chapter 52

Male and Female Hormones

Key Terms

anabolism
androgens
catabolism
endogenous
estradiol
estriol
estrogens
estrone
menarche
progesterone
progestins
testosterone
virilization

Chapter Objectives

On completion of this chapter, the student will:

- Discuss the medical uses, actions, adverse reactions, contraindications, precautions, and interactions of the male and female hormones.
- Discuss important preadministration and ongoing assessment activities the nurse should perform on the patient taking male or female hormones.
- List some nursing diagnoses particular to a patient taking male or female hormones.
- Discuss ways to promote an optimal response to therapy, how to manage adverse reactions, and important points to keep in mind when educating the patient about the use of male or female hormones.

Male and female hormones play a vital role because they aid in development and maintenance of secondary sex characteristics and are necessary for human reproduction. Although hormones are naturally produced by the body, administration of a male or female hormone may be indicated in the treatment of certain disorders, such as inoperable breast cancer, male hypogonadism, and male or female hormone deficiency. Hormones also are used as contraceptives and for treating the symptoms of menopause.

MALE HORMONES

Male hormones—**testosterone** and its derivatives—are collectively called **androgens**. Androgen secretion is under the influence of the anterior pituitary gland. Small amounts of male and female hormones are also produced by the adrenal cortex (see Chap. 50). The anabolic steroids are closely related to the androgen testosterone and have both androgenic and anabolic (stimulate cellular growth and repair) activity. Androgen hormone inhibitors inhibit the conversion of testosterone into a potent androgen.

ACTIONS

Androgens

The male hormone testosterone and its derivatives actuate the reproductive potential in the adolescent boy. From puberty onward, androgens continue to aid in the development and maintenance of secondary sex characteristics: facial hair, deep voice, body hair, body fat distribution, and muscle development. Testosterone also stimulates the growth in size of the accessory sex organs (penis, testes, vas deferens, prostate) at the time of puberty. The androgens also promote tissue-building processes **(anabolism)** and reverse tissue-depleting processes **(catabolism).** Examples of androgens are fluoxymesterone (Halotestin), methyltestosterone (Oreton Methyl), and testosterone. Additional examples of androgens are given in the Summary Drug Table: Male Hormones.

Anabolic Steroids

The anabolic steroids are synthetic drugs chemically related to the androgens. Like the androgens, they promote tissue-building processes. Given in normal doses,

SUMMARY DRUG TABLE MALE HORMONES

GENERIC NAME	TRADE NAME*	USES	ADVERSE REACTIONS	DOSAGE RANGES
Androgens				
fluoxymesterone *floo-oxi-mes'-te-rone*	Halotestin, *generic*	Males: hypogonadism Females: inoperable breast cancer	Males: gynecomastia, testicular atrophy, inhibition of testicular function, impotence, enlargement of the penis, nausea, jaundice, headache, anxiety, male pattern baldness, acne, depression Females: amenorrhea, virilization	Males: hypogonadism 5–20 mg/d PO Females: breast cancer, 10–40 mg/d PO in divided doses
methyltestosterone *meth-ill-tess-toss'-ter-one*	Android, Methitest, Testred, Virilon, *generic*	Males: hypogonadism, male climacteric, impotence, androgen deficiency, postpubertal cryptorchidism Females: breast cancer	Same as fluoxymesterone	Males: 10–50 mg/d PO, 5–25 mg/d buccal tablets Females: 50–200 mg/d PO, 25–100 mg/d buccal tablets
testosterone gel *tess-toss'-ter-one*	Androgel	Males: delayed puberty, androgen replacement theory, hypogonadism Females: palliation of inoperable breast cancer	Same as fluoxymesterone	5–10 mg/d applied to any skin
testosterone cypionate (in oil)	Depo-Testosterone, *generic*	Males: hypogonadism, delayed puberty Females: palliation of inoperable breast cancer	Same as fluoxymesterone	Males: 50–400 mg/dose IM; Females: 200–400 mg/dose IM
testosterone enanthate	Delastryl	Same as testosterone cypionate	Same as fluoxymesterone	50–400 mg IM q2–4 wk
testosterone transdermal system	Androderm, Testoderm, Testoderm TTS	Males: androgen replacement therapy	Same as fluoxymesterone	One system applied daily
Anabolic Steroids				
nandrolone decanoate *nan'-droe-lone*	Deca-Durabolin, *generic*	Management of anemia of renal insufficiency	Acne, nausea, vomiting, fluid and electrolyte imbalances, jaundice, anorexia, muscle cramps, malignant and benign liver tumors, increased risk of atherosclerosis, mental changes, testicular atrophy, virilization (females)	50–200 mg/wk IM
oxymetholone	Anadrol-50	Anemia	Same as nandrolone decanoate	1–5 mg/kg/d PO
oxandrolone *oks-an-droe-lone*	Oxandrin	Promote weight gain in those with weight loss after extensive surgery, severe trauma, severe infections	Same as nandrolone decanoate	2.5 mg PO BID to QID
stanozolol	Winstrol	Hereditary angioedema	Same as nandrolone decanoate	2 mg PO TID, then reduce to 2 mg/d or to 2 mg/d every other d PO
Androgen Hormone Inhibitor				
finasteride *fin-as'-teh-ride*	Proscar	Benign prostatic hypertrophy, prevention of male pattern baldness	Impotence, decreased libido, decreased volume of ejaculate	5 mg/d PO

*The term *generic* indicates the drug is available in generic form.

they have a minimal effect on the accessory sex organs and secondary sex characteristics. Examples of anabolic steroids are given in the Summary Drug Table: Male Hormones.

Androgen Hormone Inhibitor

The androgen hormone inhibitor finasteride (Proscar) is a synthetic compound drug that inhibits the conversion of testosterone into the potent androgen 5 alpha (α)-dihydrotestosterone (DHT). The development of the prostate gland is dependent on DHT. The lowering of serum levels of DHT reduces the effect of this hormone on the prostate gland, resulting in a decrease in the size of the gland and the symptoms associated with prostatic gland enlargement.

USES

Androgens

In the male patient, androgen therapy may be given as replacement therapy for testosterone deficiency. Deficiency states in male patients, such as hypogonadism (failure of the testes to develop), selected cases of delayed puberty, and the development of testosterone deficiency after puberty may be treated with androgens. The transdermal testosterone system is used as replacement therapy when endogenous testosterone is deficient or absent.

In the female patient, androgen therapy may be used as part of the treatment for inoperable metastatic breast carcinoma in women who are 1 to 5 years past menopause. In addition, some breast carcinomas in women are "hormone-dependent" tumors, that is, their growth and spread are influenced by the female hormone estrogen. Administration of an androgen to patients with this type of malignant breast tumor counteracts the effect of estrogen on these tumors. Androgens may also be administered to premenopausal women with metastatic breast carcinoma that is believed to be hormone dependent and whose tumor growth and spread have been slowed after an oophorectomy (removal of the ovaries). The uses of the androgens are listed in the Summary Drug Table: Male Hormones.

Anabolic Steroids

The uses of the various anabolic steroids include management of anemia of renal insufficiency, control of metastatic breast cancer in women, and promotion of weight gain in those with weight loss after surgery, trauma, or infections. Stanozolol is used prophylactically to decrease the frequency and severity of hereditary angioedema (a condition characterized by urticaria and edematous areas of the skin, mucous membranes, or viscera).

Nursing Alert

The use of anabolic steroids to promote an increase in muscle mass and strength has become a serious problem. Anabolic steroids are not intended for this use. Unfortunately, deaths in young, healthy individuals have been directly attributed to the use of these drugs. Nurses should discourage the illegal use of anabolic steroids to increase muscle mass.

Androgen Hormone Inhibitor

Finasteride is used in the treatment of the symptoms associated with benign prostatic hypertrophy (BPH), such as difficulty starting the urinary stream, frequent passage of small amounts of urine, and having to urinate during the night (nocturia). Several months of therapy may be required before a significant improvement is noted and symptoms of BPH decrease. Finasteride is also used for the prevention of male pattern baldness in men with early signs of hair loss.

ADVERSE REACTIONS

Androgens

In men, administration of an androgen may result in breast enlargement (gynecomastia), testicular atrophy, inhibition of testicular function, impotence, enlargement of the penis, nausea, jaundice, headache, anxiety, male pattern baldness, acne, and depression. Fluid and electrolyte imbalances, which include sodium, water, chloride, potassium, calcium, and phosphate retention, may also be seen.

In women receiving an androgen preparation for breast carcinoma, the most common adverse reactions are amenorrhea, other menstrual irregularities, and **virilization** (acquisition of male sexual characteristics by a woman). Virilization produces facial hair, a deepening of the voice, and enlargement of the clitoris. Male pattern baldness and acne may also be seen.

Anabolic Steroids

Virilization in the woman is the most common reaction associated with anabolic steroids, especially when higher doses are used. Acne occurs frequently in all age groups and both sexes. Nausea, vomiting, diarrhea, fluid and electrolyte imbalances (the same as for the androgens, discussed previously), testicular atrophy,

jaundice, anorexia, and muscle cramps may also be seen. Blood-filled cysts of the liver and sometimes the spleen, malignant and benign liver tumors, an increased risk of atherosclerosis, and mental changes are the most serious adverse reactions that may occur during prolonged use.

Many serious adverse drug reactions are being reported in healthy individuals using anabolic steroids. There is some indication that prolonged high-dose use has resulted in psychological and possibly physical addiction, and some individuals have required treatment in drug abuse centers. Severe mental changes, such as uncontrolled rage, severe depression, suicidal tendencies, malignant and benign liver tumors, aggressive behavior, increased risk of atherosclerosis, inability to concentrate, and personality changes are not uncommon. In addition, the incidence of the severe adverse reactions cited earlier appears to be increased in those using anabolic steroids for this purpose.

Androgen Hormone Inhibitor

Adverse reactions with finasteride usually are mild and do not require discontinuing use of the drug. Adverse reactions, when they occur, are related to the sexual drive and include impotence, decreased libido, and a decreased volume of ejaculate.

CONTRAINDICATIONS, PRECAUTIONS, AND INTERACTIONS

Androgens

The androgens are contraindicated in patients with known hypersensitivity to the drugs, liver disorders, or serious cardiac disease, and in men with prostate gland disorders (eg, prostate carcinoma and prostate enlargement). The androgens are classified as Pregnancy Category X drugs and should not be administered during pregnancy and lactation. When the androgens are administered with anticoagulants, the anticoagulant effect may be increased.

Anabolic Steroids

The anabolic steroids are contraindicated in patients with known hypersensitivity to the drugs, liver disorders, or serious cardiac disease, and in men with prostate gland disorders (eg, prostate carcinoma and prostate enlargement). The anabolic steroids are classified as Pregnancy Category X drugs and should not be administered during pregnancy and lactation. Anabolic steroids are contraindicated when used to enhance physical appearance or athletic performance.

Gerontologic Alert

Older men treated with the steroids are at increased risk for prostate enlargement and prostate cancer.

When the anabolic steroids are administered with anticoagulants, the anticoagulant effect may be increased. Administration of methyltestosterone with imipramine may cause a paranoid response in some patients. The anabolic steroids may increase the hypoglycemic action when administered with the sulfonylureas.

Androgen Hormone Inhibitor

Finasteride is contraindicated in patients with hypersensitivity to the drug or any component of the drug, in women who are pregnant (Pregnancy Category X) or women who may potentially be pregnant (includes handling of crushed or broken tablets), and during lactation. The drug is used cautiously in patients with liver function impairment.

NURSING PROCESS

The Patient Receiving a Male Hormone

ASSESSMENT

Preadministration Assessment

Assessment of the patient receiving an androgen or anabolic steroid depends on the drug, the patient, and the reason for administration.

ANDROGENS. In most instances, androgens are administered to the man on an outpatient basis. Before and during therapy, the primary health care provider may order electrolyte studies because use of these drugs can result in fluid and electrolyte imbalances.

When these drugs are given to the female patient with inoperable breast carcinoma, the nurse evaluates the patient's current status (physical, emotional, and nutritional) carefully and records the findings in the patient's chart. Problem areas, such as pain, any limitation of motion, and the ability to participate in the activities of daily living, are carefully evaluated and recorded in the patient's record. The nurse takes and records vital signs and weight. Baseline laboratory tests may include a complete blood count, hepatic function tests, serum electrolytes, and serum and urinary calcium levels. The nurse reviews these tests and notes any abnormalities.

ANABOLIC STEROIDS. The nurse evaluates and records the patient's physical and nutritional status before starting therapy with anabolic steroids. The nurse takes the

patient's weight, blood pressure, pulse, and respiratory rate. Baseline laboratory studies may include a complete blood count, hepatic function tests, and serum electrolytes and serum lipid levels. The nurse reviews these studies and notes any abnormalities.

ANDROGEN HORMONE INHIBITOR. The nurse questions the patient at length about symptoms of BPH, such as frequency of voiding during the day and night and difficulty starting the urinary stream. The nurse records all symptoms in the patient's chart.

Ongoing Assessment

The ongoing assessment depends on the reason the drug was prescribed and the condition of the patient. Men receiving an androgen or anabolic steroid are questioned by the primary health care provider or nurse regarding the effectiveness of drug therapy.

The nurse weighs the patient with inoperable breast carcinoma daily or as ordered by the primary health care provider. If the patient is on complete bed rest, the nurse may take weights every 3 to 4 days (or as ordered) using a bed scale. The nurse notifies the primary health care provider if there is a significant (≥ 5 lb) increase or decrease in the weight. The nurse checks the lower extremities daily for signs of edema.

Nursing Alert

The nurse observes the patient each day for adverse drug reactions, especially signs of fluid and electrolyte imbalance, jaundice (which may indicate hepatotoxicity), and virilization. The primary health care provider must be alerted to any signs of fluid and electrolyte imbalance or jaundice.

The nurse takes vital signs every 4 to 8 hours, depending on the patient's condition. The nurse evaluates the patient's response to drug therapy based on original assessments. Responses that may be seen include a decrease in pain, an increase in appetite, and a feeling of well-being.

When anabolic steroids are used for weight gain, the nurse weighs the patient at intervals ranging from daily to weekly. A good dietary regimen is necessary to promote weight gain. The nurse consults the dietitian if the patient eats poorly.

NURSING DIAGNOSES

Drug-specific nursing diagnoses are highlighted in the Nursing Diagnoses Checklist. Other nursing diagnoses applicable to these drugs are discussed in depth in Chapter 4.

PLANNING

The expected outcomes of the patient may include an optimal response to therapy, identification and management of adverse reactions, and an understanding of and compliance with the prescribed therapeutic regimen.

Nursing Diagnoses Checklist

- ✓ **Excess Fluid Volume** related to adverse reactions (sodium and water retention)
- ✓ Disturbed Body Image (in the female) related to adverse reactions (virilization)

IMPLEMENTATION

Promoting an Optimal Response to Therapy

If the androgen is to be administered as a buccal tablet, the nurse demonstrates the placement of the tablet and warns the patient not to swallow the tablet but to allow it to dissolve in the mouth. The nurse reminds the patient not to smoke or drink water until the tablet is dissolved. Oral and parenteral androgens are often taken or given by injection on an outpatient basis. When given by injection, the injection is administered deep intramuscularly (IM) into the gluteal muscle. Oral testosterone is given with or before meals to decrease gastric upset.

When the testosterone transdermal system Testoderm is prescribed, the nurse places the system on clean, dry scrotal skin. Optimal skin contact of the transdermal system is achieved by dry shaving scrotal hair before placing the system.

Nursing Alert

This system is designed for application to scrotal skin only (the system is five times more permeable to scrotal skin). Testoderm or Testoderm Adhesive will not produce adequate serum testosterone levels if applied to other skin sites.

The system is worn for 22 to 24 hours, removed, and a new system applied. If the system comes off before it has been on 12 hours, it can be reapplied; however, if the system has been on more than 12 hours, the patient may wait until the next scheduled application time to apply a new patch. Before application of a new system, the skin of the scrotum is washed and dried. The nurse periodically checks the scrotum for scrotal hair and dry shaves the area if needed.

Another transdermal system is Testoderm TTS. This system is applied at about the same time each day and worn for 24 hours. The adhesive side is placed on a clean, dry area of skin on the arm, back, or upper buttocks immediately upon removal from the protective pouch. This system is not applied to the scrotum. The system is pressed firmly in place with the palm of the

hand for about 10 seconds or until good contact is made with the skin. If the system falls off, the same system may be reapplied unless the system has been worn for 12 hours or more and it cannot be reapplied. Should this occur, the nurse applies the new system at the next scheduled application time.

Androderm, another transdermal system, is applied nightly to clean, dry skin on the abdomen, thigh, back, or upper arm. This system is not applied to the scrotum. Sites are rotated, with 7 days between application to any specific site. The system is applied immediately after opening the pouch and removing the protective covering. If the patient has not exhibited a therapeutic response after 8 weeks of therapy, another form of testosterone replacement therapy should be considered.

Testosterone gel (Androgel) is applied once daily (preferably in the morning) to clean, dry, intact skin of the shoulders and upper arms or abdomen. After the packet is opened, the contents are squeezed into the palm of the hand and immediately applied to the application sites. The application sites are allowed to dry before the patient gets dressed. The gel is not applied to the genitals.

Monitoring and Managing Adverse Reactions

The nurse observes the patient receiving an androgen or anabolic steroid for signs of adverse drug reactions. In women, virilization may be seen with long-term administration and in many cases must be tolerated to obtain the desired effect of the drug.

When the androgens are administered to a patient with diabetes, blood glucose measurements should be done frequently because glucose tolerance may be altered. Adjustments may need to be made in insulin dosage, oral antidiabetic drugs, or diet. The nurse monitors the patient for signs for hypoglycemia and hyperglycemia (see Chap. 49).

Sodium and water retention may also occur with androgen or anabolic steroid administration, causing the patient to become edematous. In addition, other electrolyte imbalances, such as hypercalcemia, may occur. The nurse monitors the patient for fluid and electrolyte disturbances (see Chap. 58 for signs and symptoms of electrolyte disturbance).

Gerontologic Alert

Older adults with cardiac problems or kidney disease are at increased risk for sodium and water retention when taking the androgens or anabolic steroids.

The nurse makes a daily comparison of the patient's preadministration weight with current weights. The nurse notes the presence of puffy eyelids and dependent swelling of the hands or feet (if the patient is ambulatory) or the sacral area (if the patient is nonambulatory) and reports any findings to the primary health care provider. The nurse monitors the daily fluid intake and output to calculate fluid balance.

With long-term administration, the female patient may experience mild to moderate masculine changes (virilization), namely facial hair, a deepening of the voice, and enlargement of the clitoris. Male pattern baldness, patchy hair loss, skin pigmentation, and acne may also be seen. Although these adverse effects are not life threatening, they often are distressing and only add to the patient's discomfort and anxiety. These problems may be easy to identify, but they are not always easy to solve. If hair loss occurs, the nurse can suggest the wearing of a wig. The nurse advises the patient that mild skin pigmentation may be covered with makeup, but severe and widespread pigmented areas and acne are often difficult to conceal. Each patient is different, and the emotional responses to these outward changes may range from severe depression to a positive attitude and acceptance. The nurse works with the patient as an individual, first identifying the problems, and then helping the patient, when possible, to deal with these changes.

Educating the Patient and the Family

The nurse explains the dosage regimen and possible adverse drug reactions to the patient and family and develops a teaching plan to include the following points.

ANDROGENS

- Notify the primary health care provider if any of the following occur: nausea, vomiting, swelling of the legs, or jaundice. Women should report any signs of virilization to the primary health care provider.
- Oral tablets—Take with food or a snack to avoid gastrointestinal upset.
- Buccal tablets—Place the tablet between the cheek and molars and allow it to dissolve in the mouth. Do not smoke or drink water until the tablet is dissolved.
- Testosterone transdermal system—Apply according to the directions supplied with the product. (See "Promoting an Optimal Response to Therapy".) Be sure the skin is clean and dry and the placement area is free of hair. Do not store outside the pouch or use damaged systems. Discard systems in household trash in a safe manner to prevent ingestion by children or pets.

ANABOLIC STEROIDS

- These drugs may cause nausea and gastrointestinal upset. Take this drug with food or meals.
- Keep all primary health care provider or clinic visits because close monitoring of therapy is essential.

- Female patients: Notify the primary health care provider if signs of virilization occur.

ANDROGEN HORMONE INHIBITOR

- Take this drug without regard to meals.
- Inform the primary health care provider immediately if sexual partner is or may become pregnant because additional measures such as discontinuing the drug or use of a condom may be necessary.

EVALUATION

- The therapeutic response is achieved.
- Adverse reactions are identified and reported to the primary health care provider.
- The patient verbalizes the importance of complying with the prescribed treatment regimen.
- The patient and family demonstrate an understanding of the drug regimen.
- The patient verbalizes an understanding of treatment modalities and importance of continued follow-up care.

FEMALE HORMONES

The two **endogenous** (produced by the body) female hormones are the **estrogens** and **progesterone.** Like the androgens, their production is under the influence of the anterior pituitary gland. The endogenous estrogens are **estradiol, estrone,** and **estriol.** The most potent of these three estrogens is estradiol. Examples of estrogens used as drugs include estropipate (Ortho-Est) and estradiol (Estrace).

There are natural and synthetic progesterones, which are collectively called **progestins.** Examples of progestins used as drugs include medroxyprogesterone (Provera) and norethindrone (Aygestin). Examples of estrogens and progestins are given in the Summary Drug Table: Female Hormones.

ACTIONS

Estrogens

The estrogens are secreted by the ovarian follicle and in smaller amounts by the adrenal cortex. Estrogens are important in the development and maintenance of the female reproductive system and the primary and secondary sex characteristics. At puberty, they promote growth and development of the vagina, uterus, fallopian tubes, and breasts. They also affect the release of pituitary gonadotropins (see Chap. 50).

Other actions of estrogen include fluid retention, protein anabolism, thinning of the cervical mucus, and the inhibition or facilitation of ovulation. Estrogens contribute to the conservation of calcium and phosphorus, the growth of pubic and axillary hair, and pigmentation of the breast nipples and genitals. Estrogens also stimulate contraction of the fallopian tubes (which promotes movement of the ovum), modify the physical and chemical properties of the cervical mucus, and restore the endometrium after menstruation.

Progestins

Progesterone is secreted by the corpus luteum, placenta, and in small amounts by the adrenal cortex. Progesterone and its derivatives (ie, the progestins) transform the proliferative endometrium into a secretory endometrium. Progestins are necessary for the development of the placenta and inhibit the secretion of pituitary gonadotropins, which in turn prevents maturation of the ovarian follicle and ovulation. The synthetic progestins are usually preferred for medical use because of the decreased effectiveness of progesterone when administered orally.

USES

Estrogens

Estrogen is most commonly used in combination with progesterones as contraceptives or as hormone replacement therapy in postmenopausal women. The estrogens are used to relieve moderate to severe vasomotor symptoms of menopause (flushing, sweating), female hypogonadism, atrophic vaginitis (orally and intravaginally), osteoporosis in women past menopause, palliative treatment for advanced prostatic carcinoma, and in selected cases of inoperable breast carcinoma. The estradiol transdermal system is used as estrogen replacement therapy (ERT) for moderate to severe vasomotor symptoms associated with menopause, female hypogonadism, after removal of the ovaries in premenopausal women (female castration), primary ovarian failure, and in the prevention of osteoporosis. Estrogen is given IM or intravenously (IV) to treat uterine bleeding caused by hormonal imbalance. When estrogen is used to treat menopausal symptoms in a woman with an intact uterus, concurrent use of progestin is recommended to decrease the risk of endometrial cancer. After a hysterectomy, estrogen alone may be used for ERT.

The estrogens, in combination with a progestin, are also used as oral contraceptives (Table 52-1). The uses of individual estrogens are given in the Summary Drug Table: Female Hormones. The use of estrogens in the treatment of carcinoma is discussed in Chapter 55.

SUMMARY DRUG TABLE FEMALE HORMONES

GENERIC NAME	TRADE NAME*	USES	ADVERSE REACTIONS	DOSAGE RANGES
Estrogens				
conjugated estrogens	Premarin, Premarin Intravenous	Oral: vasomotor symptoms associated with menopause, atrophic vaginitis, osteoporosis, hypogonadism, castration, primary ovarian failure, breast cancer palliation, prostate cancer palliation Parenteral: abnormal uterine bleeding due to hormonal imbalance	Headache, migraine, dizziness, mental depression, chorea, insomnia, chloasma, nausea, vomiting, abdominal cramps, pain/bloating, colitis, breakthrough bleeding, spotting, dysmenorrhea, steepening of corneal curvature, intolerance to contact lenses, edema, changes in libido, breast pain and tenderness, hypertension, gallbladder disease	0.3–1.25 mg PO QD–TID 25 mg IV or IM
esterified estrogens	Estratab, Menest	Vasomotor symptoms, atrophic vaginitis, vulva and vaginal atrophy, hypogonadism, castration, primary ovarian failure, palliation for breast cancer, palliation for prostate cancer, osteoporosis prevention	Same as conjugated estrogens	0.3–1.25 mg/d PO
estradiol, oral *ess-troe-dye'-ole*	Estrace, *generic*	Moderate to severe vasomotor symptoms associated with menopause, atrophic vaginitis, female hypogonadism, female castration, primary ovarian failure, palliative therapy for breast and prostate cancer	Same as conjugated estrogens	1–2 mg/d PO
estradiol cypionate in oil *ess-troe-dye'-ole sip-ee-oh-nate*	depGynogen, Depo-Estradiol, DepoGen, *generic*	Moderate to severe vasomotor symptoms associated with menopause, female hypogonadism	Same as conjugated estrogens; pain at injection site	1–5 mg IM
estradiol hemihydrate *ess-troe-dye'-ole*	Vagifem	Atrophic vaginitis	Same as conjugated estrogens	1 tablet inserted vaginally daily
estradiol transdermal system *ess-troe-dye'-ole*	Alora, Climara, Estraderm, FemPatch, Vivelle	Same as conjugated estrogens	Same as conjugated estrogens	0.025–0.1 mg; therapy may be given continuously in patients with no intact uterus; in patients with uterus, treatment regimen is on a cyclic schedule (eg, 3 weeks therapy, 1 week off)
estradiol valerate in oil *ess-troc-dye'-ole val-eh-rate*	Delestrogen, Estra-L 40, Gynogen LA 20, *generic*	Same as conjugated estrogens	Same as conjugated estrogens; pain at injection site	10–20 mg IM, IV

(continued)

SUMMARY DRUG TABLE: FEMALE HORMONES (*Continued*)

GENERIC NAME	TRADE NAME*	USES	ADVERSE REACTIONS	DOSAGE RANGES
estrone *ess-trone*	Estrone Aqueous, Kestrone 5	Moderate to severe vasomotor symptoms associated with menopause, atrophic vaginitis, female hypogonadism, female castration, primary ovarian failure, palliative therapy for breast and prostate cancer, treatment of abnormal uterine bleeding due to hormone imbalance	Same as conjugated estrogens; pain at injection site	Menopause symptoms: 0.1–0.5 mg 2–3 × wk
estropipate *ess-troe-pi'-pate*	Ogen, Ortho-Est, *generic*	Moderate to severe vasomotor symptoms associated with menopause, atrophic vaginitis, female hypogonadism, female castration, primary ovarian failure	Same as conjugated estrogens	0.625–5 mg/d PO
ethinyl estradiol *eth'-i-nil ess-troe-dye'-ole*	Estinyl	Same as conjugated estrogens	Same as conjugated estrogens	0.02–2 mg PO
synthetic conjugated estrogens, A *ess'-troe-jens*	Cenestin	Moderate to severe vasomotor symptoms associated with menopause	Same as conjugated estrogens	0.0625–1.25 mg PO
vaginal estrogens *ess'-troe-jens*	Estring, Estrace Vaginal Cream, Ogen Vaginal Cream, Premarin Vaginal Cream	Atrophic vaginitis	Rare: minor vaginal irritation or itching	1–2 applicatorsful per day
Progestins				
hydroxyprogesterone caproate in oil *hi-drox-ee-pro-jess'-te-rone cap-row'-ate*	Hylutin, *generic*	Amenorrhea, abnormal uterine bleeding, production of secretory endometrium and desquamation	Breakthrough bleeding, spotting, change in menstrual flow, amenorrhea, breast tenderness, weight gain or loss, chloasma, melasma, mental depression	125–375 mg IM
medroxyprogesterone acetate *me-drox'-ee-proe-jess'-te-rone*	Amen, Cycrin, Depo-Provera (parenteral), Provera, *generic*	Amenorrhea, abnormal uterine bleeding, reduction of endometrial hypoplasia in postmenopausal women	Same as hydroxyprogesterone caproate	5–10 mg/d PO; 400–1000 mg/wk IM
megestrol acetate *me-jess'-troll*	Megace, *generic*	Palliation of advanced carcinoma of breast or endometrium	Same as hydroxyprogesterone caproate	Breast cancer: 160 mg/d in 4 doses Endometrial cancer: 40–320 mg/d PO in divided doses

SUMMARY DRUG TABLE FEMALE HORMONES (*Continued*)

GENERIC NAME	TRADE NAME*	USES	ADVERSE REACTIONS	DOSAGE RANGES
norethindrone acetate *nor-eth-in'-drone*	Aygestin, *generic*	Amenorrhea, abnormal uterine bleeding, endometriosis	Same as hydroxyprogesterone caproate	Amenorrhea, abnormal uterine bleeding: 2.5–10 mg/d PO; endometriosis: up to 15 mg/d PO
progesterone *proe-jess'-te-rone*	Crinone, Prometrium, *generic*	Amenorrhea, abnormal uterine bleeding, infertility	Same as hydroxyprogesterone caproate; Vaginal gel (Crinone): somnolence, headache, constipation, breast enlargement	5–10 mg IM, 200–400 mg PO; Crinone: 90 mg vaginally QD
Combination Products				
estrogens and progestins combined	Activella, CombiPatch, Femhrt, Orho-Prefest, Prempro	Treatment of moderate to severe vasomotor symptoms associated with menopause, treatment of vulval and vaginal atrophy, osteoporosis Combination: Menopause symptoms only	Adverse reactions of both hormones; same as synthetic conjugated estrogens and progesterone	PO and Patch system: dosage varies depending on specific drug and reason for administration; follow primary health care provider's instructions
estrogen and androgen, parenteral	Depo-Testadiol	Moderate to severe vasomotor symptoms associated with menopause in patients with no response to estrogens alone	Adverse reactions of both hormones (estrogen and androgen)	Parenterally: dosage varies depending on specific drug and reason for administration; follow primary health care provider's instructions
estrogen and androgen, oral	Estratest, Estratest H.S., Syntest D. S.	Same as estrogen and androgen, parenteral	Same as estrogen and androgen, parenteral	PO dosage varies depending on reason for administration; follow primary health care provider's instructions

*The term *generic* indicates the drug is available in generic form.

Progestins

The progestins are used in the treatment of amenorrhea, endometriosis, and functional uterine bleeding. Progestins are also used as oral contraceptives, either alone or in combination with an estrogen (see the Summary Drug Table: Female Hormones and Table 52-1).

Contraceptive Hormones

Estrogens and progestins (combination oral contraceptives) are used as oral contraceptives. There are three types of estrogen and progestin combination oral contraceptives: monophasic, biphasic, and triphasic. The monophasic oral contraceptives provide a fixed dose of estrogen and progestin throughout the cycle. The biphasic and triphasic oral contraceptives deliver hormones similar to the levels naturally produced by the body (Table 52-1).

The oral contraceptives have changed a great deal since their introduction in the 1960s. Today the levels of hormones provide lower dosages of hormones compared with the older formulations, while retaining the same degree of effectiveness (>99% when used as prescribed).

Taking the contraceptive hormones provides health benefits not related to contraception, such as regulating the menstrual cycle and decreased blood loss, and incidence of iron deficiency anemia, and dysmenorrhea. Health benefits related to the inhibition of ovulation include a decrease in ovarian cysts and ectopic pregnancies. In addition, there is a decrease in fibrocystic breast disease, acute pelvic inflammatory disease, endometrial cancer, ovarian cancer, maintenance of bone density, and symptoms related to endometriosis in women taking contraceptive hormones. Newer combination contraceptives such as norgestimate and ethinyl estradiol

TABLE 52-1 Oral and Implantable Contraceptives

GENERIC NAME	TRADE NAME
Monophasic Oral Contraceptives	
50 mcg ethinyl estradiol acetate 1mg norethindrone	Necon 1/50, Norinyl 1+50, Ortho-Novum 1/50
50 mcg ethinyl estradiol, 1 mg ethynodiol diacetate	Demulen 1/50, Zovia 1/50E
50 mcg ethinyl estradiol, 0.5 mg norgestrel	Orgestrel, Ovral
35 mg ethinyl estradiol, 1 mg norethindrone	Necon 1/35, Norinyl 1+35, Ortho Novum 1/35
35 mcg ethinyl estradiol, 0.5 mg norethindrone	Brevicon, Modicon, Necon 0.5/35, Notrel
35 mcg ethinyl estradiol, 0.4 mg norethindrone	Ovcon-35
35 mcg ethinyl estradiol, 0.25 mg norgestimate	Ortho-Cyclen, Sprintex
35 mcg ethinyl estradiol, 1 mg ethynodiol diacetate	Demulen 1/35, Zovia 1/35 E
30 mcg ethinyl estradiol, 1.5 mg norethindrone acetate	Loestrin, 21 1.5/30, Loestrin Fe 1.5/30, Microgestin Fe 1.5/30
30 mcg ethinyl estradiol, 0.3 mg norgestrel	Lo/Ovral, Low-Ogestrel, Cryselle
30 mcg ethinyl estradiol, 0.15 mg desogestrel	Apri, Desogen, Ortho-Cept
30 mcg ethinyl estradiol, 0.15 mg levonorgestrel	Levler, Levora, Nordette, Portia
20 mcg ethinyl estradiol, 1 mg norethindrone acetate	Loestrin 21 1/20, Loestrin Fe 1/20, Microgestin Fe 1/20
20 mcg ethinyl estradiol, 0.1 mg levonorgestrel	Alesse, Aviane, Levlite
Biphasic Oral Contraceptives	
Phase one: 35 mcg ethinyl estradiol, 0.5 mg norethindrone Phase two: 35 mcg ethinyl estradiol, 1 mg norethindrone	Necon 10/11, Ortho-Novum 10/11
Triphasic Oral Contraceptives	
Phase one: 35 mcg ethinyl estradiol, 0.5 mg norethindrone Phase two: 35 mcg ethinyl estradiol, 1 mg norethindrone Phase three: 35 mcg ethinyl estradiol, 0.5 mg norethindrone	Tri-Norinyl
Phase one: 35 mcg ethinyl estradiol, 0.5 mg norethindrone Phase two: 35 mcg ethinyl estradiol, 0.75 mg norethindrone Phase three: 35 mcg ethinyl estradiol, 1 mg norethindrone	Ortho-Novum 7/7/7, Necon 7/7/7
Phase one: 30 mcg ethinyl estradiol, 0.05 mg levonorgestrel Phase two: 40 mcg ethinyl estradiol, 0.075 mg levonorgestrel Phase three: 30 mcg ethinyl estradiol, 0.125 mg levonorgestrel	Tri-Levlen, Triphasil, Trivora, Enpresse
Phase one: 35 mcg ethinyl estradiol, 0.18 mg norgestimate Phase two: 35 mcg ethinyl estradiol, 0.215 mg norgestimate Phase three: 35 mcg ethinyl estradiol, 0.25 mg norgestimate	Ortho Tri-Cyclen
Phase one: 25 mcg ethinyl estradiol, 0.18 mg norgestimate Phase two: 25 mcg ethinyl estradiol, 0.215 mg norgestimate Phase three: 25 mcg ethinyl estradiol, 0.25 mg norgestimate	Ortho Tri-Cyclen Lo
Phase one: 1 mg norethindrone acetate, 20 mcg ethinyl estradiol Phase two: 30 mcg ethinyl estradiol, 1 mg norethindrone acetate Phase three: 35 mcg ethinyl estradiol, 1 mg norethindrone acetate	Estrostep 21, Estrostep Fe
Phase one: 25 mcg ethinyl estradiol, 0.1 mg desogestrel Phase two: 25 mcg ethinyl estradiol, 0.125 mg norgestimate Phase three: 25 mcg ethinyl estradiol, 0.15 mg norgestimate	Cyclessa
Progestin Only Contraceptives	
0.35 mg norethindrone 0.075 norgestrel	Camila, Errin, Nor-QD, Nora-BE, Ortho Micronor Ovrette
Implant Contraceptive Systems (Progestins)	
levonorgestrel: 6 capsules, each containing 36 mg levonorgestrel for subdermal implantation	Norplant System
progesterone: T-shaped unit containing 38 mg progesterone for insertion in the uterine cavity	Progestasert

combinations found in Ortho Tri-Cyclen have been shown to help reduce moderate acne and maintain clear skin in women 15 years of age or older (who menstruate, want contraception, and have no response to topical anti-acne medications).

ADVERSE REACTIONS

Estrogens

Administration of estrogens by any route may result in many adverse reactions, although the incidence and intensity of these reactions vary. Some of the adverse reactions seen with the administration of estrogens include:

- Central nervous system—headache, migraine, dizziness, mental depression
- Dermatologic—chloasma (pigmentation of the skin) or melasma (discoloration of the skin), which may continue when use of the drug is discontinued
- Gastrointestinal—nausea, vomiting, abdominal cramps, dermatitis, pruritus
- Genitourinary—breakthrough bleeding, withdrawal bleeding, spotting, change in menstrual flow, dysmenorrheal, premenstrual-like syndrome, amenorrhea, vaginal candidiasis, cervical erosion, vaginitis
- Local—pain at injection site, sterile abscess, redness and irritation at the application site with transdermal system
- Ophthalmic—steepening of corneal curvature, intolerance to contact lenses
- Miscellaneous—edema; changes in libido; breast pain, enlargement, and tenderness; reduced carbohydrate tolerance; venous thromboembolism; pulmonary embolism; increase or decrease in weight; skeletal pain

Warnings associated with the administration of estrogen include an increased risk of endometrial cancer, gallbladder disease, hypertension, hepatic adenoma (a benign tumor of the liver), cardiovascular disease, increased risk of thromboembolic disease, and hypercalcemia in those with breast cancer and bone metastases.

Progestins

Administration of the progestins by any route may result in many adverse reactions, although the incidence and intensity of these reactions varies. Progestin administration may result in breakthrough bleeding, spotting, change in the menstrual flow, amenorrhea, breast tenderness, edema, weight increase or decrease, acne, chloasma or melasma, and mental depression. In addition to the adverse reactions seen with progestins, the use of a levonorgestrel implant system may result in bruising after insertion, scar tissue formation at the site of insertion, and hyperpigmentation at the implant site. The use of medroxyprogesterone acetate contraceptive injection may result in the same adverse reactions as those associated with administration of any progestin.

Contraceptive Hormones

When estrogen/progestin combinations are used as oral contraceptives, the adverse reactions associated with the estrogens and the progestins must be considered. Because these drugs may exhibit adverse reactions that vary depending on their estrogen or progestin content, the adverse reactions of each must be considered. Table 52-2 identifies the symptoms of estrogen and progestin

TABLE 52-2 Estrogen and Progestin: Excess and Deficiency

HORMONE*	SIGNS OF EXCESS	SIGNS OF DEFICIENCY
estrogen	Nausea, bloating, cervical mucorrhea (increased cervical discharge), polyposis (numerous ploops), melasma (discoloration of the skin), hypertension, migraine headache, breast fullness or tenderness, edema	Early or midcycle breakthrough bleeding, increased spotting, hypomenorrhea
progestin	Increased appetite, weight gain, tiredness, fatigue, hypomenorrhea, acne, oily scalp, hair loss, hirsutism (excessive growth of hair), depression, monilial vaginitis, breast regression	Late breakthrough bleeding, amenorrhea, hypermenorrhea

*Hormonal balance is achieved by adjusting the estrogen/progestin dosage. Oral contraceptives have different amounts of progestin and estrogen varying the estrogenic and progestational activity in each product.

excess or deficiency. The adverse effects are minimized by adjusting the estrogen progestin balance or dosage.

CONTRAINDICATIONS, PRECAUTIONS, AND INTERACTIONS

Estrogens

Estrogen therapy is contraindicated in patients with known hypersensitivity to the drugs, breast cancer (except for metastatic disease), estrogen-dependent neoplasms, undiagnosed abnormal genital bleeding, known or suspected pregnancy (Pregnancy Category X), and thromboembolic disorders.

The estrogens are used cautiously in patients with gallbladder disease, hypercalcemia (may lead to severe hypercalcemia in patients with breast cancer and bone metastasis), cardiovascular disease, and liver impairment.

The effects of the oral anticoagulants may be decreased when administered with the estrogens. When the estrogens are combined with the tricyclic antidepressants there is an increased risk of toxicity of the antidepressant. Barbiturates or rifampin may decrease estrogen blood levels, increasing the risk for breakthrough bleeding. When estrogens are administered concurrently with the hydantoins, breakthrough bleeding, spotting, and pregnancy have occurred. A loss of seizure control has also been reported. Cigarette smoking increases the risk for cardiovascular complications.

Progestins

The progestins are contraindicated in patients with known hypersensitivity to the drugs, thromboembolic disorders, cerebral hemorrhage, impaired liver function, and cancer of the breast or genital organs. Both the estrogens and progestins are classified as Pregnancy Category X drugs and are contraindicated during pregnancy. The progestins are used cautiously in patients with a history of migraine headaches, epilepsy, asthma, and cardiac or renal impairment.

The effects of the progestins are decreased when administered with anticonvulsants, barbiturates, or rifampin. Administration of the penicillins or tetracyclines with the oral contraceptives decreases the effects of the oral contraceptives.

Contraceptive Hormones

See the "Contraindications, Precautions, and Interactions" section regarding estrogens and progestins in this chapter for information regarding the combination oral contraceptives. The warnings associated with the use of oral contraceptives are the same as those for the estrogens and progestins and include cigarette smoking, which increases the risk of cardiovascular side effects, such as venous and arterial thromboembolism, myocardial infarction, and thrombotic and hemorrhagic stroke. Also reported with oral contraceptive use are hepatic adenomas and tumors, visual disturbances, gallbladder disease, hypertension, and fetal abnormalities.

Herbal Alert: Black Cohosh

Black cohosh, a herb reported to be beneficial in managing symptoms of menopause, is generally regarded as safe when used as directed. Black cohosh is a member of the buttercup flower family. The dosage of standardized extract is 2 tablets twice a day, or 40 drops of standardized tincture twice a day or one 500- to 600-mg tablet or capsule three times daily. Black cohosh tea is not considered as effective as other forms. Boiling of the root releases only a portion of the therapeutic constituents.

The benefits of black cohosh (not to be confused with blue cohosh) include:

- *Reduction in physical symptoms of menopause: hot flushes, night sweats, headaches, heart palpitations, dizziness, vaginal atrophy, and tinnitus (ringing in the ears)*
- *Decrease in psychological symptoms of menopause: insomnia, nervousness, irritability, and depression*
- *Improvement in menstrual cycles by balancing the hormones and reducing uterine spasms*

Adverse reactions are rare when using the recommended dosage. The most common adverse reaction is nausea. Black cohosh is contraindicated during pregnancy. Toxic effects include dizziness, headache, nausea, impaired vision, and vomiting. This herb is purported to be an alternative to hormone alternative replacement therapy (HART). Women who choose HART may increase their risk for endometrial cancer (cancer of the membrane lining the uterus), along with gallbladder disease, breast tenderness, high blood pressure, depression, and weight gain. Patients desiring to use any herbal remedy should consult with the primary health care provider before beginning therapy. Although no specific drug interactions have been reported, it is important that women taking HART should consult with their primary health care provider. In addition to its popularity as an herb for women's hormonal balance, black cohosh has been used for muscular and arthritic pain, headache, and eyestrain.

Herbal Alert: Saw Palmetto

Saw palmetto is used to relieve the symptoms of benign prostatic hypertrophy. The herb reduces urinary frequency, increases the flow of urine, and decreases the incidence of nocturia. Saw palmetto may delay the need for prostate surgery. The dosage of the herb is:

- *160 mg twice daily of standardized extract*
- *One 585-mg capsule or tablet up to three times/day*
- *20 to 30 drops up to four times a day tincture (1:2 liquid extract)*

It is not recommended to take saw palmetto as a tea because the active constituents are not water soluble. Improvement can be seen after 1 to 3 months of therapy. It is usually recommended that the herb be taken for 6 months, followed by evaluation by a primary health care provider.

NURSING PROCESS

The Patient Receiving a Female Hormone

ASSESSMENT

Preadministration Assessment

Before administering an estrogen or progestin, the nurse obtains a complete patient health history, including a menstrual history, which includes the **menarche** (age of onset of first menstruation), menstrual pattern, and any changes in the menstrual pattern (including a menopause history when applicable). In patients prescribed an estrogen (including oral contraceptives), the nurse obtains a history of thrombophlebitis or other vascular disorders, a smoking history, and a history of liver diseases. Blood pressure, pulse, and respiratory rate are taken and recorded. The primary health care provider usually performs a breast and pelvic examination and obtains a Pap smear before starting therapy. He or she may also order hepatic function tests.

If the male or female patient is being treated for a malignancy, the nurse enters in the patient's record a general evaluation of the patient's physical and mental status. The primary health care provider may also order laboratory tests, such as serum electrolytes and liver function tests.

Ongoing Assessments

ASSESSMENT OF THE OUTPATIENT. At the time of each office or clinic visit, the nurse obtains the blood pressure, pulse, respiratory rate, and weight. The nurse questions the patient regarding any adverse drug effects, as well as the result of drug therapy. For example, if the patient is receiving an estrogen for the symptoms of menopause, the nurse asks her to compare her original symptoms with the symptoms she is currently experiencing, if any. The nurse weighs the patient and reports a steady weight gain or loss. A periodic (usually annual) physical examination is performed by the primary health care provider and may include a pelvic examination, breast examination, Pap smear, and laboratory tests. The patient with a prostatic or breast carcinoma usually requires more frequent evaluations of response to drug therapy.

ASSESSMENT OF THE HOSPITALIZED PATIENT. The hospitalized patient receiving a female hormone requires careful monitoring. The nurse takes the vital signs daily or more often, depending on the patient's physical condition and the reason for drug use. The nurse observes the patient for adverse drug reactions, especially those related to the liver (the development of jaundice) or the cardiovascular system (thromboembolism). The nurse weighs the patient weekly or as ordered by the primary health care provider. The nurse reports any significant weight gain or loss to the primary health care provider.

In patients with breast carcinoma or prostatic carcinoma, the nurse observes for and evaluates signs indicating a response to therapy, for example, a relief of pain, an increase in appetite, a feeling of well-being. In prostatic carcinoma, the response to therapy may be rapid, but in breast carcinoma the response is usually slow.

NURSING DIAGNOSES

Drug-specific nursing diagnoses are highlighted in the Nursing Diagnoses Checklist. Other nursing diagnoses applicable to these drugs are discussed in depth in Chapter 4.

PLANNING

The expected outcomes of the patient may include an optimal response to therapy, identification and management of adverse reactions, a reduction in anxiety, and an understanding of and compliance with the prescribed therapeutic regimen.

IMPLEMENTATION

Promoting an Optimal Response to Therapy

ESTROGENS. Estrogens may be administered orally, IM, IV, or intravaginally. Oral estrogens are administered with food or immediately after eating to reduce gastrointestinal upset. When estrogens are given vaginally for atrophic vaginitis, the nurse gives the patient instructions on proper use.

CONTRACEPTIVE HORMONES. The monophasic oral contraceptives are administered on a 21-day regimen, with the first tablet taken on the first Sunday after the menses begins or on the day the menses begin if the menses begin on Sunday. After the 21-day regimen, the next 7 days are skipped, then the cycle is begun again. With the biphasic oral contraceptives, the first phase is 10 days of a smaller dosage of progestin, and the second phase is a larger amount of progestin.

Nursing Diagnoses Checklist

- ✓ **Ineffective Tissue Perfusion** related to adverse reactions (thromboembolic effects)
- ✓ **Excess Fluid Volume** related to adverse reactions (sodium and water retention)
- ✓ **Imbalanced Nutrition: More or Less than Body Requirements** related to adverse reactions (weight gain or loss)
- ✓ **Anxiety** related to diagnosis, use of estrogen replacement therapy, other factors

The estrogen dosage remains constant for 21 days, followed by no estrogen for 7 days. Some regimens contain seven placebo tablets for easier management of the therapeutic regimen. With the triphasic oral contraceptives, the estrogen amount stays the same or may vary and the progestin amount varies throughout the 21-day cycle. Progestin-only oral contraceptives are taken daily and continuously.

IMPLANT CONTRACEPTIVE SYSTEM. Levonorgestrel, a progestin, is available as an implant contraceptive system (Norplant System). Six capsules, each containing levonorgestrel, are implanted under local anesthesia in the subdermal (below the skin) tissues of the mid-portion of the upper arm. The capsules provide contraceptive protection for 5 years but may be removed at any time at the request of the patient. See Table 52-3 for more information on ways to promote an optimal response when taking the contraceptive hormones.

MEDROXYPROGESTERONE ACETATE CONTRACEPTIVE INJECTION. Medroxyprogesterone acetate (Depo-Provera), a synthetic progestin used in the treatment of abnormal uterine bleeding and secondary amenorrhea, is also used as a contraceptive. This drug is given IM every 3 months, and the initial dosage is given within the first 5 days of menstruation or within 5 days postpartum. When this drug is given IM, the solution must be shaken vigorously before use to ensure uniform suspension, and the drug is given deep IM into the gluteal or deltoid muscle.

Nursing Alert

If the interval is greater than 14 weeks between the IM injections, the nurse must be certain that the patient is not pregnant before administering the next injection.

Monitoring and Managing Adverse Reactions

The patient prescribed the female hormones usually takes them for several months or years. Throughout that time, the patient must be monitored for adverse reactions (see "Ongoing Assessment"). These drugs are self-administered at home. This makes patient education an important avenue for detecting and managing adverse reactions.

With the estrogens it is important to monitor for breakthrough bleeding. If breakthrough bleeding occurs with either the estrogens or progestin, the patient notifies the primary health care provider. A dosage change may be necessary.

Gastrointestinal upsets, such as nausea, vomiting, abdominal cramps, and bloating may also occur. Nausea usually decreases or subsides within 1 to 2 months of therapy. However, until that time the discomfort may lessen if the drug is taken with food. If nausea is continual, frequent small meals may help. If nausea and vomiting persist, an antiemetic may be prescribed. Bloating may be lessened with light to moderate exercise or by limiting fluid intake with meals.

The nurse carefully monitors the patient with diabetes who is taking female hormones. The primary health care provider is notified if blood glucose levels are elevated or the urine is positive for glucose or ketone bodies because a change in the dosage of insulin or the oral hypoglycemic drug may be required. See Chapter 49 for how to manage hypo- and hyperglycemic episodes.

MANAGING SODIUM AND WATER RETENTION. Sodium and water retention may occur during female hormone therapy. In addition to reporting any swelling of the hands, ankles, or feet to the primary health care provider, the nurse weighs the hospitalized patient daily, keeps an accurate record of the intake and output, encourages ambulation (if not on bed rest), and helps the patient to eat a diet low in sodium (if prescribed by the primary health care provider).

MANAGING THROMBOEMBOLIC EFFECTS. The nurse monitors the patient for signs of thromboembolic effects, such as pain, swelling, tenderness in the extremities, headache, chest pain, and blurred vision. These adverse effects are reported to the primary health care provider. Patients with previous venous insufficiency, who are on bed rest for other medical reasons, or who smoke are at increased risk for thromboembolic effects. The nurse encourages the patient to elevate the lower extremities when sitting, if possible, and to exercise the lower extremities by walking.

Nursing Alert

There is an increased risk of post-operative thromboembolic complications in women taking oral contraceptives. If possible, use of the drug is discontinued at least 4 weeks before a surgical procedure associated with thromboembolism or during prolonged immobilization.

MANAGING ALTERATIONS IN NUTRITION. Alterations in nutrition can occur, resulting in significant weight gain or loss. Weight gain occurs more frequently than weight loss. The nurse encourages a daily diet that includes adequate amounts of protein and carbohydrates and that is low in fats. A variety of nutritious foods (fruits, vegetables, grains, cereals, meats, and poultry) should be included in the daily diet, with portion sizes decreased to meet individual needs. A dietitian may be consulted if necessary. An exercise program is helpful in both losing weight and maintaining weight loss.

TABLE 52-3 Contraceptive Hormones

GENERIC AND TRADE NAME*	PROMOTING AN OPTIMAL RESPONSE
emergency contraceptives (Plan B, Preven)	Used for emergency contraception after unprotected intercourse. When using Plan B take one tablet within 72 h after unprotected intercourse. The second dose of Plan B is taken 12 h later. When using Preven take 2 tablets within 72 h of unprotected intercourse and the last 2 tablets 12 h after the first dose. These drugs can be used anytime during the menstrual cycle. If vomiting occurs within 1 hour after taking either dose, notify the primary health care provider. Emergency contraceptives are not effective in terminating an existing pregnancy. Should not be used as a routine form of contraception.
etonogestrel/ethinyl estradiol vaginal ring (Nuvaring, *generic*)	The woman inserts vaginal ring in the vagina, where it remains continuously for 3 weeks. Remove for 1 week, during which bleeding usually occurs (usually 2–3 days after removal). Insert new ring 1 week after the last ring removed on the same day of the week as it was inserted in the previous cycle. Do this even if bleeding is not finished. Insertion: Position for insertion by the woman may be standing with one leg up, squatting, or lying down. Compress the ring and insert into the vagina. (The exact position of the vaginal ring inside the vagina is not critical to its effectiveness.) The vaginal ring is removed after 3 weeks on the same day of the week as it was started. Removal is accomplished by hooking the index finger under the forward rim or by grasping the rim between the index finger and pulling it out. Discard the used ring in the foil pouch in a waste receptacle out of the reach of children or pets. (Do not flush the ring down the toilet.) Consider the menstrual cycle, ovulation, and the possibility of pregnancy before beginning treatment. The vaginal ring may be accidentally expelled (eg, when it was not inserted properly, during straining for defecation, removing a tampon, or with severe constipation). If this occurs, rinse the vaginal ring with lukewarm water and reinsert promptly. (If the ring has been out of the vagina for more than 3 h, contraceptive effectiveness may be reduced and an alternate contraceptive must be used for the next 7 days. The most common adverse reactions leading to discontinuation include: device-related problems (eg, foreign body sensations, coital problems, device expulsion). Other adverse reactions include vaginitis, headache, upper respiratory tract infection, leukorrhea, sinusitis, weight gain, and nausea.
intrauterine progesterone contraceptive system (Progestasert)	Intrauterine contraception device (IUD) for women who have had at least one child, are in a stable monogamous relationship, and have no history of pelvic inflammatory disease (PID). There is an increased risk of PID associated with IUD use, most often occurring within the first 4 months of use. The device prevents uterine pregnancy but it does not prevent ovulation or ectopic (implantation of the fertilized egg outside of the uterus) pregnancy. Before insertion, a complete medical and social history is performed, including Pap smear, gonorrhea, and *Chlamydia* culture, and tests for other sexually transmitted diseases. The patient is reexamined shortly after the first menses after insertion or within the first 3 months and at any time the patient exhibits symptoms. The device is removed for the following reasons: pelvic infection, endometritis, genital actinomycosis (a noncontagious bacterial infection), intractable pelvic pain, pregnancy, endometrial or cervical malignancy, increase in length of the threads extending from the cervix or any other indication of partial expulsion. Retrieval threads should be visible. If they are not visible, they may have retracted into the uterus or have been broken. After menstrual period, determine if the threads still protrude from the cervix. If threads are not found, the system is considered displaced and removed. Caution the patient not to pull the threads. If partial expulsion occurs, removal is indicated and a new system inserted. For the first few weeks after insertion, bleeding and cramping may occur. If symptoms continue or become severe, the health care provider is contacted.

(*continued*)

TABLE 52-3 Contraceptive Hormones (*Continued*)

GENERIC AND TRADE NAME*	PROMOTING AN OPTIMAL RESPONSE
	Prophylactic antibiotics may be prescribed before IUD insertion to decrease the risk of PID. Patient package insert and instructions are available with the product. The primary health care provider should be notified if any of the following occurs: abnormal or excessive bleeding, severe cramping, abnormal or odorous vaginal discharge, fever or flu-like symptoms, pain, genital lesions, or missed periods. The device is replaced every 12 months.
levonorgestrel implants *lev'-oh-nor-jes-trel* (Norplant System)	An informed consent may be required in some institutions before this procedure. A surgical incision is required to insert six capsules. Removal also requires surgical Intervention. The capsules are inserted during the first 7 days of the cycle or immediately after an abortion. Irregular menstrual bleeding, spotting, prolonged episodes of bleeding, and amenorrhea may occur. These symptoms diminish with continued use.
levonorgestrel-releasing intrauterine system (LRIS) *lev'-oh-nor-jes-trel* (Mirena)	Before insertion, provide the patient with the patient package insert. LRIS is an intrauterine contraception device for use of not more than 5 years. Inserted with the provided inserter into the uterine cavity within 7 days of the onset of menstruation or immediately after the first trimester abortion. Teach the patient to check after each menstrual period to make certain that the thread still protrudes from the cervix and caution her not to pull the thread. If pregnancy occurs with the LRIS in place, the LRIS should be removed. If the LRIS is not removed there is an increase in the risk of miscarriage, sepsis, premature labor, and premature delivery. Monitor the woman for flu-like symptoms, fever, chills, cramping, pain, bleeding, vaginal discharge, or leakage of fluid. Before insertion a complete medical and social history, including that of the partner, is obtained to determine conditions that might influence the use of an IUD. Initial insertion is done by the physician within 7 days of the onset of a menstrual period. Re-examination and evaluation is done shortly after the first menses or within the first 3 months after insertion. Menstrual flow usually decreases after the first 3–6 months of LRIS use; therefore, an increase of menstrual flow may indicate expulsion of the device. Symptoms of partial or complete expulsion include pain and bleeding. However, the LRIS can be expelled without any noticeable effects.
medroxyprogesterone acetate/estradiol cypionate (MPA/E2C) (Lunelle) *me-drox'-ee-proe-jess'-te-rone*	The first injection is given during the first 5 days of a normal menstrual period and is administered no earlier than 4 weeks after delivery if not breastfeeding or 6 weeks if breastfeeding. Second and subsequent injections given monthly (28–30 days) after the previous injection, not to exceed 33 days. Give patient a copy of the patient labeling before administration of the drug. The injection schedules are indicated according to the number of days and not bleeding episodes. If any patient misses 2 consecutive menstrual periods, the possibility of pregnancy should be considered. Another form of contraception should be used if the monthly dosage is late (more than 33 days since the last injection). Menstrual bleeding patterns are usually disrupted but should normalize. Irregular bleeding, amenorrhea, and excessive or prolonged bleeding should be reported to the health care provider.
medroxyprogesterone contraceptive injection (Depo-Provera) *me-drox'-ee-proe-jess'-te-rone*	Long-term injectable contraceptive administered IM every 3 months. The injection is given only during the first 5 days after the onset of a normal menstrual period, within 5 days postpartum if not breastfeeding, or at 6 weeks postpartum. Bleeding irregularities may occur (ie, irregular or unpredictable bleeding or spotting, or heavy continuous bleeding). Bleeding usually decreases to amenorrhea as the treatment continues. The drug is not readministered if there is a sudden partial or complete loss of vision or if the patient experiences ptosis, diplopia, or migraine.
norelgestromin/ethinyl estradiol transdermal system (Ortho Evra) *nor-el-jes'-tro-min*	A 28-day cycle, with a new patch applied each week for 3 weeks. Week 4 is patch free. Apply new patch on the same day each week (note patch change day on the calendar).

TABLE 52-3 Contraceptive Hormones (*Continued*)

GENERIC AND TRADE NAME*	PROMOTING AN OPTIMAL RESPONSE
	Discard used patch (only wear one patch at a time). Patch is applied to clean, dry, intact, healthy skin on the buttock, abdomen, upper outer arm, or upper torso in a place where the patch will not be rubbed by clothing. Patch should not be placed on the breast or on areas that are red or irritated. Beginning treatment: First day start (apply first patch on the first day of the menstrual cycle) or Sunday start (apply first patch on the first Sunday after the menstrual period begins). Use no creams or lotions on area where patch is to be applied. A backup contraceptive should be used for the first week of the first treatment cycle. Patch partially or completely detached for no longer that 24 hours: reapply to the same place or replace with a new patch immediately (no backup contraception needed). Patch detached for more than 24 hours: apply new patch immediately (new patch change day). Backup contraception needed for the first week (7 days). Forgets to change patch: begin again immediately with new patch change day (backup contraception needed for the first 7 days). If breakthrough bleeding continues longer than a few cycles, a cause other than the patch should be considered. Bleeding should occur during the patch-free week. If no bleeding occurs, consider the possibility of pregnancy. If pregnancy is confirmed, discontinue treatment.

*The term *generic* indicates that the drug is available in generic form.

Weight loss is often as difficult to manage as weight gain. When a patient taking the female hormones has a decrease in appetite and loses weight, the nurse encourages the individual to increase protein, carbohydrates, and calories in the diet. Small feedings with several daily snacks are usually better tolerated in those with a loss of appetite than are three larger meals. Patients are encouraged to eat foods that they like. Dietary supplements may be necessary if a significant weight loss occurs. A dietitian may be consulted if necessary. Weights are usually taken on a weekly, rather than daily, basis.

Managing Anxiety

The woman taking female hormones may have many concerns about therapy with these drugs. Some concerns may be based on inaccurate knowledge; for example, the woman who hears incorrect facts about certain dangers associated with female hormones. Although there are dangers associated with long-term use of female hormones, many of these adverse reactions occur in a small number of patients. When the patient is closely followed up by the primary health care provider, the dangers associated with long-term use are often minimized.

Some women may be anxious because of a fear of experiencing uterine cancer as the result of taking ERT. The nurse explains that taking progestin, which counteracts the negative effect of estrogen, can prevent estrogen-induced cancer of the uterus. Other women may fear the development of breast cancer. Most research studies find that there is little risk for breast cancer developing and that the benefits of ERT often outweigh the risk of breast cancer.

The nurse encourages the patient to ask questions about her therapy. Information that is inaccurate is clarified before therapy is started. The nurse refers to the primary health care provider questions that cannot or should not be answered by a nurse.

The male patient with inoperable prostatic carcinoma also may have concerns about taking a female hormone. The nurse assures the patient that the dosage is carefully regulated and that feminizing effects, if they occur, are usually minimal.

Educating the Patient and Family

The instructions for starting oral contraceptive therapy vary with the product used. Each product has detailed patient instruction sheets regarding starting oral contraceptive therapy, and the nurse reviews them with the

patient. The instructions for missed doses also are included in the package insert and are reviewed with the patient.

The nurse gives the patient a thorough explanation of the dose regimen and adverse reactions that may be seen with the prescribed drug. The nurse advises those taking oral contraceptives that skipping a dose could result in pregnancy. See Table 52-3 for more information to include in a teaching plan for a woman taking the contraceptive hormones.

In most instances, the primary health care provider performs periodic examinations, for example, laboratory tests, a pelvic examination, or a Pap smear. The patient is encouraged to keep all appointments for follow-up evaluation of therapy. The nurse includes several points in a teaching plan.

Estrogens and Progestins

- A patient package insert is available with the drug. Read the information carefully. If there are any questions about this information, discuss them with the primary health care provider.
- If gastrointestinal upset occurs, take the drug with food.
- Notify the primary health care provider if any of the following occurs: pain in the legs or groin area, sharp chest pain or sudden shortness of breath, lumps in the breast, sudden severe headache, dizziness or fainting, vision or speech disturbances, weakness or numbness in the arms or legs, severe abdominal pain, depression, or yellowing of the skin or eyes.
- Female patient: If pregnancy is suspected or abnormal vaginal bleeding occurs, stop taking the drug and contact the primary health care provider immediately.
- Patient with diabetes: Check the blood glucose or urine daily, or more often. Contact the primary health care provider if the blood glucose is elevated or if the urine is positive for glucose or ketones. An elevated blood glucose level or urine positive for glucose or ketones may require a change in diabetic therapy (insulin, oral hypoglycemic drug) or diet; these changes must be made by the primary health care provider.

Oral Contraceptives

- A patient package insert is available with the drug. Read the information carefully. Begin the first dose as directed in the package insert or as directed by the primary health care provider. If there are any questions about this information, discuss them with the primary health care provider.
- To obtain a maximum effect, take this drug as prescribed and at intervals not exceeding once every 24 hours. An oral contraceptive is best taken with the evening meal or at bedtime. The effectiveness of this drug depends on following the prescribed dosage schedule. Failure to comply with the dosage schedule may result in a pregnancy.
- Use an additional method of birth control (as recommended by the primary health care provider) until after the first week in the initial cycle.
- If one day's dose is missed, take the missed dose as soon as remembered or take 2 tablets the next day. If 2 days are missed, take 2 tablets for the next 2 days and continue on with the normal dosing schedule. However, another form of birth control must be used until the cycle is completed and a new cycle is begun. If 3 days in a row or more are missed, discontinue use of the drug and use another form of birth control until a new cycle can begin. Before restarting the dosage regimen, make sure a pregnancy did not result from the break in the dosage regimen.
- If there are any questions regarding what to do about a missed dose, discuss the procedure with the primary health care provider.
- Avoid smoking or excessive exposure to second-hand smoke while taking these drugs; cigarette smoking during estrogen therapy may increase the risk of cardiovascular effects.
- Report adverse reactions such as fluid retention or edema to the extremities; weight gain; pain, swelling, or tenderness in the legs; blurred vision; chest pain; yellowed skin or eyes; dark urine; or abnormal vaginal bleeding.
- While taking these drugs, periodic examinations by the primary health care provider and laboratory tests are necessary.

Estradiol Transdermal System

- Alora, Estraderm, Esclim, and Vivelle are applied twice a week; Climara and FemPatch are applied every 7 days.
- Apply the system immediately after opening the pouch, with the adhesive side down (Fig. 52-1). Apply to clean, dry skin of the trunk (not breast or waistline), buttocks, abdomen, upper inner thigh, or upper arm. (Do not apply to breasts or a site exposed to sunlight.) The area should not be oily or irritated.
- Press the system firmly in place with the palm of the hand for about 10 seconds. The application site is rotated with at least 1-week intervals between applications to a particular site.
- Avoid areas that may be exposed to rubbing or where clothing may rub the system off or loosen the edges.
- Remove the old system before applying a new system unless the primary health care provider directs

FIGURE 52-1. This low-dose estrogen transdermal patch, available as the trade name Estraderm (Estradiol Transdermal System), is transparent and about the size of a silver dollar. It releases small amounts of estrogen directly into the bloodstream at a constant and controlled rate to a female requiring estrogen replacement therapy for postmenopausal symptoms.

otherwise. Rotate application sites to prevent skin irritation.
- Follow the directions of the primary health care provider regarding application of the system (eg, continuous, 3 weeks use followed by 1 week off, changed weekly, or applied twice weekly).
- If the system falls off, reapply it or apply a new system. Continue the original treatment schedule.

Intravaginal Application

- Use the applicator correctly. Refer to the package insert for correct procedure. The applicator is marked with the correct dosage and accompanies the drug when purchased.
- Wash the applicator after each use in warm water with a mild soap and rinse well.
- Maintain a recumbent position for at least 30 minutes after instillation.
- Use a sanitary napkin or panty liner to protect clothing if necessary.
- Do not double the dosage if a dose is missed. Instead, skip the dose and resume treatment the next day (see Patient and Family Teaching Checklist: Self-Administering Intravaginal Estrogen).
- When using the vaginal ring, press the ring into an oval and insert into the upper third of the vaginal vault.

EVALUATION

- The therapeutic effect is achieved.
- Adverse reactions are identified, reported to the primary health care provider, and managed using appropriate nursing interventions.

Patient and Family Teaching Checklist

Self-Administering Intravaginal Estrogen

The nurse:

- ✓ Explains the reason for the drug and prescribed therapy, including drug name, correct dosage, and frequency of administration.
- ✓ Describes the equipment to be used.
- ✓ Reinforces the need to empty the bladder and wash hands before administration.
- ✓ Demonstrates step-by-step procedure for filling applicator with drug and administration.
- ✓ Recommends a supine position with knees flexed and legs spread.
- ✓ Instructs patient to insert applicator into vagina, angling it toward the tailbone and advancing it about 2 inches.
- ✓ Warns that drug may feel cold when inserted.
- ✓ Urges patient to remain recumbent for about 30 minutes after inserting drug.
- ✓ Suggests use of sanitary pad or napkin to prevent staining of clothes.
- ✓ Advises patient to wash applicator with mild soap and warm water, rinse well, and dry with paper towel after use.
- ✓ Cautions not to double dose if dose is missed but to skip dose and resume treatment the next day.
- ✓ Encourages daily inspection of perineal area for irritation or signs of allergic reaction.

- Anxiety is reduced.
- The patient verbalizes an understanding of the dosage regimen and the importance of continued follow-up care.
- The patient verbalizes the importance of complying with the prescribed therapeutic regimen.

● *Critical Thinking Exercises*

1. *Ms. Burton is receiving methyltestosterone (Oreton Methyl) for treatment of metastatic breast cancer. The drug has caused changes in her appearance, namely deepening of her voice, some male pattern baldness, and facial hair. Analyze the situation and decide what suggestions you could give this patient who has a limited income and may be unable to afford extensive cosmetic and wardrobe changes.*
2. *John, a friend of your brother, has started to use anabolic steroids to increase his strength and muscle mass*

to improve his chances of getting a football scholarship. Your brother tells you that this is acceptable because his friend wants an education. Discuss what you would tell your brother.

3. *Susan Parker, a mother of three young children, calls the health clinic where you work stating that she has missed 3 days of oral contraceptives when she was ill. She wants to know if she can continue with the oral contraceptive. Discuss what information Susan needs to know to protect herself from becoming pregnant.*

● Review Questions

1. The nurse monitors the patient taking an anabolic steroid for the more severe adverse reactions, which include _____.
   - **A.** anorexia
   - **B.** nausea and vomiting
   - **C.** severe mental changes
   - **D.** acne

2. The nurse must be aware that older men taking the androgens are _____.
   - **A.** prone to urinary problems
   - **B.** at greater risk for hypertension
   - **C.** at increased risk for confusion
   - **D.** at increased risk for prostate cancer

3. When monitoring a patient taking an oral contraceptive, the nurse would observe the patient for signs of excess progestin. Which of the following reactions would indicate to the nurse that a patient has an excess of progestin?
   - **A.** Increased appetite, hair loss
   - **B.** Virilization, constipation
   - **C.** Nausea, early breakthrough bleeding
   - **D.** Deepening of the voice, light-headedness

4. A patient calls the outpatient clinic and says that she missed one day's dose of her "birth control pills." Which of the following statements would be most appropriate for the nurse to make to the patient?
   - **A.** Do not take an additional tablet but resume the regular schedule today.
   - **B.** Discontinue use of the drug and use another type of contraceptive until after your next menstrual period.
   - **C.** Take 2 tablets today; then resume the regular daily schedule.
   - **D.** Come into the office immediately for a pregnancy test.

5. When teaching the patient taking an oral contraceptive for the first time, the nurse emphasizes the importance of taking _____.
   - **A.** two tablets per day at the first sign of ovulation
   - **B.** the drug at the same time each day
   - **C.** the drug early in the morning before arising
   - **D.** the drug each day for 20 days beginning on the first of the month

● Medication Dosage Problems

1. Medroxyprogesterone 650 mg IM is prescribed. The drug is available in a solution of 400 mg/mL. The nurse administers _____.

2. The physician prescribes estrone 0.5 mg IM for a postmenopausal woman with vasomotor symptoms. On hand is a vial of estrone with a solution containing 0.5 mg/mL. The nurse administers _____.