Emergency Contraception

Abstract

Objective: To review current knowledge about emergency contraception (EC), including available options, their modes of action, efficacy, safety, and the effective provision of EC within a practice setting.

Options: The combined estradiol-levonorgestrel (Yuzpe regimen) and the levonorgestrel-only regimen, as well as post-coital use of copper intrauterine devices, are reviewed.

Outcomes: Efficacy in terms of reduction in risk of pregnancy, safety, and side effects of methods for EC and the effect of the means of access to EC on its appropriate use and the use of consistent contraception.

Evidence: Studies published in English between January 1998 and March 2010 were retrieved though searches of Medline and the Cochrane Database, using appropriate key words (emergency contraception, post-coital contraception, emergency contraceptive pills, post-coital copper IUD). Clinical guidelines and position papers developed by health or family planning organizations were also reviewed.

Values: The studies reviewed were classified according to criteria described by the Canadian Task Force on Preventive Health Care, and the recommendations for practice were ranked according to this classification (Table 1).

Benefits, Harms, and Costs: These guidelines are intended to help reduce unintended pregnancies by increasing awareness and appropriate use of EC.

Sponsor: The Society of Obstetricians and Gynaecologists of Canada.

Summary Statements

1. Hormonal emergency contraception may be effective if used up to 5 days after unprotected intercourse. (II-2)
2. The earlier hormonal emergency contraception is used, the more effective it is. (II-2)
3. A copper IUD can be effective emergency contraception if used within 7 days after intercourse. (II-2)
4. Levonorgestrel emergency contraception regimens are more effective and cause fewer side effects than the Yuzpe regimen. (I)
5. Levonorgestrel emergency contraception single dose (1.5 mg) and the 2-dose levonorgestrel regimen (0.75 mg 12 hours apart) have similar efficacy with no difference in side effects. (I)

Key Words: Emergency contraception, post-coital contraception, emergency contraceptive pills, post-coital copper intrauterine device, IUD
Emergency Contraception

INTRODUCTION

Emergency contraception refers to all methods of contraception that are used after intercourse and before implantation. The most commonly used methods can reduce the risk of pregnancy by 75% to 89%.1-3 The EC methods are intended for occasional use, primarily as a backup to regular methods of birth control.

Emergency contraception has been available in Canada for almost 30 years, but as of 2002 only 57% of Canadian women were familiar with it.4 Forty to fifty percent of pregnancies in Canada remain unplanned despite the wide availability of contraceptive methods,5,6 and in 2006, 91 310 abortions were performed in Canada.7 The appropriate use of EC may reduce the number of unintended pregnancies.

METHODS OF EMERGENCY CONTRACEPTION

There are 2 methods of emergency contraception available in Canada: hormonal methods, also known as emergency contraceptive pills, and post-coital insertion of a copper intrauterine device.

Three products, Plan B, NorLevo, and Next Choice, are approved in Canada as hormonal EC. The first 2 consist of 2 tablets of levonorgestrel 750 μg taken as a single dose. The third consists of 2 tablets of levonorgestrel 750 μg taken 12 hours apart. All are now available in participating Canadian pharmacies without a prescription.8

The other hormonal EC, known as the Yuzpe method,1 has been in use since the 1970s, and consists of 2 tablets of Ovral (50 μg of ethinyl estradiol and 250 μg of levonorgestrel) taken orally and repeated 12 hours later. Occasionally, an antiemetic is also required. Other contraceptive pills can be substituted if they are more readily available, as they are

### Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>EC</td>
<td>Emergency contraception</td>
</tr>
<tr>
<td>EE</td>
<td>Ethinyl estradiol</td>
</tr>
<tr>
<td>LNG</td>
<td>Levonorgestrel</td>
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considered to offer equivalent efficacy, although they may not deliver an exactly equivalent dose (Table 2). None of these combined hormonal products have been approved for use as EC in Canada. Nonetheless, they may still be used for this purpose as they are readily available (on prescription) and economical.

The antiprogestin mifepristone (RU 486) has been shown to be a highly effective post-coital contraceptive, but this product is unlikely to be available to Canadian women in the near future. Another antiprogestin, ulipristal acetate, has been found to be at least as effective as levonorgestrel emergency contraception and was approved in 2010 by the United States Food and Drug Administration but has not yet been approved by Health Canada.

The insertion of a copper IUD within 5 days of unprotected intercourse has been shown to prevent pregnancy. The use of a post-coital copper IUD between 5 and 7 days after unprotected intercourse is less well studied, although some trials have extended the treatment window to 7 days. If successful in preventing pregnancy, the copper IUD may remain in place to provide ongoing contraception. Flexi-T and Nova-T are the 2 copper-bearing IUDs currently licensed for contraceptive use in Canada. Both are prescription products and may be used “off-label” for EC. The levonorgestrel intrauterine system (Mirena intrauterine system) is not currently recommended for use as EC.

MECHANISM OF ACTION OF EMERGENCY CONTRACEPTION

The exact mechanisms of action of emergency contraceptives are unclear, but EC could theoretically interfere with follicle maturation, the ovulatory process, cervical mucus, sperm migration, corpus luteum sufficiency, endometrial receptivity, fertilization, or zygote development, transport, or adhesion. The mechanism of action may differ not only with the different EC regimens, but also within each regimen, depending upon when it is given relative to the time of both intercourse and ovulation.

Statistical evidence of the effectiveness of hormonal EC agrees with clinical data, suggesting that the main mechanism of action is related to interference with ovulation. When given before ovulation, the Yuzpe EC, levonorgestrel-only EC, and mifepristone appear to suppress or delay ovulation; if ovulation does occur, it appears to be dysfunctional. When EC is given at the time of or after ovulation, no effect on ovulation is seen. Recent data show that LNG-EC prevents pregnancy only when taken before fertilization of the ovum has occurred. It appears unlikely that EC has an effect on the luteal phase.

Studies of the effects of combined EC and levonorgestrel-only EC (LNG-EC) on the endometrium are not consistent; however, most recent studies have failed to show major alterations in the mechanisms associated with endometrial receptivity. Since the effect on ovulation may not explain the total effectiveness of hormonal EC, more clinical data are required to assess the contribution of other mechanisms of action.

EFFICACY

Hormonal Regimens

The Yuzpe and levonorgestrel-only regimens have been shown to reduce the risk of pregnancy by about 75% to 89%, respectively, but this does not mean that up to 25% of women using the Yuzpe regimen will become pregnant. Theoretically, if 100 women had unprotected intercourse once during the second or third week of their cycle, about 8 would become pregnant; following treatment with the Yuzpe regimen, only 2 would become pregnant, a reduction of 75%. However, recent studies using statistical estimation of the effectiveness of hormonal EC suggest that the risk reduction may not be this great.

The World Health Organization reports a pregnancy rate of 1.1% with the levonorgestrel-only regimen compared with 3.2% for the Yuzpe regimen.

Two randomized trials compared levonorgestrel given twice 12 hours apart with the Yuzpe regimen, and both showed that levonorgestrel only had higher efficacy (85% vs. 57% for typical use and 89% vs. 76% for perfect use).

In 2002, 2 large randomized trials showed that a single dose of 1.5 mg of levonorgestrel was as effective as the standard 2-dose levonorgestrel regimen.

In a randomized controlled trial, a 1-dose regimen of Ovral was less effective than the 2-dose regimen, but the difference was not significant (54% vs. 67% for typical use and 62% vs. 73% for perfect use). In a study that assessed effect of Ovral on ovulation, it appeared that a single dose of Ovral did not suppress ovulation as efficiently as 2 doses.

Although mifepristone is not available in Canada, it is worth noting that it is 6 times more effective than the Yuzpe regimen, even at low doses, and that very low-dose mifepristone (unidose of 10 mg) is as effective as levonorgestrel only. Mifepristone 25 mg to 50 mg is superior to all hormonal regimens currently in use in Canada.
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Copper Intrauterine Device
A meta-analysis of 20 published papers\(^1\) showed that copper IUDs inserted within 5 days of unprotected intercourse are significantly more effective than hormonal EC, with an efficacy of 98.7%. There were no pregnancies in 2 studies: 1 comparing 14 emergency users of copper IUD with 219 mifepristone users,\(^1\) and another following a cohort of 1963 women obtaining a copper IUD within 120 hours of unprotected sexual intercourse.\(^1\) Only 1 pregnancy occurred in another descriptive study of 1013 women using copper IUDs post-coitally.\(^1\) The 2008 Cochrane Review supported the conclusion that the copper IUD is an excellent EC with efficacy close to 99\%.\(^4\)

Timing
Effectiveness of EC appears to decline with increasing delay between unprotected intercourse and initiation of treatment. Levonorgestrel prevented 95% of pregnancies when taken ≤ 24 hours after intercourse, 85% within 25 to 48 hours, and 58% within 49 to 72 hours. The corresponding figures for the Yuzpe regimen were 77%, 36%, and 31%.\(^1\) These findings were replicated in several studies,\(^1,11,38,42\) although this timing–efficacy relationship was not universally seen.\(^37,43\)

Although their use has generally been recommended only up to 72 hours after intercourse, the Yuzpe regimen\(^43,44\) and the 1 double-dose and 2-dose levonorgestrel regimens\(^37,38\) have been shown to be effective when taken between 72 and 120 hours after unprotected intercourse.

Other Factors
Hormonal EC is less effective in women who do not take it according to instructions (non-perfect use) and in those who have unprotected intercourse again after taking it.\(^1,12,37–39\)

Repetitive use of hormonal EC as a regular contraceptive has not been found to provide adequate contraceptive efficacy.\(^45\) In 1 study,\(^45\) women were asked to take levonorgestrel 0.75 mg within 1 hour of each act of intercourse. The overall pregnancy rate over the 6-month period was 6 per 100 women-years, which was twice the failure rate for combined oral contraceptives. Irregular bleeding was a major drawback of this method, as it was experienced by 70% of the participants.\(^45\)

AVAILABILITY
PlanB and NorLevo are the only products currently approved by Health Canada for emergency contraception. Neither product requires a prescription, but availability depends on the pharmacist’s willingness to stock these items. A 2006 study of Ontario pharmacies found that, province-wide, levonorgestrel emergency contraception was available in 93% of pharmacies.\(^46\) The combined oral contraceptive and copper IUD are licensed in Canada and may be prescribed “off-label” for EC use.

INDICATIONS
Hormonal EC should be considered for any woman who presents within 5 days of unprotected or inadequately protected sexual intercourse and who does not wish to be pregnant. Insertion of a copper IUD can be considered up to 7 days after the unprotected intercourse. Unprotected intercourse may occur because of the following:

- failure to use a contraceptive method
- condom breakage or leakage
- dislodgement of a diaphragm or cervical cap
- 1 missed birth control pill in the first week of combined oral contraception (SOS [Stay on Schedule] algorithm)\(^47\)
- 3 or more missed birth control pills in the second or third week of combined oral contraception (SOS algorithm)\(^47\)
- missed progestin-only pill (SOS algorithm)\(^47\)
- detachment of the contraceptive patch (SOS algorithm)\(^47\)
- withdrawal of the contraceptive vaginal ring (SOS algorithm)\(^47\)
- Depo-Provera injection over 2 weeks late (SOS algorithm)\(^47\)
- ejaculation on the external genitalia
- mistimed fertility awareness
- sexual assault, when the woman is not using reliable contraception.

Table 2. Ovral and substitutions

<table>
<thead>
<tr>
<th>Brand</th>
<th>Pills/2 doses</th>
<th>EE Dose, μg</th>
<th>LNG Dose, μg</th>
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<tbody>
<tr>
<td>Ovral</td>
<td>2</td>
<td>100</td>
<td>500</td>
</tr>
<tr>
<td>Allesse</td>
<td>5</td>
<td>100</td>
<td>500</td>
</tr>
<tr>
<td>Triphasil</td>
<td>4 yellow</td>
<td>120</td>
<td>500</td>
</tr>
<tr>
<td>Triquilar</td>
<td>4 yellow</td>
<td>120</td>
<td>500</td>
</tr>
<tr>
<td>Minovral</td>
<td>4</td>
<td>120</td>
<td>600</td>
</tr>
</tbody>
</table>

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Because it is difficult to determine with certainty the fertile time of a woman’s cycle, EC should be provided regardless of the cycle day on which exposure occurs if a woman is concerned about her risk of pregnancy. Although hormonal EC is not recommended as a regular form of contraception, repeat use poses no known health risks and should not be a reason for denying women access to treatment.

**CONTRAINDICATIONS**

There are no absolute contraindications to the use of emergency hormonal contraception except known pregnancy, and this is only because it is ineffective. The research is reassuring that these drugs are not teratogenic. A recent study of pregnancy outcomes after LNG-EC failure found no associated risk of malformation or other adverse pregnancy outcomes in exposed pregnancies. Studies of pregnancies in which the fetus has been exposed to oral contraceptives have shown no evidence of teratogenicity, and exposure, therefore, is not an indication for termination of pregnancy.

The WHO found no contraindications for hormonal or IUD emergency contraception use in breastfeeding women, and there are no known medical contraindications to the use of hormonal EC, except allergy to one of the constituents. Data from the United Kingdom on more than 4 million prescriptions of the Yuzpe regimen showed only 6 serious adverse events (3 venous thrombosis and 3 cerebrovascular events); in none of these was the relationship between the administration of hormonal EC and the event clearly determined. Women who have contraindications to the daily use of oral contraceptives, such as smokers over the age of 35, can safely use either of the hormonal methods of EC, as the duration of hormonal use is very brief. No substantial increased risk for developing venous thromboembolism has been found with combined EC, but studies of safety have frequently excluded women who have contraindications to oral contraception. As the levonorgestrel-only regimen carries no theoretical risk, it may be a preferable option for women who have strong contraindications to estrogen, such as women with known thrombophilia, history of stroke, heart attack, or active migraine with neurological symptoms. There has been concern that an excess risk of ectopic pregnancy may exist should the progestin-only EC fail to prevent pregnancy, as is seen with other progestin-only contraceptives. Although a few case reports of ectopic pregnancies associated with hormonal EC have been published, a recent review concludes that the rate of ectopic pregnancy when treatment with emergency contraceptive pills fails does not exceed the rate observed in pregnancies in the general population. Because emergency contraceptive pills are effective in lowering the risk of pregnancy, their use will reduce the chance that an act of intercourse will result in ectopic pregnancy.

If a copper IUD is considered the following should be taken into account:

- A pre-existing pregnancy must be excluded. This may require a urine pregnancy test or serum hCG test, especially in women who have had sexual intercourse at the beginning of their cycle.
- There should be no history of recent pelvic inflammatory disease and no apparent vaginal or cervical infection on examination.
- At the time of insertion, consider obtaining endocervical specimens to test for gonorrhea and Chlamydia.
- Although a 2001 Cochrane Review concluded that prophylactic antibiotics at the time of IUD insertion were not routinely warranted, the use of antibiotic prophylaxis in populations at higher risk for sexually transmitted infections was shown to reduce subsequent pelvic infection by one third. Antibiotics such as a single dose of azithromycin (1g) or doxycycline 200 mg should be considered in women at high risk to reduce the risk of pelvic infection.
- If the copper IUD fails to prevent pregnancy the device should be removed immediately once the diagnosis of pregnancy is made. It is also important to rule out ectopic pregnancy.

**ASSESSMENT**

Very little information is required to determine whether EC is indicated. History taking must determine that unprotected intercourse occurred within the time frame when EC is effective. The woman’s risk for having a pre-existing pregnancy should be assessed by determining the timing of her last menstrual period, that it was normal, and that she is not currently overdue for her expected period. Rarely will a urine pregnancy test be necessary to rule out pregnancy. A woman who has had unprotected intercourse earlier in the cycle may be at risk of pregnancy because the EC therapeutic period has passed, but she should not be denied EC if she has also had unprotected intercourse within the 5-day window during which it is likely to be effective.
When seeing women for consideration of EC, health care providers should address related sexual health concerns such as whether the unprotected act was coerced, risks for sexually transmitted infections, and need for ongoing birth control. Appropriate counselling, testing, and treatment should be offered. Women should be informed about the potential side effects and potential failure of EC and should be advised that hormonal EC will not prevent pregnancy from unprotected intercourse in the days or weeks following treatment. A barrier method such as the condom can be used for the remainder of the cycle and a different method initiated at the beginning of the next cycle if the woman desires. If a woman with no contraindications wishes to start oral contraceptives, she can be provided with a prescription to start the next day following the use of hormonal EC or with her next period. A condom should be used until she has taken the contraceptive pill for 7 consecutive days.

**FOLLOW-UP**

Women should be advised to have a pregnancy test if they do not experience normal menstrual bleeding by 21 days following EC treatment or by 28 days if an oral contraceptive was started after taking hormonal EC. If indicated, a follow-up appointment can be made to address ongoing birth control or to test for sexually transmitted infections.

**SIDE EFFECTS**

The 2-dose levonorgestrel regimen has a significantly lower incidence than the Yuzpe regimen of nausea (23.1% vs. 50.5%), vomiting (5.6% vs. 18.8%), dizziness (11.2% vs. 16.7%), and fatigue (16.9% vs. 28.5%). In the studies comparing the 2-dose levonorgestrel regimen with the 1 double-dose regimen, the occurrence of side effects was similar. An antiemetic has been demonstrated to reduce the risk of nausea by 27% and vomiting by 64% when taken 1 hour before the first dose of the Yuzpe regimen. Expert opinion suggests that if the woman vomits within the first 2 hours after taking hormonal EC, the dose should be repeated and consideration should be given to vaginal administration of the medication.

Possible complications of the post-coital copper IUD include pelvic pain, abnormal bleeding, pelvic infection, uterine perforation, and expulsion.

**RETURN OF MENSES**

Most women will have their next menses within 3 weeks of taking EC. In the 1998 WHO study, the onset of next menses was similar for women taking the Yuzpe regimen and those taking the 2-dose levonorgestrel regimen, with 15% of women having an early onset of menses, 57% having menses return within 3 days of the expected day, and 28% experiencing a delay of more than 3 days. In other trials, a number of women tended to have an early onset of menses. The time to resumption of menses may be affected by the timing of EC in relation to the date of ovulation.

**ACCESS**

From a public health perspective, the promotion of EC can be seen as primary prevention of unintended pregnancy. To maximize the potential for EC to reduce the number of unintended pregnancies, women at risk of pregnancy and their partners need to be knowledgeable about EC before they require it and able to access it quickly.

Possible barriers to the appropriate use of EC include lack of knowledge, negative attitude, fear of side effects, judgemental attitudes from providers, overstating of associated health risks, impractical business hours of medical clinics and pharmacies, and unavailability of the product in some pharmacies. The cost of emergency contraception is relatively high compared with other methods and may be a barrier to access. Provincial and territorial public health sectors should make removal of cost barriers a priority. Making EC available without a prescription improves access to EC.

One randomized controlled trial and 2 controlled trials have shown that, compared with women given information only, women provided with hormonal EC in advance of need were more likely to use it and to use it appropriately and were not more likely to abandon regular methods of contraception. However, a recent review of 8 randomized trials by the Cochrane Collaboration did not demonstrate a reduction in pregnancy rates with advance provision of EC compared with conventional provision. During visits to her health care provider for periodic health examinations or reproductive health concerns, any woman in the reproductive age group who has not been sterilized may be counselled about EC in advance with detailed information about how and when to use it. There is no evidence that EC use or advanced provision of EC is associated with future risky sexual behaviour, or sexually transmitted infection.
CONCLUSION

Emergency contraception has the potential to safely and effectively reduce the number of unintended pregnancies. The effective use of EC is dependent on increasing both public and professional awareness and improving access to this important therapeutic intervention. Health care providers can encourage the appropriate use of EC by discussing it with their patients. Professionals involved in the promotion of women’s health must become advocates for EC, both locally and nationally.

Summary Statements

1. Hormonal emergency contraception may be effective if used up to 5 days after unprotected intercourse. (II-2)
2. The earlier hormonal emergency contraception is used, the more effective it is. (II-2)
3. A copper IUD can be effective emergency contraception if used within 7 days after intercourse. (II-2)
4. Levonorgestrel emergency contraception regimens are more effective and cause fewer side effects than the Yuzpe regimen. (I)
5. Levonorgestrel emergency contraception single dose (1.5 mg) and the 2-dose levonorgestrel regimen (0.75 mg 12 hours apart) have similar efficacy with no difference in side effects. (I)
6. Of the hormonal emergency contraception regimens available in Canada, levonorgestrel-only is the drug of choice. (I)
7. A pregnancy that results from failure of emergency contraception need not be terminated (I)

Recommendations

1. Emergency contraception should be used as soon as possible after unprotected sexual intercourse. (II-2A)
2. Emergency contraception should be offered to women if unprotected intercourse has occurred within the time it is known to be effective (5 days for hormonal methods and up to 7 days for a copper IUD). (II-2B)
3. Women should be evaluated for pregnancy if menses have not begun within 21 days following emergency contraception treatment. (III-A)
4. During physician visits for periodic health examinations or reproductive health concerns, any woman in the reproductive age group who has not been sterilized may be counselled about emergency contraception in advance with detailed information about how and when to use it. (III-C)

REFERENCES


