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Best Practices to Minimize Risk of Infection With Intrauterine Device Insertion

This committee opinion has been prepared by the Infectious Disease Committee, reviewed by the Family Practice Advisory Committee, the Registered Nurse Advisory Committee, the Aboriginal Health Initiative, and the Canadian Paediatric and Adolescent Gynaecology and Obstetricians Committee, and approved by the Executive and Council of the Society of Obstetricians and Gynaecologists of Canada.

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Abstract

Background: Intrauterine devices provide an extremely effective, long-term form of contraception that has the benefit of being reversible. Historically, the use of certain intrauterine devices was associated with increased risk of pelvic inflammatory disease. More recent evidence suggests that newer devices do not carry the same threat; however, certain risk factors can increase the possibility of infection.

Objectives: To review the risk of infection with the insertion of intrauterine devices and recommend strategies to prevent infection.

Outcomes: The outcomes considered were the risk of pelvic inflammatory disease, the impact of screening for bacterial vaginosis and sexually transmitted infections including chlamydia and gonorrhea; and the role of prophylactic antibiotics.

Evidence: Published literature was retrieved through searches of PubMed, Embase, and The Cochrane Library on July 21, 2011, using appropriate controlled vocabulary (e.g., intrauterine devices, pelvic inflammatory disease) and key words (e.g., adnexitis, endometritis, IUD). An etiological filter was applied in PubMed. The search was limited to the years 2000 forward. There were no language restrictions.

Grey (unpublished) literature was identified through searching the web sites of national and international medical specialty societies.

Values: The quality of evidence in this document was rated using the criteria described in the Report of the Canadian Task Force on Preventative Health Care (Table).

Recommendations

1. All women requesting an intrauterine device should be counselled about the small increased risk of pelvic inflammatory disease in the first 20 days after insertion. (II-2A)
2. All women requesting an intrauterine device should be screened by both history and physical examination for their risk of sexually transmitted infection. Women at increased risk should be tested prior to or at the time of insertion; however, it is not necessary to delay insertion until results are returned. (II-2B)
3. Not enough current evidence is available to support routine screening for bacterial vaginosis at the time of insertion of an intrauterine device in asymptomatic women. (II-2C)

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Key to evidence statements and grading of recommendations, using the ranking of the Canadian Task Force on Preventive Health Care

Quality of evidence assessment*		Classification of recommendations†	
I:	Evidence obtained from at least one properly randomized controlled trial	A.	There is good evidence to recommend the clinical preventive action
II-1:	Evidence from well-designed controlled trials without randomization	B.	There is fair evidence to recommend the clinical preventive action
II-2:	Evidence from well-designed cohort (prospective or retrospective) or case–control studies, preferably from more than one centre or research group	C.	The existing evidence is conflicting and does not allow to make a recommendation for or against use of the clinical preventive action; however, other factors may influence decision-making
II-3:	Evidence obtained from comparisons between times or places with or without the intervention. Dramatic results in uncontrolled experiments (such as the results of treatment with penicillin in the 1940s) could also be included in this category	D.	There is fair evidence to recommend against the clinical preventive action
		E.	There is good evidence to recommend against the clinical preventive action
III:	Opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees	L.	There is insufficient evidence (in quantity or quality) to make a recommendation; however, other factors may influence decision-making

*The quality of evidence reported in these guidelines has been adapted from The Evaluation of Evidence criteria described in the Canadian Task Force on Preventive Health Care.[66]

†Recommendations included in these guidelines have been adapted from the Classification of Recommendations criteria described in the Canadian Task Force on Preventive Health Care.[66]

4. Routine use of prophylactic antibiotics is not recommended prior to intrauterine device insertion, although it may be used in certain high-risk situations. (I-C)
5. Standard practice includes cleansing the cervix and sterilizing any instruments that will be used prior to and during insertion of an intrauterine device. (III-C)
6. In treating mild to moderate pelvic inflammatory disease, it is not necessary to remove the intrauterine device during treatment unless the patient requests removal or there is no clinical improvement after 72 hours of appropriate antibiotic treatment. In cases of severe pelvic inflammatory disease, consideration can be given to removing the intrauterine device after an appropriate antibiotic regimen has been started. (I-B)
7. An intrauterine device is a safe, effective option for contraception in an HIV-positive woman. (I-B)
8. An intrauterine device can be considered a first-line contraceptive agent in adolescents. (I-A)

BACKGROUND

In the past, the use of IUDs, in particular the Dalkon shield, was found to be associated with increased risk of PID and septic abortion.[1,2] As a result, the IUD fell out of favour as a contraceptive option, especially in women who had not yet had children. However, more recent literature from the last 2 decades has illustrated that the risk of PID after insertion of an IUD is extremely low, especially in women at low risk of STIs, and that this risk peaks in the first month after insertion.[3–6]

Despite the overall low risk of infection, it is prudent to examine the roles of screening for and treating STIs prior to IUD insertion, the administration of prophylactic antibiotics, and cervical preparation in preventing PID in patients undergoing IUD insertion.

RISK OF PELVIC INFLAMMATORY DISEASE AFTER INSERTION

A recent retrospective cohort study in northern California that included 57 728 IUD insertions found an overall risk of PID in the first 90 days of 0.54%.[6] This supports historical data that found low rates of PID in women who had IUDs inserted. In a review of trials of IUD insertion in the mid-1970s and 1980s, among 22 908 IUD insertions over 51 399 woman-years of follow-up, Farley et al. found an overall rate of PID of 1.6 per 1000 woman-years of use.[3] When sub-analyzed for time from insertion, the rate of PID infection was highest at 9.7 per 1000 woman-years in the first 20 days and then dropped to 1.4 per 1000 woman-years, suggesting infection was most strongly associated with the insertion process. In this study, PID rates also varied by the country in which the trial took place and the age of the women, with a higher risk seen in younger women.

Other studies have also found a differential risk of PID based on geographic location. In an RCT investigating the role of prophylactic antibiotics for IUD insertion in Los Angeles County, California, there was only 1 case of salpingitis in 915 control subjects 90 days after insertion.[5] Similarly, very low rates of PID (0.6 per 1000 woman-years) were seen in an international collaboration comparing the effectiveness of Norplant, IUDs, and sterilization

in women from Bangladesh, Chile, China, Columbia, Egypt, Indonesia, Sri Lanka, and Thailand.[7] Rates of PID following IUD insertion were found to be higher in African studies. Two RCTs from Nigeria and Nairobi investigating the use of prophylactic antibiotics identified rates of PID of 1.4% to 1.6% in their control arms.[8,9]

Younger age also appears to be associated with higher rates of PID in women using an IUD. In addition to Farley's review,[3] an RCT comparing levonorgestrel and copper IUDs identified higher rates of PID in women under 25 years in the copper IUD arm.[10] Investigation of other potential factors influencing risk of PID development has found that women who are at low risk of STI have only a minimal, and not statistically significant, higher risk of PID than women using no contraception.[6,11] Women who were currently married or cohabitating had the same relative risk of developing PID as women who were not using contraception. In contrast, there was an increased risk of developing PID after IUD insertion in women who were not currently married. Young age, relationship status, and geographical location are important factors in determining the risk of current STI and may thus offer some explanation for the differential rates of PID after insertion in these groups.[12]

Trials examining the prolonged use of IUDs have found similarly low rates of PID. An international randomized trial comparing prolonged use of levonorgestrel and copper IUDs over a 7-year period found declining rates of PID over time.[13] In the first 2 years, the rates of PID in the levonorgestrel and copper IUD groups were 0.9 per 100 and 0.8 per 100, respectively. This fell to 0.2 per 100 and 0.3 per 100 at 6 to 7 years from insertion. Another study comparing levonorgestrel and copper IUDs over 5 years identified an overall discontinuation rate of 0.8 to 2.2 per 100 women as a result of PID.[10]

ABBREVIATIONS

ACOG	American College of Obstetricians and Gynecologists
BV	bacterial vaginosis
IUD	intrauterine device
IPPA	International Planned Parenthood Association
LNG-IUS	levonorgestrel intrautrine system
PID	pelvic inflammatory disease
RCOG	Royal College of Obstetricians and Gynaecologists
STI	sexually transmitted infection
WHO	World Health Organization

Overall, multiple studies have shown that the risk of PID associated with the use of IUDs is low, even in higher risk populations.[4,14]

Recommendation

1. All women requesting an intrauterine device should be counselled about the small increased risk of pelvic inflammatory disease in the first 20 days after insertion. (II-2A)

ROLE OF AND INDICATIONS FOR SCREENING FOR SEXUALLY TRANSMITTED INFECTIONS

In 2006, a systematic review attempted to answer the question of whether IUD use increased the risk of PID in women with an STI.[15] Ultimately, no studies addressed this issue directly, although 6 did so indirectly. Overall, the rates of PID were low: 0% to 5% in women with an STI at the time of insertion versus 0% to 2% in women without. In 2 of the studies, there were no cases of PID in a total of 18 women who had an asymptomatic chlamydia infection at the time of insertion.[16,17] Women were treated within 2 weeks of insertion in one study,[17] but treatment time was not specified in the other. The other 4 studies included in the review did find an increased risk of PID with IUD insertion, and the study with the largest sample size found the relative risk to be 2.69 (95% CI 1.11 to 6.53).[9,15]

A recent retrospective cohort study of 57 728 women with either an LNG-IUS or a copper IUD inserted in northern California from 2005 to 2009 found that the risk of PID was equivalent in women who were not screened within a year of insertion and those who were.[6] Forty-seven percent of these women were not screened, and unscreened women had a higher average age (35.8 years vs. 28.6 years) than women with any screening prior to or at the time of insertion. In women who were screened, there was no difference in risk of PID whether they were tested at the time of insertion or prior to insertion. In women under 26 years old, generally considered to be at higher risk of having an STI, there was also no difference in PID rates whether they were tested at or prior to insertion.

To determine whether inserting an IUD in women with asymptomatic cervical infection increases the risk of PID an appropriate control group should be selected. Ideally this group would include women who have asymptomatic infections and who do not use any contraception, rather than uninfected women using an IUD or infected women using other forms of contraception. Data in this area are sparse and not robust; however, 1 study from 1979 investigated the risk of PID in 672 women with gonorrhea who used either the IUD, hormonal birth control, or

another method of contraception (including barrier methods).[18] There was a significant risk of PID in women who used IUDs and tested positive for an STI (23.5%); however, the background risk in women using other methods of contraception (including barrier methods) for having an STI was 15.1%. This increased risk of PID in women using IUDs cannot necessarily be extrapolated to women with asymptomatic chlamydia infection; other studies have seen much lower risk of PID at the time of IUD insertion in women with chlamydia than in women with gonorrhea.[9] It is important to note that the study showing a higher risk of PID in women using IUDs than in women using other contraception was conducted in the late 1970s, and that none of the IUDs used were the LNG-IU.

Neither ACOG nor RCOG recommend testing all women for asymptomatic cervical infections before insertion, but rather recommend identifying those at high risk through history and physical exam, and testing these women and any women who request testing.[19,20] The Centers for Disease Control and Prevention consider women with any of the following to be at increased risk of STIs: age under 26 years, having a new partner, having had more than 1 partner in the last 12 months, and having a history of an STI.[21] Canadian recommendations for testing are similar and also include vulnerable populations, such as injection drug users and women who are incarcerated.[22]

WHO lists current PID, purulent cervicitis, and current chlamydial or gonorrheal infection, among others, as absolute contraindications to the insertion of an IUD.[23] The question that remains is whether it is better to screen all asymptomatic women at higher risk and wait for the results, or to test at the time of insertion and treat as soon as possible. When testing first and delaying insertion to a follow-up appointment, consideration must be given to the likelihood of the patient being able to return, and the potential benefit of decreasing the risk of PID from 0–5% to 0–2% must be weighed against the risk of unintended pregnancy during this time. If the decision is taken to test at the time of insertion, it is important to consider the likelihood of contacting the patient again. Although routine prophylactic antibiotics are not generally recommended, they may be considered in women considered to be at high risk of STI or in whom follow-up may be problematic.

Current data suggest that an undiagnosed STI at the time of IUD insertion increases a woman's risk of developing PID; however, this overall risk is low.[8,9,15] Selective screening based on risk factors is preferable to screening all women prior to insertion. The decision of whether to screen and treat prior to insertion rather than at the time of insertion must be made in consultation with the patient, taking into consideration the risk of unintended pregnancy and the patient's ability to return.

Recommendation

2. All women requesting an intrauterine device should be screened by both history and physical examination for their risk of sexually transmitted infection. Women at increased risk should be tested prior to or at the time of insertion; however, it is not necessary to delay insertion until results are returned. (II-2B)

BACTERIAL VAGINOSIS

PID has historically been associated with STIs, such as chlamydia and gonorrhea, but multiple other agents including genital mycoplasmas, both aerobic and anaerobic endogenous vaginal flora, and aerobic streptococcus can also cause PID.[24] This has raised the question of the role of BV in the development of PID. In a longitudinal study of 1179 women in the US, Ness et al. did not find an increased risk of PID in women who had BV[25]; this study, however, did not include women having IUDs inserted.

Studies have found higher rates of BV in women using the IUD than in women using other contraceptive methods.[26–28] This does not, however, appear to translate into a higher risk of PID.[29] In a Canadian study, 70 women were tested for BV and cervical infections prior to having an IUD inserted, and 5 (7%) were found to have BV.[30] Only 1 of these 5 women was symptomatic at insertion, and was therefore treated with metronidazole. Repeat swabs were performed at 1 month; 4 of the 5 women no longer had BV and the remaining woman was treated with metronidazole. In the entire cohort, 1 woman developed PID and a tubo-ovarian abscess 3 months after insertion, and all testing in her for BV was negative. There were no cases of PID in women who had BV during the study period.

In the 2007 IUD guidelines published by RCOG, testing for BV or treating asymptomatic women before insertion of an IUD was not recommended in light of the lack of evidence of harm.[31–33] WHO also addressed this in 2009, and categorized the insertion of an IUD in the presence of BV as category 2 (generally use).[23]

Recommendation

3. Not enough current evidence is available to support routine screening for bacterial vaginosis at the time of insertion of an intrauterine device in asymptomatic women. (II-2C)

ROLE OF PROPHYLACTIC ANTIBIOTICS

There have been several RCTs investigating the role of prophylactic antibiotics in the prevention of pelvic infection following IUD insertion and none found a statistically significant decrease in the rate of PID when women were given antibiotics before IUD insertion.[5,8,9,34] A 2010 Cochrane review found that the overall risk of PID was low after IUD insertion, and that giving women either doxycycline 200 mg or azithromycin 500 mg before insertion did not significantly reduce the risk of PID.[35] In a large study of 1813 women in Nairobi, there was a trend to decreasing rates of PID in women with positive swabs for gonorrhea (0% in the treatment group vs. 11.1% in the placebo group); however, the numbers were too small for this difference to meet statistical significance.[9]

ACOG and RCOG differ slightly in their recommendations for the use of pre-insertion antibiotics. ACOG does not recommend routine use of antibiotic prophylaxis and suggests testing women at increased risk of STIs at the time of insertion and treating those with positive results as soon as possible.[19] RCOG also discourages routine administration of prophylactic antibiotics, but suggests considering prophylaxis in women who are at high risk of STIs and whose results are not available at the time of insertion. RCOG recommends using an antibiotic that will treat chlamydia, and if rates of gonorrhea in the population are high, antibiotics that cover both chlamydia and gonorrhea.[33]

Current evidence does not support the routine use of prophylactic antibiotics prior to the insertion of IUDs. Women at increased risk of asymptomatic infection should be tested, and only those who test positive should be treated. Consideration may be given to pre-insertion antibiotics when test results are not available prior to insertion and there is significant concern about follow-up for treatment if the test result should be positive. The antibiotic should treat chlamydia, and—if rates in the community are high—gonorrhea.

Recommendation

4. Routine use of prophylactic antibiotics is not recommended prior to intrauterine device insertion, although it may be used in certain high-risk situations. (I-C)

INSERTION TECHNIQUE

The role of poor aseptic technique in the risk of PID after IUD insertion is not well-known, but it is well-documented in other areas including puerperal and post-abortion infection.[36] Intrauterine microbial contamination is highest in the first month of insertion and decreases with time.[37] The risk of potentially infectious vectors being introduced into the cavity at the time of IUD insertion is long established; however, this risk is short-lived.[38]

Although no RCTs have been conducted in this area, some studies have suggested that IUD insertion under aseptic technique is one of the main reasons for much lower rates of PID after insertion in higher resource countries such as China and the USA than in African countries.[37,39] There is insufficient evidence that cleansing the cervix affects the risk of infection, but RCOG found that 94% of family practitioners do this before inserting an IUD.[33]

Several trials have been designed to determine whether leaving a tail string (visible through the cervical os) on the IUD impacts the rate of PID. A 1996 meta-analysis of 7 studies found that there was no difference in infection rate between tail string or no tail string (RR 1.2 95% CI 0.6–1.7).[40] Therefore, leaving a visible string to allow for ease of removal and confirmation of correct placement is appropriate, reserving shortening the strings for women who have discomfort themselves or whose partners have discomfort from strings visible through the os.

Recommendation

5. Standard practice includes cleansing the cervix and sterilizing any instruments that will be used prior to and during insertion of an intrauterine device. (III-C)

Management of Pelvic Inflammatory Disease With IUD In Situ

There is limited research and evidence to guide recommendations in the case of the development of PID in women who already have an IUD in place. The studies that do exist have conflicting results. Two studies comparing removing, versus retaining, the IUD in hospitalized women with PID treated with IV antibiotics found that women who had the IUD removed had a significantly longer stay in hospital.[41,42] Of these, the one retrospective study of 186 women found no difference in clinical outcome, but a longer hospital stay in those with the IUD removed. However, there may have been some bias in removing the IUD in women who were considered to be more ill.[42] Another study randomly assigning 53 women with PID and an IUD in place to either removal and IV antibiotics or retention and IV antibiotics found no statistical difference in the time to peak or to decreasing erythrocyte sedimentation rate.[43] There were also no treatment failures or rehospitalizations in the following 3 months in either group.

A more recent study investigating women with mild to moderate PID and an IUD in place found a statistically significant improvement of short-term outcomes in women who had their IUD removed.[44] This study included 126 women, in 60 of whom the IUD was removed, and all received ciprofloxacin, metronidazole, and doxycycline for 14 days. After 2 weeks, those who had the IUD removed reported less pelvic pain, vaginal discharge, dyspareunia, dysuria, and abdominal and cervical tenderness. There was no difference in the resolution of vaginal bleeding, nausea and vomiting, and cervical discharge. The rates of symptomatic improvement were high in both groups of women, with the resolution of symptoms at 2 weeks between 45% and 67% even when the IUD was not removed.

Unfortunately, no studies address differences in long-term outcomes, such as infertility, ectopic pregnancy, and chronic pelvic pain, between women who have or have not had their IUD removed at the time of treatment of PID. Unintended pregnancy in women who have their IUD removed is another important long-term complication that needs to be considered. RCOG recommends removal of the IUD only on patient request and with failure to improve after 72 hours of treatment,[31–33] and the IPPA does not recommend removal of an IUD in the setting of PID.[45] WHO classifies continuation of an IUD in women with PID as category 2 (generally use).[23] In contrast, the British Association for Sexual Health and HIV recommends considering removal at the time of treatment as it may be associated with better short-term clinical outcomes; however, the decision to remove the IUD needs to be balanced with the risk of pregnancy in the patient.[46]

Recommendation

6. In treating mild to moderate pelvic inflammatory disease, it is not necessary to remove the intrauterine device during treatment unless the patient requests removal or there is no clinical improvement after 72 hours of appropriate antibiotic treatment. In cases of severe pelvic inflammatory disease, consideration can be given to removing the intrauterine device after an appropriate antibiotic regimen has been started. (I-B)

HORMONE-RELEASING VERSUS COPPER IUD

There are conflicting data comparing any difference in rates of PID in women using the LNG-IUS IUD versus the copper IUD. A large international RCT published in 1991 comparing the LNG-IUD to the Copper T found no statistical difference in rates of PID over 7 years of follow-up.[13] As mentioned in the section on PID, the rates of PID did decrease over time for both types of IUD. In contrast, a large European multicentre RCT including 1821 women with LNG-IUS and 937 women with the Nova T did find a statistically significant lower rate of PID at 3, 4, and 5 years of use in the women with the LNG-IUS.[10] At 5 years of follow-up, the rate of PID in women with Nova T was 1.6 per 100 and with the LNG-IUS it was 0.6 per 100. In women under 25, the difference between the cumulative rates at 60 months was significant at 5.6 per 100 for women with a Nova T and 0.3 per 100 in women with the LNG-IUS. In both studies, the overall annual rates of PID in women with either form of IUD was low.

SPECIAL POPULATIONS

HIV-Positive Women

Current evidence supports the safety and efficacy of IUD use in HIV-positive women.[47–50] Concerns about the potential for increased risk of PID in HIV-positive women using IUDs have not been supported by existing literature. In a study in Kenya comparing 156 HIV-positive women and 493 HIV-negative women all using IUDs, the overall complication rates were similar (14.7% vs. 14.8%) and rates of PID were low (2% vs. 0.4%, $P = 0.09$).[50] HIV infection was not found to be associated with increased risk of infectious complications, however cervical infection was, illustrating the importance of identifying and treating cervical infections in women who request an IUD. The other studies also found low rates of PID in HIV-positive women using the IUD,[47–49] and the RCT comparing IUDs to hormonal contraception in 296 HIV-positive women with an IUD followed for 2 years identified only 1 episode of PID; this episode occurred 29 days after insertion and was associated with a chlamydial infection.[48]

An additional concern is the effect an IUD may have on the transmission of HIV to partners. Two studies, one investigating copper IUDs and the other LNG-IUS, found that cervical shedding of HIV is not increased when an IUD is present.[51,52] Although a study by Carael et al. in 1988 suggested an increased transmission rate with IUDs,[53] multiple subsequent studies have not supported this finding.[54–56]

Both WHO and the IPPA recommend the use of IUDs in HIV-positive women.[23,45] WHO categorizes initiating an IUD in HIV-positive women as category 2 (generally use).[23] This is consistent with RCOG recommendations.[20]

Recommendation

7. An intrauterine device is a safe, effective option for contraception in an HIV-positive woman. (I-B)

ADOLESCENTS

High levels of sexual activity and inconsistent contraceptive use are factors contributing to the rate of adolescent pregnancy, with a recent review suggesting almost 30% of Americans in grade 9 and over 60% of those in grade 12 have engaged in intercourse.[57,58] Canadian women aged 15 to 19 years rely primarily on contraceptive methods associated with higher compliance requirements, such as condoms and oral contraceptives.[59] Nearly 18% rely on the withdrawal method, which has much higher rates of failure for pregnancy prevention and STI protection, and only 1% of Canadian youth (15 to 19 years) report the use of IUDs.[59] Adolescents have the second highest rates of chlamydia and gonorrhea infection among all age groups of Canadian women, second only to young adults 20 to 24 years of age.[60–62] This age group also has among the highest rates of abortion,[63] which further supports the need for effective contraception in this group of women. Historically, IUDs were not recommended in adolescents; however, recent literature has supported the safety of IUDs in this population and refuted concerns about PID, STIs, infertility, and difficult insertions of IUDs in adolescents.[4,64] In 2012, ACOG released a committee option recommending long-acting contraception including the IUD be offered as a first-line method to adolescents.[57]

Limited knowledge about IUDs and negative beliefs about their efficacy have limited the use of IUDs in adolescents. A recent study by Whitaker et al. suggests that even a brief 3-minute counselling session on IUDs can dramatically alter adolescent viewpoints and encourage the use of this long-acting contraceptive method.[65] Health care professionals can play an important role in increasing awareness of, and positive attitudes towards, the IUD and promoting it as an effective, safe, convenient, and appropriate first-line method of contraception for adolescents, especially those at risk of unwanted pregnancies.

Recommendation

8. An intrauterine device can be considered a first-line contraceptive agent in adolescents. (I-A)

SUMMARY

IUDs are an extremely safe and effective contraceptive option for women. The historic association with a significantly increased risk of PID that was seen with use of the Dalkon shield has not persisted with the advent of modern IUDs. Screening women for their risk of STIs with a thorough history and a physical exam can identify those who need testing prior to or at the time of insertion. Based on RCTs, there is no benefit to offering all women prophylactic antibiotics. Although there is limited evidence supporting cervical cleansing prior to insertion of the IUD, it is possible that this practice may decrease the risk of PID. The IUD can be considered a safe and effective form of contraception for HIV-positive women and adolescents, and it should be considered a first-line contraceptive option.

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