

Oral Contraceptives

MEDICAL ASPECTS AND NURSING RESPONSIBILITIES

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ORAL Contraception, though known for more than 30 years, is the newest method of preventing pregnancy. The ability of estrogen and progesterone to prevent pregnancy was discovered in 1934. But the unpleasant side effects of estrogen in large doses and the high cost of progesterone rendered these hormonal approaches to contraception impractical.

In 1954 Djerassi synthesized a progestin which Dr. Pincus demonstrated could prevent ovulation. Dr. John Rock then demonstrated the effectiveness of progestagen as a contraceptive in women. Interestingly enough, Dr. Rock's primary interest lay in assisting sterile women to establish pregnancies.

Oral contraception is another simple term for the prevention of pregnancy by hormones, the secretions of ductless glands. Essentially the same ductless glands exist in both men and women and they produce the same or similar hormones. The pituitary, the master gland at the base of the brain, controls reproductive physiology for males and females. This is so closely related to the brain at the hypothalamus that we can accurately say the brain controls the pituitary gland.

The pituitary secretes hormones that stimulate the gonads (ovary in the female and testes in the male). The gonad responds by producing some germ plasma (an egg or some sperm) and a hormone to react on the pituitary which stimulates the ovary to produce an egg, and the ovary not only produces the egg but produces a hormone to react on the pituitary and to act on the uterus. This is a sort of balancing of the scales with hormones from the pituitary and from the ovary, and is the basis of this "new technique" or oral contraception. The relation between the pituitary and testis in the male is also similar. The pituitary in the male secretes a gonadotrophic hormone that stimulates the testis, and the testis responds by producing sperm, and also a male hormone, androgen, to react on the pituitary.

How do oral contraceptives work? The anterior pituitary gland secretes two important hormones for reproduction. The first is the Follicular Stimulating Hormone (F.S.H.) which passes through the blood stream to the ovary where it stimulates one of the thousands of immature eggs or primordial follicles to grow and mature into a fully developed egg or Graafian Follicle. This takes about 14 days. Even on the first day the follicle begins to produce estrogen and this hormone is known to have several effects—(1) it causes the endometrial lining of the uterus to proliferate and thicken, (2) it causes the cervical glands at the mouth of the uterus to produce an increasingly

thin fluid, (3) it causes the pituitary to release L.H., the Luteinizing Hormone.

When the pituitary hormones, F.S.H. and L.H., reach a certain level, the ovary releases the egg or ovum from the mature Graafian Follicle. This is called *ovulation* and the release of the egg is a crucial phase of female reproduction; without the egg there is obviously no reproduction. This egg or ovum taken into the tube is directed down it, and for the next 2 days the ovum can be fertilized if the sperm becomes available through the thin cervical mucus. This is the second crucial phase of reproduction and is called *fertilisation*.

Once the egg has been released, the hormone L.H. continues to act on the "shell" or remains of the follicle still in the ovary, so that it becomes a yellow body (corpus luteum) which continues to produce some estrogen and begins to produce more progesterone. This progesterone also has several well-known effects, the more important ones being: (1) it causes the thickened lining of the uterus or endometrium to become secretory, or rich in glucose for the implantation of a fertilized egg, (2) it causes the cervical glands of the uterus to secrete a thick fluid that really "plugs up" the cervix to prevent sperm entry, and (3) it seems to depress and virtually stop production of F.S.H. and L.H. by the pituitary. At this point the pituitary is almost inactive, and hormones from the ovary have prepared the lining of the uterus to receive a fertilized egg—the zygote or young embryo.

If the egg was produced, and if the egg was fertilized, on about the 15th or 16th day of the cycle, then it can be *implanted* on about the 22nd or 23rd day of the cycle. If no implantation takes place, then menstruation will begin in another 4 or 5 days and the unfertilized egg and the lining of the uterus will be discarded.

But if the ovum is fertilised and if the fertilized ovum is implanted, it immediately begins to produce hormones that (1) continue to depress the pituitary so it won't stimulate further egg production from the ovary and (2) stimulate the corpus luteum of the ovary to continue estrogen and progesterone production until such time as the placenta itself is sufficiently developed to do so. We don't often think of the placenta as a ductless gland, but it is a most important one in this cycle, as it produces hormones which prevent further egg production until the placenta is delivered or removed from the uterus. This is important because it helps in understanding how oral contraceptives work and why certain side effects occur.

(Contd. on page 122)