Executive Summary - Contraceptive Methods

Highly effective methods of birth control have been available for several decades. In spite of this, approximately one-half of pregnancies in the United States are unplanned, and as of 1998, approximately 36% of American women of childbearing age were not using contraception. Barriers to the use of contraception are many and diverse, but include shortcomings intrinsic to contraceptive methods such as cost, inconvenience, and unacceptable side effects. Several new methods that are in development or that have recently become available may help improve user acceptability and lower barriers to contraceptive use.

STERILIZATION

Sterilization is the most common form of contraception in the United States and in the world; more than 190 million couples worldwide have elected to use sterilization as their method of contraception.

What it is: Female sterilization (tubal ligation) involves cutting, clipping, or occluding the fallopian tubes (the pathway between the ovaries and the uterus). It is most commonly performed by means of laparoscopy (through a tube inserted into the abdomen through a small incision), minilaparotomy (through a limited surgical incision) or while the abdomen is open following cesarean section. Male sterilization (vasectomy) involves cutting the vas deferens. This is a minor outpatient procedure done under local anesthesia. Advances in techniques have made the procedure less invasive and reduced postoperative discomfort.

Efficacy: Failure rates for women vary slightly according to method and age and have decreased over the years since tubal ligation came into use. Failure generally occurs in less than 1%. Failure rates for vasectomy are less than .1%.

Drawbacks: Fatalities occur rarely during female sterilization but are most commonly due to general anesthesia or generalized infection. Surgical complications occur rarely. Incomplete reversibility, varying with technique, practitioner, age, and sex (more successful in men) is a drawback for many.

New Developments: Newer approaches under investigation for women include microlaparascopy (using instruments measuring just 2 mm) and methods that involve introducing chemical substances into the fallopian tubes directly through the cervix. Chemical methods may be used without general anesthesia, and may reduce risk and cost.

IMPLANTABLE HORMONAL CONTRACEPTION

What it is: Rods or capsules implanted under the skin of the upper arm. These rods contain progestins that are slowly released into the bloodstream and prevent pregnancy in several ways, including preventing ovulation and causing changes in the cervix and endometrium. Several types with different delivery systems and different forms of progestins are available. These devices need to be replaced every 1 to 7 years.

Efficacy: The failure rate is reported as less than 0.1% to less than 1%.

Drawbacks: Although done a few minutes in the doctor's office, surgical implantation and removal are required. The most common side effects that may lead to discontinuation are changes in menstruation (which occurs in most patients) and headache. Others include weight gain, acne, and mood changes.

New Developments: Newer systems may improve ease of implantation and removal; biodegradable systems are under development. Implants with newer

progestins should decrease some side effects. Implants for men are under investigation.

INJECTABLE CONTRACEPTION

What it is: Injection of hormones that are released over a period of time. These include Depo-Provera (DMPA), a progesterone-only formulation that lasts for 3 months, and Lunelle (MPA/E_2C) a combination of a progestin and an estrogen that lasts for 1 month.

Efficacy: Failure rates are from 0 to 0.7 for DMPA and 0 to 0.7 for MPA/ E_2C.

Drawbacks: Menstrual changes, weight gain, and depression are side effects. A decrease in bone mineral density (which may lead to fractures) has been reported with DMPA in some studies and may be particularly important in adolescents.

New Developments: Injectable contraception for men, using testosterone and progestins, are under investigation.

ORAL CONTRACEPTIVES

What it is: Generally, a combination of estrogen and a progestin in the form of a pill taken daily. An alternative progestin-only pill, the "mini-pill" is an alternative.

Efficacy: Failure rates are reported as 3% to 6%. Most of this is due to incorrect usage. Failure rates with mini-pills are slightly higher than combined pills.

Drawbacks: Widespread concern over side effects of combination oral contraceptive may be due in part to older, higher dose formulations. There is an increase in incidence of blood clots; however, the incidence is lower than that in pregnant women. The incidence of myocardial infarction is increased in women who smoke, and this type of contraception should not be used in smokers over age 35. The relationship of oral contraception to breast cancer remains unclear. The need for daily administration of oral contraceptives may be difficult for some women, especially adolescents. Mini-pills do not cause changes in blood clotting. Decrease in menstruation occurs in most women. Pills must be taken daily at the same time. Depression may be a side effect.

New Developments: New ways to deliver cyclical hormones that work like oral contraceptives but do not have their systemic effects are in development. Patches that deliver cyclical hormones through the skin and need to be changed only once weekly are under development. A vaginal ring that releases hormones and is removed for 1 out of 4 weeks to allow menstruation is currently being tested.

INTRAUTERINE DEVICES

What it is: The intrauterine device (IUD) is the most widely used form of reversible contraception in the world; however, IUDs are used by less than 1% of married contracepting women in the United States. An IUD is a small device inserted into the uterus. A tail string protruding through the cervix confirms its continued presence and allows for removal at 1 year for progesterone-releasing IUDs and up to 10 years for copper-containing IUDs. Contrary to a misconception held by some people, the IUD does not work by inducing abortion.

Efficacy: First-year failure rates are 2% for the progesterone IUD, and 0.6% for the copper IUD. The levonorgestrel-releasing IUD, in widespread use in Europe, has a 0.1% first-year failure rate.

Drawbacks: Expulsion and failure rates are slightly higher in women who have not had children. IUDs are not recommended for use by women with multiple sexual partners because of increased risk of infection. Changes in menstrual bleeding and increased menstrual cramping occur commonly.

New Developments: The levonorgestrel-releasing IUD has recently become available in the US. It offers not only improved efficacy over older IUDs, but also decreases menstrual bleeding and is not associated with increased incidence of infection.

BARRIER METHODS

What they are: These methods use physical or chemical barriers to prevent the passage of sperm. Among these are the male and female condom, the diaphragm, the cervical cap, the sponge, and various forms of spermicides. Among the oldest contraceptive techniques, the use of these methods has declined in recent years. They have the advantage of preventing STDs and have no systemic side effects.

Efficacy: Failure rates are generally higher than for other types of contraception and differ by method and how correctly and consistently they're used. Failure rates for range from approximately 28% for the sponge in nulliparous women to 2% to 3% for daphragms.

Drawbacks: These methods must be used consistently and correctly in order to be effective. Latex allergies are a concern in condom users, and localized side effects specific to each device can occur.

New developments: Development of barrier devices that provide improved protection against STDs, greater ease of use, and fewer local side effects is ongoing.

EMERGENCY CONTRACEPTION

What it is: Hormonal therapy following an act of unprotected sexual intercourse. These may be given up to 72 hours following exposure. Regimens include either ethinyl estradiol plus levonorgestrel, or ethinyl estradiol alone.

Efficacy: Failure rates are approximately 2.5%.

Drawbacks: Side effects include nausea, vomiting, dizziness, fatigue, headache, and abdominal pain. Side effects are less common with levonorgestrel alone.

New developments: Mifepristone (RU 468) is a synthetic steroid that interferes with binding of progesterone and prevents ovulation and causes shedding of the lining of the uterus. It may be used as emergency contraception. It has been used extensively in Europe as an abortifacient, and was approved for use in the United States in 2000 for up to 7 weeks of pregnancy.

NATURAL METHODS

What it is: Natural methods do not make use of any artificial hormonal, chemical, or surgical procedures to prevent pregnancy. Natural methods include withdrawal prior to ejaculation and abstinence from intercourse around the time of ovulation when the woman is fertile.

Efficacy: Failure rates are the highest of all categories of contraception, ranging from 20% to 25%.

Drawbacks: There are no side effects of natural methods.

New Developments: Newer developments may help women pinpoint their fertile periods more effectively.

This executive summary was written by Naomi Pliskow in February 2000 and reviewed by Dr. Charles Westoff of the Office of Population Research at Princeton University. Sources include: Update in Contraception. *Obstetrics and Gynecology Clinics of North America* 2000; 27: 1-930. Contraceptive Advances: CONRAD. Available at http://www.reproline.jhu.edu.