Diagnosis of Hypothalamic-pituitary-adrenal Insufficiency in Non Critically Ill, Hospitalized Patients

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Background: Adrenal insufficiency is one of the frequently suspected conditions in hospitalized patients. The diagnostic value of plasma morning or basal cortisol level that is usually used as the first screening test of adrenal insufficiency is derived from ambulatory patients. Nonetheless, the cut-off level of plasma basal cortisol for detecting adrenal insufficiency in non-critically ill, hospitalized patients is still unclear.

Objective: To determine the diagnostic value of plasma basal cortisol level for detecting hypothalamus-pituitary adrenal insufficiency in non-critically ill, hospitalized patients who had clinical suspicion of adrenal insufficiency.

Methods: The study was a cross sectional (analytic) study. Non-critically ill patients, who had clinical suspicion of adrenal insufficiency and plasma basal cortisol < 18 µg/dl, were included in the study. All patients underwent a short, standard-dose corticotropin test (250 µg ACTH stimulation test). Corticotropin was injected and plasma cortisol level before 30 and 60 minutes after injection were taken. Basal cortisol cut points were determined, using the 250 µg ACTH stimulation test as reference test, by receiver operating characteristic analysis (ROC) and calculation the area under ROC curve (AUC).

Results: Forty-eight patients were studied. Most of the patients were admitted in general medical wards (60.4%). The most frequent reason led to basal cortisol measurement was hyponatremia/SIADH (42%). Using a peak cortisol level above 18 µg/dl as the criterion for a normal response and < 18 µg/dl as an abnormal poor response to 250 µg ACTH stimulation test, adrenal insufficiency was suspected. Plasma basal cortisol less than 5 µg/dl best predicted poor response; whereas, values greater than 12 µg/dl best predicted a normal response. The AUC for this diagnostic threshold was 0.918. (95% CI 0.84-0.99).

Conclusion: In non-critically ill, hospitalised patients, the plasma basal cortisol level less than 5 µg/dl is a useful diagnostic threshold to determine poor response to 250 µg ACTH stimulation test and adrenal insufficiency is likely. Whereas, the level above 12 µg/dl is best predicted normal response. So, further 250 µg ACTH stimulation test may not be routinely performed.

Keywords: Basal cortisol, Adrenal insufficiency, Hospitalized, Inpatient