ORIGINAL ARTICLE

Awareness of Diastolic Heart Failure as a Disease Entity Among Malaysian Doctors - A Questionnaire Survey from Three General Hospitals

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SUMMARY

The concept of diastolic heart failure (DHF) is not new. However awareness and understanding on this subject may remains uncertain among medical practitioners. We wished to examine the extent of awareness of such entity among doctors in Malaysia. A questionnaire was designed and distributed randomly during hospital Continuous Professional Development (CPD/CME) sessions and also in the respective outpatient departments (OPD) between July to October 2008. This cross-sectional survey in three urban-based general hospitals showed that there are a significant proportion of doctors who are lack of understanding and awareness of diastolic heart failure.

KEY WORDS:
Awareness and Understanding, Diastolic Heart Failure (DHF), Doctors

INTRODUCTION

Heart failure is a common medical problem encountered in general practice and is an important cause of hospital admissions [1]. Among patients with heart failure, as many as 40 to 60 percent have a normal or near normal left ventricular ejection fraction [2,3].

Patients with chronic heart failure (HF) can be divided into two broad categories i.e. systolic and diastolic heart failure. In systolic heart failure, there is progressive chamber dilatation, eccentric remodeling and abnormal left ventricle ejection fraction (LVEF). By contrast, myocardial contraction is preserved in diastolic heart failure which is characterized by normal left ventricular volume and systolic function, concentric remodeling with increased wall thickness and abnormal diastolic function [4]. Thus, systolic and diastolic heart failures are distinct syndromes.

The concept of diastolic heart failure (DHF) was first introduced in the 1990s when several community-based epidemiology studies of heart failure suggested that 30-50% of cases of heart failure have preserved left ventricular systolic function [3,5]. This has lead to attempts to define diastolic heart failure and Vasan *et al* subsequently put forward the criteria for diagnosis of DHF [6].

The 2007 consensus statement of the Heart Failure and Echocardiography Associations of the European Society of Cardiology requires the following three conditions for diagnosis of DHF or 'heart failure with normal ejection fraction' (HFNEF) [7]: (1) Signs or symptoms of HF; (2) Normal or mildly abnormal LV systolic function (both LVEF >50 percent and an LV end-diastolic volume <97 mL/m2); (3) Evidence of LV diastolic dysfunction via invasive or noninvasive methods. The combination of symptomatic HF and a normal LVEF is often used in epidemiologic studies, while further tests using Doppler echocardiography is typically performed in the clinical setting.

The main pathophysiology of DHF is decrease left ventricular relaxation and increased passive stiffness [8]. There is inadequate ventricular filling during diastole at normal diastolic pressure and a volume sufficient to maintain an appropriate stroke volume. Overtime this leads to an increase in the left atrial and pulmonary venous pressure which produces symptoms of pulmonary venous congestion [8,9].

Essentially the signs and symptoms of diastolic heart failure are similar to systolic heart failure, although they are generally less severe. Thus patients with clinical presentation of heart failure with normal ejection fraction may be mistaken to have non-cardiac pathology contributing to their signs and symptoms or vice versa.

Even though the concept of diastolic heart failure (DHF) is not new, awareness and understanding on this subject may remain uncertain among medical practitioners. We wished to examine the extent of awareness of such entity among doctors in Malaysia.

MATERIALS AND METHODS

This study was a cross-sectional survey conducted in three hospitals; Hospital Pulau Pinang, Hospital Tuanku Ja'afar Seremban and Hospital Ampuan Najihah Kuala Pilah. A questionnaire was designed and information about the doctors' posting and years of practice was obtained.

The questionnaire was distributed at random during the hospital Continuous Professional Development (CPD/CME) sessions and also in the respective outpatient departments (OPD) between July to October 2008. The forms were immediately collected at the end of the CME or OPD session. Two third were distributed during internal CME meetings in respective hospitals and one third randomly given to the doctors in OPD.

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Table I: Summary and overall response on the questionnaire

Question		Response			
		YES	NO	DK*	(%) Correct Response
(1)	Have you heard about the term diastolic heart failure or 'heart failure with normal ejection fraction' (HFNEF)?	107	14	NA	88.4
(2)	Is diastolic heart failure due to abnormal left ventricular filling and elevated filling pressures[4]?	71	13	37	58.7
(3)	Does the prevalence of diastolic heart failure as the cause of HF increase with age[5]?	77	11	36	61.2
(4)	Are the symptoms of diastolic HF similar to those of systolic HF?	41	54	26	33.9
(5)	Criteria in diagnosing diastolic heart failure6 include:				
(5.1)	Signs or symptoms of HF.	89	16	16	73.6
(5.2)	Normal or mildly abnormal LV systolic function (LVEF >50 percent).	77	14	30	63.6
(5.3)	Evidence of LV diastolic dysfunction via invasive or noninvasive methods (by Echocardiogram or cardiac catheterization study).	96	4	21	79.3

*DK – DON"T KNOW

Table II: Summary of response according to posting

Question	No Of Correct Response According To Posting									P Value
	POSTING									
	Medical (N=64)%			Opd (N=17)%			Others (N=40)%			
	Yes	No	DK	Yes	No	DK	Yes	No	KD	
Q1	93.8	6.3		94.1	5.9		77.5	22.5		0.031
Q2	68.8	9.4	21.9	47.1	5.9	47.1	47.5	15.0	37.5	0.124
Q3	59.4	10.9	29.7	88.2	5.9	5.9	52.5	7.5	40.0	0.100
Q4	35.9	46.9	17.2	52.9	35.3	11.8	22.5	45.0	32.5	0.117
Q5.1	76.6	17.2	6.3	76.5	17.6	5.9	67.5	5.0	27.5	0.014
Q5.2	67.2	15.6	17.2	64.7	17.6	17.6	57.5	2.5	40.0	0.037
Q5.3	89.1	0	10.9	88.2	5.9	5.9	60.0	7.5	32.5	0.004

Table III: Summary of response according to years of service

Question	Of Correct Response According To Years Of Service												P Value
	Year 1 (N=40)%			Year 2-5 (N=50)%			Year 6-10 (N=21)%			Year > 10 (N=10)%			
	Yes	No	DK	Yes	No	DK	Yes	No	DK	Yes	No	DK	
Q1	80.0	20.0		94.0	6.0		95.2	4.8		80	20		0.11
Q2	55.0	15.0	30.0	46.0	12.0	42.0	85.7	4.8	7.5	80.0	0.0	20.0	0.04
Q3	47.5	7.5	45	66.0	14.0	20.0	85.7	0.0	14.3	40.0	10.0	50.0	0.02
Q4	25.0	50.0	25.0	42.0	38.0	20.0	38.1	47.6	14.3	20.0	50.0	30.0	0.60
Q5.1	62.5	20.0	17.5	78.0	12.0	10.0	90.5	4.7	4.7	60.0	10.0	30.0	0.19
Q5.2	55.0	17.5	27.5	66.0	10.0	24.0	81.0	0.0	19.0	50.0	20.0	30.0	0.35
Q5.3	77.5	2.5	20.0	76.0	6.0	18.0	95.2	0.0	4.8	70.0	0.0	30.0	0.41

Table IV: Cross-tabulations on the number of correct response in Q2-Q5 in relationship to Q1

		Question 1		
		Yes (%)	No (%)	P Value
Q2	YES(%)	57.9	0.8	< 0.001
	NO(%)	10.7	0.0	
	DK(%)	19.8	10.7	
Q3	YES(%)	59.5	1.7	< 0.001
	NO(%)	9.1	0.0	
	DK(%)	19.8	9.9	
Q4	YES(%)	32.2	1.7	< 0.001
	NO(%)	43.8	0.8	
	DK(%)	12.4	9.1	
Q5.1	YES(%)	71.1	2.5	< 0.001
	NO(%)	12.4	0.8	
	DK(%)	5.0	8.3	
Q5.2	YES(%)	62.8	0.8	< 0.001
	NO(%)	10.7	0.8	
	DK(%)	14.9	9.9	
Q5.3	YES(%)	76.0	3.3	< 0.001
	NO(%)	3.3	0.0	
	DK(%)	9.1	8.3	

The following questions were asked:

(1) Have you heard about the term diastolic heart failure or 'heart failure with normal ejection fraction' (HFNEF)?

(2) Is diastolic heart failure due to abnormal left ventricular filling and elevated filling pressures?(8)

(3) Does the prevalence of diastolic heart failure as the cause of HF increase with age?(9)

(4) Are the symptoms of diastolic HF similar to those of systolic HF?

(5) Criteria in diagnosing diastolic heart failure (7) include:

(5.1) Signs or symptoms of HF.

(5.2) Normal or mildly abnormal LV systolic function (LVEF >50 percent).

(5.3) Evidence of LV diastolic dysfunction via invasive or noninvasive methods (by Echocardiogram or cardiac catheterization study).

A 'YES' response for each of the above questions was considered as a correct response.

Percentage, cross-tabulations and significant testing with chi-square of each question was analysed using statistical package SPSS version 13.0 for Windows (Chicago, Illinois, USA).

RESULTS

Out of the 180 forms distributed, a total of 121(67.2%) doctors completed the survey – 39 from Hospital Pulau Pinang and the OPD Penang, 54 from Hospital Tuanku Ja'afar Seremban and 28 from Hospital Ampuan Najihah Kuala Pilah. Out of these, 64 doctors were from the medical department, 17 from primary care OPD and 40 from non-medicine based departments (including surgery, pediatric, O&G, anesthesiology, ophthalmology, ENT).

The number of correct response of each question was (1) 88.4% (2) 58.7% (3) 61.2% (4) 33.9% (5.1) 73.6% (5.2) 63.6% (5.3) 79.3% (Table I). Medical posting doctors has a significantly higher correct response for Q5 ($X2 < 0.05$) (Table II). This may not be surprising as heart failure patients are generally managed in medical wards. Thus doctors doing the medical posting were more knowledgeable on the diagnosis of diastolic heart failure. Their years of practice ranged from 31.3% in year 1, 43.8% between year 2-5, 17.2% between year 6-10 and 7.8% in year >10. In overall performance, according to the years of practicing as a medical doctor, doctors in Year 6-10 have the highest correct response. However, these are only significant for Q2 and Q3 (Table III). This was interesting, however further study is needed for a more objective conclusion.

In this survey, question 1 asked the responder whether he/she had ever heard of diastolic heart failure. The subsequent question 2 to 5 asked about the pathophysiology and clinical diagnosis of DHF. Those who answered "Yes" to Q1 would presumably know more about DHF. However, a cross checking for a correct response in Q1 in relation to other questions showed significant differences in the true understanding of DHF: Q2 only 57.9% correct response, Q3 = 59.5%, Q4 = 32.2%, Q5.1 = 71.1%, Q5.2 = 62.8%, Q5.3 = 76% (all with $X2 < 0.001$)(Table IV).

DISCUSSION

We have shown in this study that there is 88.4% of doctors have heard about the term diastolic heart failure or 'heart failure with normal ejection fraction' (HFNEF). Surprising low proportions (less than two third) of participants has true understanding on diastolic heart failure. An average of 30-40% may not be aware of criteria in diagnosing diastolic heart failure. There are also no major differences among doctors in different specialties and years of practicing as a medical doctor as majority of the comparison are not significant. And this is further confirmed with the cross checking of question 1 with the rest of the other questions.

To our knowledge, there has been no published data on the DHF awareness among non-cardiologists. These findings are the first to show among Malaysian doctors regarding the true awareness of a common condition encounter in daily medical practice.

We are aware of the limitation of a questionnaire-based survey. The questions asked may just reflect a small part of knowledge on DHF. A two-third (67%) response rate may create bias in this assessment but an overall trend can be seen here across the postings.

Inadequate knowledge may lead to misdiagnosis, improper referral and delay of treatment of DHF. For example, a patient who is seen in the primary care outpatient department or being admitted for symptoms and signs of fluid overload may have an echocardiogram which showed normal ejection fraction. The primary doctor may assume this is not due to heart failure even though other differential diagnosis has been ruled out. Likewise a stable patient who has been discharge from a cardiology clinic for treatment of DHF may have his medications taken off when this patient is being referred back to the primary team if the assessment is just based on systolic function alone.

Although the treatment of DHF maybe limited at this point of time, it is nonetheless paramount to recognize this entity in our clinical practice. The lack of emphasis during medical training despite the high prevalence of the condition among HF patients may have contributed to the poor understanding of this condition. Introduction of DHF in medical school may be helpful in creating awareness on this subject. There may also be a need for the current national guidelines on heart failure to consider greater emphasis on recognizing and diagnosing DHF in the community.

The results of this preliminary study should be confirmed in larger prospective multicentre research. The extent of awareness lack should be further explored in view of the clinical importance of misdiagnosing an absence of heart failure due to normal ejection fraction.

CONCLUSION

There is a significant proportion of doctors who are lack of understanding and awareness of diastolic heart failure in this study. Failure of recognizing DHF may lead to misdiagnosis, improper referral and treatment. Greater emphasis on DHF is needed at all level especially at undergraduate and early-years of medical officer. The results of this preliminary study should be confirmed in larger prospective multicentre research.

REFERENCES

1. The BT, Lim MN, Robiah A et al. Heart failure hospitalization in Malaysia. J of Cardiac Failure 1999: 3 (suppl 1).
2. Zile MR, Brutsaert DL. New concepts in diastolic dysfunction and diastolic heart failure: Part I: diagnosis, prognosis, and measurements of diastolic function. Circulation 2002; 105: 1387-93
3. Bursi F, Weston SA, Redfield MM, et al. Systolic and diastolic heart failure in the community. JAMA 2006; 296: 2209-16
4. Aurigemma GP, Zile MR, Gaasch WH. Contractile behavior in the left ventricle in diastolic heart failure: With emphasis on regional systolic function. Circulation 2006; 113: 296.
5. Vasan RS, Larson MG, Benjamin EJ, *et al.* Congestive heart failure in subjects with normal versus reduced left ventricular ejection fraction. Prevalence and mortality in a population-based cohort. J Am Coll Cardiol 1999; 33: 1948.
6. Vasan RS, Levy D. Defining diastolic heart failure: A call for standardized diagnostic criteria. Circulation 2000; 101: 2118-21.
7. Paulus WJ, Tschope C, Sanderson JE, et al. How to diagnose diastolic heart failure: a consensus statement on the diagnosis of heart failure with normal left ventricular ejection fraction by the Heart Failure and Echocardiography Associations of the European Society of Cardiology. Eur Heart J 2007; 28: 2539.
8. Aurigemma GP, Gaasch WH. Clinical practice. Diastolic heart failure. N Engl J Med 2004 ; 351: 1097-105.
9. Zile MR, Brutsaert DL. New concepts in diastolic dysfunction and diastolic heart failure: Part I: diagnosis, prognosis, and measurements of diastolic function. Circulation 2002 ; 105: 1387-93.