Clitoral Vascularization and Sexual Behavior in Young Patients Treated with Drospirenone–Ethinyl Estradiol or Contraceptive Vaginal Ring: A Prospective, Randomized, Pilot Study

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ABSTRACT

Introduction. Oral contraceptives (OC) are effective for birth control and have good cycle control and tolerability. However, the hormonal components could modify mood and libido.

Aim. The aim of this study is to evaluate the genital vascular effects and sexual behavior of an OC containing 30 μg ethinyl estradiol and 3 mg drospirenone in comparison with a flexible combined contraceptive vaginal ring.

Methods. Forty women underwent a sonographic assessment of the clitoral anatomy and vascularization and were administered the McCoy Female Sexuality Questionnaire (MFSQ) and the Beck's Depression Inventory questionnaire (BDI). Estradiol, androstenedione, testosterone, and SHBG were assayed. Free Androgen Index (FAI) and Free Estrogen Index (FEI) were calculated. The patients were randomly submitted to OC (group I; n = 21) or vaginal ring (group II; n = 19).

Main Outcome Measures. Ultrasonographic clitoral volume, pulsatility index (PI) of dorsal clitoral arteries, MFSQ, BDI, and hormonal and biochemical assays were analyzed.

Results. After therapy, the testosterone levels were reduced in both groups, whereas estradiol decreased only in group I women. The SHBG increased in all the subjects, and both FAI and FEI decreased. The clitoral volume decreased in all the women. The PI of the dorsal clitoral artery increased only in patients on OC. The hormonal contraception was associated, in both studied groups, with a significant decrease of the two-factor Italian MFSQ score, which was more marked in OC users. In group I subjects, there was a reduction of the number of intercourse/week and a reduction of orgasm frequency during intercourse. The pain during intercourse worsened after OC use. The vaginal ring users reported a vaginal wetness.

Conclusions. Six-month treatment with hormonal contraception is associated with a diminished MFSQ score. However, the frequency of sexual intercourse and orgasm was reduced only by the use of OC. The OC use was associated with increased pain during intercourse. **Battaglia C, Morotti E, Persico N, Battaglia B, Busacchi P, Casadio P, Paradisi R, and Venturoli S. Clitoral vascularization and sexual behavior in young patients treated with drospirenone–ethinyl estradiol or contraceptive vaginal ring: A prospective, randomized, pilot study. J Sex Med 2014;11:471–480.**

Key Words. Contraception; Sexuality; Drospirenone; Vaginal Ring; Clitoris; Effects of Contraceptives on Sexual Function

Introduction

Since its first introduction in 1960, oral contraception is currently the most widely used method worldwide for birth control and for the treatment of different gynecological disorders, such as polycystic ovary syndrome and endometriosis [1,2].

The vast majority of oral contraceptives (OCs) contain ethinyl estradiol (EE), whereas the progestin component varies from 19-testosterone derivatives to the more recent drospirenone

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(DRSP; a 17α-spirolactone derivative progestin that combines a potent progestogenic activity with antiandrogenic and antimineralcorticoid activity), norgestimate, and desogestrel [3]. The difference between the different types of progestins used in contraception is mainly related to their androgenic activity. The most frequently reported disadvantages of OCs are the need for daily administration, fluctuations in plasma contraceptive concentrations, hepatic first-pass metabolism, and potential gastrointestinal interference with absorption [4].

Over the past half century, about 45,000 studies focusing on OCs' efficacy and safety, weight gain, spotting or other bleeding irregularities, nausea, vomiting, and adverse metabolic effects on lipid and carbohydrate metabolism and hemostasis have been published [1,5–7]. Recent OCs are equally effective for birth control and, in general, have both good cycle control and tolerability [5–7]. However, the hormonal components of OCs could have various effects on mood and libido [8–14]. Although the reduction of circulating androgens levels and the loss of estrogen fluctuations may decrease sexual desire and vaginal lubrication, Sabatini and Cagiano demonstrated that these sexual negative effects progressively decrease and, in general, disappear by cycle 12 [15]. Several studies have demonstrated that women taking the 21-day regimen of OCs have higher coital and orgasm frequency than women using other contraceptive methods [16,17]. Furthermore, the estradiol valerate and dienogest multiphasic extended regimen have been found to have a positive effect on sexuality [9]. Caruso et al., by using two different pills, reported opposite results: a low-dose pill containing 15 μg EE and 60 μg gestodene negatively influenced the subjective measures of female sexual behavior, whereas a pill containing 30 μg EE and 3 mg DRSP improved vaginal lubrication and sexual arousal, decreased dyspareunia, and improved sexual performances [18,19].

At the beginning of the year 2000, a flexible and combined contraceptive vaginal ring releasing 15 μg EE and 120 μg etonogestrel per day over 3 consecutive weeks has been developed [20]. This vaginal device has overcome most of the disadvantages of OCs [4]. Furthermore, the progestogen etonogestrel (a desogestrel metabolite) seems to have no androgenic activity [3]. In addition, the ring can be easily inserted and removed by the woman herself. The efficacy, tolerability and acceptability of the ring have been documented in large-scale studies [21,22]. As for the OCs, the use of the vaginal ring showed discordant effects on mood and libido in the reported studies. A recent trial demonstrated that the vaginal ring users have less dyspareunia and increased vaginal wetness in comparison with OCs users [23]. Furthermore, two small randomized studies revealed improvements in sexual desire and satisfaction [12,24]. In contrast, Gracia et al. recently demonstrated a slight decrement in sexual function [25].

Sex involves a successful integration between an intact neural, vascular, and muscular circuitry; complex interactions between multiple neurotransmitter systems; and critical modulating influences from the endocrine system. One of the earliest signs of changes in the female sexual excitation is an increase in the vulvar, clitoral, and vaginal blood flow. We recently demonstrated that the modifications in clitoral volume and blood flow are correlated with the menstrual cycle and hormonal variations, and they can be objectively measured by ultrasonography and color Doppler [26,27]. In these studies, conducted in different phases of the cycle, the ultrasonographic assessment of the clitoral body volume evidenced a progressive and significant increase during the periovulatory phase. Contemporary, reduced resistances were observed at the level of the dorsal clitoral artery. Estradiol levels resulted positively correlated with the clitoral body volume and inversely correlated with the dorsal clitoral artery pulsatility index (PI). Furthermore, we showed that after 3-month treatment with an OC containing 30 μg EE and 3 mg DRSP, the labia minora thickness and the vaginal introitus area significantly decreased in comparison with the baseline values, whereas the PI of the dorsal clitoral artery and the posterior labial artery significantly increased. This was associated with a significant decrease of the two-factor Italian McCoy Female Sexuality Questionnaire (MFSQ) score, a reduction of the number of intercourse/week, and a reduction of the frequency of orgasm during intercourse [28].

The aim of this prospective, randomized, pilot study was to evaluate (independently from any sexual stimulation) in young, eumenorrheic, healthy women the genital vascular effects of the worldwide most used OC containing 30 μg EE and 3 mg DRSP in comparison with a flexible, combined contraceptive vaginal ring (15 μg EE and 120 μg etonogestrel) [29]. Furthermore, we aimed to examine the impact of the type of contraceptive on genital vascularization, sexual behavior, and circulating hormones.

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