

OBJECTIVE

Alberta clinicians understand the investigation and management of erectile dysfunction, are aware of indicators for referral and the importance of counselling.

TARGET POPULATION

- Men who are unable to have or sustain an erection adequate for satisfactory sexual activity for at least three months
- Men who have symptoms of decreased sexual desire and/or erectile dysfunction

EXCLUSIONS

Patients with other forms of sexual dysfunction (i.e., premature ejaculation)

RECOMMENDATIONS

See Appendix A - [Algorithms](#)

INVESTIGATION

PRACTICE POINT

History is the most important component to evaluate ED and hypogonadism

- ✓ Conduct detailed medical, sexual (see Appendix B: [Sexual Health Inventory for Men](#)) and social history to:
 - Rule out ejaculatory disorders, performance anxiety, depression, and other psychological disorders.
 - Identify reversible causes (e.g., recently prescribed medications such as antidepressants or anti-hypertensives (see [Table 1](#)) with concurrent development of erectile dysfunction (ED).

| Medications Linked to ED ¹ | |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Drug Class | Agents |
| Diuretic | Thiazides, spironolactone |
| Antihypertensive drugs | Calcium-channel blockers, beta-blockers, methyldopa, clonidine, reserpine, guanethidine |
| Cardiac or cholesterol drugs | Digoxin, gemfibrozil, clofibrate |
| Antidepressants | Selective serotonin-reuptake inhibitors, tricyclic antidepressants, lithium, monoamine oxidase inhibitors |
| Tranquilizers | Butyrophenones, phenothiazines |
| H ₂ antagonists | Ranitidine, cimetidine |
| Hormones | Progesterone, estrogens, corticosteroids, lutenizing hormone-releasing hormone agonists, 5 α-reductase inhibitors, cyproterone acetate |
| Cytotoxic agents | Methotrexate |
| Immunomodulators | Interferon α |
| Anticholinergic agents | Disopryamide, anticonvulsants |
| Recreational drugs | Alcohol, cocaine |

Table 1: Medications Linked to Erectile Dysfunction⁴

- ✓ Consider evaluation for diseases associated with ED (see [Table 2](#)).

| Common Causes of Erectile Dysfunction | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Most common:</p> <ul style="list-style-type: none"> • Diabetes • Cardiac and peripheral vascular disease • Medications linked to ED (see Table 1) • Including substance abuse and cigarette smoking • Psychogenic <ul style="list-style-type: none"> ○ Anxiety or depressive disorder ○ Concern about poor sexual function ○ Previous traumatic sexual experience | <p>Diseases with a high prevalence of ED:</p> <ul style="list-style-type: none"> • Diabetes mellitus • Renal failure • Liver disease • Multiple sclerosis • Spinal cord injuries • Penile anomalies or disease (Peyronie's disease) • Pelvic surgery • Pelvic trauma • Prostate cancer treatment • Hypogonadism |

Table 2: Common Causes of Erectile Dysfunction

- ✓ Perform focused physical examination for signs of hypogonadism:
 - Gynecomastia
 - Decreased male hair distribution
 - Small testes
- ✓ Perform focused exam for signs of vascular disease and diabetic complications (including blood pressure, ankle brachial index and peripheral pulses).
- ✓ Screen for unrecognized systemic disease (e.g., diabetes, hypogonadism – see Appendix A - [Algorithms](#))

PRACTICE POINT.

*A psychogenic component is present in many cases of erectile dysfunction.
Counselling of patient (+/- partner) is recommended.*

MANAGEMENT

- ✓ Treat associated medical conditions. Note: This alone may not reverse ED.
- AND/OR
- ✓ Modify medication regimen.
- ✓ Suspect hormonal cause if laboratory test abnormal:²
 - If testosterone low and LH and FSH high: consider testosterone replacement therapy.
 - If prolactin high: consider pituitary imaging and referral.
- ✓ If psychogenic cause suspected consider sex therapy/psychiatric referral AND/OR trial of therapy (education, phosphodiesterase type V inhibitors, intracavernosal vasodilator injection).
- ✓ If neurogenic or vasculogenic causes suspected consider trial of therapy (education, phosphodiesterase type inhibitors, intracavernosal vasodilator injection).
- ✓ Refer for the following common indicators:
 - Failed medical therapy
 - Significant penile anatomic disease
 - A younger patient with a history of pelvic or perineal trauma
 - Cases requiring vascular or neurological assessment
 - Complicated endocrinopathies
 - Complicated psychiatric or psychosocial problems
 - Patient or physician desire for further evaluation
- ✓ Follow-up with patients after treatment is initiated to evaluate progress and monitor therapy (e.g., testosterone).

BACKGROUND

EPIDEMIOLOGY

ED is defined as the inability to have or sustain an erection adequate for satisfactory sexual activity.^{1,3} It is one of the most common chronic medical disorders in men over the age of 40. In an American study, 39% of men aged 40 to 70 reported moderate or complete impotence, with 52% of the whole group reporting some degree of ED.⁴ The prevalence and severity of the disorder increases with age; men in their 50s are three times more likely to experience ED than men in their twenties. It is estimated that moderate to complete ED affects 45% of men in their mid-60s, with a further increasing prevalence in older age groups.^{4,5}

PATHOPHYSIOLOGY

Two-thirds of cases of ED are organic in origin and comorbid conditions should therefore be actively evaluated. Heart and vascular diseases (especially those associated with hyperlipidemia, diabetes, and hypertension) are associated with ED.^{4,6} The combination of these conditions and aging increases ED risk in older men. Other hormonal and metabolic problems including primary and secondary hypogonadism, hypothyroidism, chronic renal failure, and hepatic failure, also negatively impact on erectile function.⁷ Testosterone levels do decline slightly with age but are only related to ED in the **small minority** of men (~3-5%) who are truly hypogonadal and have low hormone levels.

Substance abuse, such as excessive intake of alcohol or other recreational drugs is a major contributor to ED. Smoking, a known cause of arterio-occlusive disease, is clearly a co-factor and probably an independent etiologic factor itself.

Penile anatomical defects and Peyronie's disease may contribute to erectile problems. Spinal cord injuries, pelvic and prostate surgery and pelvic trauma are less common causes of dysfunction.

Psychogenic disorders, including depression, dysphoria, and anxiety states are associated with an increased incidence of multiple sexual dysfunctions including erectile difficulties.⁸

Iatrogenic ED can result from nerve disrupting pelvic or prostate surgery; inadequate glycemic, blood pressure, or lipid control; and many of the medications commonly used in primary care.

Antihypertensive medications, notably diuretics and central acting agents, can cause ED, as can digoxin, psychopharmacologic agents, including some of the newer antidepressants, and anti-testosterone hormonal agents.

INVESTIGATION

MEDICAL HISTORY

The medical history should include review for risk factors and screening for psychological problems. A medication review, including over-the-counter drugs may reveal the source of the problem since medications have been implicated in up to 25% of cases of ED.⁹ Some medications have adverse effects on all phases of sexual functioning, making clarification of the patient's complaint a priority before ascribing symptoms to specific medication side-effects.¹⁰ When evaluating for the presence of psychological problems, brief screening for depression may elicit responses. Other psychiatric conditions, such as anxiety, may also be responsible for ED. It is critical that the social history include assessing for stress regarding a relationship or substance abuse including alcohol and cigarettes.

Specific questions regarding the presence of claudication during activity (e.g., walking up stairs) or decreased thigh muscle strength or size increases suspicion for pelvic inflow vascular occlusive disease.

Finally, a review of daily activities and a review of cardiovascular status are important to determine the potential risk for enhancing ED in patients who may have a sedentary lifestyle and who may be at risk for an adverse cardiac event when sexual activity potential is increased.¹¹

SEXUAL HISTORY

A sexual history is the most important component of diagnosis. Some physicians may find it useful to use a sexual health questionnaire (see [Appendix B](#)) and to involve the partner as this will not only confirm the problem but also may reveal other causes of sexual dysfunction.

FOCUSED PHYSICAL EXAMINATION

The physical examination should be comprehensive, with emphasis on several areas.^{12,13}

Evaluation of blood pressure, cardiac size and heart sounds, and a complete peripheral vascular examination looking specifically for abdominal or femoral bruits, diminished femoral pulses, or thigh muscle wasting (signs of decreased pelvic inflow), may contribute to the diagnosis of vascular disease as an associated cause. A neurologic examination that includes the evaluation of pelvic sensory function and anal sphincter tone is needed to confirm both sympathetic and parasympathetic function. A digital rectal examination of the prostate should be conducted, and a visual and manual exam of the penis to discover any anatomical defects and help to identify Peyronie's disease.

Immature secondary sex characteristics, including lack of male hair distribution, poor penile and testicular development, gynecomastia, and fine wrinkling at the corners of the eyes and mouth, indicate the possibility of hypogonadism.

LABORATORY EVALUATION

Laboratory testing to evaluate ED will confirm risk factors/entities previously identified. A urine analysis to rule out renal disease or infection; a complete blood count to note any potential hematologic disorder; a chemistry profile to check for fasting glucose, renal, and hepatic function; a lipid profile to rule out hyperlipidemia; and TSH to evaluate thyroid function.

Prostate specific antigen (PSA) should be considered in men over age 45 years with risk factors for prostate cancer especially if testosterone treatment is a possibility. A morning serum total testosterone and prolactin level should be measured on all patients, although the threshold level of testosterone for maintaining an erection is unknown.

Borderline or unequivocally low levels require confirmation of diagnosis by measuring calculated free or bioavailable testosterone and sex hormone binding globulin (SHBG) levels. SHBG binds 60% of testosterone and often is low or low normal in obesity and many normal men and therefore results in artifactually low serum total testosterone measurements.²⁴⁻²⁶ Unequivocally low testosterone measurements additionally require measuring luteinizing hormone (LH) and prolactin for differential diagnosis.² However, the majority of causes of ED are not due to low testosterone.¹⁴ If the patient is well known to the physician and the problem is clearly not related to libido or ejaculatory disorders, and there are other contributing factors that can account for the ED, these tests can be ordered on an individual basis. If there is any evidence of hypogonadism or the dysfunction is particularly consistent at a young age, then further hormone evaluation is obligatory.²

Advanced testing with nocturnal penile tumescence studies and vascular evaluation with sonography, and other tests are somewhat subjective and rarely provide useful information except in cases of trauma or other vascular injury, or if there is a need for legal documentation. Referral may be indicated for these studies.

MANAGEMENT

COUNSELLING

Because ED often has a psychological component, patient or couple counseling may help reduce anxiety and overcome the condition. This therapy is sometimes used in combination with other treatments as directed by the practitioner.

LIFESTYLE MODIFICATION

Making healthy lifestyle changes may reduce the symptoms of ED and improve general physical health (see [Table 3](#)). Patients should understand that lifestyle habits that negatively affect the heart and the peripheral vascular system or the nervous system will also negatively affect the penis.

Eliminating smoking is critical as well as eliminating all other recreational drug use. The occurrence of ED among patients that smoke provides an opportunity to discuss smoking cessation. Dietary modification includes reducing cholesterol and fats, managing hyperglycemia if present, and decreasing salt intake when salt-sensitive hypertension is noted. These modifications will contribute to reducing the progression of vascular insufficiency. Exercise can increase cardiac output and improve peripheral circulation. Moderate exercise for sedentary men may minimize the small increase in relative risk of a myocardial infarction.^{15,16} Prevention of obesity is associated with a decreased risk of ED.¹⁷

| Recommended Lifestyle Changes | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • Stop smoking • Reduce fat and cholesterol in diet • Increase exercise • Lose weight if overweight | <ul style="list-style-type: none"> • Comply with prescribed diabetes and cardiovascular medication regimens • Reduce stress |

Table 3 Recommended Lifestyle Changes

Changing medication regimens to remove causative agents is an option when good alternatives are available and/or the clinical situation permits pharmacologic adjustments. Medication changes must be individualized depending upon the specific clinical circumstances.

Specific treatment regimens for ED are varied; they include oral medications, transurethral suppositories, intracavernosal injection, vacuum devices, and surgery.

ORAL MEDICATIONS

The most effective and useful drugs available are inhibitors of phosphodiesterase type V, an enzyme present predominantly in the penile smooth muscles and responsible for vasoconstriction. Currently, sildenafil (VIAGRA®), tadalafil (Cialis®) and vardenafil (Levitra®) are marketed. Randomized trials demonstrate that sildenafil is effective in most etiologies of ED with efficacies of up to 80%. In some groups, i.e., post radical prostatectomy or diabetes, sildenafil may have lower efficacy ranging from 40 to 57%.¹⁸⁻²¹

Lower doses (25mg) of sildenafil may be given to patients who are elderly; have renal or hepatic insufficiency; have spinal cord injury (where there is an increased sensitivity to sildenafil); have

moderate to severe coronary vascular insufficiency and NOT using nitrates (see [note](#) below); or are taking another drug that is a cytochrome P450 inhibitor).

Note: When used in conjunction with nitrate containing medications, PDE5 inhibitors can cause excessive vasodilation and hypotension, which can result in death. The use of nitrate containing medication is a definite contraindication to prescribing PDE5 inhibitors. Recent data suggest severe coronary disease may not be a contraindication to PDE5 inhibitors. However, data is limited and caution is strongly advised in these situations.

The evidence regarding efficacy of Yohimbine (another oral medication) used for improving ED is inconclusive, especially when the strong placebo effect of any oral medication for ED is considered.¹⁶

PRACTICE POINT

Testosterone therapy requires thorough evaluation to exclude prostate cancer (in men over age 45 conduct digital rectal exam [DRE] + PSA) prior to starting therapy. Monitoring of therapy is mandatory.

Non-Oral Medications Testosterone therapy, available in intramuscular injection (testosterone enanthate or cypionate), oral (testosterone undecanoate), by dermal patch or by transdermal gels should be used only for patients with documented hypogonadism. Generally, testosterone augmentation is associated with enhanced libido. This may improve erectile status by restoring interest and perhaps through other neurohormonal mechanisms, however, relying solely on testosterone to restore ED is inappropriate.²² Monitoring includes surveillance for prostate cancer (yearly rectal examinations and PSA); and detection of polycythemia (measuring hematocrit every six to 12 months); and decrease testosterone dose if hematocrit rises above the normal range. There is no current evidence for other adverse effects of testosterone therapy²⁷.

Intracavernosal injection therapy can be considered when oral medications appear to be ineffective. This injection is given directly into the corpus cavernosum through the side of the penis. The success rate is high, but problems may include pain, prolonged erections or priapism, and penile fibrosis and plaques.²³ It is recommended to start with the minimal effective dose and titrate upwards. Spinal cord injury patients often have an exaggerated response and require lower doses. The recommended maximal frequency of usage is three times weekly with 48 hours between dosages. Urologic consultation is recommended for patients in whom this treatment is being considered. Note: Caution should be exercised for patients on anticoagulation medications.

Penile implant surgery is a successful therapy, although it should be reserved for patients who have considered or tried several other treatments. The surgery is irreversible and the normal function of the corpus cavernosa is obliterated. The surgery carries low morbidity and mortality and the satisfaction rate is high. It is a well-established urological procedure.

INDICATORS FOR REFERRAL

Common indications for referral to a specialist include: significant penile anatomic disease, a younger patient with a history of pelvic or perineal trauma, cases requiring vascular or neurosurgical intervention, complicated endocrinopathies, complicated psychiatric or psychosocial problems.

Urology consult is required for instruction regarding use of intracavernosal vasodilator injection therapy, and if patient or physician desire further evaluation.

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GUIDELINE COMMITTEE

The committee consisted of representatives of family medicine, general medicine, medical biochemistry, pathology, internal medicine, endocrinology, laboratory technologists and the public.

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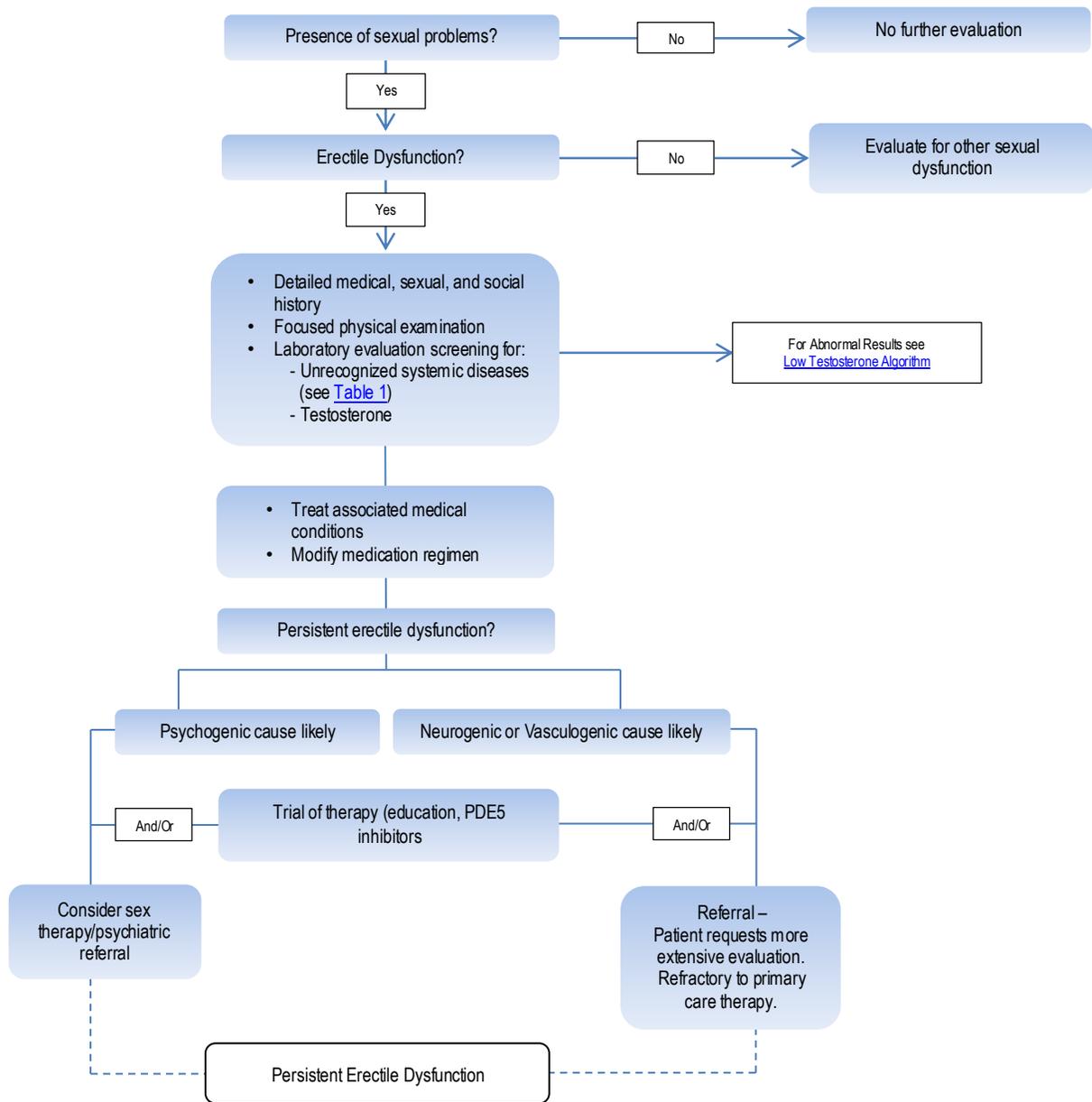
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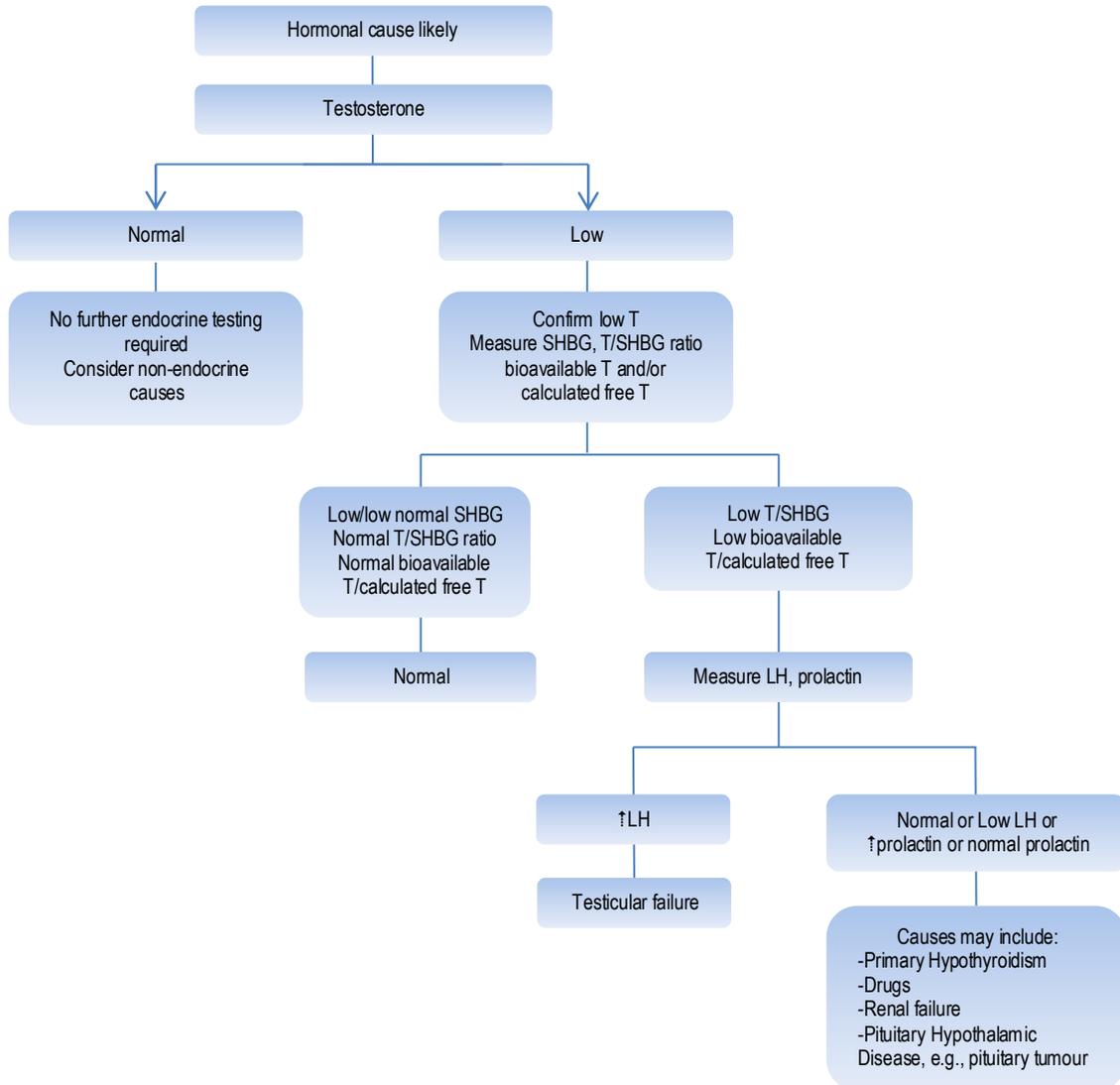
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APPENDIX A

Erectile Dysfunction Algorithm



Low Testosterone Algorithm



APPENDIX B

| Sexual Health Interview for Men (SHIM) | | | | | | |
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| <p>To administer the Sexual Health Inventory for Men (SHIM), patients answer each of the questions in the SHIM scale from 0 to 5, where “0” indicates not activity, “1” is the most negative response, and “5” is the most positive response. Overall, scores on the SHIM range from 1 to 25. Higher scores indicate better erectile function, with a score of 20 or higher indicating a normal degree of erectile functioning. Low scores (10 or less) indicate moderate to severe erectile dysfunction. The scale can be given at the initial visit or follow-up visits as a means to facilitate patient-physician communication about erectile function or sexual satisfaction.</p> | | | | | | |
| 1. How do you rate your confidence that you could get an erection? | | Very Low 1 | Low 2 | Moderate 3 | High 4 | Very High 5 |
| 2. When you had erections with sexual stimulation, how often were your erections hard enough for penetration? | No sexual activity 0 | Almost never/never 1 | A few times 2 | Sometimes 3 | Most times 4 | Almost always/always 5 |
| 3. During sexual intercourse, how often were you able to maintain your erection after you had penetrated (entered) your partner? | Did not attempt 0 | Almost never/never 1 | A few times 2 | Sometimes 3 | Most times 4 | Almost always/always 5 |
| 4. During sexual intercourse, how difficult was it to maintain your erection to completion of intercourse? | Did not attempt 0 | Extremely difficult 1 | Very difficult 2 | Difficult 3 | Slightly difficult 4 | Not difficult 5 |
| 5. When you attempted sexual intercourse, how often was it satisfactory to you? | Did not attempt 0 | Almost never/never 1 | A few times 3 | Sometimes 4 | Most times 5 | Almost always/always 5 |
| <p>ED is an issue that impacts relationships:</p> <ul style="list-style-type: none"> • Have you discussed your ED issues and concerns with your partner? • Is your partner willing to attend appointments with health care professionals with you to learn more about this problem? | | | | | | |