Chapter 2
The Intrauterine Device

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BACKGROUND/EPIDEMIOLOGY OF USE BY TEENS AND YOUNG ADULTS

The intrauterine device (IUD) is an excellent method of contraception for adolescents and young adults. The three IUDs available in the United States include the Copper T380 A and the two levonorgestrel intrauterine systems, one containing 52 mg and one containing 13.5 mg of levonorgestrel. The copper IUD is approved for 10 years of continuous use. The 52 mg levonorgestrel IUD is approved for 5 years and the 13.5 mg for 3 years. IUDs have an outstanding record of safety and effectiveness [1]. Although less research has focused specifically on use of IUDs in teens and young adult women, evidence suggests that the benefits of IUDs—high efficacy, rare complications, and high satisfaction—are similar among younger and older users. The Centers for Disease Control and Prevention (CDC), through the US Medical Eligibility Criteria, supports IUD use in adolescents, indicating that the benefits outweigh the risks [2]. In a Committee Opinion, the American College of Obstetricians and Gynecologists recommend IUDs as first line for nulliparous and parous adolescents [3].

IUDs are underused in the United States, and young women are less likely to use the IUD for contraception than older women. However, IUD use has increased for all groups of women when

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comparing results from the 2002 to the 2006–2008 National Survey of Family Growth. Although usage rates remain low, women in the under 24 age group had a particularly large increase in long-acting reversible contraceptive (LARC) use [4]. In 2006–2008, 5.6 % of all women used a LARC method; 3.6 % of teens aged 15–19 used such a method (compared to 0.3 % in 2002), and 6.0 % of women aged 20–24 used a LARC method (compared to 1.9 % in 2002) [4].

MECHANISM OF ACTION

The mechanism of action of IUDs is multifactorial. The major effect of the IUD is prevention of fertilization through the creation of a microenvironment toxic to the ovum and sperm [5]. This microenvironment is achieved through the foreign body effect as well as the release of copper ions or levonorgestrel hormone. An inflammatory reaction is created within the uterine cavity that spreads to the genital tract lumen affecting the development and transport of oocytes and spermatozoa. Studies have examined early HCG levels, flushing out the genital tracts of women in early pregnancy and of women with IUDs. They conclude that fertilization does not usually occur in women wearing IUDs. The common belief that the mechanism of action of IUDs is the destruction of an implanted embryo is not supported by evidence. Since the action of IUDs occurs before implantation, the IUD is by definition not an abortifacient.

The levonorgestrel IUDs have additional local and systemic effects. Levonorgestrel is known to increase the viscosity of cervical mucus, obstructing the path of the spermatozoa to the egg. In addition to decreased menstrual flow due to the progesterone effect on the endometrium, about 40 % percent of women have anovulatory cycles due to suppression of FSH and LH [6].

CONTRACEPTIVE EFFICACY AND EFFECTIVENESS

A major advantage of intrauterine contraception is its high effectiveness. Unlike the large gap in effectiveness between perfect and typical use for short-acting contraceptive methods, particularly for adolescents, the gap for IUDs is essentially nonexistent. The proportion of women experiencing an unintended pregnancy within the first year of use of the 52 mg hormonal IUD (levonorgestrel intrauterine system) with both perfect and typical use is 0.2, and for the copper IUD, the proportion is 0.6 for perfect use and 0.8 for typical use [7]. The lower than 1 % failure rate of both IUDs makes them ideal for use in adolescents and young women, a group at high risk for unintended pregnancy.

The Contraceptive CHOICE Project is a large prospective cohort study that has enrolled close to 10,000 women, with the goal of promoting LARC use to decrease unintended pregnancy [8]. Women are counseled about all contraceptive methods, but the effectiveness of LARC methods is emphasized. Additionally, since the project funds all contraceptive methods, study subjects face no financial barriers to obtaining their method of choice. With this approach, 75 % of women in the study chose a LARC method. In a recent analysis of 7,486 participants, the superior effectiveness of LARC methods in preventing unintended pregnancy was clearly demonstrated. Contraceptive failure with pills, patch, and ring users was 4.55 per 100 participant-years vs. 0.27 among LARC users. In other words, the risk of failure with pills, patch, and ring was 20 times higher than with LARC methods. This analysis also emphasized the lower effectiveness of short-acting methods in teens. In women under age 21 using pills, patch, or ring, the risk of unintended pregnancy was almost twice as high as that of older women. The proportion of teens experiencing an unintended pregnancy with the IUD was <1 %; there was no difference in effectiveness of the IUD based on age.

SIDE EFFECTS

The major side effects of both the copper and the hormone IUD include bleeding and pain. In a large Brazilian study, adolescents had a higher rate of copper IUD removal than parous adults, mostly due to problems with pain and bleeding [9]. In a prospective cohort study of teens who chose an IUD for contraception, bleeding and pain were the two major side effects for which teens requested removal [10], but the rate of discontinuation of both devices was similar, as was the time frame of request for removal. Additionally, removal requests were not clustered within a few months of insertion.

Women using the levonorgestrel IUD rarely complain of hormone side effects because the dose of hormone released by the IUD is small and mostly acts locally within the endometrium. In the Contraceptive Choice study, 3 % of women using a levonorgestrel IUD discontinued use due to perceived side effects of acne and weight change [11].

Satisfaction and continuation are often a proxy for the severity of side effects of a contraceptive method. Continuation rates for IUDs in adolescents and young women are high. Similarly, satisfaction rates appear high in the limited number of prospective studies addressing adolescents and young women. Retrospective studies, including a small case series of Canadian teens and a small study

of New Zealand teens using the levonorgestrel IUD, show high satisfaction [12, 13]. In a trial with a large number of adolescents, over 84 % of participants were somewhat or very satisfied with IUDs compared to 53 % using non-long-acting methods [11].

CONTINUATION

Continuation rates for IUDs are generally high in adolescents and young adults. Two recent studies examined continuation rates in young women: In the Contraceptive Choice study, 12-month continuation for the 52 mg levonorgestrel IUD was similar to that of older adults at 88 %, but continuation for the copper IUD was 72 % for adolescents compared with 85 % for older women [11]. Satisfaction rates for both IUDs were high. In a recent study of parous adolescents, 12-month continuation was 55 % for both copper and levonorgestrel IUDs [10]. Even at the lower end of the range, continuation rates of around 50 % are higher than those for short-acting methods. Continuation rates for teens for the patch, DMPA, ring, and pills ranged from 10.9 per 100 person-years to 32.7 per 100 person-years [14] and were the lowest for the patch and DMPA. Higher rates of discontinuation of all shorter-acting methods were associated with younger age. Reasons for discontinuation of IUDs include expulsion, request for removal for bleeding and pain, and desire for pregnancy.

In a small, randomized controlled trial, 23 teens aged 14–18 desiring an IUD for contraception were assigned either to a levonorgestrel IUD or to the Copper T380 A IUD [15]. At 6-month follow-up, 75 % of the hormone IUD group and 45 % of the copper IUD group were still using the IUD. The difference was not significantly different, given the small sample size. Two partial expulsions occurred in the copper IUD group. Satisfaction in those continuing the IUD was high in both groups.

Studies conflict about a higher risk of expulsion associated with young age and/or nulliparity [10, 16]. In a cohort study of adolescent mothers who received an IUD for contraception, higher than expected rates of expulsion occurred: 13.3 % for the levonorgestrel IUD and 16.7 % for the copper IUD [10]. These results, however, should be interpreted with caution in light of the CHOICE study, with its finding of significantly lower risk of unintended pregnancy in adolescent women using LARC methods. Request for removal for bleeding and pain appears similar between younger and older IUD users [10, 16]. Overall, among teens and young women, long-acting methods such as the IUD and implant are associated with less unintended pregnancy and repeat pregnancy than with shorter-acting methods [17, 18].

CONTRAINDICATIONS

Since there are few contraindications to IUD use, almost all women are eligible for intrauterine contraception. The World Health Organization (WHO) and CDC have developed evidence-based medical eligibility criteria for contraceptive use (US MEC) [2, 19]. Guidelines are assigned a rating of one through four based on risk (Appendix A); in some cases there are separate recommendations for initiation and continuation of use. Contraindications most likely to affect adolescents and young women are pregnancy, anatomic abnormalities, active PID, and active sexually transmitted infections (STIs). Anatomic abnormalities are relatively common in young women and include Mullerian anomalies such as septa or uterus didelphys. Although scant data exist about IUD use in the setting of uterine anomalies, it may be useful to consider insertion on a case-by-case basis, depending on the particular anomaly [20]. It is important to note that while current PID and current STIs are given a US MEC Category 4 (condition represents an unacceptable health risk) rating for initiation of an IUD, both are given a Category 2 rating for continuation of an IUD. Providers may jump to removal of an IUD, particularly in a younger woman, in the setting of cervicitis or PID, whereas it may be acceptable to retain the IUD, treat the infection with appropriate antibiotics, and recommend close follow-up with reassessment in 48–72 h to verify clinical and microbiologic resolution of the infection [21]. The clinical course of PID does not appear to change based on whether or not the IUD is retained or removed [2]. (See Appendix B for summary of US MEC, including recommendations regarding IUDs).

TIMING OF INSERTION AND FOLLOW-UP

Although some sources recommend inserting an IUD during menses, the US SPR states that an IUD can be inserted anytime the provider can be reasonably certain that a woman is not pregnant. Additional contraception (or abstinence) is recommended for 7 days if a levonorgestrel IUD is inserted >7 days after the first day of menses, but no additional contraception is required for the copper IUD regardless of timing of insertion [21] (see Appendix C).

It is unclear whether follow-up after IUD insertion is necessary, but a "string check," usually scheduled 3–4weeks after IUD insertion is customary. At this check, a speculum exam and bimanual exam are performed to identify the strings and to rule out partial expulsion, which may occur more frequently than complete expulsion. Additionally, the bimanual exam may identify signs of systemic infection.

The US Selected Practice Recommendations for Contraceptive Use recommend having a woman return to discuss side effects, if she wants to change her method, and when it is time to remove or replace the IUD. The recommendations state that no routine follow-up visit is required; however, some populations, including adolescents may benefit from more frequent follow-up visits [21].

ISSUES FOR ADOLESCENTS AND YOUNG WOMEN

Lack of Familiarity with IUDs

A major issue for adolescents and young women is unfamiliarity with IUDs and their advantages. Several studies corroborate young women's lack of knowledge about the method [22–24]. In a questionnaire of young women seeking emergency contraception, over half reported they did not know whether the IUD was more or less effective or had` more or fewer side effects than the pill [24]. In a survey of teens attending a family planning clinic, only 19 % had heard of an IUD [23]. In a study of young pregnant women aged 14–25, only half had heard of an IUD and those who had heard of it were more likely to be older and parous [22].

Restrictive Criteria Excluding Teens and Nulliparous Women from IUD Use

Many providers use restrictive criteria to define an appropriate candidate for IUDs, further limiting young women's access both to knowledge about and use of the method. In a survey of physicians, nurse practitioners, and physician assistants, knowledge gaps about IUDs were common, and only 39 and 45 % of respondents respectively, would offer an IUD to a teenager or to a nulliparous woman [25].

Many adolescent and young women are nulliparous; some providers have specific concerns about the use of IUDs in nulliparous women, namely concerns about infection, pain with insertion, and increased side effects. The 52 mg levonorgestrel IUD remains off-label for use in nulliparous women although a growing body of evidence demonstrates safety and efficacy in nulliparous women [26] and the US MEC gives a Category 2 rating for use of both the copper and hormone IUDs in nulliparous women. As with parous women, nulliparous women have higher satisfaction rates with IUDs than with short-acting methods [2]. No studies show higher rates of PID or infertility in nulliparous women [27]. A large case–control study examining risk factors for tubal infertility did not show an increased risk of PID in women who had been IUD users but rather in women with a positive chlamydia antibody, demonstrating that STIs, not IUDs, are likely responsible for PID that may lead to infertility [27]. Pain with insertion may be greater for

nulliparous women, but evidence is reassuring that overall pain scores for IUD insertion are low for both nulliparous and parous women [28].

Rapid Repeat Pregnancy

Teens are at high risk for rapid repeat pregnancy, defined as a second pregnancy within 24 months of delivery. The negative consequences of bearing multiple children in adolescence include lack of educational attainment and poverty. Approximately 20–66 % of teen mothers experience repeat pregnancy within a year of delivery [29]; minority adolescent women have higher rates of rapid repeat pregnancy than whites. The postpartum time period is critical for initiating contraception to prevent rapid repeat pregnancy.

Postpartum IUD Initiation in Teens

A qualitative study of 20 postpartum African American teens desiring an IUD examined factors that prevented, delayed, or supported their ability to receive it [30]. Barriers included providers' restrictive criteria for candidate selection, lack of insurance coverage, fear of side effects, and delay in placement. An important facilitative factor was a strong positive message from providers promoting IUD use.

The most promising strategy for reducing rapid repeat pregnancy in teens is the use of LARC methods [17]. In a recent prospective cohort study of pregnant adolescents, 65 % intended to use a LARC method [31], confirming the high uptake seen in the CHOICE study, given appropriate counseling. Of the 65 % who desired LARC for postpartum contraception, only 63 % actually received it, and implant intenders were more likely to receive the method than IUD intenders. In this study setting, the implant was placed prior to hospital discharge, whereas the IUD was placed at the traditional 6-week postpartum visit. Notably, over half of the adolescents intending the IUD resumed intercourse prior to receiving their contraceptive method. The study suggests that optimal timing for initiation of LARC methods is immediately postpartum.

CONCLUSION

Although studies specific to IUD use in adolescents are urgently needed, existing evidence is reassuring that adolescents are excellent candidates for the IUD. Teens experience unique challenges in preventing unintended pregnancy and rapid repeat pregnancy and are much more likely to experience contraceptive failure using short-acting methods than older women. IUDs hold a number of advantages for adolescents, including ease of use, effectiveness, and rapid reversibility. IUDs should be considered a first-line choice for all women, including adolescents [16].

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