

Hormone changes: acute phase illness

Critical illness is characterized by striking alterations in the hypothalamic–anterior-pituitary–peripheral-hormone axes, the severity of which is associated with a high risk of morbidity and mortality. Most attempts to correct hormone balance have been shown ineffective or even harmful because of a lack of pathophysiologic insight. There is a biphasic (neuro)-endocrine response to critical illness. The acute phase is characterized by an actively secreting pituitary, but the concentrations of most peripheral effector hormones are low, partly due to the development of target-organ resistance. In contrast, in prolonged critical illness, uniform (predominantly hypothalamic) suppression of the (neuro)-endocrine axes contributes to the low serum levels of the respective target-organ hormones. The adaptations in the acute phase are considered to be beneficial for short-term survival. In the chronic phase, however, the observed (neuro)-endocrine alterations appear to contribute to the general wasting syndrome.

Pearl: With the exception of intensive insulin therapy, and perhaps hydrocortisone administration for a subgroup of patients, no hormonal intervention has proven to beneficially affect outcome.

Summary:

Hormone	Acute phase	Chronic phase
1.Somatotropic axis		
GH	↑	↓
IGF-I	↓	↓↓
ALS	↓	↓↓
IGFBP-3	↓	↓↓
2.Thyroid axis		
TRH	↑ N	↓
T4	↑ N	↓
T3	↓	↓↓
rT3	↑	↑ N
3.Gonadal/lactotropic axis		
LH	↑ N	↓
Testosterone	↓	↓↓
PRL	↑	↓
4.Adrenal axis		
Corticotropin	↑	↓
Cortisol	↑↑	↑ N ↓
CBG	↑	N

Question:

During the acute phase of critical illness the following is expected to be elevated:

- a. Growth hormone
- b. T3
- c. Testosterone
- d. Insulin-like growth factor (IGF-I)

Answer: A - The acute phase is characterized by an actively secreting pituitary, but the concentrations of most peripheral effector hormones are low. Elevated hormones include: GH, cortisol, LH, TRH, T4, prolactin, and corticotropin