

# Sexual Health Among Cardiac Survivors



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# Why we talk about that !!

- Sexual activity is an important component of QOL
- Great concern for both cardiac survivors and their physicians
- Cardiac patients are often fearful of triggering MI during intercourse and may therefore have sex less frequently



# Sexual Satisfaction and the Importance of Sexual Health to Quality of Life Throughout the Life Course of US Adults

*Flynn et al. J Sex Med. 2016 November ; 13(11): 1642–1650. doi:10.1016/j.jsxm.2016.08.011.*

**Methods**—Data are from a cross-sectional, self-report questionnaire from a sample of 3515 English-speaking US adults recruited from an online panel that uses address-based probability sampling.

**Main Outcome Measures**—We report ratings of importance of sexual health to quality of life (single item with 5-point response) and the PROMIS<sup>®</sup> Satisfaction with Sex Life score (5 items, each with 5-point responses, scores centered on the US mean).

**Results**—High importance of sexual health to quality of life was reported by 62.2% of men (95% CI, 59.4%–65.0%) and 42.8% of women (95% CI, 39.6%–46.1%;  $P < .001$ ). Importance of sexual health varied by sex, age, sexual activity status, and general self-rated health. For the 55% of men and 45% of women who reported sexual activity in the previous 30 days, satisfaction with sex life differed by sex, age, race/ethnicity (among men only), and health. Men and women in excellent health had significantly higher satisfaction than participants in fair or poor health. Women with hypertension reported significantly lower satisfaction (especially younger women), as did men with depression or anxiety (especially younger men).

**Conclusion**—In this large study of US adults' ratings of the importance of sexual health and satisfaction with sex life, sexual health was a highly important aspect of quality of life for many participants, including participants in poor health. Moreover, participants in poorer health reported lower sexual satisfaction. Accordingly, sexual health should be a routine part of clinicians' assessments of their patients. Health care systems that state a commitment to improving patients' overall health must have resources in place to address sexual concerns. These resources should be available for all patients across the life span.

**Table 10** Reports of sexual problems at T1 (N = 42)

	Dublin centre (n = 19)		Non-Dublin centre (n = 23)	
	Men (n = 18)	Women (n = 1)	Men (n = 18)	Women (n = 5)
Lacked interest in sex	6 (33.3%)	1 (100%)	7 (38.8%)	3 (60%)
Did not find sex pleasurable	6 (33.3%)	1 (100%)	3 (16.6%)	3 (60%)
Were unable to come to orgasm	9 (50%)	1 (100%)	2 (11.1%)	2 (40%)
Felt anxious about performance	5 (27.7%)	1 (100%)	5 (27.7%)	2 (40%)
Came to orgasm too quickly ( <i>men only</i> )	5 (27.7%)	n/a	4 (22.2%)	n/a
Trouble maintaining an erection ( <i>men only</i> )	7 (38.8%)	n/a	7 (38.8%)	n/a
Pain during intercourse ( <i>women only</i> )	n/a	1 (100%)	n/a	4 (80%)
Trouble becoming lubricated ( <i>women only</i> )	n/a	1 (100%)	n/a	4 (80%)

n/a not applicable

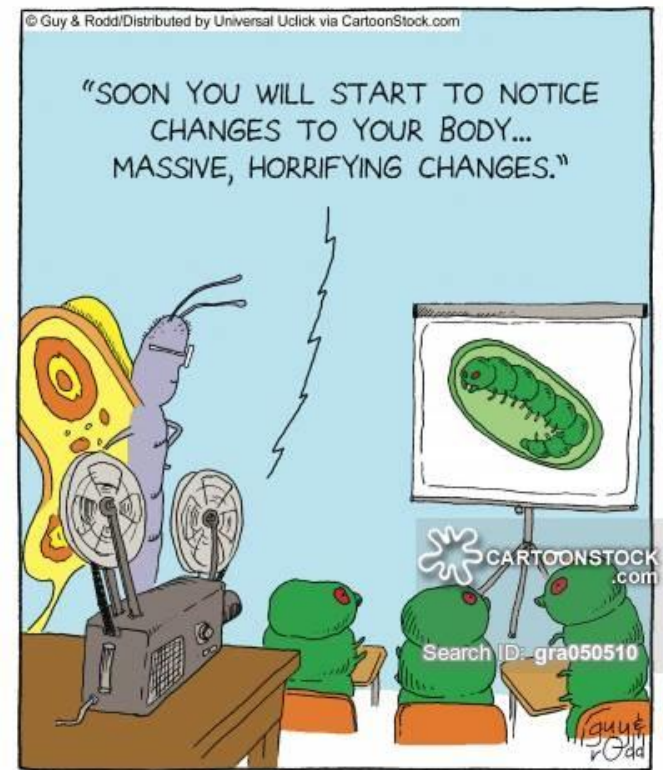
Murphy et al. *The CHARMS pilot study: a multi-method assessment of the feasibility of a sexual counselling implementation intervention in cardiac rehabilitation in Ireland*(2018) 4:88

# **Acute Cardiovascular Effects of Sexual Activity**

# CARDIOVASCULAR EFFECTS OF SEXUAL ACTIVITY

- Sexual activity : arousal, erection, ejaculation, orgasm, refractory period and resolution, dependent upon changes in autonomic nervous system
- Penile erection in men results from stimulation of parasympathetic nerves in the penis, reduced activity of sympathetic pathways, and the release of nitric oxide from the endothelium . ***The importance of nitric oxide constitutes the rationale for the use of sildenafil in men with sexual dysfunction***
- Early sexual arousal in women appears to result from sympathetic nervous system activation

- The main outflow to the cardiovascular system during sexual intercourse is sympathetic and is mediated by outputs from the brain carried by efferent pathways originating from the thoracic spinal cord
- ***Hemodynamic stress .....***



# Energy requirement during sexual activity to orgasm equals that spent during



1) Walking at 2 mph (3.2 km/h)

2) Climbing 2 flights of stairs comfortably in 20 sec

3) Cycling at 10 mph (16 km/h)

4) Walking at 4.2 mph (6.8km/h) and 16% Grade





# Energy Requirements (METs) of Selected Physical Activities

Activities	METs
■ Walking 2 mph, level	2
■ Walking 3 mph, level	3
■ Walking(6MWD), 241m	3
■ Sexual Activity, pre-orgasm	2-3
■ Sexual Activity, during orgasm	3-4
■ Climbing 2 flights of stairs	3-4
■ Cycling 10 mph, level	6-7
■ Walking 4.2 mph, 16% Grade (Bruce treadmill stage 4)	13

# Physiological Responses during Heterosexual Vaginal Intercourse

- During foreplay SBP, DBP and HR increase mildly
- More modest increases during sexual arousal
- The greatest increases occur during the 10 to 15 seconds of orgasm (HR rarely > 130 bpm and SBP rarely > 170 mm Hg in normotensive individuals), with a rapid return to baseline
- Men and women have similar responses

# Acute Cardiovascular Effects of Sexual Activity

- Sexual activity in young healthy married men with his usual partner is comparable to mild to moderate physical activity in the range of 3 to 4 METS
- This may not characterize all individuals, especially those who are older, are less physically fit, or have CVD
- Some patients, esp older people, may have difficulty reaching an orgasm for medical or emotional reasons and may exert themselves to a greater degree of exhaustion with relatively greater demand on their cardiovascular system

# **Sexual Activity and Cardiovascular Risk**

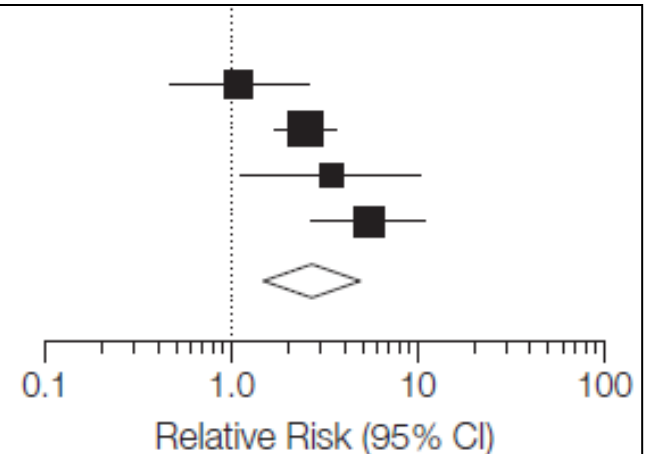
# Coital Angina “angina d’amour”

- Occurs during the minutes or hours after sexual activity - 5% of all anginal attacks
- Rare in patients who do not have angina during strenuous physical exertion
- More prevalent in sedentary individuals with severe CAD who experience angina with minimal physical activity
- If a patient can achieve an energy expenditure of 3 to 5 METs without demonstrating ischemia during exercise testing, then the risk for ischemia during sexual activity is very low

# Sexual Activity and MI

## Sexual activity: myocardial infarction

Möller et al, <sup>40</sup> 2001	659	1.10 (0.46-2.60)
Muller et al, <sup>14</sup> 1996	1633	2.50 (1.69-3.69)
Masoomi et al, <sup>41</sup> 2010	198	3.42 (1.13-10.42)
Baylin et al, <sup>34</sup> 2007	470	5.47 (2.71-11.03)
Test for heterogeneity: $I^2 = 64\%$ ; $P = .04$		2.70 (1.48-4.91)



- A meta-analysis of 4 case-crossover studies, including males in their 50 and 60, showed sexual activity was associated with **2.7 increased relative risk** of MI, compared with periods of time when the subjects were not engaged in sexual activity

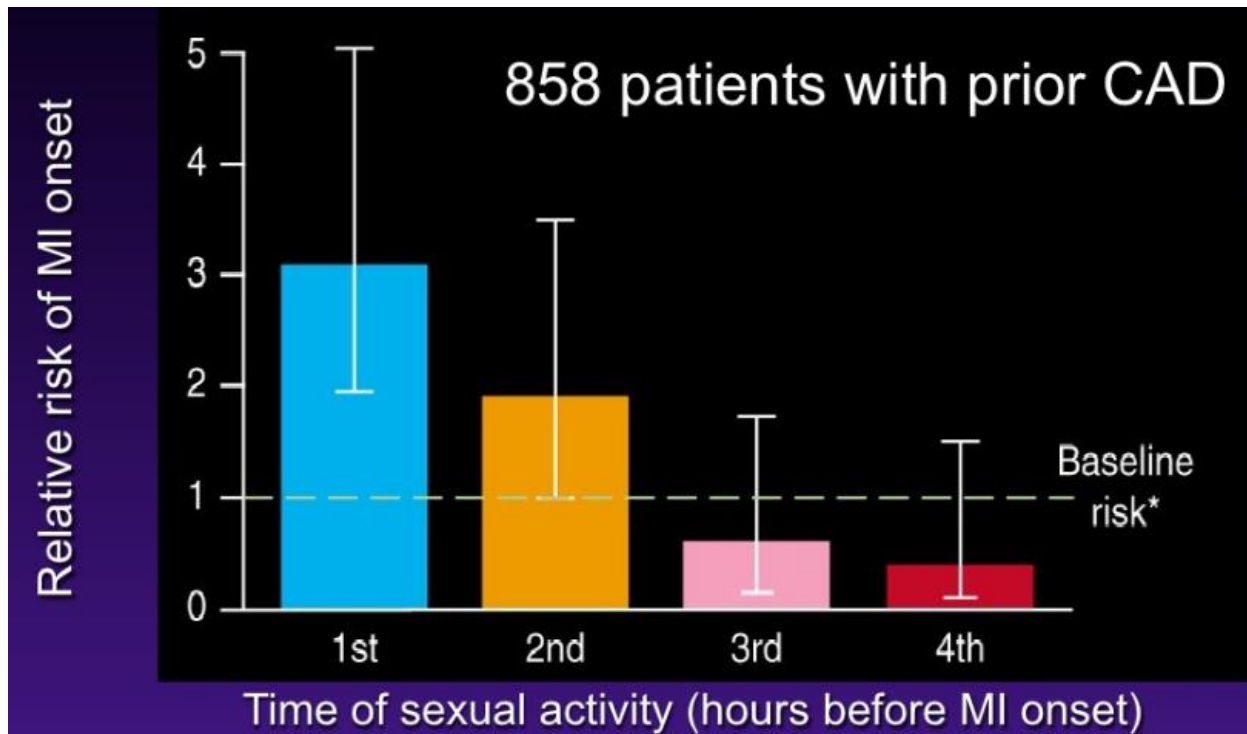
# Onset of MI Following Sexual Activity

- The absolute rate of events is very low because exposure to sexual activity is of short duration and constitutes a very small percentage of the total time at risk for myocardial ischemia or MI
- Sexual activity is the cause of **1%** of all acute MIs
- The absolute risk increase for MI associated with 1 hour of sexual activity per week is estimated to be 2 to 3 per 10 000 person-years

Dahabreh IJ, Paulus JK. Association of episodic physical and sexual activity with triggering of acute cardiac events: systematic review and meta-analysis. *JAMA*. 2011;305:1225–1233.

Muller et al. Triggering myocardial infarction by sexual activity. Low absolute risk and prevention by regular physical exertion. Determinants of Myocardial Infarction Onset Study Investigators. *JAMA* 1996; 275 (18): 1405-9

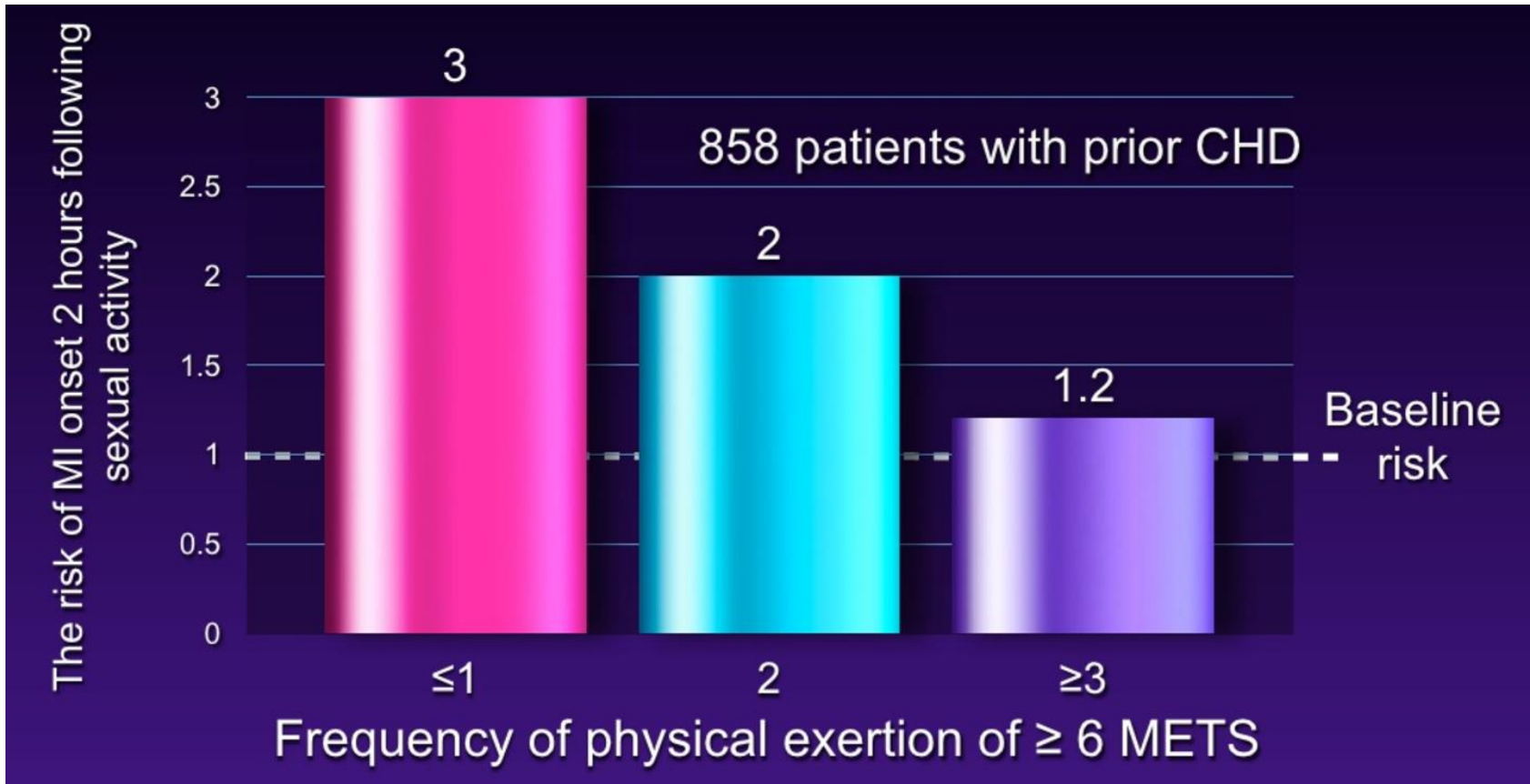
# Onset of MI Following Sexual Activity



858 patients with prior CAD Relative risk of MI onset Time of sexual activity (hours before MI onset)



# Protective Effect of Regular Exercise



Muller et al. Triggering myocardial infarction by sexual activity. Low absolute risk and prevention by regular physical exertion. Determinants of Myocardial Infarction Onset Study Investigators. JAMA 1996; 275 (18): 1405-9

# Sexual Activity and Ventricular Arrhythmias/Sudden Death

- Autopsy studies reported **low rates (0.6%–1.7%)** of sudden death related to sexual activity
- 82% to 93% were men, and the majority (75%) were having extramarital sexual activity with a younger partner in an unfamiliar setting and/or after excessive food and alcohol consumption
- The increase in absolute risk of sudden death associated with 1 hour of additional sexual activity per week is estimated to be 1 per 10 000 person-years

# Sexual Activity and CVD: General Recommendations

- Men and women with stable CAD who have no or minimal symptoms during routine activities can engage in sexual activity
- This includes patients able to achieve 3 to 5 METS during exercise stress testing without angina, ischemic ECG changes, hypotension, cyanosis, arrhythmia, or excessive dyspnea
- In patients with unstable or decompensated heart disease (i.e., unstable angina, decompensated heart failure, uncontrolled arrhythmia, or severe valvular disease), sexual activity should be deferred until the patient is stabilized

# According to the American College of Cardiology guidelines

- Resumption of sexual activity after uncomplicated MI is allowed after ;
  - 1) 1-2 weeks
  - 2) 3-4 weeks
  - 3) 6-8 weeks

# Sexual Activity after MI

- Before routine use of reperfusion therapy - sexual activity be avoided for 6 to 8 weeks after MI
- In 2005, Princeton Conference suggested that post -MI patients who had successful coronary revascularization or had a treadmill test without ischemia could resume sexual activity 3 to 4 weeks after MI
- ACC guidelines for the management of patients with STEMI allowed sexual activity as early as **1 week** after MI in the stable patient
- Because participation of stable patients in cardiac rehabilitation 1 week after MI has proved safe, resumption of sexual activity soon after uncomplicated MI seems reasonable in the stable patients who are asymptomatic with mild to moderate physical activity (eg, 3–5 METS).

# Sexual Activity after MI

- Exercise training during cardiac rehabilitation increases maximum exercise capacity and decrease peak coital heart rate
- Regular exercise is associated with a decreased risk of sexual activity–triggered myocardial infarction
- Thus, cardiac rehabilitation and regular exercise are reasonable strategies in patients with stable CAD who plan to engage in sexual activity

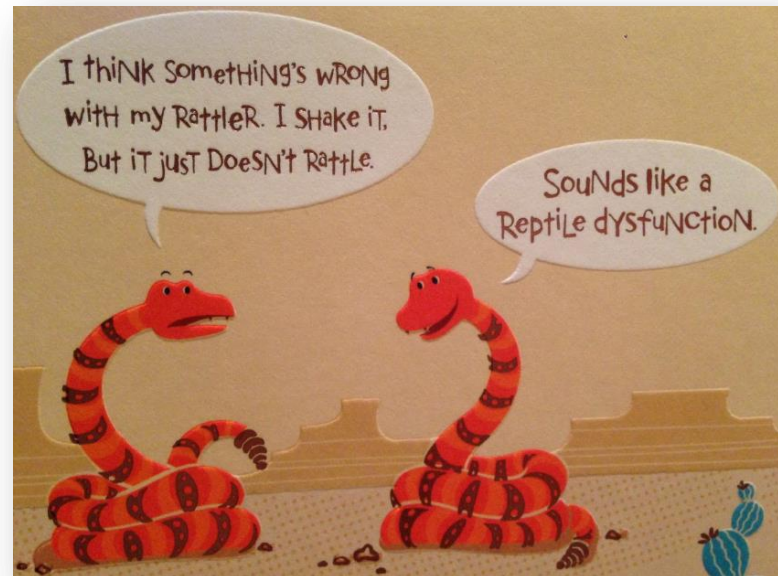
Muller JE, Mittleman MA, Maclure M, Sherwood JB, Tofler GH; Determinants of Myocardial Infarction Onset Study Investigators. Triggering myocardial infarction by sexual activity: low absolute risk and prevention by regular physical exertion. *JAMA*. 1996; 275: 1405– 1409

Stein RA. The effect of exercise training on heart rate during coitus in the post myocardial infarction patient. *Circulation*. 1977; 55: 738– 740.

# Sexual Activity after Percutaneous Coronary Intervention (PCI)

- The cardiovascular risk is related to the adequacy of coronary revascularization
- Complete revascularization should be able to resume sexual activity **within days of PCI**, provided there are no complications related to femoral vascular access
- PCI via radial access should be able to resume sexual activity as early as if not earlier than those who undergo PCI via the femoral access
- Incomplete revascularization, exercise stress testing may be of benefit in assessing the extent and severity of residual ischemia.

# Cardiovascular Drugs and Sexual Function





- Numerous classes of cardiovascular drugs, particularly  $\beta$ -blockers, are the cause of ED in many CAD patients

1) True

2) False

# Cardiovascular Drugs and ED

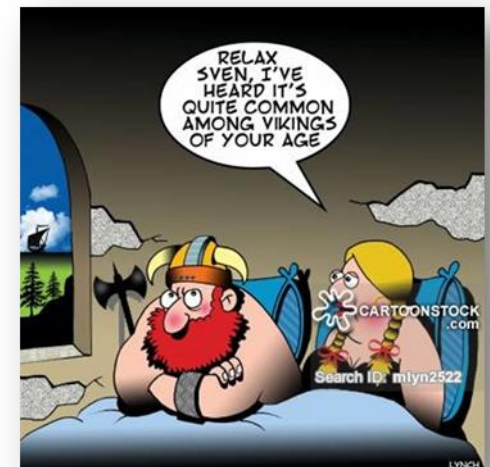
- Studies have not found clear relationships between many contemporary cardiovascular drugs and ED
- An analysis of 6 studies of 15 000 patients found  $\beta$ -blocker increased the annual rate of sexual dysfunction by only 5 reports per 1000 patients and the annual rate of ED by only 3 per 1000 patients
- A placebo effect, in which a patient's knowledge that a drug has been associated with ED, is an important contributing factor to ED
- Cardiovascular drugs that improve symptoms and survival should not be withheld because of concerns about the potential impact on sexual function

# Erectile Dysfunction

- ED is a remarkably common condition
- ED in a substantial majority of men is due to underlying vascular causes
- ED is highly prevalent in men with vascular risk factors for CVD

Table 4. Associations Between ED and Various Comorbid States

Comorbid Diagnosis	ED Absent*	ED Present*	Prevalence of ED Among Men With a Comorbid Diagnosis, %
Diabetes mellitus	3 675 146	3 572 607	49.3
Obesity	16 206 023	4 990 098	23.5
Heart disease	3 055 592	3 344 306	52.3
Hypertension	13 124 111	7 184 282	35.4
Smoking	20 088 443	3 543 914	15.0



Christopher S Saigal, Hunter Wessells, Jennifer Pace, Matt Schonlau, Timothy J Wilt.  
Predictors and prevalence of erectile dysfunction in a racially diverse population. Arch Intern Med. 2006;166:207-212

# Erectile Dysfunction

## Cardiovascular Aspects of Sexual Medicine

Graham Jackson, MD,\* Piero Montorsi, MD,<sup>†</sup> Michael A. Adams, PhD,<sup>‡</sup> Tarek Anis, MD,<sup>§</sup>  
Ahmed El-Sakka, MD,<sup>¶</sup> Martin Miner, MD,\*\* Charalambos Vlachopoulos, MD,<sup>††</sup> and Edward Kim, MD<sup>‡‡</sup>

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### ABSTRACT

**Introduction.** Erectile dysfunction (ED) is common and considered to be predominantly of vascular origin.

**Aim.** To evaluate the link between ED and coronary artery disease (CAD) and provide a consensus report regarding evaluation and management.

**Methods.** A committee of eight experts from six countries was convened to review the worldwide literature concerning ED and CAD and provide a guideline for management.

**Main Outcome Measure.** Expert opinion was based on grading the evidence-based medical literature, widespread internal committee discussion, public presentation, and debate.

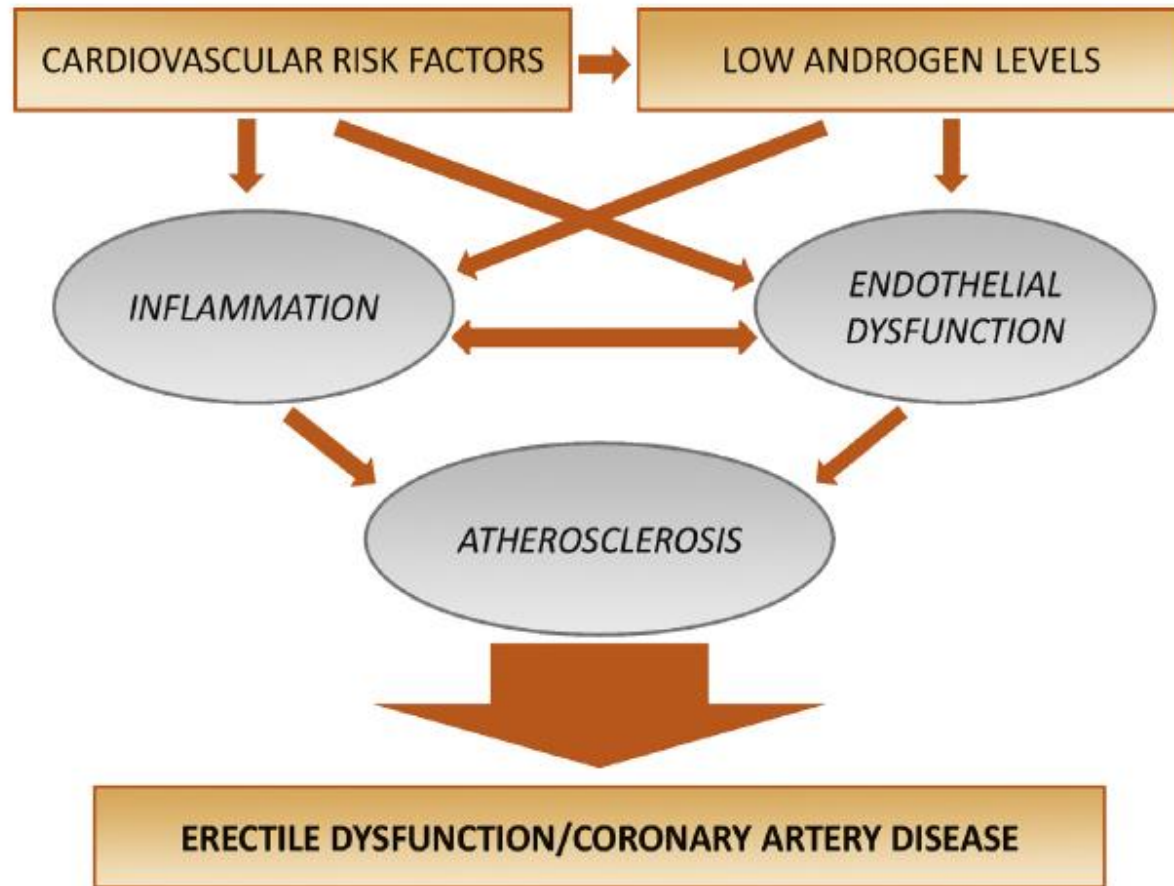
**Results.** ED and CAD frequently coexist. Between 50–70% of men with CAD have ED. ED can arise before CAD is symptomatic with a time window of 3–5 years. ED and CAD share the same risk factors, and endothelial dysfunction is the common denominator. Treating ED in cardiac patients is safe, provided that their risks are properly evaluated.

**Conclusion.** ED is a marker for silent CAD that needs to be excluded. Men with CAD frequently have ED that can be treated safely following guidelines. Jackson G, Montorsi P, Adams MA, Anis T, El-Sakka A, Miner M, Vlachopoulos C, and Kim E. Cardiovascular aspects of sexual medicine. *J Sex Med* 2010;7:1608–1626.

**Table 1** Shared risk factors

Coronary artery disease	Erectile dysfunction
Age	Age
Dyslipidemia	Dyslipidemia
Hypertension	Hypertension
Diabetes	Diabetes
Smoking	Smoking
Sedentary lifestyle	Sedentary lifestyle
Obesity	Obesity
Depression	Depression

# Pathogenesis of erectile dysfunction and CAD



Giorgio Gandaglia et al. A Systematic Review of the Association Between Erectile Dysfunction and Cardiovascular Disease; *European Urology* 65 (2014) 968–978

# Risk Factors of ED

## Traditional

- Age
- High LDL
- Low HDL
- Hypertension
- DM
- Smoking

## Underlying

- Obesity
- Sedentary lifestyle
- Atherogenic diet

## Emerging

- Insulin resistance/metabolic syndrome

# Princeton III Consensus Recommendations

- Comprehensive CV workup should include ED: Man with organic ED considered higher risk of cardiovascular disease until proven otherwise. ED is good predictor of CV event-Research shows that a man with ED may progress to a CV event in 2-5 years after ED diagnosis  
(Montorsi et al. Eur Urol. 2003; Hodges et al. Int J Clin Pract. 2007; Kostis et al. Am J Card. 2005)
- Low testosterone may increase mortality  
(Shores et al, 2006; Laughlin et al, 2008; Khaw et al, 2007; Haring et al, 2010; Malkin et al 2010; Tivesten et al, 2009; Menke et al, 2010; Vikan et al, 2009; Corona et al, 2010) Nehra et al. (2004). The princeton III consensus recommendations for the management of erectile dysfunction and cardiovascular disease. Mayo Clinic Proceedings, 87(8),

# Low T and the Heart

- Men with heart disease die sooner if their testosterone levels are low, a U.K. study shows
- It's becoming clear that low testosterone is a risk marker for heart disease in men
- Now it appears low testosterone predicts worse outcomes in men who already have heart disease



# Risks of Testosterone Replacement Therapy (TRT)

- Hepatic adverse effects with oral therapy
- Polycythemia
- Edema
- Gynecomastia
- Precipitation or worsening of sleep apnea
- Infertility
- Acceleration of BPH or Prostate Cancer

Petak S.M., et al. AACE Clinical Practice Guidelines. Available at:

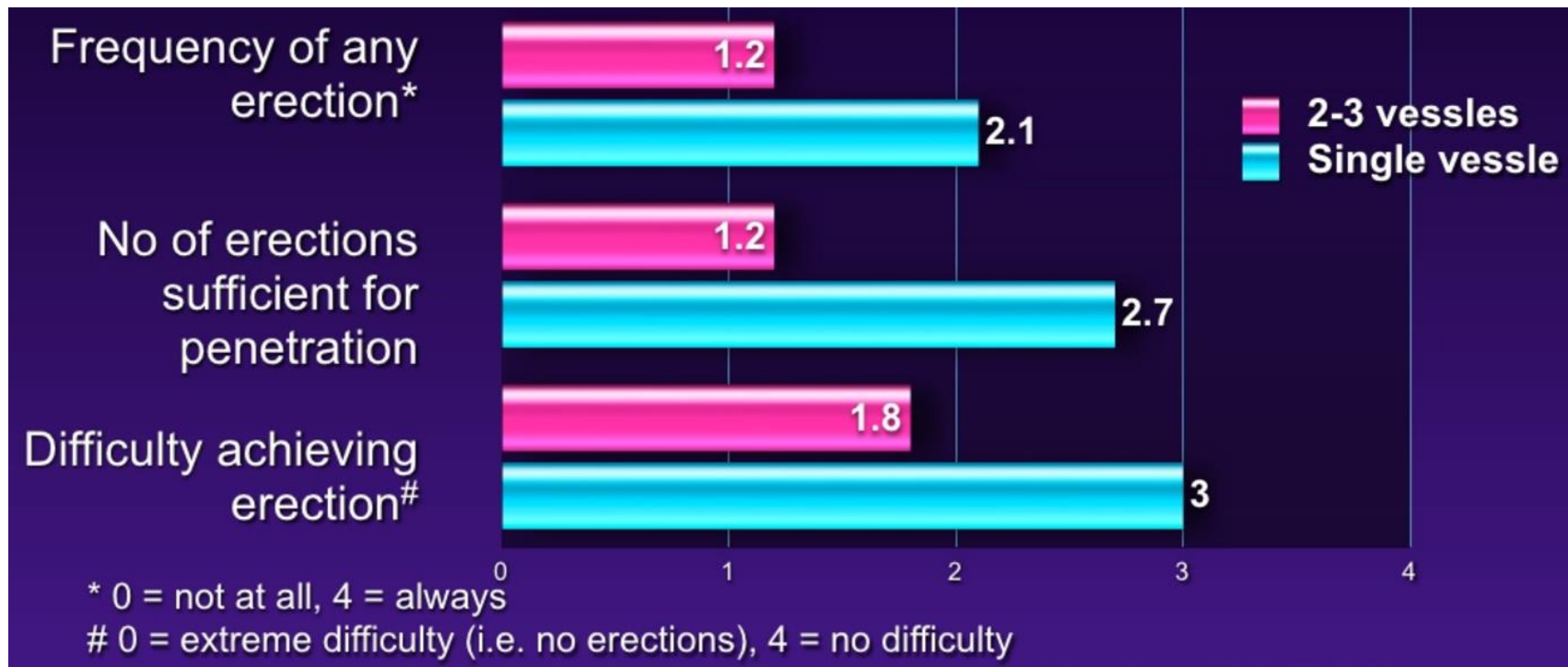
<http://www.aace.com/clin/guidelines/hypogonadism.html>. S.Leungwattanakij, et al. Mediguide to Urology 2000; 13:1.

# FDA Warning

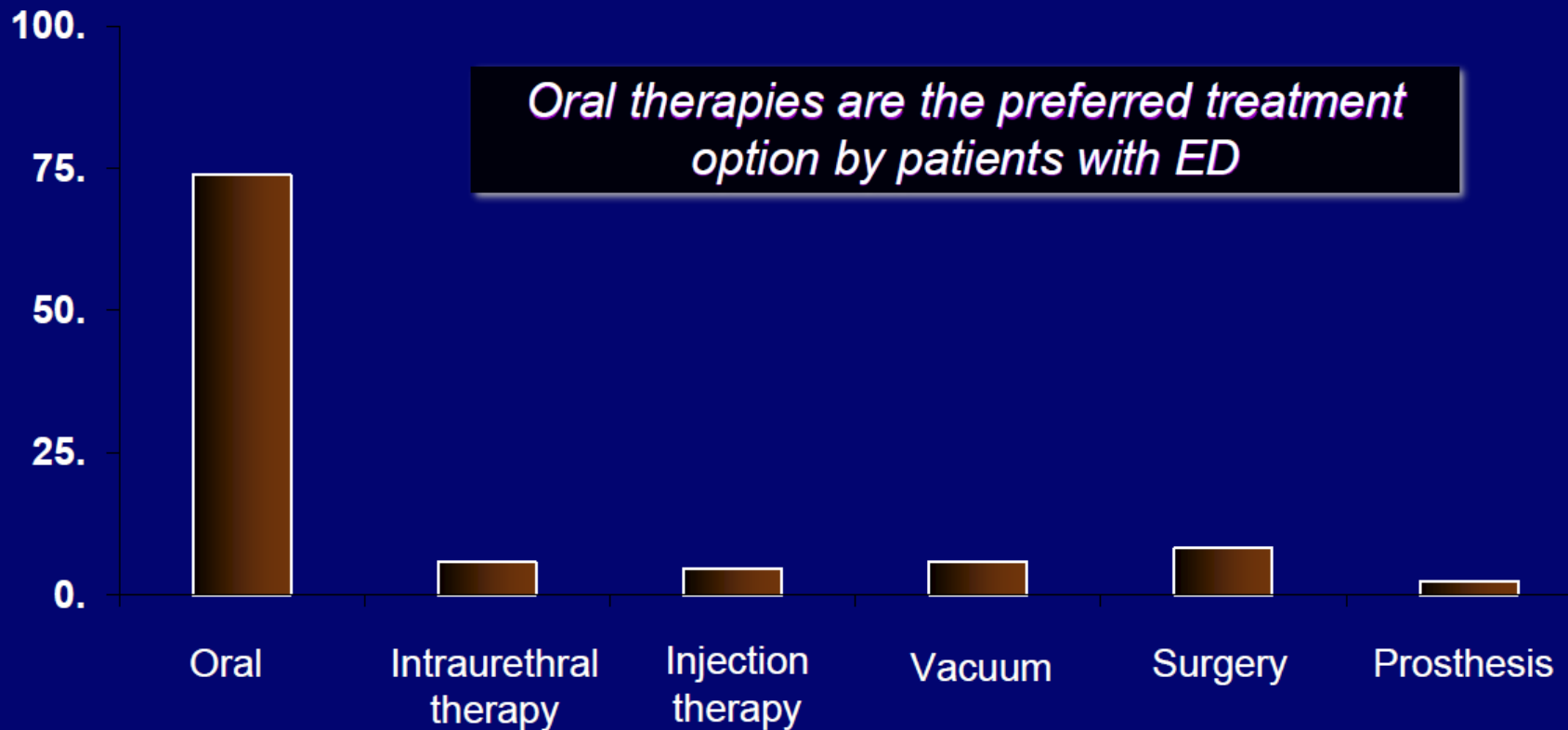
- Testosterone Can Kill
- Prescription testosterone products are approved for use only for men who have low testosterone levels due to disorders of the testicles, pituitary gland, or brain (hypothalamus) that cause hypogonadism
- FDA states that some studies have indicated increased risk of heart attack, stroke or death with testosterone treatment

# Degree of ED Related to Extent of CAD

Sexual activity in the previous month in patients with IHD



# Patient Preferences for ED Treatment Options



# **Safety of PDE<sub>5</sub> Inhibitors for Men with Ischemic Heart Disease**

# PDE<sub>5</sub> Inhibitors

- PDE Type 5 inhibitors primary drug class - oral erectile dysfunction therapy
  - Sildenafil (Viagra 24-100mg)
  - Vardenafil (LeVitra 5-20mg); Staxyn 10 mg dissolves on tongue
  - Tadalafil (Cialis 5-20mg); Daily 2.5-5mg
  - Avanafil (Stendra 50-200mg)
- Drugs are potent, selective inhibitors of type 5 phosphodiesterase - improve erectile function by inhibiting breakdown of cyclic GMP - smooth muscle relaxation enhanced

# PDE<sub>5</sub> Inhibitors for Cardiac Patients

- PDE<sub>5</sub> inhibitors are generally safe and effective for the treatment of ED in patients with arterial hypertension, stable CAD and compensated heart failure
- No studies have shown one agent to be more effective or safer than the others
- Despite occasional anecdotal case reports linking PDE<sub>5</sub> inhibitors to cardiac events, large trials and meta-analyses suggest that they are not associated with an increase in MI or cardiac events

Kloner RA. Cardiovascular effects of the 3 phosphodiesterase-5 inhibitors approved for the treatment of erectile dysfunction. *Circulation*. 2004; 110: 3149–3155

Kloner et al., Cardiovascular safety update of tadalafil: retrospective analysis of data from placebo-controlled and open-label clinical trials of tadalafil with as needed, three times-per-week or once-a-day dosing. *Am J Cardiol*. 2006;97: 1778–1784

# PDE<sub>5</sub> Inhibitors for Cardiac Patients

- The concomitant use of PDE<sub>5</sub> inhibitors and  $\alpha$ -blocking agents may result in symptomatic hypotension
- When both are indicated, the lowest  $\alpha$ -blocker dose should be initiated and tolerated by the patient before the patient begins the lowest dose of a PDE<sub>5</sub> inhibitor
- PDE<sub>5</sub> inhibitors should not be administered to treat ED in patients who are already receiving PDE<sub>5</sub> inhibitor therapy for pulmonary hypertension
- Vardenafil (but not sildenafil or tadalafil) carries a precautionary statement about prolongation of QT interval and should be avoided in patients with congenital QT prolongation and in those taking medications known to prolong the QT interval



# PDE<sub>5</sub> Inhibitors for Cardiac Patients

- Organic nitrates remain an **absolute contraindication** to PDE<sub>5</sub> inhibitor - may result in unpredictable reductions in SBP
- Patients with chest pain or acute MI **should not** be administered nitrates until **at least 24 hours after the last dose of sildenafil or vardenafil** and until **48 hours after the last dose of tadalafil**
- Chronic nitrate therapy who desire to use PDE<sub>5</sub> inhibitors, the need for continued nitrate therapy should be evaluated, particularly in patients who have undergone complete revascularization

Cheitlin et al; Technology and Practice Executive Committee. Use of sildenafil (Viagra) in patients with cardiovascular disease. *Circulation*. 1999; 99: 168–177

Kloner et al. Time course of the interaction between tadalafil and nitrates. *J Am Coll Cardiol*. 2003;42: 1855–1860

# **Patient and Partner Counselling after Myocardial Infarction**

# Sexual Counselling Following Acute Myocardial Infarction

- Sexual counselling of patients and partners with CVD is rarely provided
- Reasons include the lack of experience or comfort discussing sexual issues, inadequate knowledge regarding sexual activity and CVD, and limited time
- Partners of patients with CVD often have anxiety about sexual activity, which may adversely impact the sexual activity of the couple
- When information is provided, it is more likely provided in written form than verbally, more likely to be provided to men than to women, and rarely provided to the partner

# Sexual Counselling Following Acute Myocardial Infarction

- General suggestions to the patient:
  - well rested at the time of sexual activity
  - avoid unfamiliar surroundings and partners
  - avoid heavy meals or alcohol before sexual activity
  - use a position that does not restrict respiration
- Orgasm may require a greater degree of exertion and may not be a realistic initial goal in some patients after MI
- Randomized trials have demonstrated that sexual counselling increased the likelihood of return to sexual activity, improved sexual desire and satisfaction, and increased confidence and reduced fear of resuming sexual activity

# Take Home Messages

# Take Home Message

- It is reasonable that patients with CVD wishing to initiate or resume sexual activity after MI be evaluated with a thorough medical history and physical examination
- Exercise stress testing is reasonable for patients who are not at low cardiovascular risk or have unknown cardiovascular risk to assess exercise capacity
- Sexual activity is reasonable for patients who can exercise  $\geq 3$  to 5 METS without angina, excessive dyspnoea, ischemic ST-segment changes, cyanosis, hypotension, or arrhythmia

# Take Home Message

- Cardiac rehabilitation and regular exercise can be useful to reduce the risk of cardiovascular complications with sexual activity after MI
- Sexual activity is reasonable 1 or more weeks after uncomplicated MI if the patient is without cardiac symptoms during mild to moderate physical activity
- Sexual activity is reasonable for patients who have undergone complete coronary revascularization and may be resumed
  - several days after percutaneous coronary intervention if the vascular access site is without complications
  - 6 to 8 weeks after standard CABG, provided the sternotomy is well healed

# Take Home Message

- Cardiovascular drugs that can improve symptoms and survival should not be withheld because of concerns about the potential impact on sexual function
- PDE<sub>5</sub> inhibitors are effective and safe for the treatment of ED in patients with stable CAD
- Anxiety and depression regarding sexual activity should be assessed in patients with CVD
- Patient and spouse/partner counselling by healthcare providers is useful to assist in resumption of sexual activity after an acute cardiac event or new CVD diagnosis



# DOCTOR SATISFIED PATIENT

How to have sex after a heart attack?

Go slow, have therapy and DON'T go 'on top'



# Thank You

Sex three times a week  
lowers your risk of heart  
attack by 50%.

Here's to your health.



your  cards  
someecards.com

Hall, S. A., Shackelton, R., Rosen, R. C., & Araujo, A. B. (2010). Sexual activity, erectile dysfunction, and incident cardiovascular events. *The American Journal of Cardiology*, 105(2), 192-197.