Acute Effects of Intravenous Heroin on the Hypothalamic-Pituitary-Adrenal Axis Response: A Controlled Trial

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Heroin dependence is associated with a stressful environment and with dysfunction of the hypothalamic-pituitary-adrenal (HPA) axis. The present study examined the acute effects of intravenous heroin versus placebo on the HPA axis response in heroin-dependent patients.Twenty-eight heroin-dependent patients in heroin-assisted treatment and 20 age- and sex-matched healthy participants were included in a controlled trial in which patients were twice administered heroin or saline in a crossover design, and healthy controls were only administered saline. The HPA axis response was measured by adrenocorticotropic hormone (ACTH) levels and by cortisol levels in serum and saliva before and 20 and 60 minutes after substance administration. Craving, withdrawal, and anxiety levels were measured before and 60 minutes after substance application. Plasma concentrations of heroin and its main metabolites were assessed using high-performance liquid chromatography.Heroin administration reduces craving, withdrawal, and anxiety levels and leads to significant decreases in ACTH and cortisol concentrations (P <0.01). After heroin administration, cortisol concentrations did not differ from healthy controls, and ACTH levels were significantly lower (P <0.01). In contrast, when patients receive saline, all hormone levels were significantly higher in patients than in healthy controls (P <0.01).Heroin-dependent patients showed a normalized HPA axis response compared to healthy controls when they receive their regular heroin dose. These findings indicate that regular opioid administration protects addicts from stress and underscore the clinical significance of heroin-assisted treatment for heroin-dependent patients.
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