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Poster 7

The occurrence and timing of delirium in acute care hospitalizations in the last year of life: A population-based retrospective cohort study

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BACKGROUND

- Delirium is a common and highly distressing neurocognitive complication for patients in acute care hospitals. It is particularly common among patients at the end of life, when illness burden is often highest[1].
- Delirium adversely impacts the patient, family and healthcare providers. It hinders communication and thus can impede assessment and treatment. Towards the end of life, delirium can limit precious communication between loved ones.[2]
- Efforts to prevent and manage delirium in hospital can minimize its adverse impact. However, there is currently limited evidence, particularly at the population-level, to indicate who is at risk of developing delirium in hospital.

AIM

- The aim of this study was to describe the occurrence and timing of delirium in patients admitted to acute care hospitals in Ontario, Canada in their last year of life, and to identify factors associated with the occurrence of delirium in hospital.

METHODS

Study design: Population-based retrospective cohort study

Study population: Residents of Ontario, Canada who died between January 1, 2014 and December 31, 2016 and who were admitted to an acute care hospital in the province in their last year of life.

Exclusions: Less than 19 or over 105 years of age at hospital admission, individuals with incomplete OHIP eligibility between hospital admission date and death, and individuals who were not residents of Ontario at admission

Data sources: Population-based, routinely collected Ontario health administrative data from ICES. Specific databases used in this study are described below

ICES database	Database description
Ontario Registrar General Vital Statistics Database (ORGD)	Information on all deaths in Ontario, including date and cause of death
Canadian Institutes for Health Information Discharge Ab-	Administrative, demographic and clinical data on acute care hospital discharges in Ontario.
Ontario Drug Benefits Database (ODB)	Information on prescription drugs, including dispensation dates and quantities, for individuals eligible for coverage under the ODB (age 65+, on social assistance,
Ontario Health Insurance Program (OHIP) Physician Claims	Billing claims for care provided by physicians in Ontario. Includes details of service provided and diagnosis.
Continuing Care Reporting System (CCRS)	Information, collected via routine Resident Assessment Instrument (RAI) assessments, on long-term care and complex continuing care residents in Ontario.
Home Care Database (HCD)	Information on publicly funded home care provided to Ontario residents.
Narcotics Monitoring System (NMS)	Information on all dispensed prescriptions for narcotics, controlled substances and other monitored drugs in Ontario.
Registered Persons Database (RPDB)	Demographic information on all individuals in Ontario who were ever covered under OHIP

Study variables:

Outcome: Occurrence of delirium during hospitalization, identified via ICD-10 diagnosis codes (F05) on CIHI-DAD hospital discharge record.

Study population characteristics: Age; sex; presence of 18 different chronic conditions (including dementia) captured using previously developed algorithms; disease trajectory based on cause of death; opioid prescription; antipsychotic prescription; polypharmacy; long-term care resident; home care recipient; admitted via emergency department; ICU admission; type of admission (surgical or medical); palliative care involvement.

Statistical analysis: Multivariable modified Poisson regression with robust error variance to compare patient characteristics between hospitalizations with delirium and those without, analyzing a random sample of 1 hospitalization per patient. .

Ethics statement: The use of data in this project was authorized under Section 45 of Ontario's Personal Health Information Protection Act, which does not require review by a Research Ethics Board.

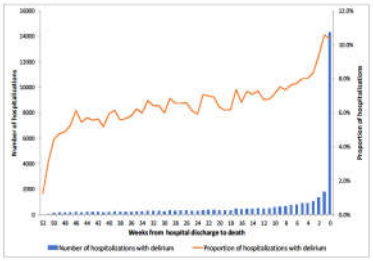
RESULTS

Patient characteristics

- 208,715 patients were admitted to hospital in the last year of life, with a total of 420,387 hospitalizations.
- Mean age at admission was 76.9 years, 51.2% were male, and 19.8% had existing dementia.

Occurrence of delirium

- ICD-10 coded delirium occurred in 8.2% of all hospitalizations in the last year of life.
- The number and proportion of hospitalizations with a diagnosis of delirium increased as death approached (see Figure at right)



Determinants of delirium during end of life hospitalizations

	RR (95% CI)
Female	0.81 (0.77-0.84)
Age*	
40	0.32 (0.28-0.36)
60	0.56 (0.53-0.60)
80	Reference
100	1.77 (1.66-1.89)
Number of chronic conditions*	
0	Reference
3	1.02 (1.00-1.05)
5	1.04 (1.00-1.09)
10	1.09 (1.00-1.19)
Dementia	1.42 (1.36-1.50)
Disease trajectory	
Terminal	Reference
Organ failure	1.23 (1.16-1.31)
Frailty	1.67 (1.56-1.80)
Sudden death	1.55 (1.42-1.69)
Other	1.74 (1.59-1.90)

	RR (95% CI)
Active opioid prescription	1.17 (1.13-1.22)
Active antipsychotic prescription†	1.34 (1.27-1.41)
Polypharmacy†	
<5 prescriptions	Reference
5-9 prescriptions	0.97 (0.92-1.01)
10+ prescriptions	1.01 (0.96-1.06)
Long-term care resident	0.66 (0.62-0.71)
Home care recipient	1.25 (1.20-1.31)
Admitted through emergency department	1.22 (1.11-1.34)
Surgical admission (vs. medical)	1.37 (1.27-1.49)
Palliative care involvement	
High	1.15 (0.94-1.41)
Medium	1.77 (1.63-1.92)
Low	1.56 (1.45-1.67)
No involvement	Reference
ICU admission	1.21 (1.12-1.31)

*Modelled using 3-knot restricted cubic splines[3]; †Among individuals age 66+ at death

CONCLUSIONS

- Delirium is relatively common in hospitalizations in the last year of life. This finding is concerning, given the negative impact that delirium can have on patients, both in its acute symptomatology and impact on subsequent cognitive functions, as well as the stress this condition can cause for families and healthcare providers.
- Our finding that delirium occurs in almost one in ten hospitalizations in the last year of life may be an underestimate. Delirium is often underdiagnosed and therefore not documented in hospital records. Our data likely captures the occurrence of severe and/or hyperactive delirium, potentially missing mild or hypoactive cases.[4-5]
- Patient, health and healthcare characteristics are associated with an increased risk of delirium during end of life hospitalizations. These findings can be used to inform delirium prevention efforts.

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REFERENCES

1. Watt CL, Momoli F, Ansari MT, Sikora L, Bush SH, Hosie A, Kabir M, Rosenberg E, Kanji S, Lawlor PG. The incidence and prevalence of delirium across palliative care settings: A systematic review. Palliative Medicine 2019 Jun 11:269216319854944. doi: 10.1177/0269216319854955. [Epub ahead of print]
2. Breitbart W, Gibson C, Tremblay A. The delirium experience: delirium recall and delirium-related distress in hospitalized patients with cancer, their spouses/caregivers, and their nurses. Psychosomatics 2002; 43(3): 183-94.
3. Harrell FE. Regression modeling strategies: With applications to linear models, logistic regression, and survival analysis. New York: Springer; 2001.
4. McCoy TH, Jr., Snapper L, Stern TA, Perlis RH. Underreporting of Delirium in Statewide Claims Data: Implications for Clinical Care and Predictive Modeling. Psychosomatics 2016; 57(5): 480-8.
5. Katznelson R, Djaiani G, Tait G, et al. Hospital administrative database underestimates delirium rate after cardiac surgery. Canadian Journal of Anesthesia/Journal canadien d'anesthésie 2010; 57(10): 898-902.

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