

ADRENAL HORMONES AS INDEPENDENT PREDICTOR FACTORS OF MORTALITY DURING SEPSIS OR SEPTIC SHOCK

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The activation of the hypothalamic-pituitary-adrenal axis is critical for adaptation to stress and serious illness. The imbalance between antiinflammatory activity of cortisol and proinflammatory activity of the adrenal androgens, dehydroepiandrosterone (DHEA) and dihydroepiandrosterone sulfate (DHEAS) can be an important predictor factor of mortality in sepsis.

OBJECTIVES

Determine the adrenal hormones ability to predict at 28 days mortality, in patients with severe sepsis or septic shock.

MATERIAL AND METHODS

Patients diagnosed of severe sepsis or septic shock who were admitted to critical unit of Sierrallana Hospital in Torrelavega (Spain). Cortisol, DHEA and DHEAS were determined in the first 24 hours of admission and mortality was recorded at 28 day. For each biomarker, Area Under Curve (AUC) and its 95% confidence interval (95%CI) were estimated by using ROC curves. Levels of biomarkers were ordinal categorized in tertiles (T1, T2 and T3), and as association measure Odds Ratios (OR) with their 95%CI adjusted for age, sex, SOFA and presence of severe sepsis or septic shock were estimated.

RESULTS

Table 1: Baseline characteristics

	TOTAL N=72	SURVIVORS N=63	NO SURVIVORS N=9	P
AGE Median (IQR)	67.2 (58.4-76.3)	65.1 (56.2-75.3)	80.39 (69.6-82.2)	0.004
SEX n (%)	M: 43 (59.7) W: 29 (40.3)	M: 41 (95) W: 22 (76)	M: 2 (5) W: 7 (24)	0.025
SEPTIC SHOCK n(%)	29 (40,3)	24 (82.8)	5 (17.2)	0.525
APACHE II Mean(SD)	15.7 (7.0)	15.02 (7.3)	18.3 (5.1)	0.051
SOFA Mean(SD)	6 (3.5)	5.7 (3.5)	7 (3)	0.276
PCT Median (IQR)	6.8 (3.0-41.4)	6.0 (2.8-43.0)	9.73 (5.24-40.4)	0.640

Table 2: Linear trend, crude OR and adjusted OR for age, sex, SOFA scale or diagnosis of severe sepsis or septic shock

	Tertiles	cOR	95%CI	aOR	95% CI
TOTAL CORTISOL (µg/dL)	≤13.50	1.00	--	1.00	--
	13.60-21.80	0.96*	0.12-7.40	1.98*	0.19-21.22
	>21.80	3.24**	0.56-18.7	4.98**	0.59-41.90
Linear trend		<i>p=0.16</i>		<i>p=0.12</i>	
TOTAL CORTISOL/ DHEA (µg·dl ⁻¹ /ng·ml ⁻¹)	≤4.62	1.00	--	1.00	--
	4.63-7.70	0.95*	0.06-16.2	0.71*	0.03-17.20
	>7.70	10.00**	1.10-90.59	9.43**	0.62-143.27
Linear trend		P=0.01		P=0.03	
TOTAL CORTISOL/ DHEAS (ng/ng)	≤0.19	--	--	--	--
	0.20-0.59	1.00	--	1.00	--
	>0.59	2.24***	0.48-10.3	2.04***	0.34-12.22

* Comparison Second-First tertile. ** Comparison Third-First tertile. *** Comparison Third-Second Tertile (First tertile category without deaths)

Graphic 1: ROC curves and AUC

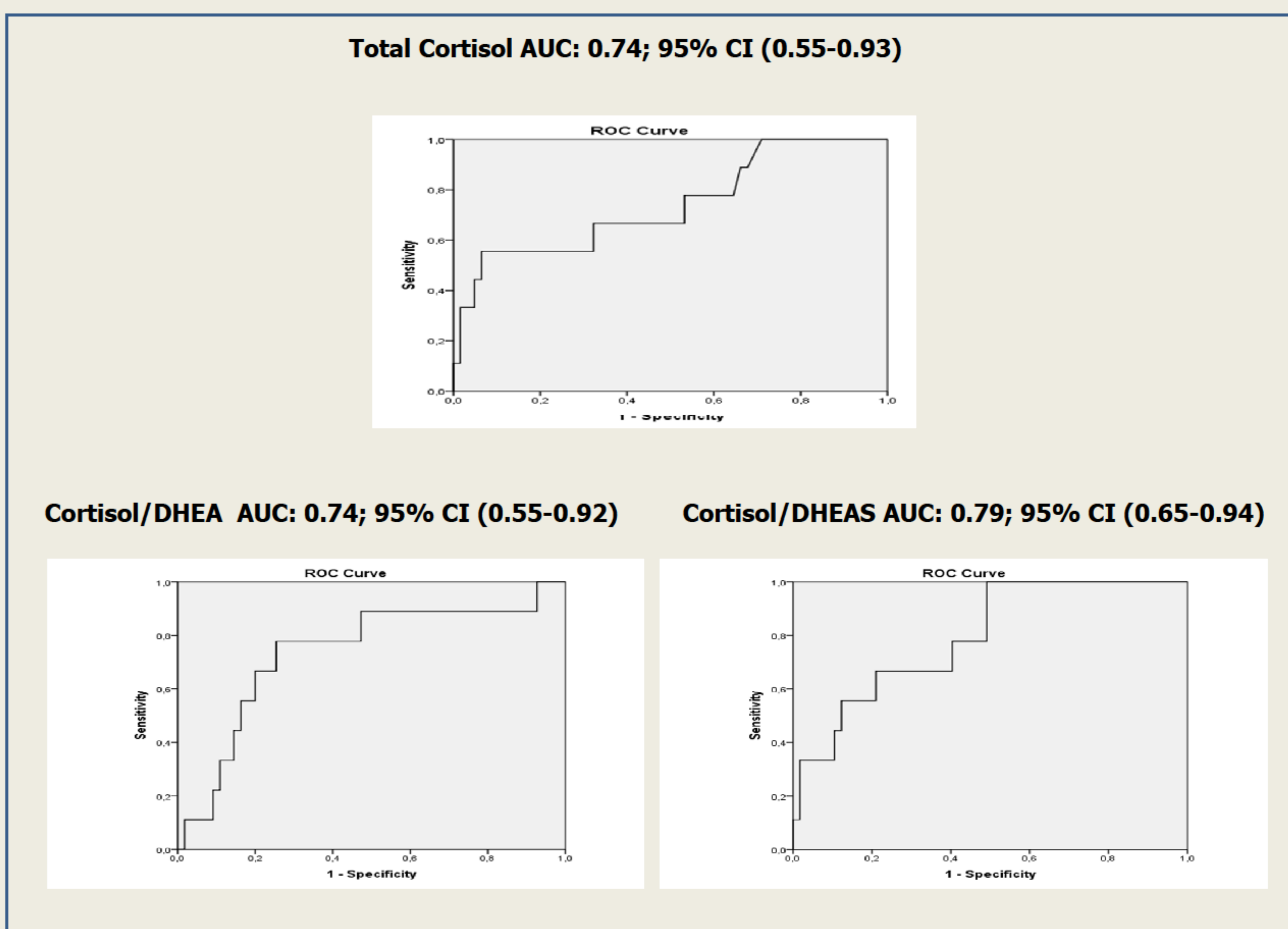


Table 3: AUC adjusted for albumin levels

	AUC	95% CI	AUC (Alb ≥ 2,5 nmol/l)	95% CI	AUC (Alb < 2,5 nmol/l)	95% CI
CORTISOL (µg/dl)	0,74	0,55-0,93	1	1-1	0,71	0,52-0,91
DHEA (ng/dl)	0,55	0,34-0,76	0,83	0,62-1	0,38	0,15-0,61
DHEAS (µg/dl)	0,65	0,50-0,79	0,46	0,16-1	0,34	0,18-0,49
CORTISOL/DHEA (µg·dl ⁻¹ /ng·ml ⁻¹)	0,74	0,55-0,92	0,83	0,62-1	0,75	0,54-0,95
CORTISOL/DHEAS (ng/ng)	0,79	0,65-0,94	0,91	0,74-1	0,79	0,64-0,84

CONCLUSIONS

Markers of adrenal function are independent predictors of mortality in patients with severe sepsis or septic shock.

The predictive ability discriminated by the AUC of the ROC curve is higher for the ratios cortisol/DHEA and cortisol/DHEAs than for isolated values.

The predictive ability discriminated by the AUC of ROC curve is higher for normal levels of albumin than for low levels.

