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a systematic review**

Dan Arvig, Michael; Laursen, Christian Borbjerg; Jacobsen, Niels; Gæde, Peter; Lassen, Anmarie Touborg

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# The prognostic and clinical value of monitoring patients with acute dyspnea with serial focused ultrasound of the lungs and inferior vena cava: a systematic review

Michael Dan Arvig<sup>1,2</sup>, Christian B. Laursen<sup>3,4</sup>, Niels Jacobsen<sup>3,5</sup>, Peter Haulund Gæde<sup>4,6</sup>, Anmarie Touborg Lassen<sup>4,7</sup>

<sup>1</sup>Dept. of Emergency Medicine, Slagelse Hospital, Denmark

<sup>2</sup>Dept. of Clinical Medicine, University of Copenhagen, Copenhagen, Denmark

<sup>3</sup>Dept. of Respiratory Medicine, Odense University Hospital, Odense, Denmark

<sup>4</sup>Dept. of Clinical Research, Faculty of Health Science, University of Southern Denmark, Odense, Denmark

<sup>5</sup>Regional Center for Technical Simulation, TechSim, Region of Southern Denmark, Odense, Denmark

<sup>6</sup>Dept. of Cardiology and Endocrinology, Slagelse Hospital, Denmark

<sup>7</sup>Dept. of Emergency Medicine, Odense University Hospital, Odense, Denmark

## Background

Acute dyspnea is one of the most common complaints in the emergency department with high in-hospital mortality. The current methods of monitoring the patients lack both sensitivity and specificity. The aims were to investigate if monitoring patients with focused ultrasound of the lungs (FLUS) and/or ultrasound of inferior vena cava (IVC) has a 1) prognostic value, 2) clinical value, and 3) if ultrasound findings correlate over time with other parameters.

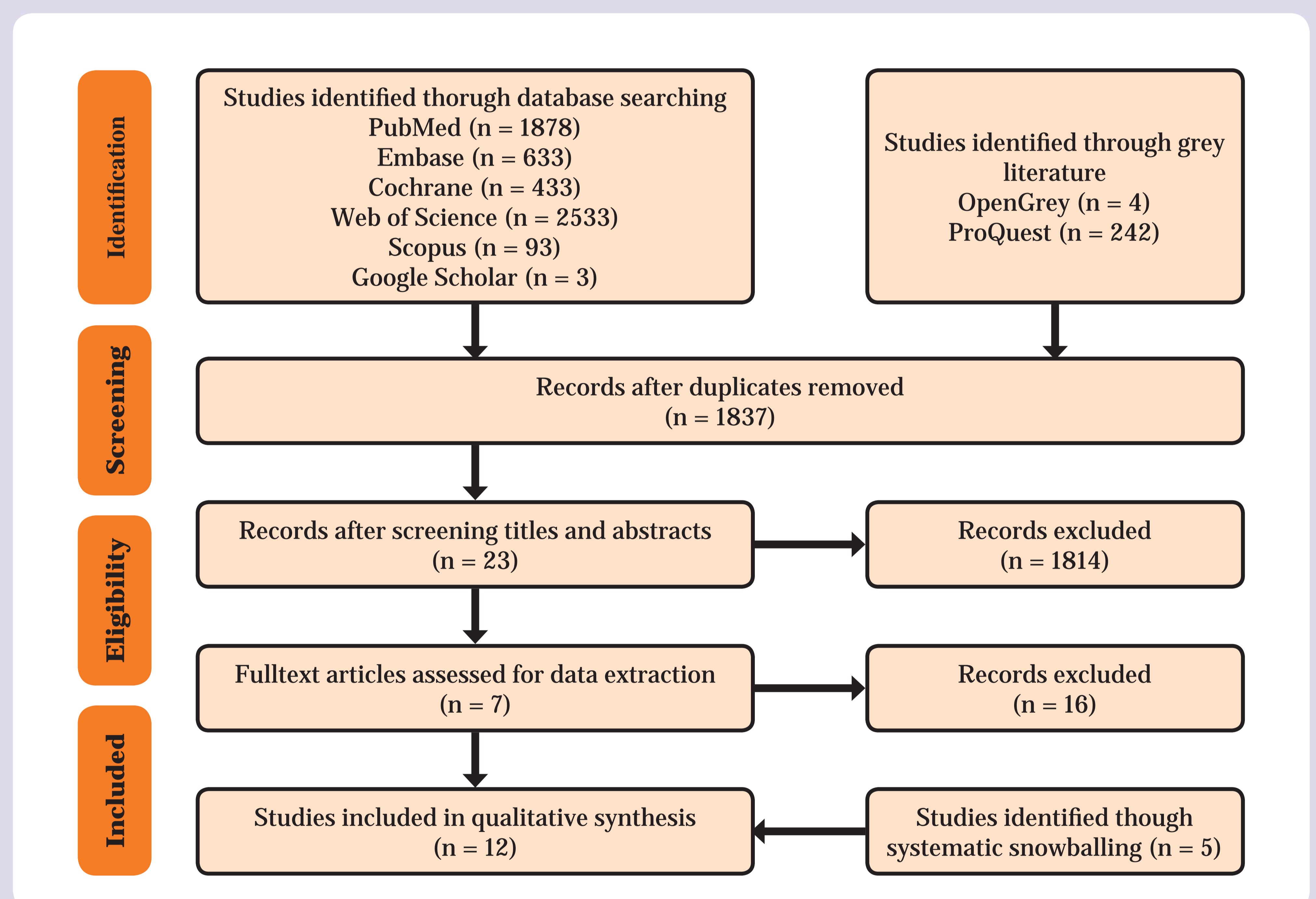
## Methods

A systematic search was conducted on 12th of June 2018 on PubMed, Embase, Cochrane, Web of Science, Google Scholar, and Scopus. The grey literature was sought in OpenGrey and ProQuest. We included trials with adult patients with acute dyspnea admitted to a hospital who underwent repeated FLUS and/or IVC scans. In the 1837 studies identified, first titles and abstracts were screened. 23 studies were selected for full-text screening, and of those, 7 were chosen for data extraction. Additional 5 papers were identified through systematic snowballing. Risk of bias was assessed according to the study design.

## Results

Twelve studies were included (11 prospective cohort studies, 1 RCT) with a total of 824 patients. In 5 studies the patients only received ultrasound scanning of IVC; in 4 studies only with FLUS, and in 3 studies with both modalities. Generally, the studies had small study populations, and no sample size calculations were made. Only patients suspected of heart failure were investigated, and the studies were methodological heterogeneous. Four studies reported that patients with a reduction in either B-lines, IVC size and/or an increased IVC collapsibility index (IVCCI) had fewer readmissions and deaths. Three studies reported on optimized treatment in relation to the same findings. All studies reported either a reduction of B-lines, IVC size and an increase in IVCCI as a sign of possible decreased congestion/redistribution of fluid but few studies related the findings to other parameters.

**Figure 1:** PRISMA flow chart.



## Conclusions

The overall bias in the studies was high. Repeated FLUS and IVC scans showed promising results as a monitoring tool, but further investigations with larger study populations and with patients with undifferentiated dyspnea are needed to generalize the findings.

## Corresponding author

Michael Dan Arvig

MD, consultant, clinical associate professor

Tel.: +45 6086 9013

Email: [mdar@regionsjaelland.dk](mailto:mdar@regionsjaelland.dk)