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## Cortisol in the ICU

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## Keywords

Adrenal hypofunction, cortisol, intensive care

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## Comments

Defining adrenocortical hypofunction in the critically ill remains controversial, and unfortunately this paper is unable to throw much more light on the subject. Many of the patients studied had levels of cortisol that may be considered low (400 nmol/l) for the stressed critically ill patient, and some had corresponding impaired responses to adrenocorticotrophic hormone (ACTH) stimulation. These patients may, therefore, have been experiencing various levels of adrenocortical dysfunction. Whether any of these patients would have benefited from substitution therapy remains unknown, and so a definition for 'adrenal hypofunction in the critically ill' can not be devised until this is answered. This may well be a survival response in the critically ill and substitution therapy may cause harm. A recent prospective study by Annane *et al* (*JAMA* 2000, **283**:1038-1045 ) showed that elevated basal cortisol levels and a poor response to the ACTH stimulation test, predicted increased mortality in septic shock.

## Introduction

The incidence of adrenal hypofunction in the critically ill is unknown as there is conflicting evidence in the literature over expected cortisol measurements in these patients and their response to ACTH. Consequently, it is difficult to decide which patients would benefit from substitution therapy. This study attempts to answer these two questions.

## Methods

- Prospective, consecutive critically ill patients (n = 55)
- Exclusions: steroid and etomidate therapy; expected ICU stay shorter than 3 days

- Morning cortisol measurements (n = 55) and proportion of patients identified with cortisol levels less than 400 or 500 nmol/l (proposed cut off points for adrenal insufficiency)
- Short ACTH stimulation test performed (n = 16)
- 24 h urinary cortisol excretion measured (n = 34)

## Results

Thirty-six percent of patients had cortisol levels < 400 nmol/l and 47% < 500 nmol/l. There was a positive correlation between basal plasma cortisol levels and urinary cortisol concentration. Cortisol levels < 400 nmol/l were associated with trauma, cerebral affection, mannitol therapy and ventilatory therapy. Out of 16 patients, nine had an incremental rise in cortisol (< 200 nmol/l) following ACTH stimulation at 30 min and four after 60 min. Eleven of these patients had basal cortisol levels < 400 nmol/l.

## References

1. Rydvall A, Brandstrom A, Banga R, Asplund K, Backlund U, Stegmayr BG: Plasma cortisol is often decreased in patients treated in an intensive care unit. *Intensive Care Med.* 2000, 26: 545-551.