

Delirium in intensive care: a retrospective study using natural language processing (NLP) of electronic health records (EHR)

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BACKGROUND

Delirium, characterized by acute alterations in attention, awareness, and cognition, poses a significant challenge in ICUs, remaining underdiagnosed due to imprecise terminology and limited awareness of its importance.

OBJECTIVE

In this retrospective study, we investigated the occurrence of delirium in ICU patients, focusing on those with heart failure (HF), utilizing both NLP techniques and structured data extraction.

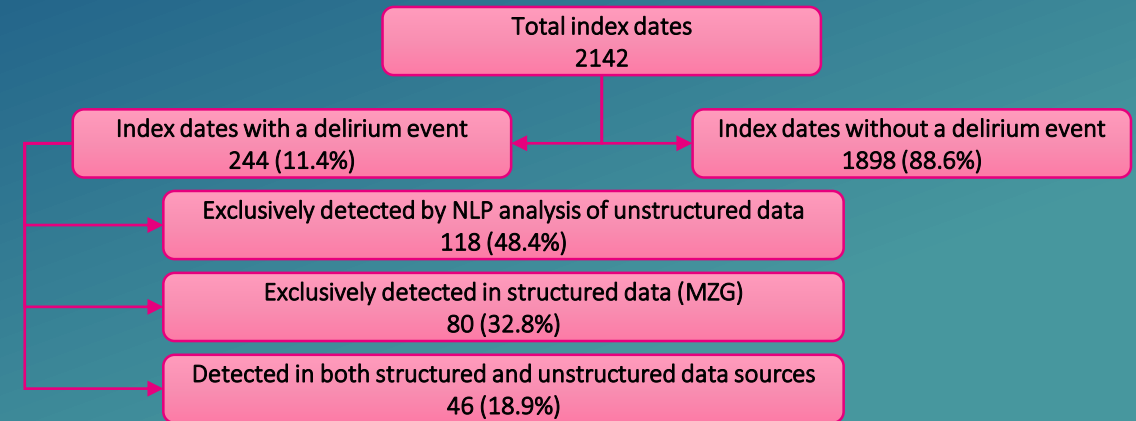
METHODS

The study used all available data from the Observational Medical Outcomes Partnership Common Data Model (OMOP-CDM) database of Maria Middelaes General Hospital (Ghent, Belgium), limited to the period Jan. 2016 - July 2022.

The index event, signifying ICU admission with a discharge exceeding 24 hours, was identified from ADT data. The cohort comprised patients with a structured diagnosis of HF (ICD-10-CM code I50), with the index period spanning from ICU admission to hospital discharge. Delirium events were captured from unstructured data via LynxCare NLP technology (detecting "delirium") and from structured data by searching for ICD-10-CM code F05 ("delirium due to known physiological condition") in the Minimal Hospital Data (MZG).

RESULTS

Our study analyzed a total of 2142 distinct hospitalizations in the ICU in 1647 patients. We identified a total of 244 delirium events, meaning that 1 out of 10 index dates (11.4%) contained a delirium event after admission to ICU and before discharge from the hospital. Interestingly, nearly half (48.4%, 118 events) of the mentions of delirium were exclusively detected by NLP analysis of unstructured data. *Currently, we plan to manually validate these results.*



CONCLUSION

The findings indicate that 11.4% of ICU admissions in HF patients were likely affected by delirium.

Despite challenges such as imprecise terminology (hindering NLP detection) and human error (e.g., missing codes in MZG), NLP algorithms show promise in transforming unstructured data into standardized codes, thereby enriching structured data sources to improve delirium detection and hence hospital management and patient care.

