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Weight change at 12 months in users of three progestin-only contraceptive methods☆

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Abstract

Background: Concerns about weight gain may influence contraceptive use. We compared the change in body weight over the first 12 months of use between women using the etonogestrel (ENG) implant, the levonorgestrel intrauterine system (LNG-IUS) or depot medroxyprogesterone acetate (DMPA) with women using the copper intrauterine device (IUD).

Study Design: This was a substudy of the Contraceptive CHOICE Project, a prospective cohort study of 9256 women provided no-cost contraception. Women who had been using the ENG implant, LNG-IUS, DMPA or copper IUD continuously for at least 11 months were eligible for participation. We obtained body weight at enrollment and at 12 months and compared the weight change for each progestin-only method to the copper IUD.

Results: We enrolled a total of 427 women: 130 ENG implant users, 130 LNG-IUS users, 67 DMPA users and 100 copper IUD users. The mean weight change (in kilograms) over 12 months was 2.1 for ENG implant users [standard deviation (SD)=6.7]; 1.0 for LNG-IUS users (SD=5.3); 2.2 for DMPA users (SD=4.9) and 0.2 for copper IUD users (SD=5.1). The range of weight change was broad across all contraceptive methods. In the unadjusted linear regression model, ENG implant and DMPA use were associated with weight gain compared to the copper IUD. However, in the adjusted model, no difference in weight gain with the ENG implant, LNG-IUS or DMPA was observed. Only Black race was associated with significant weight gain (1.3 kg, 95% confidence interval=0.2–2.4) when compared to other racial groups.

Conclusions: Weight change was variable among women using progestin-only contraceptives. Black race was a significant predictor of weight gain among contraceptive users.

Keywords: Contraception; Weight change; Levonorgestrel intrauterine system; Etonogestrel implant; Copper intrauterine device

1. Introduction

Weight gain is a commonly perceived side effect of hormonal contraception and may cause women to avoid or discontinue contraceptive methods [1]. Prior studies have shown weight gain and changes in body composition among users of depot medroxyprogesterone acetate (DMPA), progestin-only pills and the subdermal levonorgestrel implant [2]. Therefore, it is plausible that newer, long-acting progestin contraceptives may also cause weight gain. However, there are fewer studies investigating weight change with these methods, which include the etonogestrel (ENG) implant and the levonorgestrel intrauterine system (LNG-IUS). In a 2006 retrospective study of ENG implant users, 5% discontinued the method for the complaint of weight gain, but weight measurements were not objectively collected [3]. A 2004 study of nulliparous women choosing either the LNG-IUS or combined oral contraceptives failed

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to find a difference in reported weight change between the two methods [4]. The ENG implant and the LNG-IUS are associated with high rates of effectiveness, continuation and satisfaction [5,6]. However, concerns about weight gain may limit some women's choice of these methods, and additional evidence about the risk of weight gain with these contraceptive methods is needed.

A better understanding of weight gain and progestin-only contraceptives requires objective assessment of weight change. The aim of this study was to compare the 12-month weight change among progestin-only contraceptive users (ENG implant, LNG-IUS and DMPA) to users of the copper intrauterine device (IUD). Our hypothesis was that progestin-only contraceptive users would gain more weight over the initial 12 months of use than users of the copper IUD.

2. Materials and methods

This study was a substudy of the Contraceptive CHOICE Project. CHOICE is a prospective cohort study of 9256 women designed to promote the use of long-acting reversible contraceptive methods, remove financial barriers to contraception and evaluate method continuation. The methods of this study have been described in detail elsewhere [7]. Women between 14 and 45 years of age were eligible to participate in CHOICE if they desired reversible contraception and were willing to start a new method; had not had a hysterectomy or sterilization; spoke English or Spanish and were sexually active or planning to become sexually active in the next 6 months. Enrollment occurred between August 2007 and September 2011, and follow-up is ongoing. We obtained approval from the Washington University School of Medicine Human Research Protection Office prior to participant recruitment.

In this substudy, we compared the change in body weight from baseline to 12 months among users of the ENG implant, the LNG-IUS, DMPA and the copper IUD. Because the copper IUD contains no hormones, women using this method served as the control group. Potential participants were identified from the study database and contacted by telephone. Eligible women were continuous users of the above methods for at least 11 months who had enrolled at our university clinical research site between June of 2009 and May of 2011 and had height and weight measured at the enrollment visit. Women who did not speak English, were younger than 18 years of age or had metabolic disorders known to affect body weight such as hypothyroidism or diabetes were not eligible for participation. At the time of scheduling the 12-month CHOICE telephone survey, a research assistant offered eligible women participation in this study.

Women who met the study criteria and agreed to participate were scheduled for an in-person visit at our university clinical research site within 6 weeks of their 12-month anniversary of enrollment. A research assistant obtained written informed consent and measured the participant's height and weight using the same scale and protocol used for baseline measurements. Participants were provided with a gift card in appreciation for their participation.

For our sample size calculation, we assumed that copper IUD users would have a mean change of +0.6 kg over 12 months. This is the average weight gain for US reproductive-aged females reported in the 2003–04 National Health and Nutrition Examination Survey [8]. We assumed that the weight gain in users of progestin-only contraceptives would be greater with a mean weight gain of 2.0 kg. Assuming an alpha of 0.05, 80% power and a standard deviation of 3.0 kg in all groups, we would require a sample size of 73 women in each group. Analysis of the data when we reached the planned sample size showed wide variability in the range of weight change resulting in larger-than-anticipated standard deviations. Using a larger standard deviation of 5.0 kg in copper IUD users and 6.0 kg in progestin-only users, we increased our sample size to provide greater power, planning for 130 women in both the ENG implant and LNG-IUS group and 100 women in the copper IUD group.

We compared the demographic, socioeconomic and reproductive characteristics of participants. Categorical variables were compared with Pearson's χ^2 or Fisher's Exact Test where appropriate, while continuous variables were compared using analysis of variance or Kruskal–Wallis test depending on the sample distribution. We calculated the mean and median weight change over 12 months in our sample. Change in weight was normally distributed. A simple linear regression model using a four-category method variable was used to compare weight change between each of the three progestin methods with the copper IUD. As race was associated with weight change in the univariate analysis, we also stratified the mean weight change by race comparing Black women to all other women (due to the small numbers of other races, White race and other races were collapsed into a single category). Linear regression was used to calculate coefficients that estimate the mean change in weight attributable to any given covariate including contraceptive method. We considered a value statistically significant if the 95% confidence interval (CI) for the coefficient did not cross zero. Confounding was defined as covariates that were associated with both the outcome and the exposure and also altered the effect size by greater than 10%. Confounding factors were included in the final adjusted models. We performed all analyses using STATA version 11 (StataCorp, College Station, TX, USA).

3. Results

The study flow is shown in Fig. 1. In total, 2145 women were screened for study eligibility, 749 met eligibility criteria and 427 women (57.0%) enrolled in the study. Of these, 130 women were using the ENG implant, 130 were using the