ICU
MANAGEMENT & PRACTICE

Are 'sniffer systems' effective in detecting ARDS?

Acute respiratory distress syndrome (ARDS) results in substantial mortality but remains underdiagnosed in clinical practice. For this reason, automated “sniffer” systems that analyse electronic records have been developed to assist clinicians with ARDS diagnosis. However, a new systematic review found that these sniffer tools had moderate to high predictive value in their derivation cohorts, indicating that published literature had potential for high risks of bias in study design, particularly with regard to patient selection and reference standard application.

You might also like: "Sepsis sniffer": prediction tool for early ID and care

Approximately 40 percent of patients with ARDS are not identified and 35 percent do not receive low-tidal volume ventilation despite its proven mortality benefit. Under-recognition of patients with ARDS is thought to be a major reason for inadequate treatment.

Individual ARDS sniffer systems can automatically analyse electronic health record data, including the text of radiology reports and laboratory data, to identify patients with ARDS in real-time. Initial reports have described promising diagnostic performance of such tools when compared to adjudication of patients for ARDS by clinical reviewers. However, in one subsequent evaluation, sniffer system performance was somewhat worse.

Researchers from the University of Michigan performed a systematic review of currently published electronic sniffer systems for ARDS, examining the diagnostic performance of individual tools across studies. They hypothesised that variation in study quality and potential risks for biases in study design could explain the variability in performance.

Methodology

MEDLINE and Scopus databases were searched through October 2018 to identify studies of tools using routinely available clinical data to detect patients with ARDS. Study design, tool description, and diagnostic performance were extracted by two reviewers. The Quality Assessment of Diagnostic Accuracy Studies (QUADAS-2) was used to evaluate each study for risk of bias in four domains: patient selection, index test, reference standard, and study flow and timing.

Results and conclusion

Among 480 studies identified, nine met inclusion criteria, evaluating six unique ARDS sniffer tools. Eight studies were derivation and/or temporal validation designs, with one also evaluating the effects of implementing a tool in clinical practice. A single study performed an external validation of previously published ARDS sniffer tools.

Studies reported a wide range of sensitivities (43 to 98 percent) and positive predictive values (26 to 90 percent) for detection of ARDS. Most studies had potential for high risks of bias identified in their study design, including patient selection (5 of 9), reference standard (4 of 9), and flow and timing (3 of 9). In the single external validation without any perceived risks of biases, performance of ARDS sniffer tools were worse.

Taken together, the systematic review did not identify sufficient electronic ARDS “sniffer” system studies, nor the necessary range of evaluations to recommend widespread adoption. There remains an ongoing need for robust evaluations of ARDS sniffer systems and their impact on clinical practice, the researchers conclude.

Image credit: iStock

Published on : Tue, 11 Dec 2018