PITUITARY RESPONSIVENESS TO GONADECTOMY IN FERTILE WOMEN

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SUMMARY

The pituitary gonadotropin secretion in eight ovariectomized women was evaluated. The FSH plasma levels rose significantly, while no differences were found in serum LH after castration. This study provides further evidence that FSH and LH secretion is regulated by two different mechanisms.

INTRODUCTION

The lack of ovarian steroids after surgical castration evokes a dramatic release in gonadotropin plasma levels ([1, 2, 3]). The FSH and LH patterns increase after the oestradiol and progesterone drop but, while FSH can show a rapid and massive release, LH is characterized by a more gradual and slight increase ([4]). Pituitary response in castrated women is strongly correlated with the menstrual phase; gonadectomy in the early follicular phase ([4]) can also cause a significant increase of LH plasma levels.

This study was performed in order to evaluate the pituitary responsiveness to gonadectomy in fertile women during the early follicular phase with the purpose of analyse what different factors can be involved in gonadotropin secretion.

MATERIAL AND METHODS

Eight women, aged from 38 to 44 years, were castrated between the 9th and 11th day of the menstrual cycle. Blood samples were collected for three days before the castration and between the 7th and the 13th day following the surgical procedure. The separated plasma was frozen to —20 °C until the assay. The plasma levels of oestradiol, progesterone and gonadotropins were assayed by RIA (Cea-Ire-Sorin, Saluggia; Biodata, Milan). The statistical analysis was performed using the "t" paired test.

RESULTS

Oestradiol-Progesterone: the plasma levels of both oestradiol (80.1 ± 6.2 pg/ml) and progesterone (600.0 ± 120.1 pg/ml) were as in normal follicular phase. Castration caused their rapid and significant fall down to levels, which remained constantly low during the post-operative period (fig. 1).

FSH-LH: basal values of both gonatropins were in the normal range (FSH $= 7.0 \pm 1.2$ mU/ml; LH $= 7.3 \pm 1.2$ mU/ml). FSH showed a rapid increase (27.0 ± 6.1 mU/ml) as from 7th postoperative day; its values gradually aug-

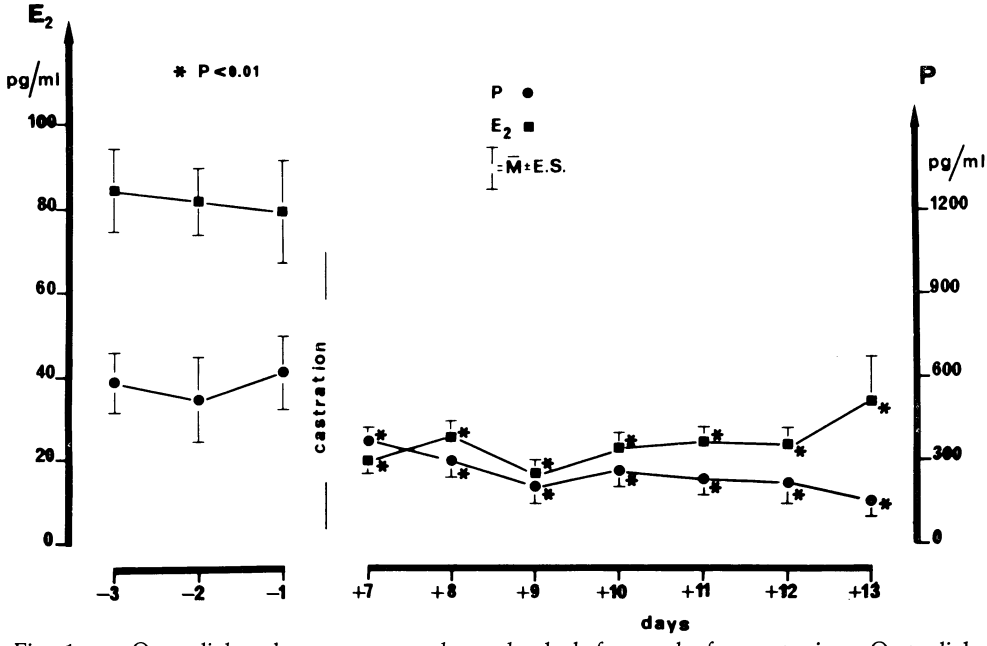

Fig. 1. — Oestradiol and progesterone plasma levels before and after castration. Oestradiol and progesterone drop in the blood at the first post-operative control and remain significantly low during the control period.

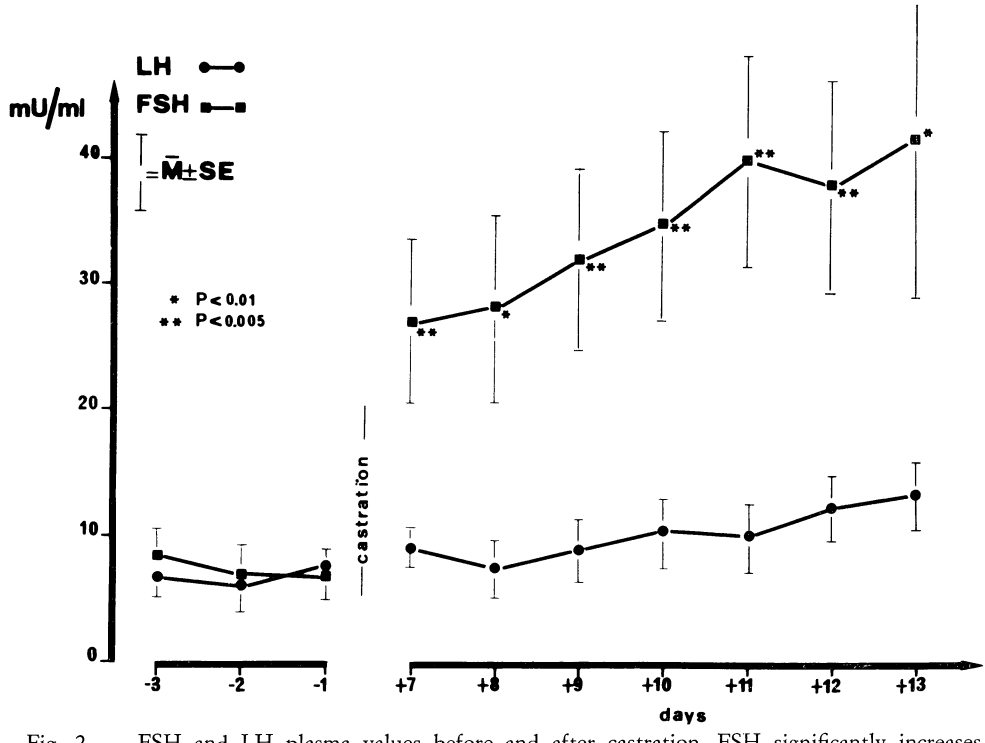

Fig. 2. — FSH and LH plasma values before and after castration. FSH significantly increases in the blood, while LH remains unchanged during the post-operative period, showing a no-significant increase on the 12th and 13th day.

mented reaching the plasma concentration of 42.5±12.0 mU/ml on the 13th day. Statistical analysis shows a significant difference between FSH values measured before and after castration. LH plasma concentrations were unchanged towards the basal levels, showing only a slight, but no-significant, increase on the 12th (13.0±2.0 mU/ml) and the 13th post-operative day (14.0±2.5 mU/ml) (fig. 2).

DISCUSSION

It is known that ovarian steroids regulate the pituitary secretion of gonadotropins, either modulating the release of hypothalamic factors ([5, 6]) or by exerting a stimulatory effect on pituitary receptors ([7]); while LH secretion might be regulated by plasma steroid levels through hypothalamic LH-RH feed-back, which is controlled by dopamine ([8]), FSH would be selectively regulated also by an ovarian factor ([9]), which could act by reducing pituitary responsiveness to FSH-RH ([10, 11]). Castration determined in our patients a rapid and significant FSH increase and a slow and delayed elevation of serum LH. This could be explained by: *a*) a higher responsiveness of the mechanism which controls FSH secretion to the fall of oestrogens ([12]); *b*) a lower FSH clearance towards LH ([13]) or, more probably, by the fact that the disappearance of "inhibin" could cause the lack of its inhibiting effect on FSH secretion. Recent experiences ([14, 15]) confirm the hypothesis that FSH and LH secretion is regulated by two different mechanisms and demonstrated that oestradiol treatment in castrated female rats is able to bring LH levels back to precastration values, while high plasma FSH concentrations decrease only a little. The existence of an ovarian factor able to modulate FSH secretion was further confirmed by Bronson and Channing ([14]) who administered "liquor folliculi" without oestrogens to ovariectomized rats and observed a rapid decrease of FSH plasma values alone. In conclusion, these results sustain the hypothesis that an ovarian factor is involved in regulation of FSH secretion; we think also that further studies are necessary to confirm these previous data.

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