Derivation and external validation of a simple prediction rule for the development of respiratory failure in hospitalized patients with influenza

Abstract

Background: Influenza viruses cause seasonal epidemics worldwide with a significant morbimortality burden. Clinical spectrum of Influenza is wide, being respiratory failure (RF) one of its most severe complications. This study aims to elaborate a clinical prediction rule of RF in hospitalized Influenza patients.

Methods: A prospective cohort study was conducted during two consecutive Influenza seasons (December 2016–March 2017 and December 2017–April 2018) including hospitalized adults with confirmed A or B Influenza infection. A prediction rule was derived using logistic regression and recursive partitioning, followed by internal cross-validation. External validation was performed on a retrospective cohort in a different hospital between December 2018 and May 2019.

Results: Overall, 707 patients were included in the derivation cohort and 285 in the validation cohort. RF rate was 6.8% and 11.6%, respectively. Chronic obstructive pulmonary disease, immunosuppression, radiological abnormalities, respiratory rate, lymphopenia, lactate dehydrogenase and C-reactive protein at admission were associated with RF. A four category-grouped seven point-score was derived including radiological abnormalities, lymphopenia, respiratory rate and lactate dehydrogenase. Final model area under the curve was 0.796 (0.714–0.877) in the derivation cohort and 0.773 (0.687–0.859) in the validation cohort ($p < 0.001$ in both cases). The predicted model showed an adequate fit with the observed results (Fisher's test $p > 0.43$).

Conclusion: We present a simple, discriminating, well-calibrated rule for an early prediction of the development of RF in hospitalized Influenza patients, with proper performance in an external validation cohort. This tool can be helpful in patient's stratification during seasonal Influenza epidemics.

Source: Ayuso, B., Lalueza, A., Arrieta, E. *et al.* Derivation and external validation of a simple prediction rule for the development of respiratory failure in hospitalized patients with influenza. *Respir Res* **23**, 323 (2022). https://doi.org/10.1186/s12931-022-02245-w.

Predictive potential of ACE phenotyping in extrapulmonary sarcoidosis

Abstract

Elevated ACE expression in tissues (reflected by blood ACE levels) is associated with increased risk of cardiovascular diseases and is also a marker for granulomatous diseases. We developed a new approach for characterization of ACE status in the blood—ACE phenotyping and established normal values of ACE levels 50–150% of control pooled plasma. ACE phenotyping was performed in citrated plasma of 120 patients with known interstitial lung diseases. In the 1st set of 100 patients we found 22 patients with ACE levels > 150%; ACE phenotyping also objectively identified the presence of ACE inhibitors in the plasma of 15 patients. After excluding these patients and patient with ACE mutation that increases ACE shedding, 17 patients were identified as a suspicious for systemic sarcoidosis based on elevation of blood ACE (> 150% of mean). A new parameter that we have established–ACE immunoreactivity (with mAb 9B9)—allowed us to detect 22 patients with decreased values (< 80%) of this parameter, which may indicate the presence of ACE in the blood that originates from macrophages/dendritic cells of granulomas. In the remaining 20 patients, this new parameter (mAbs binding/activity ratio) was calculated using 3 mAbs (9B9, 3A5 and i1A8—having overlapping epitopes), and 8 patients were identified as having decreases in this parameter, thus increasing dramatically the sensitivity for detection of patients with systemic sarcoidosis. Whole body PET scan confirmed extrapulmonary granulomas in some patients with lower immunoreactivity towards anti-ACE mAbs. ACE phenotyping has novel potential to noninvasively detect patients with systemic sarcoidosis.

Source: Danilov, S.M., Kurilova, O.V., Sinitsyn, V.E. *et al.* Predictive potential of ACE phenotyping in extrapulmonary sarcoidosis. *Respir Res* **23**, 211 (2022). https://doi.org/10.1186/s12931-022-02145-z.

Postoperative Pneumonia and Aspiration Pneumonia Following Elderly Hip Fractures

Abstract

Objectives: The present study aimed to investigate the incidence of and risk factors for postoperative pneumonia and aspiration pneumonia after hip fracture surgery.

Design: Retrospective cohort study from 2005 to 2021.

Setting: Asan Medical Center in Seoul, Republic of Korea.

Participants: A total 1,208 patients aged ≥ 65 years who underwent hip fracture surgery.

Measurements: Postoperative pneumonia was defined as cases with new infiltration on chest x-ray or chest computed tomography (CT) after surgery or confirmed by a pulmonologist's consultation and diagnosis. Aspiration pneumonia was defined as: 1) radiologic findings of hospital-acquired pneumonia on chest radiographs or CT, medical record of aspiration pneumonia confirmed by a pulmonologist's consultation, and history of vomiting or aspiration, or 2) gravity-dependent opacity on chest CT when the history of vomiting or aspiration is ambiguous. Patient demographics, past medical history, pre-injury Koval score, Charlson Comorbidity Index (CCI), blood test results, length of hospital stay, and in-hospital mortality were evaluated. A comparison analysis and binary logistic regression were performed to identify the incidence and risk factors for postoperative pneumonia and aspiration pneumonia.

Results: Postoperative pneumonia was diagnosed in 47 patients (3.9%), including 20 with aspiration pneumonia (1.7%). In the multivariate analysis, postoperative delirium (odds ratio [OR], 3.42; $P < 0.001$), American Society of Anesthesiologists (ASA) scores ≥ 3 (OR, 2.11; $P = 0.021$), and CCI (OR, 1.21; $P = 0.013$) were significant risk factors for postoperative pneumonia. Male sex (OR, 3.01; $P = 0.017$), postoperative delirium (OR, 3.16; $P = 0.014$), and preoperative serum albumin levels < 3.5 g/dL (OR, 7.00; $P = 0.010$) were significant risk factors for aspiration pneumonia.

Conclusion: ASA classification ≥ 3, higher CCI, and postoperative delirium were the risk factors for postoperative pneumonia. Male sex, postoperative delirium, and lower preoperative serum albumin level were the risk factors for aspiration pneumonia. Thus, physicians should pay attention to patients with the risk factors.

Source: Ahn, J., Chang, J.S. & Kim, J.W. Postoperative Pneumonia and Aspiration Pneumonia Following Elderly Hip Fractures. *J Nutr Health Aging* **26**, 732–738 (2022). https://doi.org/10.1007/s12603-022-1821-9.

Decreasing Hospital Readmissions Utilizing an Evidence-Based COPD Care Bundle

Abstract

Purpose: Chronic obstructive pulmonary disease (COPD) is a chronic condition that leads to significant morbidity and mortality. Management of COPD hospitalizations utilizing an evidence-based care bundle can provide consistent quality of care and may reduce readmissions.

Methods: This single-center retrospective cohort study evaluated readmission rates in patients hospitalized with a COPD exacerbation. Patients in the pre-intervention cohort received usual care, while patients in the post-intervention cohort received an innovative inpatient COPD care bundle. The bundle focused on optimizing care in five areas: consults, inpatient interventions, education, transitions of care, and after discharge care.

Results: In this study, 149 subjects were included in the pre-intervention cohort and 214 subjects were included in the post-intervention cohort. Thirty-day readmission rates were lower in the post-intervention cohort compared to the pre-intervention cohort, 22.4% vs. 38.3% ($p = 0.001$). A reduction in 60-day and 90-day readmission rates was also observed, 13.7% vs. 40.3% ($p < 0.001$) and 10.1% vs. 32.2% ($p < 0.001$), respectively.

Conclusion: Bundled care is an effective and inexpensive method for institutions to provide consistent and quality care. The findings of this study demonstrate that the implementation of a COPD care bundle is an effective strategy to decrease hospital readmissions.

Source: Kendra, M., Mansukhani, R., Rudawsky, N. *et al.* Decreasing Hospital Readmissions Utilizing an Evidence-Based COPD Care Bundle. *Lung* **200**, 481–486 (2022). https://doi.org/10.1007/s00408-022-00548-9.