



How do levonorgestrel-only emergency contraceptive pills (LNG ECPs) prevent pregnancy?

Levonorgestrel-only emergency contraceptive pills:

- Inhibit or delay an egg from being released from the ovary when taken before ovulation;
 - Possibly prevent the sperm and the egg from meeting by affecting the cervical mucus or the ability of sperm to bind to the egg.
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The Evidence:

Ovulation:

- A number of studies provide strong direct evidence that LNG ECPs prevent or delay ovulation. If taken before ovulation, LNG ECPs inhibit the pre-ovulatory luteinizing hormone (LH) surge, impeding follicular development and maturation and/or the release of the egg itself.¹⁻⁷ This is the primary and possibly the only mechanism of action for LNG ECPs

Implantation:

- One study has estimated effectiveness of LNG ECPs by confirming the cycle day by hormonal analysis (other studies used women's self-reported cycle date). In this study, pregnancies occurred only in women who took ECPs on or after the day of ovulation, while no pregnancies occurred in the women who took ECPs before ovulation, providing evidence that ECPs were unable to prevent implantation.⁸
- A number of studies have evaluated whether ECPs produce changes in the histological and biochemical characteristics of the endometrium. Most studies show that LNG ECPs have no such effect on the endometrium, indicating that they have no mechanism to prevent implantation.^{1,2,9} One study found a single altered endometrial parameter only when LNG was administered prior to the LH surge, at a time when ECPs inhibit ovulation.¹⁰
- One study showed that levonorgestrel did not prevent the attachment of human embryos to a simulated (in vitro) endometrial environment.¹¹
- Animal studies demonstrated that LNG ECPs did not prevent implantation of the fertilized egg in the endometrium.^{12,13}

Sperm:

- LNG ECPs may interfere with sperm motility by thickening the cervical mucus, which prevents sperm from reaching the egg, thus inhibiting fertilization.^{14,15} Levonorgestrel may also affect the ability of sperm to bind to an egg.¹⁶
- However, a recent study did not find any effect of LNG on the number of viable sperm found in the uterine flushings taken 36-60 hours after coitus and 24-48 hours after taking LNG ECPs.¹⁷
- Research on the effect of LNG ECPs on sperm is inconclusive.

Other facts:

- Emergency contraception is not the same as early medical abortion. EC is effective only in the first few days following intercourse before the ovum is released from the ovary and before the sperm fertilizes the ovum. Medical abortion is an option for women in the early stage of an established pregnancy, but requires a different drug from levonorgestrel.
- EC cannot interrupt an established pregnancy or harm a developing embryo.^{18,19}

Implications of the research:

- Inhibition or delay of ovulation is LNG ECP's principal mechanism of action.
 - Review of the evidence suggests that LNG ECPs cannot prevent implantation of a fertilized egg. Language on implantation should not be included in LNG ECP product labeling.
 - The fact that LNG ECPs have no demonstrated effect on implantation explains why they are not 100% effective in preventing pregnancy, and are less effective the later they are taken. Women should be given a clear message that ECPs are more effective the sooner they are taken.
 - ECPs do not interrupt a pregnancy (by any definition of the beginning of pregnancy). However, ECPs can prevent abortions by reducing unwanted pregnancies.
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