Oral Contraception

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KEYWORDS

• Oral contraception • Ethinyl estradiol • Levonorgestrel • Venous thromboembolism
• Medical eligibility criteria

KEY POINTS

- Oral contraceptives (OC) offer noncontraceptive benefits, including improvement of acne, hirsutism, and dysmenorrhea.
- Many OC formulations exist; ethinyl estradiol at 20 to 30 mcg with levonorgestrel seems to confer a lower risk of venous thromboembolism than OCs with other progestins.
- Medical eligibility criteria, developed by the World Health Organization and adapted by individual countries, provide a resource to assess patients' medical situations for contraindications to OCs.
- Blood pressure measurement is the only physical examination or testing needed before OC prescription.
- Continuous daily use of OCs and extended (3 month) cycles are reasonable alternatives to cyclic monthly use and can further improve menstrual-associated symptoms.

INTRODUCTION

The development of hormonal contraception marked a breakthrough in the technology of pregnancy prevention and planning. Hormonal contraception relies on a progestin to

- Thicken cervical mucus, forming a mechanical barrier
- Suppress ovulation by suppressing the midcycle surge of follicle-stimulating hormone (FSH) and luteinizing hormone (LH)
- Keep the endometrium thin and thus inhospitable for implantation

Estrogen contributes to ovulation suppression and also prevents sloughing of the endometrium, thus reducing irregular bleeding, which can be a limiting side effect of progestin-only methods.

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HISTORY AND SAFETY OF THE PILL

In 1960, the Food and Drug Administration (FDA) approved the first oral contraceptive (OC), a pill containing mestranol 150 mcg and norethynodrel, 3 years after its approval for the treatment of menstrual disorders.[1] The pill has been popular, but the early high-dose formulation was associated with increased mortality from venous thromboembolism (VTE) and arterial vascular events.[2,3] With the development of other formulations, the effect of the estrogen dose and the specific progestin on thromboembolism risk were recognized,[4] leading to the development of lower-dose, lower-risk formulations. Current formulations of combination OCs (COCs) contain one-third to one-fifth of the amount of estrogen in the first COC, plus any of 8 synthetic progestins in a dizzying array of patterns (**Table 1**).

In 1973, a progestin-only pill (POP), popularly called the *mini pill*, became available. The sole active ingredient in the only POP available in the United States and Canada is norethindrone. The POP is less effective than other hormonal methods of contraception and commonly causes irregular bleeding, but it is safer than combined hormonal contraceptives (CHCs) for women in whom exogenous estrogen is contraindicated.

In 1996, the World Health Organization (WHO) developed and began a periodic review called *Medical Eligibility Criteria for Contraceptive Use* (hereafter referred to as *MEC*); the fourth edition of MEC was released in 2009[6] with subsequent updates. The MEC suggests a weighing of risks and benefits ranging from level 1 to level 4 (**Box 1**) for each form of contraception with regard to specific patient factors and medical conditions and has been adopted and adapted by individual countries for their own use. Free resources to assist in the clinical use of the MEC are available for download at the Centers for Disease Control and Prevention's Web site.[7]

PREGNANCY PREVENTION

Modern CHCs are effective for contraception, with perfect use theoretically resulting in only 0.3 pregnancies per 100 women in the first year. Actual effectiveness depends significantly on adherence. Typical use of COCs results in about 9 pregnancies per 100 women in the first year, performing significantly better than barrier methods, spermicides, withdrawal, and fertility awareness (rhythm) methods but not as well as intrauterine devices (IUDs), progestin implants or injections, or sterilization.[8] For comparison, 85% of sexually active heterosexual women conceive in 1 year without contraception.[8]

NONCONTRACEPTIVE HEALTH BENEFITS

Since the original introduction of COCs, many noncontraceptive benefits have been discovered and used; in addition, benefits have been attributed to COCs that are not currently substantiated by research (**Box 2**). Because patients are frequently unaware of the noncontraceptive benefits, health care providers have an important opportunity to debunk myths and educate patients on the real and relevant benefits.[9–11]

Acne is an important consideration to many young adult patients. All COCs are effective for relief of acne in clinical trials.[12,22] In general, about half (50%–90%) of patients will experience improvement in acne after 6 to 9 months, with an average of 30% to 60% reduction in inflammatory lesions.[29,30] The estrogen component of a COC decreases circulating free androgen via 2 mechanisms: (1) suppression of LH-driven androgen production by ovaries and (2) induction of hepatic synthesis of sex hormone binding globulin (SHBG), which leads to lower levels of free testosterone.

The comparative effectiveness against acne between formulations of COCs is unclear.[12,22] The ring and patch may not be as effective against acne as OCs because