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Reference

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Plasma sex hormone binding globulin and oestrogen therapy

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Oestrogens increase sex hormone binding globulin (SHBG) in human plasma and SHBG levels are a sensitive indication of oestrogenisation.

Using the method of Rudd, Duignan & London (1974), with [^{14}C]-labelled testosterone as a ligand, SHBG levels were measured in groups of women on oestrogen or oestrogen-progestogen therapy and the levels compared with those seen in comparable groups of untreated women. The levels of SHBG are expressed as μg of bound testosterone per 100 ml plasma (± 1 s.e. mean).

The first group were twenty-two pre-menopausal women on a combined oral contraceptive. Of these, eleven were taking a Pill containing 50 μg ethinyl oestradiol and eleven a Pill containing 35 μg or less ethinyl oestradiol. Plasma SHBG levels in these women were compared with those of fifty-two normal, ovulating women who had not received hormone therapy over the previous 6 months. The mean SHBG levels in women on (a) a 50 μg Pill was 2.73 ± 0.13 , (b) a 35 μg or less Pill was 2.2 ± 0.12 and (c) in the untreated women was 2.31 ± 0.05 μg testosterone/100 ml. Statistical comparison between these three groups of premenopausal women showed that the levels in women on the 50 μg Pill were significantly elevated over the levels in the women taking a 35 μg or less Pill as well as over the levels seen in the untreated ovulating group ($P < 0.01$ and $P < 0.005$).

The second group consisted of nine women with

hypergonadotrophic ovarian failure eight of whom were post-menopausal and all of whom had been receiving a variety of different hormone replacement regimes over the previous three months. The SHBG levels in the treated women were compared with those seen in twenty-six untreated post menopausal women who had never received any therapy. The mean SHBG level in the treated group was 2.75 ± 0.16 μg testosterone/100 ml while in the untreated group the mean level was 1.84 ± 0.05 μg testosterone/100 ml. The levels of SHBG in the treated patients were significantly elevated ($P < 0.001$) over those in the untreated group.

A further comparison showed a significant elevation of SHBG levels in the hormone-treated post menopausal women over those seen in the normal ovulating women ($P < 0.02$).

These results show that the combined oral contraceptive containing 35 μg or less of ethinyl oestradiol more closely mimics the SHBG levels in the normal menstrual cycle than those seen in women on a 50 μg combined Pill. Standard hormone replacement therapy substantially elevates the SHBG to levels higher than those seen in normal ovulating women and suggests an element of overtreatment rather than true replacement therapy in the post menopausal women. These results also suggest that oral contraceptives containing 35 μg or less of ethinyl oestradiol would more closely resemble, in terms of SHBG levels, true replacement therapy than do the preparations more commonly used for this purpose.

Reference

RUDD, B.T., DUIGNAN, N.M. & LONDON, D.R. (1974). A rapid method for the measurement of sex hormone binding globulin capacity of sera. *Acta Clinica Chim.*, **55**, 165-178.