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Long-Acting Reversible Contraception (LARC) for Adolescent

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Abstract

Purpose of review—Teen pregnancy continues to plague the United States. This review will discuss long-acting reversible contraceptive (LARC) method use in teens. It will specifically address the myths about appropriate candidates as well as continuation and satisfaction among teen users.

Recent findings—The American College of Obstetrics and Gynecology along with the American Academy of Pediatrics, the Centers for Disease Control, and the World health Organization have recognized the potential impact of LARC (comprising intrauterine contraception and subdermal implants) to reduce unintended pregnancies. They have affirmed the safety of such devices, and no effects on long-term fertility have been identified. Teen users of these methods have been shown to have high continuation and satisfaction rates. On the other hand, oral contraceptive pills, the patch, and the contraceptive vaginal ring have significantly higher contraceptive failure rates, and these rates are magnified in young women.

Summary—LARC methods should be considered first-line options for teens seeking contraception.

Keywords

long-acting reversible contraception; subdermal implant; intrauterine device; adolescent contraception; teen pregnancy

Introduction

Adolescents are among the highest risk group for unintended pregnancy, yet are using some of the least effective methods of contraception. Although progress has been made, and rates are beginning to decline, the United States continues to lead developed nations with the highest rates. [1,2] The recent decline in adolescent birth rates has largely been attributed to increasing use of contraception. [3] Long-acting reversible contraception (LARC), including intrauterine devices (IUDs) and the subdermal implant, are among the most effective methods of reversible contraception, but traditionally have not been offered to the adolescent population. Recent changes in practice are reflective of an evolution of our understanding of

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these methods. Increasing uptake of intrauterine contraception and subdermal contraceptive implants in the adolescent population has the potential to reduce teen pregnancy rates.

Is there a need?

Almost 750,000 teens become pregnant each year, resulting in a US teen pregnancy rate of 7% in 2006. [2] Despite the fact that sexual behaviors and practices among US teens are similar to those of other developed nations, pregnancy rates are not. European teens are more likely to use contraception, especially the more effective methods, which is reflected in a US teen pregnancy rate that is three-fold greater than Sweden, and four-fold greater than France.[4,5] Although the majority of teens report using contraception during their first sexual experience, most are relying on condoms. Only 20% of sexually active female adolescents report using both barrier methods and hormonal methods simultaneously,[6] with another 19% reporting no contraceptive use.[7]

Across all ages, contraceptive methods that are coital or user-dependant (condoms, pills, patch, ring, injections) have higher typical use failure rates (Table 1).[8] LARC methods have perfect and typical use failure rates that rival permanent sterilization, and are clearly more appropriate in an adolescent population with decades of fertility ahead of them. Adolescents are at even higher risk of inconsistent contraceptive use than are other populations. In fact, a recent New England Journal publication demonstrated a two-fold increased risk of contraceptive failure in women under 21 years of age using the pill, patch or ring, compared to older women.[9] In this study, adolescents had similar, low failure rates with LARC methods as women 21 years of age and older. LARC methods are user independent, and therefore require no effort by the patient after initial insertion. This results in essentially equal typical and perfect use failure rates.[8]

Currently Available LARC

Long-acting reversible contraceptive (LARC) methods include intrauterine devices and the subdermal implant. There are very few contraindications to LARC methods. Each LARC method requires a clinician visit for insertion and removal. Although this can be viewed as a barrier to access in some populations, in the adolescent population it affords the healthcare team an opportunity for screening, intervention and counseling specifically related to making healthy choices about sexual activity, condom use, STI prevention, and other preventive services.

The Intrauterine Device (IUD)

There are currently two IUDs available in the United States: the levonorgestrel intrauterine system and the Copper T380A IUD. It is a myth that an IUD should be inserted during a woman's menses. In fact, an IUD can be inserted at any point in the menstrual cycle if pregnancy can be confidently ruled out. Additionally, an IUD can be placed immediately following delivery or abortion.[10]

The levonorgestrel IUS (LNG-IUS) is a T-shaped polyethylene frame containing 52mg of levonorgestrel which is released at a rate of 20μg/day for five years after which time the daily dose drops by approximately 50%.[11] The LNG-IUS prevents pregnancy through a

combination of mechanisms, but mainly through prevention of fertilization. The hormonal component thickens cervical mucus inhibiting sperm motility and capacitation, as well as thinning the endometrial lining eliciting a foreign body reaction. In some women, ovulation may be suppressed. [12] The LNG-IUS has many non-contraceptive benefits that make it appealing to adolescents. Average monthly blood loss can decrease by up to 90%, with 20-40% of users becoming amenorrheic by one year of use. [13-15] In addition, the LNG-IUS reduces painful menses (dysmenorrhea).

The CuT380A (ParaGard) IUD is a T-shaped, non-hormonal, polyethylene frame wrapped in copper wire (surface area of copper = 380/mm^2). Pregnancy prevention with this method is primarily through inhibition of fertilization. The copper ions appear to be spermicidal.[16] The Cu T380A can also be used as emergency contraception within five days following unprotected intercourse. It is a non-hormonal method, and has been consistently shown to have rapid return to fertility. [17,18]. Because of the potential to use this method for up to ten years, this is one of the most cost-effective contraceptive options. [19] Despite these advantages, the CuT380A is chosen less often than the LNG-IUS by adolescents, because it does not improve menorrhagia or dysmenorrhea. In fact, in some women these symptoms may worsen with copper IUD use.[12]

In addition to providing excellent contraception, prevention of endometrial cancer[17,18,20] and cervical cancer[21] have also been suggested benefits of both the CuT380A and the LNG-IUS. Endometrial cancer is thought to be prevented through both inflammatory response created by the IUD as well as prevention of endometrial proliferation in the case of the LNG-IUD. [22,23]The mechanism by which cervical cancer may be prevented is less understood, but increased cellular immunity initiated by the device is one leading theory.

Subdermal Etonogestrel Implant

There is only one contraceptive implant available in the United States, the etonogestrel-releasing (ENG) subdermal implant. The current implant (Implanon) will soon be replaced by Nexplanon, which is identical to Implanon, but contains barium for radiographic identification. In addition, Nexplanon has a new inserter mechanism. The ENG implant is a single rod, progestin-only implant that measures 4cm in length and 2mm in diameter. Similar to the IUD, the ENG implant provides excellent contraceptive effectiveness. It is approved for three years of use; however, two small studies of 75-200 patients reported zero pregnancies in the fourth year of use. [24,25] This device works predominantly through ovulation inhibition as well as thickening of cervical mucous and thinning of the endometrial lining. The ENG implant has been popular among the adolescent population within the Contraceptive CHOICE Project in St. Louis, Missouri. The CHOICE Project is an ongoing prospective cohort study designed to increase LARC uptake by eliminating financial and knowledge barriers. The project has enrolled 9,256 women , of which more than 5,500 are younger than the age of 25. Among the first 658 adolescents enrolled, 64% chose a LARC method at baseline, and among those LARC users age 14-17, 63% chose the implant. [26] There are many features of the ENG implant that make it appealing to younger age groups. The contraceptive effectiveness is outstanding, and it requires “no maintenance.” Other than remembering that its FDA-approved duration is 3 years, the

method is “forgettable.” In addition, the ENG implant has been shown to improve acne and relieve dysmenorrhea, both of which are fairly common in adolescents. [27] Because the device is inserted in the arm under local anesthesia, adolescents can avoid the pelvic exam and IUD insertion; which many teens experience as anxiety provoking and potentially painful. There are some disadvantages to the implant. The main disadvantage reported is unscheduled or unpredictable bleeding. [12] Bleeding patterns can range from amenorrhea to daily spotting or heavy flow; there is no way to predict the pattern of individual users. Some providers have suggested non-steroidal anti-inflammatory agents (NSAIDs), doxycycline, or low-dose oral contraceptives to control bleeding in teens that are experiencing undesirable, irregular bleeding.[28] However, there is limited evidence to support these practices.

Common misconceptions

IUD—One misconception surrounding the intrauterine device that has limited its use in the adolescent population is that IUDs cause pelvic inflammatory disease (PID) and infertility. ACOG has published a committee opinion on IUDs in adolescents and notes that IUDs do not increase an adolescent’s risk of PID, sexually transmitted infection (STI), or infertility.[29] Because adolescents and young adults contribute the majority of incident cases of sexually transmitted infections, testing for *Neisseria gonorrhoeae* and *Chlamydia trachomatis* should be performed in sexually active adolescents at the time of insertion or prior to insertion, and IUD insertion should be delayed if evidence of frank mucopurulent discharge or cervicitis is noted on exam. There is no need to delay insertion until STI test results are available. Testing at the time of insertion will allow for expedited treatment and significant reduction in the transient increased risk of infection associated with the peri-insertional period. [30]The slight increased risk of PID in the 20 days following IUD insertion (9.7 cases/1000women-years) can further be minimized with careful insertion technique and re-emphasis on the importance of correct and consistent condom use.[30]

Many providers are concerned about expulsion rates among teens. Data about expulsion in the adolescent population is limited and inconsistent. Rasheed et al found only 7 expulsions in 244 adolescents using the Cu-T380A IUD for an overall rate of 2.9%. [31] Another study found that among 141 parous adolescents receiving intrauterine contraception, 21 (14%) experienced an expulsion with no differences seen by IUD type.[32] Among the first 142 adolescents (age 14-20) that chose an IUD at enrollment into the CHOICE Project, twelve-month expulsion rates were found to be 6.3%. [33] There is slightly more data available addressing expulsion in nulliparous women. One recent European study evaluating IUD insertion and use in 117 nulliparous women reported six expulsions at one year for an overall rate of 5.1%. [34] Experience in the CHOICE project has been similar. The 12-month expulsion rate of 437 IUDs placed in nulliparous participants was 4.1%. [33] Findings of these studies fall within the overall reported expulsion rates of 2-10%.[12]

Concern regarding satisfaction and continuation of IUDs in the adolescent population are also common. It should be emphasized that teens are more likely to discontinue ALL methods when compared to older women. [35] However, adolescents are less likely to discontinue LARC methods than non-LARC methods.[36] When anticipatory guidance is given prior to initiation of a method, and teens know what to expect, continuation and

satisfaction rates will be higher. Of the first 5087 participants enrolled in the Contraceptive CHOICE project, of which 68% were using a LARC method, continuation and satisfaction rates were greater than 80%. When stratified by age, adolescents (<20 years of age) continued to have high satisfaction and continuation rates for both the LNG-IUS and subdermal implant (>80%). Adolescents using the Cu-T380A had a slightly lower satisfaction rate than older women using this method (72% versus 85%), but continuation rates were still significantly higher than non-LARC methods. [37]

Wait! Don't do it- Contraindications to LARC

There are some instances in which a LARC method may not be recommended. The US Medical Eligibility Criteria for Contraceptive Use was developed in 2010 and can be referenced to provide information related to specific comorbidities (www.cdc.gov/mmwr/pdf/rr/rr5904.pdf). [38] Table 2 represents some of the more common conditions encountered in an adolescent population. For almost all conditions, the advantages of using the method outweigh the risks. There are however a few contraindications to use of either method (Table 3) . [10,39]

Is insertion or removal more difficult in teens?

IUD—Discomfort or pain with IUD insertion is variable, with some women describing no or minimal pain, and others reporting severe pain. Advancements in pain management during IUD insertion have been lacking. Many interventions have been evaluated, but with disappointing results. Nonsteroidal anti-inflammatory drugs (NSAID) have been shown to improve post-procedural cramping, but have not been shown to improve peri-insertional pain. Misoprostol for cervical priming and paracervical injection of local anesthetic have also failed to show improvement in pain scores.[40,41] A recent Cochrane Review concluded that none of the properly evaluated interventions have been shown to improve peri-insertional pain. [40] The use of misoprostol to soften the cervix has been shown to increase ease of insertion as reported by the clinician; however it has not been shown to improve pain perceived by the patient. In fact, misoprostol may cause more pre-insertion discomfort related to the uterine contractile properties of the medication.[42,43]

Implant—Insertion and removal of the ENG-implant is done in the office under local anesthesia. There are no special precautions or modifications to insertion or removal in adolescents.

Are teen users satisfied with LARC or are they stopping use early?

Continuation and satisfaction are important factors to consider in the adolescent population. Although LARC methods are among the most cost-effective reversible methods, they come with a high upfront cost. If teens are more likely to discontinue use of the method soon after initiation, it could be argued that the potential for wasted resources outweighs the benefits of the method. One study evaluating continuation in a parous adolescent population found a median continuation rate of 14.1months for both IUD types. [32] More importantly, Behringer et al. did not find any differences in the rates of discontinuation secondary to dissatisfaction in adolescents (10.7%) vs older women (10.9%).[44] The Contraceptive CHOICE Project

noted that women using LARC methods were more satisfied than women using non-LARC methods. In addition, more than 85% of users were still using their LARC method at 12-month follow-up. Age did not significantly impact continuation rates in this analysis. [30]

Conclusion

Adolescents are among the highest risk group for unplanned pregnancy. Encouraging use of the most effective contraceptive methods has the potential to impact the high rate of teen pregnancy in the U.S. The most effective contraceptive methods are those that are user-independent. LARC methods, including intrauterine devices and the subdermal implant, are forgettable, safe in the adolescent population, have high rates of continuation and satisfaction, and are highly cost-effective. Family planning as a preventive service saves health care dollars.[45] Clinicians, policy makers, and all individuals interested in reproductive health and prevention should advocate for no-cost contraception, including LARC methods, to all women, especially adolescents.

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Key Points

- Long-acting reversible contraception is a safe and effective method of pregnancy prevention in adolescents.
- Adolescent users of LARC have 12-month continuation rates and high levels of satisfaction.
- There are many myths related to intrauterine devices limiting more wide-spread use.

Table 1
Effectiveness of Reversible Contraceptive Methods

Reversible Method	% Women Experiencing Unplanned Pregnancy During the First Year of Typical Use
No method	85%
Withdrawal, Spermicide	27-30%
Condom, Fertility awareness, Diaphragm	16-25%
Pill, Patch, Ring	8%
Depo-Provera	3%
LARC: IUD, Implant	0.05-0.8%

Adapted from Hatcher RA TJ, Nelson A, Cates W, Stewart F, Kowal D. *Contraceptive Technology*. 19 ed: Ardent Media; 2007.

Table 2

Adolescent medical Conditions and LARC

Condition	Implant	LNG-IUD	Cu-IUD
Nulliparity	1	2	2
Following Abortion			
First-Trimester	1	2	2
Second-Trimester	1	2	2
Obese	1	1	1
Thrombogenic mutation (Factor V Leiden)	2	2	1
Epilepsy	1	1	1
Past STI/PID	1	1	1
Current cervicitis/STI	1	4/2*	4/2*
Thalasemia/Sickle Cell	1	1	2
Depression	1	1	1

* Treatment of STI while IUD is in place is usually sufficient. However, insertion of IUD should be deferred if STI is suspected.

Legend

1 = A condition for which there is no restriction for the use of the contraceptive method.

2 = A condition for which the advantages of using the method generally outweigh the theoretical or proven risks.

3 = A condition for which the theoretical or proven risks usually outweigh the advantages of using the method.

4 = A condition that represents an unacceptable health risk if the contraceptive method is used.

Table 3

Contraindications to LARC use

IUD	Implant
Pregnancy	Pregnancy
PID within the previous 3 months	Active liver disease
Active cervicitis	Undiagnosed abnormal uterine bleeding
Post-partum or Post-abortion sepsis within previous 3 months	History or current breast cancer
Undiagnosed abnormal uterine bleeding	Hypersensitivity to any component of the implant
Genital tract malignancy	
Uterine anomaly	
History or current breast cancer (LNG-IUD)	
Wilson's Disease (Cu-IUD)	

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