showing the same lateralization as ACTH [1]. We have now extended these studies by measuring ACTH, Prl, growth hormone (GH) and TSH in samples obtained by bilateral SPI sampling in a larger group of patients with CD. A total of 15 patients with CD was investigated. Cushing’s syndrome was diagnosed on the basis of elevated urinary free cortisol and nonsuppressible cortisol after dexamethasone. All patients showed an increase in plasma ACTH after CRH suggesting a pituitary source of ACTH. Only patients with lateralization of ACTH in bilateral SPI sampling were evaluated. CRH was given as a bolus dose (0.1 μg/kg i.v.). ACTH (n = 15), Prl (n = 15), GH (n = 9) and TSH (n = 5) were measured by RIA or IRMA, respectively. 10 patients showed lateralization of ACTH levels to the right and 5 to the left SPI. Baseline ACTH levels on the presumed tumor side (ipsilateral side) ranged between 25 and 2,510 pg/ml and were invariably stimulated by CRH (to 231–4,500 pg/ml). Similarly, all patients without exception showed ipsilateral lateralization of SPI Prl concentrations and a Prl response to stimulation with CRH. GH was also stimulated by CRH in 5 of 9 patients lateralizing identical to Prl and ACTH (ΔGH 0.34–10.7 ng/ml). In the remaining 4 patients GH was consistently <0.25 ng/ml. In all patients studied TSH was higher in the ipsilateral SPI and also responded invariably to CRH with a slight but significant TSH increase (ΔTSH 0.3–4.6 μIU/ml). In no case was an increase of either Prl, GH or TSH found in the peripheral blood after CRH. Our results demonstrate a multihormonal response to CRH in Cushing’s disease with a rise not only of ACTH but also of Prl, GH and TSH in SPI blood with identical lateralization to the presumed tumor side. The lack of GH response in 4 patients probably reflects glucocorticoid-mediated GH suppression. The most likely explanation for these findings is hormone secretion by pituitary cells surrounding the adenoma and responding to a paracrine signal from the tumor, β-endorphin being a possible candidate. Thus bilateral SPI catheterization may become a tool to study pituitary crosstalk in vivo.

References

Supported by Landesamt für Forschung

93. Detection of episodic secretion activity by discrete deconvolution (DESADE) – a new method for the analysis of episodic hormone secretion

U. Ranft, K. Prank *, G. Brabant *, Abteilung Biometrie und *Abteilung Klinische Endokrinologie, Medizinische Hochschule Hannover

Since the first description of episodic hormone secretion a number of methods have been published to analyse these rhythms by computer-assisted pulse detection programs (PULSAR, CLUSTER). These methods are essentially based on a heuristic approach and still have certain disadvantages. In hormonal rhythms, such as TSH, where the episodic signals are small compared to basal secretion it appears to be very difficult to detect the hormonal signal against the background noise with most of these methods. To overcome this problem we developed a new method for the detection of secretory bursts of an endocrine gland.

Methods: The method is based on the simplifying assumption of a one-compartment model, e.g. the hormone is secreted by the endocrine gland into the blood pool where it is distributed immediately and eliminated in a single component decay.

Therefore the mathematical model \( c = p - kc \) holds where \( c \) means the concentration, \( p \) the production of the gland and \( k \) the elimination rate constant, respectively. Since the hormone concentration \( c \) is known only at discrete sampling points, piece-wise integration of the model equation yields a recursion formula of the hormone production within the sampling interval:

\[
p(i) = c(i) - p(i - 1 - t) \exp[k(t + 1)] - \sum_{j=1}^{i} p(i - j) \exp[ - kj]
\]
The recursion depth \( t \) can be chosen in dependence of the elimination constant \( k \). Using a specific distribution assumption for the secretory activity a threshold value can be calculated individually for each time series to detect significant production peaks.

**Results:** In comparison to other well known methods of pulse detection, such as the PULSAR program or CLUSTER program, the DESADE program has been evaluated in rhythms of a number of pulsatile secreted hormones such as ACTH, cortisol, prolactin, TSH and LH. Whereas pulsatile secretion in rhythms of hormones with high peaks as compared to basal secretion such as ACTH, Prl, Corti and LH is easily detected by all methods, DESADE showed a much better correlation to the visually expected hormone peaks in the analysis of TSH than in the other methods (Fig. 1).

**Discussion:** Using a mathematical model, DESADE estimates the secretory activity of the endocrine gland by a very robust detection algorithm. In comparison to the other methods mentioned, DESADE therefore seems to provide a better estimate of the relevant pattern of information generated by the endocrine gland for its respective target organ.

94. Concomitant secretory pattern of prolactin and LH during the menstrual cycle

K. A. BRENSING, L. WILDT, G. LEYENDECKER, *Universitätsfrauenkliniken Bonn und Erlangen; Städtische Frauenklinik Darmstadt*

Gonadotropin secretion is different between the luteal phase (LP) and the follicular phase (FP) probably due to a modulation of the hypothalamic GnRH pulse generator. The observation that exogenous dopaminergic and/or opioid stimulation induces a suppression of LH and PRL release from the pituitary gland suggests that the central neural control system for both hormones utilizes in part common neurotransmitter pathways. In this study we examined (1) whether the pulsatile pattern of PRL secretion is modulated during the menstrual cycle and (2) whether PRL release is temporally coupled to pulsatile LH secretion.

7 normally cycling women (age 25 ± 3.9) were investigated from the luteal phase to the early follicular phase of the following cycle. In a longitudinal design blood samples were taken from each volunteer at 15-min intervals for 8-h sampling periods (SP) in the early (EL), mid (ML), late (LL) luteal phase and two in the early (EF) follicular phase. The data pool of a total of 35 SP was analyzed with