Detection of Hypogonadism and Applying Testosterone Replacement Therapy

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Target Audience: Pharmacists & Technicians

CE Credits: 1.0 Credit hour or 0.1 CEU for pharmacists/technicians

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Program Overview: This program is designed to assist pharmacists, nurses, and nurse practitioners better understand how to properly diagnose a patient suffering from hypogonadism. These health care professionals will also be updated on available testosterone treatment therapies. The program includes information on pharmacologic treatments, drug interactions, patient counseling, and a question/answer period.

Objectives:
- Review the prevalence, epidemiology, and pathophysiology of testosterone deficiency.
- Understand the signs and symptoms related to hypogonadism and andropause.
- Identify, educate, and treat patients with testosterone deficiencies.
- Recommend specific pharmacologic therapy for testosterone deficient patients based upon patient variables and comorbidities.
Detection of Hypogonadism and Applying Testosterone Replacement Therapy

**Speaker:** Dr. George Simms is a professor emeritus from Pennsylvania State University's College of Medicine in Hershey, PA. Dr. Simms' education includes a Doctor of Medicine and Faculty of Medicine from the University of Zurich, a Doctor of Philosophy in Human Behavior from the United States International University, and a M.T.S. from Harvard University with a Fellowship in Medical Ethics, Harvard Divinity School. His professional experience includes academic medicine with the University of California San Diego, University of Massachusetts, and Penn State University. His clinical practice experience includes the Los Angeles, California, Hong Kong, China, and San Diego, California areas.

**Speaker Disclosure:** Dr. Simms has no actual or potential conflicts of interest in relation to this program

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Questions We Need To Ask

- What is hypogonadism (HG)?
- What is the incidence of HG?
- What is the normal physiology of sexual maturation?
- What is the pathophysiology of HG?
- How does HG present clinically?
- What is the appropriate workup for HG?
- What are the treatment modalities for HG?
- What is the prognosis for HG?
What is hypogonadism?

A clinical syndrome, found in both males and females, in which the body does not produce enough hormones to bring about healthy gonadal (ovary and testis) development and timely sexual maturation.
Incidence

- Male = 1:500-1000 live births mostly Klinefelter Syndrome

- Female = 1:2500-10,000 live births mostly Turner Syndrome
Normal Physiology of Sexual Maturation

- Hypothalamic-pituitary-gonadal axis
- Luteinizing hormone-releasing hormone (LHRH)
- Anterior pituitary secretes two hormones:
  - Follicle stimulating hormone (FSH)
  - Luteinizing hormone (LH):
Follicle Stimulating Hormone (FSH)

- stimulates tubular growth in male
- stimulates precursor steroids to estrogen in female
Luteinizing hormone (LH)

- stimulates Leydig cells to secrete testosterone in male
- stimulates interstitial cells to secrete progestins in female
Male Hypogonadism

- Basic problem = body doesn’t produce enough testosterone

- Causes:
  - Primary HG = failure within testis
  - Secondary HG = testes are normal but unstimulated due to a disturbance in the H-P-G axis
Primary HG = failure within testis

- Klinefelter Syndrome
- undescended testes
- mumps orchitis
- hemochromatosis
- testicular injury
- cancer treatment
- normal aging
Klinefelter Syndrome

- Abnormality of sex chromosomes X and Y
- Two or more X are present
- Abnormal development of testicles
Undescended Testes

- Descend during third trimester
- Spermatogenesis prevented
- Routine surgical procedure
Other

- Mumps
  - Inflammation of the testes

- Hemochromatosis
  - Excess iron in body
  - Testicular failure

- Testicular injury
  - Damage to testes
  - Lost of testicular function
Other

- cancer treatment
  - Radiation therapy kill sperm cells

- Normal aging
  - Testosterone level decreases
  - Reduced libido
  - Physical changes
Secondary HG

= testes are normal but unstimulated due to a disturbance in the:

- Kallmann Syndrome
  - Abnormal development of hypothalamus
  - LH not secreted

- Pituitary disorders
  - Tumors, radiation effect

- inflammatory diseases
  - Tuberculosis
Secondary HG

= testes are normal but unstimulated due to a disturbance in the:

- HIV/AIDS
  - Loss of sexual drive

- Medications
  - Opiates
  - Steroids

- obesity
  - Impotence
  - Reversible
Clinical Presentation of Male HG

RULE: clinical picture is age-dependent

- **FETAL**: ambiguous/abnormal genitalia
- **PRE-PUBERTY**: sparse body hair/small external genitalia
- **ADULT**: infertility, ED, low libido, fatigue, muscle wasting/weakness, gynecomastia, sparse beard/hair growth, osteoporosis
Clinical Presentation of Male HG

RULE: clinical picture is age-dependent

- **FETAL**: ambiguous/abnormal genitalia
Clinical Presentation of Male HG

- **PRE-PUBERTY**: sparse body hair/small external genitalia
- Child is sexually self conscious
Clinical Presentation of Male HG

RULE: clinical picture is age-dependent

- ADULT: infertility, ED, low libido, fatigue, muscle wasting/weakness, gynecomastia, sparse beard/hair growth, osteoporosis
- Generally married
- Negative self image
Clinical Workup (History)

- when did symptoms begin?
- how severe?
- growth problems as child/adolescent?
- testicular trauma?
- head trauma?
- mumps as child/teen?  Painful?
**Clinical Workup (History)**

- Physical examination – genitalia/habitus
  - Observe contours of body
  - Sensitive to feelings of patient
  - Age appropriate development?
  - Genitalia exam
Clinical Workup (History)

- Testing:
  - labs: testosterone, FHS, LH, prolactin, T-4 levels
  - semen analysis
  - pituitary imaging
  - genetic studies
  - testicular biopsy
Treatment Options

**Testosterone replacement therapy:**

- injection
  - Testosterone Propianate
  - Testosterone Cypionate

- patch - Androderm (Testosterone 2.5mg and 5 mg/24 hr)

- gel
  - Androgel® (Testosterone 1% Gel)
  - Testim (Testosterone 1% Gel)

- gum and cheek - Striant® Testosterone buccal system

- oral - Testred (Methytestosterone 10mg)
Treatment – Males up to 15

Testosterone replacement therapy:

- injection

- Testosterone cypionate 50 mg IM q 2 – 4 weeks gradually increase to 100 to 200 mg

- Older adolescents convert to testosterone 1% gel
Treatment – Adults

**Testosterone replacement therapy:**

- **Testosterone 1% gel**
  - 5 to 10 g daily to deliver 5 to 10 mg
  - Maintains physiologic blood levels more consistently than other treatments

- **Testosterone cypionate**
  - 100mg q 7 days

- **Buccal patch**
  - 30 mg BID

- **Transdermal Patch (5 to 10 mg daily)**
  - Lower cost
CONTRAINDICATIONS

- Men with carcinoma of the breast or known or suspected carcinoma of the prostate
- Women who are or may become pregnant, or who are breastfeeding.

FDA

The Food and Drug Administration (FDA) announced on May 7, 2009, that it is requiring manufacturers of two prescription topical testosterone gel products, AndroGel 1% and Testim 1%, to include a boxed warning on the products' labels.
WARNINGS

- Prolonged use has been associated with development of liver problems, including cancer.
- Geriactrics at risk for prostatic hypertrophy and prostatic carcinoma
- Edema with or without congestive heart failure may be a serious complication in patients with preexisting cardiac, renal, or hepatic disease.
- Gynecomastia frequently develops and occasionally persists in patients being treated for hypogonadism
Patient Counseling

- Changes in urinary habits
- Too frequent or persistent erections of the penis.
- Nausea, vomiting, changes in skin color, or ankle swelling.
Treatment - Adults

- testicular failure = TRT
- pituitary failure = pituitary hormone replacement
- pituitary tumor = surgery
- infertility = assisted reproduction
Coping and Support

- Prevent osteoporosis
- Learn about ED and infertility
- Reduce stress
- Allow time to adjust
Men and women with HG can lead a normal life with hormone replacement.

20-25% of females with Turner Syndrome have some spontaneous puberty.

Both males and females with HG at the H/P level can potentially become fertile.