



Electronically Generated Modified NEWS on the Hospital Floor and ED

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Background

The National Early Warning System Score (NEWS) is a reliable tool to detect significant patient deterioration in the general floor and in emergency departments (ED). Studies of NEWS have largely been conducted using paper, or simple software to calculate the score. With the widespread implementation of Electronic Health Records (EHR), there is the opportunity for electronically generated, and automatically updated NEWS score.

Methods

We report our experience with a modified NEWS score (mNEWS) generated by web-based software, that uses data from Telemetry and EHR feeds, to detect patient deterioration on our hospital floors and ED. From Dec 12, 2017 until July 20, 2018 our system continuously calculated a mNEWS for all floor and ED patients. The mNEWS was identical to the standard NEWS except for level of consciousness score.

Maximum daily scores (max mNEWS) were correlated to transfer to an ICU within 24 hours, which was our marker for clinical deterioration. Transfer to the ICU was determined by standard criteria and independently of the mNEWS score.

Results

The mNEWS scores showed a gradation in sensitivity, specificity and predictive values for both the floor and the ED. As the scores increased, the sensitivity decreased and the specificity increased. On the floor a max mNEWS of ≥ 4 and ≥ 7 occurred 8,096 and 1,635 times respectively. The sensitivities for ICU transfer were 59.8 and 27.6 %, the specificities 51.4 and 91 %. The Positive Predictive Values (PPV) were 6.2 and 18.4 % and the Negative Predictive Values (NPV) for both groups were 95.9 %. In the ED, a max mNEWS of ≥ 5 and ≥ 7 occurred 2,805 and 1,217 times. The sensitivities were 67.7 and 42.3 %, and specificities were 72 and 89.3 %. PPV was 21.5 and 31.0%. NPV was 95.2 and 93.2 %. The AUROC for detecting ED to ICU transfer was 0.75.

Conclusions

An electronically generated mNEWS score, can be set for the optimal ROC characteristics to detect clinical deterioration, depending upon the clinical setting. The system may allow detection of deterioration earlier than prior systems as it requires less provider input and is updated continuously. This may be especially relevant as the capability of electronic systems to transmit real-time vital signs data to the EHR evolves which can help with earlier detection and intervention of adverse events.