Changes in B-type natriuretic peptide improve weaning outcome predicted by spontaneous breathing trial.

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Abstract

OBJECTIVE: Despite the use of spontaneous breathing trial (SBT), predicting weaning success remains a major clinical challenge. Because cardiovascular dysfunction could be a major underlying mechanism of weaning failure, we evaluated the role of the levels of B-type natriuretic peptide (BNP), a marker for cardiovascular function, in patients who passed a 2-hr SBT.

DESIGN, SETTING, AND PATIENTS: Fifty-two patients recovering from acute respiratory failure were enrolled as the testing group to determine the predictive value of BNP. The predictive value of BNP was validated in a second independent cohort of 49 patients. Then, we combined both groups of patients to conduct the final analysis.

MEASUREMENTS AND RESULTS: In the testing group of 52 patients, 41 passed SBT and were extubated. Of these patients, 33 patients (80%) were extubated successfully (extubation success) while eight patients (20%) were reintubated within 48 hrs (extubation failure). There were no differences in the baseline BNP levels, but the extubation failure group had significantly greater increases in BNP at the end of SBT than the extubation success groups (32.7%, 25-75 percentile = 25.7%-50.8% vs. 0.69%, -8.8%-10.72%, p < .001). The area under the receiver operating characteristic curves for the BNP change was 0.93 and an increase of BNP <20% during SBT had the best combination of sensitivity, specificity, positive and negative predictive values, and diagnostic accuracy for predicting extubation success (91%, 88%, 97%, 70%, and 91%). This threshold value of BNP change was then validated in an independent cohort. Combining BNP with SBT as extubation criteria increased the extubation success rate to 95% from 78% using SBT alone (p = .035).
CONCLUSION: Measuring the percentage change in the BNP level during a SBT may help improve the predictive value of SBT on weaning outcome.

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