HORMONES AS BIOMARKERS OF UNCONTROLLED, SEVERE PAIN

CHAPTER 1
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BRINGING A NEW DIMENSION TO PAIN CARE

Information presented here is a public service for health practitioners. It is provided by the Tennant Foundation.

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BIOLOGIC STRESSOR

PAIN IS A SEVERE, BIOLOGIC STRESSOR THAT STIMULATES THE HYPOTHALAMUS-PITUITARY-ADRENAL-GONADAL AXIS
HOW PAIN STIMULATES THE PITUITARY AND ADRENAL

Pain Stimulus

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hypothalamus

optic chiasm

portal vessels

anterior pituitary

Corticotropin (ACTH)

hypophyseal artery

Adrenal

Information Network
Serum cortisol testing was first developed in 1954 (Silber-Porter) making it possible to determine if pain alters serum levels.

The seminal study was published in 1964 by H.A. Shenkin who found that 87% of hospitalized, pain patients compared to only 16% of non-pain patients had elevated cortisol levels and abnormal diurnal variation.

Multiple studies have subsequently confirmed Shenkin’s findings.

EFFECT OF PAIN ON SERUM HORMONES

- Pain initially causes serum elevation of a number of hormones including adrenocorticotropin (ACTH), cortisol, pregnenolone, and testosterone.

- If severe pain goes on unabated over time, the hypothalamus, pituitary, adrenals and gonads may deplete their normal reserve and/or impair synthesis and lower serum hormones.
WHY DETERMINE ABNORMAL SERUM HORMONES

✓ Validate the presence of severe pain and need for enhanced treatment.

✓ Determine if hormone replacement is needed.

✓ Provide an objective measure of treatment success.
BIOMARKERS OF SEVERE PAIN

- Serum levels of pituitary, adrenal, and gonadal hormones are the best, objective biomarkers of severe uncontrolled pain.

- This blood panel is recommended as a biomarker profile for uncontrolled, severe pain.

  - Adrenocorticotropin (ACTH)
  - Cortisol
  - Pregnenolone
  - Testosterone
WHO SHOULD BE SCREENED FOR HORMONE ABNORMALITIES

- Any patient who requires daily opioids.
- Patients who complain that their current treatment regimen is not effective.
- Patients who take long acting opioids.
CAVEAT

AN ABNORMAL HORMONE TEST RESULT CAN BE CAUSED BY PSYCOGENIC OR NON-PAIN REASONS.

AN ABNORMAL HORMONE TEST SHOULD ONLY BE CONSIDERED TO BE PAIN-RELATED WHEN THERE IS HISTORICAL AND PHYSICAL EVIDENCE THAT PAIN IS PRESENT.
Documentation that pain causes serum hormone abnormalities in the hypothalamus-pituitary-adrenal axis. Given in order of year.

18. Tennant F. Intractable pain is a severe stress state associated with hypercortisolemia and reduced adrenal reserve. Drug and Alcohol Dependence 2000;60 (suppl no. 1):220-221.