

Prevalence of Erectile Dysfunction in Men with Ischemic Heart Disease in a Tertiary Hospital in Malaysia

K C Koh, MMed (Internal Medicine)

Department of Medicine, Clinical School, International Medical University, Seremban, Negeri Sembilan, Malaysia

SUMMARY

We report a study which defined the prevalence of erectile dysfunction (ED) among men with ischaemic heart disease. We recruited 510 men with established ischemic heart disease and interviewed these men using the International Index of Erectile Dysfunction (IIEF-5) questionnaire to determine the presence and severity of ED. Presence of ED was defined as IIEF-5 score of less than 22.

The mean age was 60.5 years (range 36-92 years; SD: +9.58). 461 (90.4%) men reported some degree of ED of which two third of them had moderate to severe ED. The prevalence of ED increased significantly with age. Age above 60 years was the only significant risk factor. Non-statistically significant but important risk factors included diabetes, hypertension, diuretics and oral hypoglycemic agents.

ED is very common among men with ischemic heart disease. The prevalence and severity increased significantly with age above 60 years old.

KEY WORDS:

erectile dysfunction; ischemic heart disease; epidemiology, Malaysia

INTRODUCTION

Erectile dysfunction (ED) is defined as the inability to achieve or maintain an erection sufficient for satisfactory sexual performance¹. ED is a common condition worldwide. The Massachusetts Male Aging Study reported a prevalence of 52% in men aged 40 to 70 years old². A number of population based studies on ED in Malaysia reported prevalence of 11% to 47% depending on the age of the men^{3,4}. By the year 2025, it has been projected that there will be 322 million men worldwide with ED with 199.9 million of them in Asia⁵.

ED and ischemic heart disease (IHD) share many common risk factors but there are limited data on prevalence of ED in men with IHD. We have conducted a study to define the prevalence of ED in this population subgroup and to determine the association of demographic, medical and other risk factors with ED.

MATERIALS AND METHODS

Men who attended the cardiology clinic in the University Malaya Medical Centre (UMMC) from December 2005 until June 2006 were consecutively recruited. The UMMC is a 1200 bed teaching hospital serving the cities of Kuala Lumpur and Petaling Jaya, Malaysia. Kuala Lumpur is the capital of Malaysia and is the largest city in the country. The total population of the Kuala Lumpur-Petaling Jaya is estimated to be about 1.5 million.

Sexually active males aged 18 years and above with established IHD attending the outpatient cardiology clinic were recruited. IHD was confirmed in these patients from previous history of acute coronary syndrome, coronary revascularization therapy and coronary artery disease documented on angiogram. Patients with ED secondary to spinal injury, penile injury or neurological deficit were excluded.

The subjects were asked to complete the International Index of Erectile Function (IIEF-5) questionnaire which is an abridged version of the original 15 items questionnaire (IIEF-15). The IIEF-5 consists of 5 questions relating to a person's sexual performance and focuses on erectile function and intercourse satisfaction. The maximum score is 25. Using a cutoff score of 21, the sensitivity and specificity of discriminating between ED and no-ED are 0.98 and 0.88, respectively⁶. The respondents were further categorized into mild (IIEF-5 score: 17-21), moderate (IIEF-5: 8-16) and severe ED (IIEF-5: ≤ 7). The IIEF-5 has been validated both internationally and locally for the assessment of male erectile function⁷. The subjects were instructed to complete the questionnaire on their own. Guidance was provided to subjects who encountered difficulties in completing the questionnaire by a specific investigator. All the subjects recruited in this study was accompanied and guided by this one and only investigator in order to minimise bias.

Statistical analyses were performed using the Statistical Package for Social Sciences for Windows (SPSS 17, SPSS Inc., Chicago, Illinois). The χ^2 test was used for the initial selection of predictor variables which influenced the prevalence of ED. For each variable, univariate odds ratio (OR) was calculated to determine risks for ED when compared with the reference group, where OR=1. These were then adjusted by logistic regression taking into consideration the influence of confounding factors. This study has received approval from the ethics committee of the hospital where the research was carried out.

This article was accepted: 12 March 2013

Corresponding Author: Koh Kwee Choy, Department of Medicine, International Medical University, Jalan Rasah, 70400 Seremban, Negeri Sembilan, Malaysia Email: kweechoy_koh@imu.edu.my

Table I: Profiles of men with ischaemic heart disease (N = 510)

Demographic factors	Number (%)
Age (years)	
< 50	66 (13)
50-59	170 (33.3)
60-69	176 (34.5)
=>70	98 (19.2)
Co-morbidities	
Diabetes mellitus	212 (41.6)
Hypertension	329 (64.5)
Hyperlipidemia	202 (39.6)
Smoking status	
Non-smoker	214 (42.0)
Ex-smoker	206 (40.4)
Current smoker	90 (17.6)
Coronary bypass surgery done	87 (17.1)

Table II: Concomitant medications taken by patients (N = 510)

Medications	Number of patients (%)
Antihypertensive agents	
Beta blockers	357 (69.2)
Angiotensin II inhibitors	271 (53.1)
Calcium channel blockers	134 (26.3)
Diuretics	123 (24.1)
Angiotensin receptor blockers	104 (20.4)
Nitrates	100 (19.6)
Alpha blockers	20 (3.9)
Antiplatelet agent	489 (96.1)
Cholesterol lowering agents	
Statins	467 (91.6)
Fibrates	60 (11.8)
Anti-diabetes agents	
Oral anti-diabetes agents	185 (36.3)
Insulin	29 (5.7)
Digoxin	20 (3.9)

Table III: Association between erectile dysfunction and various factors

Variables	Odds Ratio (95% Confidence Interval)	
	Crude	Age-adjusted
Age per additional year	1.08 (1.05-1.12) #	
Diabetes mellitus	3.50 (1.66-7.37)#	2.39 (0.51-11.14)
Hypertension	2.45 (1.35-4.44) #	1.39 (0.72-2.68)
Previous myocardial infarction	0.95 (0.53-1.72)	
Smoking (current and past)	0.71 (0.38-1.32)	
Alcohol consumption	1.75 (0.61-5.03)	
Previous CABG*	1.06 (0.48-2.35)	
Drugs		
Diuretics	3.91 (1.38-11.12) #	2.63 (0.90-768)
Calcium channel blockers	1.65 (0.78-3.51)	
Beta blockers	0.65 (0.32-1.31)	
ACE** inhibitors	1.20 (0.67-2.17)	
Angiotensin receptor blockers	1.00 (0.48-2.07)	
Statins	0.21 (0.03-1.54)	
Oral anti-diabetes agents	3.19 (1.46-6.97) #	1.18 (0.24-5.84)
Insulin therapy	1.07 (1.04-1.09)	
Number of diseased coronary arteries		
Single vessel disease	0.85 (0.47-1.54)	
Two vessels disease	0.97 (0.40-2.39)	
Triple vessels disease	0.77 (0.22-2.67)	

#p < 0.01

*CABG: coronary artery bypass surgery

**ACE: Angiotensin converting enzyme

RESULTS

A total of 510 male patients were recruited. All patients completed the questionnaire. The demographic profile of the 510 respondents is presented in Table I. The mean age was 60.5 years old (range of 36 to 92; SD 9.58). The majority (67.8%) of the respondents were 50-69 years old and 19.2% were 70 years and above. Common concomitant medical conditions included hypertension (64.5%), diabetes mellitus (41.6%) and coronary bypass surgery (17.1%). The types of medications these patients were on are summarized in Table II.

Prevalence of erectile dysfunction

A total of 461 respondents (90.4%) had ED in various severities. A significant increase in the prevalence of ED with age was noted. Indeed, the prevalence increased from 75.6%

among those below 50 years old to 95.9% among those more than 70 years old. An increase in one year in age resulted in an 8.3% (95% CI 4.7-12.0) increase in the odds of having ED in this study population.

In terms of severity based on IIEF-5 criteria, 24.5% had mild ED, 32.2% had moderate ED, and 33.7% had severe ED. The prevalence of severe ED increased from 6.1% among men less than 50 years old to 67.3% among men more than 70 years old. The severity of ED in relations to age groups is shown in Figure 1.

Risk factor analysis

The association between ED and demographic factors, medical conditions and other risk factors are summarized in Table III. On univariate analysis, the significant risk factors

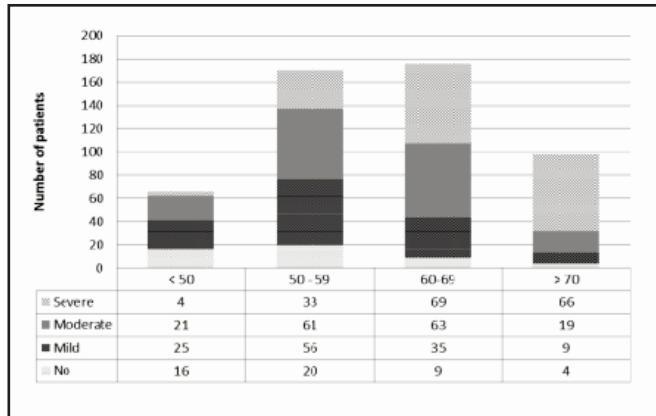


Fig. 1 : Severity of erectile dysfunction in different age groups.

were age above 50 years old (OR 6.00, CI 1.49-24.41), diabetes mellitus (OR 3.50, CI 1.66-7.37), hypertension (OR 2.45, CI 1.35-4.44), diuretics (OR 3.91, CI 1.38-11.12) and oral hypoglycemic agents (OR 3.20, CI 1.46-6.97). Beta blockers, angiotensin converting enzyme inhibitors and angiotensin receptor antagonist were not significantly associated with ED in this study population.

However, when the odds ratios were adjusted for all variables, only age above 60 years old (OR 8.97, CI 1.77-45.49) was found to be significant. In terms of age, men in their 40s have an adjusted OR of 2.11 (95% CI 0.46-9.82) which increased to 3.87 (95% CI 0.85-17.68) in men in their 50s, 8.97 (95% CI 1.77-45.49) in men in their 60s and 11.15 (95% CI 1.87-66.36) in men aged above 70 years. Age was therefore the most important predictor of ED.

Although medical conditions like diabetes mellitus and hypertension were significant predictors on univariate analysis, they were not statistically significant after adjustment for all variables or after adjustment for age alone.

There was no difference in the prevalence of ED among patients with different severity of underlying coronary artery disease. The prevalence of ED among those who had coronary bypass surgery (presumably more severe disease) did not differ significantly with those who did not undergo bypass surgery. Similarly, men who have been diagnosed with single, double or triple vessels diseases based on angiography have almost similar prevalence of ED: 89.6% in men with single vessel disease, 90.2% in men with double vessels disease and 88.0% in men with triple vessels disease.

DISCUSSION

Our study showed that ED was very common in men with established coronary artery disease (CAD), afflicting 9 out of every 10 men. Within this sub-population, 24.5% had mild ED, 32.2% had moderate ED and 33.7% had severe ED. Although direct comparisons with the results of other population based studies was not possible due to different methodologies and recruitment techniques, the prevalence of ED in our study population was much higher than reported

by other centres in this region. In a cross sectional study of general population done in Singapore, the overall prevalence of ED was 51.3% and the prevalence rate increased significantly with age. The risk of ED is also increased among patients with cardiac disease⁸. In Thailand, 37.5% of men 40-70 years old were diagnosed to have ED⁹. However, these reported studies recruited men from the general population instead of men with IHD.

Indeed, the prevalence of ED is much higher in patients with established coronary artery disease. Kloner *et al.* conducted a study using the IIEF-5 on 76 men (mean age 64 years) who have chronic stable coronary artery disease. They reported an overall prevalence of 70%¹⁰. Montorsi *et al.* conducted a similar study using the IIEF-15 on 300 consecutive men who presented with acute chest pain and angiographically documented coronary artery disease. They reported an overall prevalence of 49%¹¹.

In this study, age was the single most significant predictor of ED. Approximately 95% of the respondents were above 50 years old and 92.8% of them had some degree of ED. Using logistic regression, age above 60 was determined to be significantly associated with ED. The strong association between aging and ED has been well noted in many other epidemiological studies^{8,12}.

The role of endothelial dysfunction in the pathophysiology of erectile dysfunction and the potential clinical usefulness of erectile dysfunction to identify diabetic patients with silent coronary artery disease has recently been reviewed¹³. In this study, diabetes and hypertension were significantly associated with ED on univariate analysis. The odds ratio for diabetes mellitus was 3.50 while that of hypertension was 2.45. Men with both diabetes and hypertension have an odds ratio of 3.18 of having ED.

Many of the commonly used medications for a patient with CAD may also cause ED. The commonest drugs cited to be adversely related to ED were beta-blockers, diuretics, and centrally acting antihypertensive agents^{14,15}. In our study, diuretics and oral hypoglycemic agents were significantly associated with ED. The associated between oral hypoglycemic agents on ED was thought to be mainly due to the fact that these men have diabetes mellitus which is a major risk factor of ED rather than the effect of the drugs per se. Beta blockers were not significantly associated with ED in our study population. Although beta blockers have long been associated with ED, some studies have questioned the validity of this assumption^{16,17}. Indeed, Silvestri *et al.* showed that the knowledge and prejudice about the side effects of beta-blockers can produce anxiety that may cause erectile dysfunction¹⁸.

While some studies have noted an association between the severity of CAD and ED, we did not find any significant association in our study^{11,19,20}. Men with single vessel disease on angiography appeared to have similar prevalence of ED compared with those who had double or triple vessels disease. Similarly, men who had undergone CABG have similar prevalence of ED compared to those who had not.

Study limitations

Our data was uni-centered and therefore was representative of a specific study population which was patients with established IHD. A similar multi-centered case series study may be more representative of the prevalence of ED in Malaysian men as a whole.

CONCLUSION

Erectile dysfunction is very common among men with ischemic heart disease, affecting 90.4% of our study population. Age was the most important risk factor for ED. Diabetes mellitus, hypertension and drugs (diuretics and oral hypoglycemic agents) were important contributing factors for ED. Further studies should be done to explore the impact of ED on the quality of life and alternative therapeutic options for ED in this population group given that many of these patients are already on vasodilators which may contraindicate the use of cGMP-specific phosphodiesterase-5 inhibitors (e.g. Sildenafil) commonly used for management of ED.

ACKNOWLEDGEMENT

The author would like to acknowledge Dr. Ramesh Singh Veriah and Dr. Chee Kok Han for their supervisory role in this study.

REFERENCES

1. Impotence. NIH Consensus Statement. 1992 Dec; 10: 1-33.
2. 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.
3. Nicolosi, A, Moreira ED Jr, Shirai M, *et al.* Epidemiology of erectile dysfunction in four countries: cross sectional study of the prevalence and correlates of erectile dysfunction. *Urology* 2003; 61: 201-06.
4. Tan, H-M, Ng C-J, Low W-Y, *et al.* Prevalence of erectile dysfunction and treatment: preliminary results from three countries in the Asian Men's Attitudes to Life Events and Sexuality Study (Asian MALES). Poster presented at the International Congress of Andrology, 13-15 June 2005. Seoul, Korea.
5. Aytac, IA, Mc Kinlay JB, Krane RJ. The likely worldwide increase in erectile dysfunction between 1995 and 2025 and some possible policy consequences. *BJU Int* 1999; 84: 50-6.
6. Rosen, RC, Cappelleri JC, Smith MD, *et al.* Development and evaluation of an abridged 5-item version of the International Index of Erectile Function (IIEF-5) as a diagnostic tool for erectile dysfunction. *Int J Impot Res* 1999; 11: 319-26.
7. Rosen, RC, Riley A, Wagner G, *et al.* The International Index of Erectile Function (IIEF): A multidimensional scale for assessment of erectile dysfunction. *Urology* 1997; 49: 822-30.
8. Tan, JK, Hong CY, Png DJ, *et al.* Erectile dysfunction in Singapore: prevalence and its associated factors--a population-based study. *Singapore Medical Journal* 2003; 44: 20-6.
9. Kongkanand, A. Prevalence of erectile dysfunction in Thailand. Thai Erectile Dysfunction Epidemiological Study Group. *International Journal of Andrology* 2000; 23: 77-80.
10. Kloner, RA, Mullin SH, Shook T, *et al.* Erectile dysfunction in the cardiac patient: how common and should we treat? *The Journal of Urology* 2003; 170: 546-50.
11. Montorsi, F, Briganti A, Salonia A, *et al.* Erectile dysfunction prevalence, time of onset and association with risk factors in 300 consecutive patients with acute chest pain and angiographically documented coronary artery disease. *European Urology* 2003; 44: 360-4.
12. Pinnock, CB, Stapleton AM, Marshall VR. Erectile dysfunction in the community: a prevalence study. *The Medical Journal of Australia* 1999; 171: 353-57.
13. Gazzaruso, C. Erectile dysfunction and coronary atherosclerosis in diabetic patients: pathophysiology, clinical features and treatment. *Expert Review of Cardiovascular Therapy* 2006; 4: 173-80.
14. Shiri, R, Koskimaki J, Hakkinen J, *et al.* Cardiovascular drug use and the incidence of erectile dysfunction. *Int J Impot Res* 2007; 19: 208-12.
15. Derby, CA, Barbour MM, Hume AL, *et al.* Drug therapy and prevalence of erectile dysfunction in the Massachusetts Male Aging Study cohort. *Pharmacotherapy* 2001; 21: 676-83.
16. Mouluk, PK, Hardy KJ. Hypertension, anti-hypertensive drug therapy and erectile dysfunction in diabetes. *Diabet Med* 2003; 20: 290-3.
17. Ko, DT, Hebert PR, Coffey CS, *et al.* Beta-blocker therapy and symptoms of depression, fatigue, and sexual dysfunction. *JAMA* 2002; 288: 351-7.
18. Silvestri, A, Galetta P, Cerquetani E, *et al.* Report of erectile dysfunction after therapy with beta-blockers is related to patient knowledge of side effects and is reversed by placebo. *European Heart Journal* 2003; 24: 1928-32.
19. 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.
20. Solomon, H, Man JW, Wierzbicki AS, *et al.* Relation of erectile dysfunction to angiographic coronary artery disease. *The American Journal of Cardiology* 2003; 91: 230-1.