- While uncomplicated aging is undoubtedly associated with diminished motor function, this relationship may be exacerbated by common neurodegenerative conditions, especially AD.
- Although cognitive symptoms may be more evident, patients affected by these conditions may need additional monitoring due to increased fall and fracture risk.

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