Routine cardiac assessment is not necessary for all patients with erectile dysfunction

Naif Alhathal, MD; Serge Carrier, MD, FRCSC

Division of Urology, Department of Surgery, McGill University, Montreal, QC

Cite as: *Can Urol Assoc J* 2011;5(5):349-51; DOI:10.5489/cuaj.11218

Erectile dysfunction (ED) is defined as the persistent inability to achieve and/or maintain an erection sufficient for satisfactory sexual performance. The combined prevalence of minimal, moderate and complete ED was reported as high as 52% from the Massachusetts Male Aging Study.[1] At age 40, there is an about a 40% prevalence rate, increasing to almost 70% in men at age 70.[1] In Canada, a similar overall prevalence of ED was reported (49.4%).[2] In addition, ED been shown to have a negative impact on a patient's quality of life, sexual relationships and overall well-being.[3] The etiology of ED fits in one of 3 categories: organic, psychogenic or, most commonly, a combination of both.

Phophodiesterase-5 (PDE) inhibitors revolutionized ED treatment and is the first-line treatment. These agents have been shown to be effective with good safety profiles in a comorbid population of men with ED, including patients with vascular disease, coronary artery disease (CAD), hypertension and diabetes.[4-6] Treatment options for patients not responding to oral drugs (or contraindicated) include intracavernous injections, intraurethral alprostadil, vacuum-constriction devices and penile prosthesis.[7]

ED, endothelial dysfunction and metabolic syndrome (MetS)

Vasculogenic ED and generalized vascular disease might have a hypothetical link through a common pathophysiologic mechanism "endothelial dysfunction," an inability of the smooth muscle cells lining the arterioles to relax; this prevents vasodilatation. Diabetic patients with ED exhibited abnormal blood pressure and platelet-aggregation responses (markers of endothelial function) than diabetic men without ED; this resulted in impaired arteriolar dilatation and ED.[8]

Metabolic syndrome is a complex of symptoms that includes obesity, insulin resistance, hypertension and dyslipidemia. Most (if not all) patients with metabolic syndrome report varying degrees of ED.[9] Therefore, endothelial dysfunction with reduced nitric oxide activity is the link between metabolic syndrome and ED.[10]

ED and silent (subclinical) coronary artery disease

An association between ED and CAD has been suggested based on similar risk factors, in addition to the presence of endothelial dysfunction as a trigger for the pathogenesis of atherosclerosis. A high prevalence (up to 75%) of ED was reported in patients with established CAD and, interestingly, the severity of ED, but not ED prevalence, was significantly correlated with the number of coronary vessels involved.[11] However, the prevalence of silent CAD in the setting of ED is under reported. Subclinical coronary artery atherosclerosis can be detected non-invasively with the use of multi-slice computed tomography (MSCT). Coronary artery calcification was more frequent in individuals with ED than in age-matched controls with similar coronary risk score.[12] Furthermore, Vlachopoulos and colleagues reported angiographically documented silent CAD in 19% of patients with vasculogenic ED.[13] Conversely, the extent and prevalence of coronary artery calcification (atherosclerosis) in ED patients could not be predicted by the presence of traditional risk factors for cardiovascular disease.[12]

ED and future cardiac events

Erectile dysfunction has been suggested to be an early sign of generalized vascular disease; ED patients may be at risk of later developing CAD.[14] Additionally, ED is dependent on the presence and extent of asymptomatic atherosclerosis, including that of the coronary arteries, and precedes the development of clinically evident CAD by a significant

amount of time.[12-14] It was shown that in patients with established CAD, ED was diagnosed in most CAD patients by an average of 2 to 3 years, however, up to one third of patients with CAD did not complain of ED.[15] This is of great clinical importance as timely intervention of cardiac risk factor in patients with ED who are at risk of developing CAD could prevent future cardiac events. So far, it is not clear whether why cavernous arteries are more sensitive to systematic atherosclerosis (ischemia), than coronary arteries, in the setting of generalized vascular inflammation and endothelial dysfunction. One possible explanation is the "artery size hypothesis" where cavernosal artery has a smaller diameter than the larger vessels in the heart.[16] Nevertheless, acute coronary syndrome is more related to sudden plaque rupture rather than the insidious course of progressive penile ischemia related to cavernous artery disease.

Sexual dysfunction and cardiac risk

Patients with ED should be assessed initially during the history taking to assess for the extent and type of cardiovascular status present according to Princeton II Consensus Conference risk stratification (Table 1). The low-risk category includes asymptomatic patients with <3 cardiovascular risk factors, controlled hypertension, mild-stable angina pectoris, post-revascularization with no significant residual ischemia, myocardial infarction >6 weeks previously, mild valvular disease, left ventricular dysfunction (New York heart association class I), pericarditis, mitral valve prolapse and atrial fibrillation with ventricular response.[17] Patients with ED without these criteria fit into either intermediate- or high-risk categories. Patients categorized as low-risk require no special cardiac testing or evaluation prior to the initiation of treatment for ED and resumption of sexual activity, and they can be managed within primary care.[17] Sexual activity should be deferred until stabilization of cardiac condition in high risk category (Table 1). Patients in the intermediate-risk category require further cardiac evaluation so that they can be definitively classified as low- or high-risk (Fig. 1).

Table 1. Risk categorization for sexual activity

Risk classification	Risk factors
Low	- Asymptomatic, < 3 cardiovascular risk factors
	- Controlled hypertension
	- Mild, stable angina pectoris
	- Postrevascularisation (no significant residual ischemia)
	- MI > 6 weeks previously
	- Mild valvular disease
	- Left ventricular dysfunction (New York Heart Association class I)
	- Pericarditis
	- Mitral valve prolapse
	- Atrial fibrillation with controlled ventricular response
Intermediate	- Asymptomatic, ≥ 3 cardiovascular risk factors (excluding gender)
	- Moderate, stable angina pectoris
	- Recent MI (≥ 2 weeks, < 6 weeks)
	- Left ventricular dysfunction (NYHA class II)
	- Non-cardiac sequelae of atherosclerotic disease (peripheral vascular disease, history of stroke or transient ischemic attack)
High	- Unstable or refractory angina pectoris
	- Uncontrolled hypertension
	- Congestive heart failure (NYHA class III or IV)
	- Recent MI (< 2 weeks)
	- High-risk arrhythmia
	- Obstructive hypertrophic cardiomyopathy
	- Moderate–severe valvular disease, especially aortic stenosis

MI: myocardial infarction; NYHA: New York Heart Association. Adapted from Kostis et al.[17]

Rationale against routine cardiac assessment

We are not in favour of routine cardiac assessment for all ED patients, especially, healthy individuals with low cardiac risk. However, it is our practice to initiate cardiac risk stratification and complete cardiac assessment for patients with intermediate- to high-risk factors.[17] Another important consideration is that not all ED patients have arteriogenic causes (atherosclerosis); in contrast, a small, but significant, proportion of patients have ED secondary to veno-occlusive dysfunction, psychogenic ED, hypogonadism and neurogenic causes. However, when a patient presents with ED, it is an excellent occasion to modify some risk factors for CAD, such as smoking, to prevent further vascular deterioration. Nevertheless, it is intuitive to recommend cardiac assessment for patients with severe ED and comorbidities, as stated before, especially when cavernous artery disease present (low peak systolic velocity on penile duplex ultrasound).[11]

Initial assessment of cardiac status would include exercise treadmill testing, which maybe a good predictor of cardiac ischemia during sexual intercourse,[18] before proceeding with more invasive tests like angiography. Furthermore, there is emerging interest in a number of plasma pro-inflammatory biomarkers (e.g., high-sensitive C-reactive protein) which are simple blood tests; these biomarkers are promising in the diagnosis of silent CAD in ED patients.[19]

Modification of lifestyle factors in men with ED (i.e., weight reduction and increase in physical activity) is the first step in preventing future cardiovascular events.[20] Conversely, it is not clear whether modification of lifestyle factors has a great impact on ED, however, improvement in lifestyle factors is associated with huge positive impact on overall health.

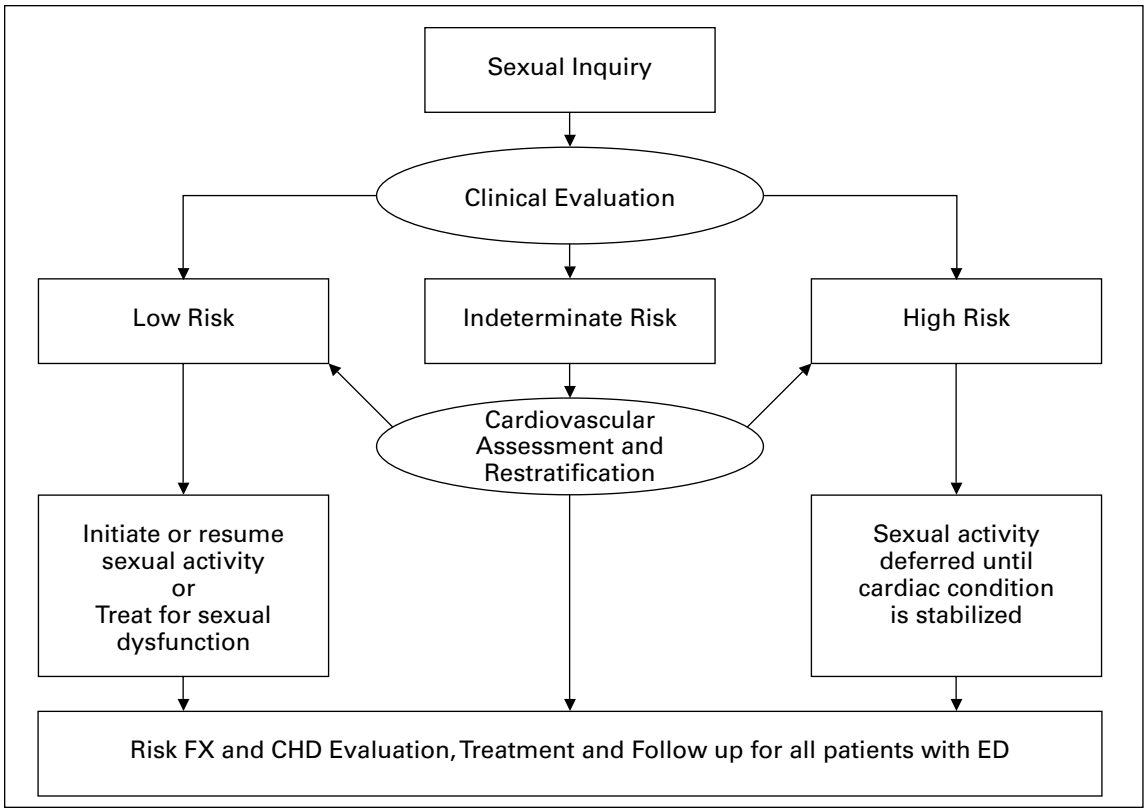

Fig. 1. Princeton II evaluation algorithm for men with erectile dysfunction.

Conclusion

Cardiac workup in patients seeking medical advice for ED should be considered for intermediate- to high-risk patients. Lifestyle changes and medical therapy for ED are safe and have additional benefits in treating ED treatment and reducing the risk of future cardiac events.

Competing interests: None declared.

This paper has been peer-reviewed.

References

1. Feldman HA, Goldstein I, Hatzichristou DG, et al. Impotence and its medical and psychosocial correlates: results of the Massachusetts Male Aging Study. *J Urol* 1994;151:54-61.
2. Grover SA, Lowensteyn I, Kaouache M, et al. The prevalence of erectile dysfunction in the primary care setting: importance of risk factors for diabetes and vascular disease. *Arch Intern Med* 2006;166:213-9.
3. Laumann EO, Paik A, Rosen RC. Sexual dysfunction in the United States: prevalence and predictors. *JAMA* 1999;281:537-44.
4. Goldstein I, Lue TF, Padma-Nathan H, et al. Oral sildenafil in the treatment of erectile dysfunction. Sildenafil Study Group. *N Engl J Med* 1998;338:1397-404.
5. Hellstrom WJ, Gittelman M, Karlin G, et al. Vardenafil for treatment of men with erectile dysfunction: efficacy and safety in a randomized, double-blind, placebo-controlled trial. *J Androl* 2002;23:763-71.
6. Guo YL, Viswanathan VP, Chiang HS, et al. Efficacy and safety of tadalafil taken as needed for the treatment of erectile dysfunction in Asian men: results of an integrated analysis. *Asian J Androl* 2009;11:423-33.
7. Wespes E, Amar E, Hatzichristou D, et al. EAU Guidelines on erectile dysfunction: an update. *Eur Urol* 2006;49:806-15.
8. De Angelis L, Marfella MA, Siniscalchi M, et al. Erectile and endothelial dysfunction in Type II diabetes: a possible link. *Diabetologia* 2001;44:1155-60.
9. Gündüz MI, Gümüs BH, Sekuri C. Relationship between metabolic syndrome and erectile dysfunction. *Asian J Androl* 2004;6:355-358
10. Vallance P, N Chan. Endothelial function and nitric oxide: clinical relevance. *Heart* 2001;85:342-50.
11. Greenstein A, Chen J, Miller H, et al. Does severity of ischemic coronary disease correlate with erectile function? *Int J Impot Res* 1997;9:123-6.
12. Chiurlia E, D'Amico R, Ratti C, et al. Subclinical coronary artery atherosclerosis in patients with erectile dysfunction. *J Am Coll Cardiol* 2005;46:1503-6.
13. Vlachopoulos C, Rokkas K, Ioakeimidis N, et al. Prevalence of asymptomatic coronary artery disease in men with vasculogenic erectile dysfunction: a prospective angiographic study. *Eur Urol* 2005;48:996-1002; discussion 1002-3.
14. Montorsi P, Ravagnani PM, Galli S, et al. Association between erectile dysfunction and coronary artery disease: Matching the right target with the right test in the right patient. *Eur Urol* 2006;50:721-31.
15. Montorsi P, Ravagnani PM, Galli S, et al. Association between erectile dysfunction and coronary artery disease. Role of coronary clinical presentation and extent of coronary vessels involvement: the COBRA trial. *Eur Heart J* 2006;27:2632-9.
16. Montorsi P, Montorsi F, Schulman CC. Is erectile dysfunction the "tip of the iceberg" of a systemic vascular disorder? *Eur Urol* 2003;44:352-4.
17. Kostis JB, Jackson G, Rosen R, et al. Sexual dysfunction and cardiac risk (the Second Princeton Consensus Conference). *Am J Cardiol* 2005;96:85M-93M.
18. Mikhail N. Management of erectile dysfunction by the primary care physician. *Cleve Clin J Med* 2005;72:293-4, 296-7, 301-5 passim.
19. Vlachopoulos C, Rokkas K, Ioakeimidis N, et al. Inflammation, metabolic syndrome, erectile dysfunction, and coronary artery disease: common links. *Eur Urol* 2007;52:1590-600.
20. Esposito K, Giugliano F, Di Palo C, et al. Effect of lifestyle changes on erectile dysfunction in obese men: a randomized controlled trial. *JAMA* 2004;291:2978-84.

Correspondence: Dr. Serge Carrier, Jewish General Hospital, 3755 Côte-Sainte-Catherine Rd, Montréal, QC H3T 1E2; serge.carrier@mcgill.ca