Topics in Primary Care Medicine

Evaluation of Impotence

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"Topics in Primary Care Medicine" presents articles on common diagnostic or therapeutic problems encountered in primary care practice. Physicians interested in contributing to the series are encouraged to contact the series' editors.

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Impotence is a prevalent and distressing problem. Not infrequently, impotence is a symptom of a medical disease or a side effect of drug therapy. The proper management of a case of impotence requires, besides technical medical competence, understanding the patient's important relationships and his attitudes towards sexuality. Finally, impotence is an interdisciplinary problem. A comprehensive initial evaluation should be undertaken by the primary practitioner before consultation with an endocrinologist, urologist, vascular surgeon or sex therapist if inappropriate referrals are to be avoided.

Prevalence and Underdiagnosis

Impotence, defined as a failure to achieve an erection adequate for intercourse in 25% or more of attempts, increases with advancing age. At age 40, about 1.5% of otherwise healthy men have impotence. At age 60, the prevalence increases to 10% to 25%, and at age 70 to 30% to 55%. Impotence in an elderly man, however, should not be accepted as normal by a physician any more than one would accept the development of cataracts. The overall prevalence of impotence in adult men with medical problems is between 10% and 35%. It is likely more common in medical clinic patients than in healthy men, but age-matched data are difficult to find. The prevalence of impotence clearly depends on the population examined. In populations with a high prevalence of diabetes mellitus, other endocrine disorders or vascular disease, more impotence will be found. However, in a study of consecutively questioned patients in the general medical clinic at the Minneapolis Veterans Administration (VA) Medical Center, the prevalence of impotence was 34%. Even more remarkable, only 1.5% of patients who complained of impotence as conventionally defined had discussed it with their physicians. Undoubtedly several factors contribute to the underdiagnosis of impotence by primary physicians. Patients are often tentative in their initial complaint and may use idioms to describe sexual dysfunction that are unfamiliar to their physicians. Conversely, in reviewing systems, a physician may use terminology that is unfamiliar to the patient and fail to elicit the complaint. Finally, feeling that impotence is generally psychogenic and therefore outside his or her expertise, a physician may not ask after the difficulty at all.

Pathophysiology

A brief review of male sexual physiology is useful in understanding the medical, psychologic and pharmacologic conditions associated with impotence. The components of male sexual performance are libido, erection, emission, ejaculation and orgasm. The mechanisms by which specific diseases interfere with sexual function are listed in Table 1.

Libido, or desire for sexual intercourse, is cortically mediated. Testosterone plays a permissive role but is clearly insufficient alone. Conditions that interfere with a normal libido include all degrees of psychologic disturbance, from stress following an argument to major psychiatric illness. Endocrine conditions, particularly primary and secondary hypogonadism, thyroid dysfunction, Cushing's disease and prolactinoma, also impair libido. Finally, poor general health and the presence of serious medical disorders which limit stamina also quite typically affect libido. It should be noted, however, that our culture attaches such importance to a vigorous libido that many patients with a serious endocrinopathy or psychological disorder will state that their interest in intercourse is unaffected and that the primary problem is erectile dysfunction. Therefore, the stated presence of a normal libido should not be taken to exclude these cortically mediated problems.

Erection is a complex phenomenon in which two separate nervous centers participate. In addition, the process requires adequate blood flow and normal erectile structures in the penis. The cortical erectile center appears to be located in the limbic brain and to be a dopaminergic system. Its outflow, which is α-adrenergic, is at the T-12 to L-2 spinal cord level. The function of the cortical erectile center may be impaired by

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thoracic spinal cord lesions and by anatomic or pharmacologic interference with the sympathetic nervous system. The second erectile center, the reflexogenic center, is located at L-2 to L-4 and is a part of a parasympathetic spinal cord reflex loop. Trauma and surgical repair of the sacral cord may result in impotence through ablation of the reflexogenic erectile center. Anticholinergic agents, including antihistamines and antidepressant and antipsychotic agents, may produce a pharmacologic parasympathectomy and impotence. Antihypertensive drugs that act through ganglionic blockade probably interfere with sexual function in this manner as well. Pelvic fractures and extensive pelvic surgical repair can cause impotence if the pelvic plexus is disrupted. Vascular insufficiency resulting in impotence usually reflects extensive atherosclerosis and may cause a classic Leriche's syndrome, although impotence may be present without claudication. Occasionally vascular insufficiency reflects a surgical accident or posttraumatic anatomy. Impotence develops in 30% to 50% of men with diabetes mellitus; a proportion appears to result from diabetic macrovascular complications as well as from autonomic neuropathy. Mechanical disorders of the penis prevent a normal erection while inflammatory conditions such as balanitis, urethritis and prostatitis may cause pain and secondarily impotence. Impotence is a common complication of recurrent priapism.

Emission—the delivery of semen into the proximal urethra and closure of the internal vesical sphincter—and ejaculation are primarily sympathetically mediated processes, in contrast to the parasympathetic control of erection. Traumatic and anatomic disruption of the sympathetic nervous system, such as pelvic node dissection and lumbar sympathectomy, and the use of sympatholytic drugs, may result in impotence. Retrograde ejaculation is the sexual dysfunction that particularly reflects the loss of α-adrenergic input.

Orgasm is the least understood component of male sexual performance. It appears to be cortically mediated. The reports of patients with spinal cord injuries and certain elderly men with erectile dysfunction suggest that orgasm can be experienced independent of erection and ejaculation.

The Relative Importance of Organic and Psychogenic Factors

It would be of great use to clinicians to know the relative prevalence of the causes of impotence. It is commonly stated that 90% of impotence is psychogenic. There are no data to support this assertion, however. Available data reflect the epidemiology of self-selected patients and patients referred to subspecialty clinics and may not be generalizable to primary care (Table 2). It is important to note that the Minneapolis VA study, which was relatively free of subspecialty bias, showed a preponderance of organic causes. In this study, of the 401 screened men who admitted impotence, 188 elected to have further workup. Patients declining workup tended to be slightly older, with more medical diagnoses and medications. Of the 188 men who underwent evaluation, 80% were found to have impotence on an organic basis, while 14% were felt to have psychogenic impotence. Of the evaluated group, 38% had endocrine disease, particularly primary and secondary hypogonadism, hypothyroidism, hyperthyroidism and prolactinomas, and 25% had a medication side effect as the underlying cause of impotence. Thus, while no study definitively establishes the relative importance of the various causes of impotence, it is clearly erroneous to assume that impotence always has a psychogenic cause. Upwards of half of all cases may reflect organic difficulties, particularly endocrine disease and medication side effects.

Evaluation of a Patient With Impotence

The first step in the evaluation of impotence is to establish that the symptom is present. A physician must be alert to

TABLE 1.—*Components of Male Sexual Response and Mechanisms of Impotence*

Response	*Physiology*	*Disorders Causing Impotence*
Libido	Cortical, testosterone required	Psychic: fatigue, stress, performance anxiety, depression, relationship disturbance, profound psychiatric disorders
		Sedation and sedative abuse
		Endocrine disease: testosterone deficiency, elevated prolactin, thyroid disease
		Poor general health
Erection	Cortical erectile center, sympathetic outflow at T-12 to L-2	Diseases of limbic system
		Cord injuries and diseases: transection above T-11 (90% have reflexogenic erection), multiple sclerosis, tabes
		Sympathetic neuropathies: surgical—aortoiliac bypass, lumbar sympathectomy, node dissection, AP resection of rectum; pharmacologic—sympatholytic antihypertensives, α-blockers including phenothiazines
	Reflexogenic erectile center, parasympathetic spinal reflex S-1 to S-4	Cord injuries and diseases: destruction of sacral cord (20% have cortical erections)
		Parasympathetic neuropathies: surgical—AP resection of the rectum; pharmacologic—anticholinergics, antidepressants, antihistamines, antipsychotics
	Vascular supply and normal erectile tissue	Vascular diseases: atherosclerosis, trauma
		Penile diseases: Peyronie's disease, chordee, microphallus, priapism
Emission and ejaculation	Sympathetic thoracolumbar reflex	Sympathetic neuropathies: surgical, as in cortical erectile center dysfunction; pharmacologic, especially guanethidine, thioridazine hydrochloride
Orgasm	Cortically mediated, independent of erection and ejaculation	

AP = anteroposterior

TABLE 2.—*Effect of the Study Population on the Relative Prevalence of the Various Causes of Impotence*

Cause of Impotence	Study Populations: 105 Patients in Whom a Serum Testosterone Level Was Measured,* Percent	188 General Medical Patients Undergoing Evaluation,† Percent	165 Patients Referred to Urology Clinic,‡ Percent
Psychogenic	14	14	51
Organic	66	80	47
Medication	7	25	2
Alcohol	3	0	1
Neurologic (excluding diabetes)	0	7	4
Vascular/penile	0	6	15
Endocrine	51	38	25
Primary and secondary hypogonadism	26	19	25
Diabetes	7	9	...
Other: thyroid prolactin	18	10	...
Miscellaneous	5	4	9
Mixed/unknown	19	7	2

*Spark RF et al (JAMA 1980; 243:750-755).
†Slag MF et al (JAMA 1983; 249:1736-1740).
‡Montague DK et al (Urology 1979; 14:545-548).

tentative comments by the patient about this intimate topic. The use of concrete description and lay terminology is often more productive in eliciting the complaint during a review of symptoms than the use of medical terms. Once it has been established that the patient suffers from impotence, the goal of the evaluation is to uncover the cause. Because many organic causes of impotence are not associated with a hormonal disruption, it should not be assumed that all impotence occurring in patients with a normal testosterone level is psychogenic. The evaluation should instead proceed in an orderly manner. The interview should permit clarification of the sexual problem, documentation of the general sexual history and evaluation of the relationship in which the dysfunction is occurring. This can be accomplished and a directed physical examination done in three brief visits, as shown in Table 3. None of the visits need devote more than 15 minutes to discussing the sexual dysfunction; the workup can thus be accommodated within a busy clinic schedule. If the patient and physician are well known to one another, there may be little barrier to discussing sexual function and the evaluation can proceed even more expeditiously.

The first visit is devoted in large part to the patient's narration of his symptom history. There are typically very strong feelings attached to this problem; having established that the physician is comfortable with the subject matter, patients are often eager to describe the difficulties they have. After an initial unstructured and patient-directed history, the physician should ask about the onset and the emotional setting of the initial episodes of impotence, current level of libido and presence or absence of morning erections. Patients should be asked about the number of sexual partners and whether impotence occurs uniformly or is restricted to a particular consort. A brief review of symptoms to screen for depression and general medical, endocrine and vascular diseases should be undertaken. In addition, the patient should be questioned about alcohol, prescription drug, over-the-counter and illicit drug use. Numerous drugs are associated with impotence by a variety of mechanisms (Table 4); antihypertensive drugs are a

TABLE 3.—*Three-Visit Assessment of a Patient With Impotence*

- First Visit
  - Patient's narration
  - Physician-directed clarification
  - Review for presence of general medical problems and depression
  - Patient's view of the problem
  - Initial assessment and plan
- Second Visit
  - Patient's review of the problem
  - General sexual history
  - Physical examination: vascular, neurologic, genital
  - Assessment and plan
- Third Visit
  - Patient introduces sexual partner
  - Partner's view of the problem
  - Assessment of health of relationship and communication skills
  - Assessment and plan—decision regarding laboratory workup and/or referral

particularly troublesome cause of iatrogenic impotence. The reported prevalence of erectile disorders in patients on antihypertensive therapy is listed in Table 5. It may be useful to ask the patient why he thinks he has the difficulty; this information provides both useful diagnostic clues and insight into the symbolic value of the dysfunction for the patient. Finally, the physician should close with a provisional assessment and explanation to the patient of the next step.

At the second visit the patient is given an opportunity to review the problem and, not uncommonly, will add new or different information. At this time, the general sexual history, which may seem intrusive to the patient at the time of the first visit, can be obtained. A directed physical examination is made, noting in particular general medical condition, evidence of endocrine dysfunction, autonomic neuropathies and vascular insufficiency. On genital examination, the testicles, prostate and phallus are assessed. Evidence of testicular atrophy, microphallus, the corporeal plaques of Peyronie's dis-

TABLE 4.—*Commonly Used Drugs Associated With Impotence and Postulated Mechanism of Action*

Sexual Response	*Mechanism of Action*	*Drugs*
Libido	Sedation	Antihypertensives: methyldopa, reserpine, clonidine, β-antagonists; alcohol; narcotics; minor tranquilizers, barbiturates; phenothiazines; baclofen
	Testosterone antagonism	Alcohol, marijuana, spironolactone, cimetidine, estrogen, digoxin
	Elevation of prolactin	Narcotics, phenothiazines, methyldopa
Erection	Parasympatholysis	Atropine, benztropine, propantheline; disopyramide, metoclopramide; antidepressants, especially amitriptyline; antipsychotics, especially chlorpromazine and thioridazine; antiparkinsonian drugs/antihistamines
Ejaculation	Sympatholysis	Antihypertensives: guanethidine, phenoxybenzamine, prazosin; monoamine oxidase inhibitors; antipsychotics, especially thioridazine

TABLE 5.—*Estimated Prevalence of Impotence Associated With Antihypertensive Therapy**

Antihypertensive Therapy	*Percent*
Untreated (receiving placebo)	10
Diuretic—thiazide	19
β-Blocker—propranolol	15
Centrally active agents—	
guanethidine	60
reserpine	30
clonidine	24
methyldopa	30
prazosin	†
Vasodilators—	
hydralazine	Occasional
minoxidil	Rare
captopril	Occasional

*Prevalence is expressed as percentage for convenience, although the number of subjects on which these percentages are based is often quite small.
†Rarely reported but common in clinical practice, especially at higher doses.

ease, phimosis, balanitis and prostatic disease is particularly sought. This session should again close with a statement by the physician indicating his or her working assessment and plan for the next step.

The third visit should include the regular sexual partner if the patient is willing. During this visit, the partner's view of the difficulty can be presented. As the physician explores the difficulty with the couple, it is important to make an initial assessment of the health of the relationship and the ability of the partners to communicate about sexual matters. There is often an opportunity to provide education and correct misconceptions. This visit also closes with the statement of the physician's assessment of the problem and plans for a further evaluation, including laboratory tests and consultation.

Often a three-visit evaluation as described above will be enough to clarify the mechanism of impotence (Figure 1). When impotence is due to psychological causes, the relative importance of performance anxiety, minor disturbances and

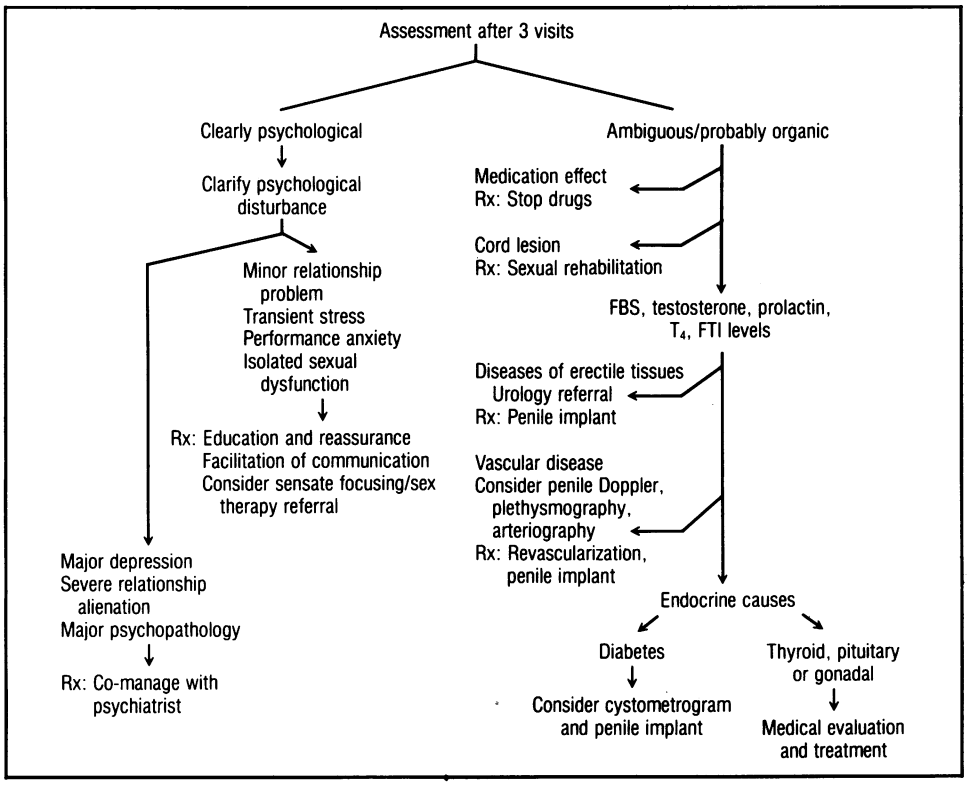

Figure 1.—Further evaluation of a man with impotence. FBS = fasting blood sugar, FTI = free thyroxine index, T_4 = thyroxine

major intrapsychic or interpersonal disorders should be estimated. Men whose impotence is related to fatigue or stress that can be expected to be brief in duration will usually require only an explanation of the phenomenon and reassurance. Couples in fundamentally healthy relationships who have poor communication skills may benefit from more formal sex therapy, possibly including sensate focusing. More profound disturbances, including gender misidentification, severe depression, psychotic disorders and profound relationship alienation, are appropriately managed in consultation with a psychiatrist.

In situations in which impotence is not unequivocally psychogenic, evaluation to exclude organic causes is appropriate, as reassurance, sex therapy and psychiatric consultation cannot be expected to fully address the problem. If therapeutic or recreational drug use may be contributing, the response to a drug-free period, if feasible, should be evaluated before laboratory evaluation and referral. Men who are abusers of alcohol can be expected to recover sexual function when abstinent, if a physical examination does not show testicular atrophy, palmar erythema, spider angiomata or other signs of estrogenization. Patients in whom cord injury, a cord operation or spinal cord disease is causing impotence may benefit from sexual rehabilitation techniques. Patients in whom a psychogenic, spinal cord or drug-induced cause is not apparent should have determination of serum prolactin, thyroxine, thyroid-stimulating hormone, serum testosterone and random blood glucose levels. The use of nocturnal penile tumescence testing is unnecessary and may be misleading, as partial tumescence without turgidity adequate for intercourse may occur in a patient with organic impotence. If a low serum testosterone level is found, primary gonadal failure should be distinguished from pituitary disease by determining serum luteinizing and follicle-stimulating hormone levels. Impotence associated with thyroid disease resolves with the treatment of the primary disorder. Impotence associated with diabetes may be helped by a penile prosthesis. If results of these studies are normal, vascular or penile disease may be the cause of impotence. Determination of the brachial-penile blood pressure ratio and arteriography permit identification of macrovascular disease but a bypass operation is rarely successful in correcting vasculogenic impotence. Rather, these patients should be referred to a urologist and considered for a penile implant. Preliminary experience with the intracavernosal injection of papaverine combined with duplex Doppler scanning of the penile artery suggests that this technique is useful in distinguishing patients with severe arterial insufficiency from those with endocrine, hormonal and psychogenic impotence and in predicting the response to yohimbine, an oral vasodilator. Urologic consultation is also appropriate in those in whom a general evaluation had shown disease of the erectile tissues.

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