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Original research article

Twelve-month discontinuation of etonogestrel implant in an outpatient pediatric setting☆

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Abstract

Objective: The etonogestrel (ENG) contraceptive implant is the most effective reversible contraceptive method. Uptake remains limited in adolescents, a population at high risk for unintended pregnancy. The objectives of this study were to determine the 12-month discontinuation rate of the ENG implant among adolescents in an outpatient setting and to characterize risk factors for discontinuation.
Study design: A retrospective chart review identified adolescent females aged 12 to 22 years who received the ENG implant in one pediatric institution between January 1, 2011, and April 15, 2014. Patients were categorized into ENG discontinuers (removed prior to 12 months) and ENG continuers (continued for ≥12 months). Associations between demographic, clinical and postplacement characteristics with ENG discontinuation category were assessed with *t* tests, χ^2/Fisher's Exact Tests and backwards stepwise logistic regression.
Results: Of the 750 patients who had an ENG implant inserted, 77 (10.3%) had the device removed prior to 12 months of use. The mean length of implant use for those who discontinued was 7.5 months. Problematic bleeding was the most commonly cited reason for discontinuation. Older age at time of insertion, history of pregnancy and ≥1 medical visit for implant concerns (not including removal) were independently predictive ($p<.01$) of method discontinuation.
Conclusion: The vast majority of adolescents continued the ENG implant at 12 months, making it an excellent contraceptive choice for adolescents within the outpatient pediatric setting. Greater efforts should be made to increase its use by pediatric providers.
Implications: The ENG implant is an excellent contraceptive option for adolescents in the outpatient pediatric setting.

Keywords: Adolescents; Contraception; Implant; Etonogestrel; Pediatric; Pediatrician

1. Introduction

Despite recent declines, the United States leads the developed world in teen births [1–3]. US adolescents have unacceptably high rates of pregnancy (~4/5 unintended) and birth [4,5]. Low use of highly effective contraceptive methods contributes to high teenage pregnancy rates [6,7]. In 2013, only 25.3% of sexually active high school students reported use of a hormonal contraceptive or intrauterine device (IUD) at last intercourse [8]. American teens who do use contraceptives predominantly rely on pills and condoms, which are relatively less effective but more commonly prescribed [6,9,10]. Only a small minority of teens use long-acting reversible contraceptives (LARCs), the most effective methods available. In 2011–2013, approximately 5% of adolescent and young adult women aged 15–24 using birth control chose a LARC method [11].

LARC methods demonstrate first-year failure rates of 0.8%, 0.2% and 0.05% for the levonorgestrel intrauterine system, copper IUD and etonogestrel (ENG) implant, respectively [9]. Prior studies have established the superior effectiveness, safety and acceptability of IUDs and the ENG implant for adolescent females [12–14]. The Institute of Medicine and the Centers for Disease Control and Prevention identify reducing unintended and teen pregnancy as a national priority and call for increased utilization of

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LARCs [15,16]. In September 2014, the American Academy of Pediatrics recommended that LARCs be first-line contraceptive choices for adolescents [17].

Improving adolescents' access to LARCs in the primary care pediatric office setting could increase uptake of LARC methods by adolescents and lead to significant reductions in teen pregnancy [18,19]. The ENG implant (Nexplanon®) may appeal to pediatricians due to ease and simplicity of placement, perceived noninvasiveness and lack of need for pelvic examination. However, pediatrician concern about appropriateness of LARCs for adolescents may limit adoption of new contraceptive practices. Few large studies have evaluated adolescents' experiences with the ENG implant, leaving pediatricians and adolescent health care providers in need of more adolescent-specific evidence.

The objectives of this study were to (a) determine 12-month discontinuation and (b) characterize risk factors for discontinuation of the ENG implant in a sample of adolescents seen in a variety of outpatient clinical settings at an urban children's hospital.

2. Methods

2.1. Participants and setting

The Nationwide Children's Hospital (NCH) Institutional Review Board approved the study protocol. A retrospective chart review was conducted of all adolescent females ages 12–22 who received the ENG implant between January 1, 2011, and April 15, 2014, at any outpatient clinic within the NCH system. Eligible patients were identified via *International Classification of Diseases, Ninth Revision,* codes (V25.5, V25.43), Current Procedural Terminology codes (11981, 11983) and medication orders for ENG implant. Patient lists were compared for redundant patients.

2.2. Data collection

Data collection occurred in June 2015 so that all eligible patients could have continued the ENG implant for a minimum of 1 year. We reviewed each patient's ENG placement visit and all subsequent medical visits and telephone contacts in the year following placement. Study data were collected and managed using REDCap hosted at NCH [20].

At time of ENG implant placement, information was collected regarding patients' age, race/ethnicity, insurance status, weight (kg), height (cm) and reason for ENG implant placement. If height and weight were not recorded at the placement visit, the closest recorded height and weight to time of insertion were used. The type of medical provider who placed the ENG implant was also noted. Additional clinical factors that were collected on patients at time of ENG placement included history of pregnancy, history of gynecological problems, contraceptive method at time of placement, contraceptive use in the 2 years prior and sexually transmitted infection (STI) diagnosis in the 1 year prior to placement. STI diagnosis was confirmed by reviewing patient notes and laboratory results.

All telephone consultations and medical visits within the year following placement were reviewed for relevance to ENG implant. The total numbers of telephone consultations and medical visits for ENG implant concerns, not including ENG removal, were tabulated. Additional data collected included prescription of temporizing measures [e.g., nonsteroidal anti-inflammatory drugs (NSAIDs), hormonal medication] and STI diagnoses in the year following ENG placement.

For those who underwent ENG implant removal, date of removal was recorded. Patients were then categorized into ENG discontinuers (i.e., removed the device prior to 12 months) and ENG continuers (continued the device for 12 months or longer). For ENG discontinuers, mean months of use was calculated. Additional clinical information collected on ENG discontinuers included reason for removal, type of provider performing removal and patient contraceptive choice after removal.

2.3. Statistical analysis

The main outcome measure was ENG implant discontinuation at 12 months. The unadjusted associations between subject, clinical and postplacement characteristics with ENG continuation category were assessed with t tests for continuous variables and χ^2/Fisher's Exact Tests for categorical variables.

All demographic, clinical and postplacement characteristics associated with ENG continuation at p value <0.1 were eligible for multivariable, stepwise logistic regression modeling predicting ENG implant discontinuation prior to 12 months. The age cutoff of 16.8 years was chosen via receiver operating characteristic curve to maximize the positive predictive value for discontinuation and to minimize the false-positive predictive value. The final adjusted logistic regression model retained all variables associated with ENG implant discontinuation at a p value $<.05$. Odds ratios were calculated for retained variables.

3. Results

Of the 750 patients who had an ENG implant inserted during the study period, 77 (10.3%) had the device removed prior to 12 months. Mean age was approximately 1 year older ($p<.001$) for those who discontinued as compared to those who continued the method (Table 1). ENG discontinuers were significantly more likely to have had a prior pregnancy ($p=.004$) and to have used one or more contraceptive methods in the preceding 2 years ($p=.048$). Postplacement, ENG discontinuers were more likely to contact the clinic or have medical visits for ENG implant concerns. Temporizing measures, particularly hormonal