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Full Length Research Paper

A review of the types of presentation among positive angiographic acute coronary syndrome patients in Hospital Universiti Sains Malaysia

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Atypical presentation of myocardial infarction is recognized as an important manifestation of coronary heart disease associated with unfavorable prognosis. Understanding the spectrum of clinical symptoms and presentations are essential to diagnose and deliver appropriate rapid treatment to patients in the emergency department. Hence, this study was carried out to identify the type of presentation of acute coronary syndrome (ACS) and its association with the risk factors related to the atypical presentation in population of study. Out of 260 patients, 25.8% had atypical presentation of ACS with the presentation of right sided chest pain (1.8%), burning chest pain (20.9%) and pricking chest pain (15%). The significant associated diseases were diabetes mellitus and past medical history of ischaemic heart disease ($p<0.01$) respectively. Other significant associated symptoms were epigastric pain ($p<0.001$), cough ($p<0.01$) and giddiness ($p<0.01$). As a conclusion, ACS with atypical presentations remains an important presentation in the Emergency Department. Despite the availability of advanced medical technology, a thorough history taking remains an important component of diagnosis for a better management and outcome of ACS.

Keywords: Atypical myocardial infarction, common presentation, emergency department.

INTRODUCTION

Despite recent major advances, ACS still pose great challenges to emergency physicians from its diagnostic, therapeutic, and prognostic standpoint. This is partly due to its considerable varied clinical manifestations. For example, the silent or atypical presentations, such as pleuritic or indigestion-like chest pain are recognized as important manifestations of ACS, as most studies suggest that they are associated with unfavorable prognosis (Sigurdsson et al., 1995; Madias et al., 1995). Such atypical presentations are more common among woman and elderly patients (Jayes et al., 1992). Several studies have concluded that between 2 to 8% of all patients with ACS are discharged home from emergency departments (Chris et al, 2001). Unfortunately, a large proportion of these patients sent home with ACS were younger patients presented with atypical symptoms or those who had non-diagnostic electrocardiography (McCarty et al., 1993). This study was carried out to determine the types of presentation of ACS in our patient

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Abbreviations: ACS, Acute coronary syndrome; **HUSM,** Hospital Universiti Sains Malaysia; **ICL,** invasive cardiac laboratory; **SPSS®,** social science and statistical package.

Table 1. Demographic data of patients presented with acute coronary syndrome.

Variable	Typical		Atypical		
	n	%	n	%	
Gender					
Male	155	75.6	50	24.4	0.326
Female	38	69.1	17	30.9	
Racial					
Malay	179	73.7	64	26.3	0.7
Chinese	11	84.6	2	15.4	
Indian	2	66.7	1	33.3	
Other	1	100	0	100	
Age					
< 40	17	89.5	2	10.5	0.3
41-50	44	73.3	16	26.7	
51-60	77	75.5	16	24.5	
>60	55	70	24	30	

population in emergency department as well as the risk factors associated with such presentations.

METHODOLOGY

This is a retrospective, a one year cross-sectional study which looked into the types of ACS cases presented to Hospital Universiti Sains Malaysia. Patients with age less than 18 years old and those with pre-existing cardiovascular diseases such as congenital heart diseases and those with underlying valvular diseases were excluded from this analysis even if they have positive angiographic findings. Other than that, all patients with positive angiographic findings were included for the analysis.

We obtained the medical records for angiogram findings from the invasive cardiac laboratory (ICL), HUSM. Data entry, interpretation and statistical analysis were done using the Social Science and Statistical Package (SPSS®) version 12.0. Statistical analysis using the Chi-Square test, Fisher's exact test and binary logistic regression were employed. Ethical approval for this study was obtained from our institutional ethical review board.

RESULTS

A total of 362 patients had coronary angiogram done at ICL, HUSM from 1st January to 31st December 2004. Out of these 362 patients, 285 (78.7%) were enrolled into the study, and 25 were excluded. Among the 285 patients enrolled in the study, 193 (74.2%) had typical presentation and 67 (25.8%) had atypical presentation.

The demographic data of patients presented with acute coronary syndrome revealed no significant statistical difference in the type of presentation between gender, race and age. However, there was a higher numbers of atypical presentation in female, Indian and elderly (Table 1).

Majority of the atypical presentation of ACS are "no chest pain" (35%), "pricking chest pain" (15%) and "burning type of chest pain" (14%). In terms of associated symptoms, significantly more patients present with coughing (9% versus 1%), giddiness (26.9% versus 9.3%) and epigastric pain (31.3% versus 13.0%) in the atypical presentation group versus the typical presentation group (Table 2).

There is also significantly higher percentage of patients with associated diabetes mellitus in the atypical presentation group compared to the typical presentation group (p=0.01) (Table 3). On the contrary, the percentage of patients with associated past history of ischaemic heart disease is significantly higher among the typical presentation group versus atypical presentation group (p=0.01) (Table 3).

DISCUSSION

In this study, atypical presentation of ACS constituted 25.8% (67) of patients, which was almost similar to other finding which found 25 to 30% of patients with myocardial infarction were clinically unrecognized because of the atypical presentation, for which they did not seek treatment (Sigurdsson, 1995; Loria, 2008). From our study, woman, elderly and Indian had higher atypical presentations, although the result was not statistically significant, as it was limited to the inequality of subjects recruitment. In fact, similar to our findings, other study also found that a woman was more likely to have atypical symptoms compared to men (Roger et al., 2000).

As documented, women with the age of more than 65 years were at higher risk for atypical presentations, which primarily consisted of shortness of breath and epigastric pain (Lusiani et al., 1994). The symptoms of dyspnoea in the setting of myocardial ischaemia may result from the acute loss of myocardial compliance, elevation in left ventricular pressures, and subsequent symptoms of heart failure to present with nausea, vomiting and shortness of breath (Golberg et al., 1998). Those women were more likely to have diabetes mellitus at the time they first experience myocardial infarction compared to men and this might be the reason of why they presented with atypical symptoms (Zucker et al., 1997).

Furthermore, women were more likely to have normal or mild disease and less likely to have left-main and three-vessel disease and were more frequently presented with jaw pain and nausea (Dey et al., 2009). Another possibility was women had difficulty in interpreting the severity of the symptoms. This is further complicated by the confusion that arises when interpreting the perception of the symptoms that they had (Rosenfield et al., 2001). Women are also less likely to be correctly assesses their symptoms (Healy et al., 1991). Atypical symptoms in women may also be mistaken as musculoskeletal, gastrointestinal or neurological in origin and inconsistent

Table 2. Nature of chest pain in typical and atypical ACS.

Description	Typical		Atypical		p value
	n	%	n	%	
Chest Pain					
Yes	193	100	31	46.2	0.01
No	0	0	36	53.7	
Left Sided	192	99.4	28	37.3	
Right Sided	0	0	4	5.9	
Nature					
Burning	0	0	14	20.9	
Discomfort	48	24.8	0	0	
Heavy	71	36.7	2	3	
Pressing	59	30.5	0		
Pricking	0	0	15	22.3	
Tight	15	7.7	1	1.5	
Nil	0	0	35	52.2	
Radiation					
Left arm	45	23.3	9	13.4	0.2
Back	8	4.1	3	4.5	
Jaw	20	10.3	4	5.9	
Lower limb	3	1.5	0	0	
Right arm	1	0.5	0	0	
Nil	116	60.1	51	76.1	
Associated symptoms					
Palpitations	47	24.4	14	20.9	0.56
Dyspnoea	97	50.3	39	58.2	0.26
Nausea	32	16.6	8	11.9	0.36
Vomiting	19	9.8	9	13.4	0.41
Sweating	65	33.7	16	23.9	0.13
Syncope	3	1.6	3	4.5	0.17
Insomnia	0	0	1	1.5	0.08
Cough	2	1.0	6	9.0	0.01
Fever	2	1.0	2	3.0	0.26
Giddiness	18	9.3	18	26.9	0.01
Epigastric pain	25	13.0	21	31.3	0.01

with the onset of myocardial infarction (Milner et al., 1999). To overcome these problems in primary care setting especially in emergency department, a range of symptoms presentation in women with myocardial infarction and understanding the disease process in women are very useful (Zbierajewski–Eischeid and Loeb, 2009).

Increasing age was associated with higher chances of getting atypical presentation16. For elderly, it was estimated that only 38% of patients older than 60 years with autopsy proved myocardial infarction, had the correct diagnosis before death (Bayer et al., 1986; Cocchi et al., 1998). Varying factors were thought to contribute to these findings, including decline in mental functions, alteration or absence of pain perception secondary to sensory neuropathies or an altered pain threshold. Impaired communication, difficulty in expressing symptoms and delay in the perception of angina pain also further contributed to the atypical presentation (Ambeptiya et al., 1994). Other than that, the cardiac pain was frequently confused by many co- morbid conditions present in elderly (Gregoratos, 2001). Since the most common atypical presentation of myocardial infarction in elderly was shortness of breath instead of chest pain, this caused difficulty in making a diagnosis (Woon and Lim, 2003; Everts et al., 1996). The presentation of acute

Table 3. The result of associated risk factors with ACS presentations.

Risk	Typical	Atypical	Chi-square test (p value)
Diabetes			
Yes	70	36	0.012
No	123	31	
Hypertension			
Yes	113	39	0.9
No	80	28	
Hyperlipidemia			
Yes	77	23	0.42
No	116	44	
Heart failure			
Yes	3	0	0.305
No	190	67	
Renal failure			
Yes	10	6	0.268
No	183	61	
History of IHD			
Yes	85	13	0.01
No	108	54	
Active smoker			
Yes	117	38	0.575
No	76	29	
Family history			
Yes	85	32	0.598
No	108	35	

myocardial infarction is modified by age-related changes in endothelial function, smooth muscle cell activity, diastolic function and response to circulating catecholamine and these explained why elderly has higher atypical presentation of myocardial infarction (Maheshwari et al., 2000).

Pain perception among racial and ethnic disparities are differently perceived and tolerated. The inter-individual differences in pain sensitivity are reported to be heritable as the result of polymorphisms of pain-relevant genes (Kim et al., 2004; Uhl et al., 1999). Nepalese and Indian found to have more tolerated to pain compared to Caucasian and Hispanic (Carmen et al., 2003). The different pain perception might be related to the interaction between endorphin and the important primary targeting receptor that is, μ-receptor (Ikeda et al, 2005). The μ-receptor1 is known to be polymorphic especially at the locus of A118G (Lotsch et al., 2005). The variants of A118G might confer the different effect of pain perception which will be under-interpreted in A118G variants group as atypical myocardial infarction. For those who presented with chest pain, the nature of the pain was described as pricking and burning. Kontos and colleagues also identified that burning sensation as in classic chest pain may be suggestive of myocardial ischaemia (Bardy, 1997; Kantos and Jesse, 1997; Selke et al., 1995). Besides the aforementioned presentations, cough, giddiness and epigastric pain were significantly present in the atypical ACS presentation. These non specific associated symptoms may be related to the neuronal stimulation in response to ischaemia and may be also related to the non-independent underlying medical illness such as diabetes mellitus and hypertension or stress related mechanism (Terkelsen et al., 2005).

In our study, 41% (106) patients suffered from DM. Of this number, 27% of diabetic patients who had coronary artery disease presented with atypical chest pain as

compared to atypical chest pain (13.8%). There was a significant difference in clinical presentation between typical and atypical presentation of ACS among diabetic patients. Our findings again re-emphasize the importance of DM as an important independent predictor of a probability of ACS or CAD in our population. High blood sugar and duration of diabetes in uncontrolled diabetes will damage the nerve cells (Angelika et al., 2004). Subsequently, peripheral neuropathy, autonomic neuropathy and focal neuropathy may affect the pain perception (AOL Health, 2007). Loss of autonomic function will affect the nerve conduction to the heart subsequently affect the sweating mechanism, pain perception and the heart rate control that occurs unpredictably. Hence, patients with diabetic might perceive pain differently as atypical in nature.

Interestingly, past history of IHD was associated with typical presentation of myocardial infarction. The possible explanation is the brain learns from its past experience. Well established medical history and experienced of having previous angina pain may alert the patients regarding their illness and make them aware about the consequence of acute coronary disease (Arntz and Claassens, 2004; Katja et al., 2008). Consequence, any chest discomfort or abnormal feelings directly will make them concern about risk of having a new episode of acute myocardial infarction.

In conclusion, atypical presentation of ACS is common and consisted of a quarter of our local population. A greater awareness of atypical presentation may improve awareness among medical personals working in emergency care setting. High index of suspicion with very skillful history clerking and examination may reduce the missed diagnose of acute myocardial infarction.

REFERENCES

Ambeptiya G, Roberts M, Ranjaadayalan K (1994). Silent exertional myocardial ischaemia in the elderly. A quantitative analysis of anginal perceptual threshold and the influence of automatic function. J. Am. Geriatr. Soc., 42: 732-737.

Angelika B, Karl-Matthias H, Humpert PM, et al (provide author full name) (2004). Loss of pain perception in diabetes is dependent on a receptor of the immunoglobulin superfamily. J. Clin. Invest., 114(12): 1741-1751.

Arntz A, Claassens L (2004). The meaning of pain influences its experienced intensity. Pain, 109: 20-25.

Bardy WJ (1997). Missing the diagnosis of acute myocardial infarction: Challenging presentation, ECG pearls and outcome-effective management strategies. Emerg. Med. Reports, 18: 91-101.

Bayer AJ, Chadha JS, Farg RR (1986). Changing presentation of myocardial infarct with increasing old age. J. Am. Geriatr. Soc., 34: 263-66.

Carmen RG, Karen OA, Tamara AB, Lisa CC, Sheila D, Roger BF, Donna AK, Kathyrn EL, Cynthia M, Raymond CT, Knox HT, April HV (2003). The Unequal Burden of Pain: Confronting Racial and Ethnic Disparities in Pain. Pain Med., 4(3): 277-294. http://www.med.umich.edu/opm/newspage/2003/Sept 03 paper.pdf-195.9KB.

Chris AG, William JB (2001). Pitfalls in the Emergency Department, diagnosis of acute myocardial infarction. Emerg Med. Clin., 19(2).

Cocchi A, Trancheschini G, Antonelli IR (1988). Clinicopathological correlations in the diagnosis of acute myocardial infarction in the elderly. Age Aging 16; 87-93. Correcte the year.

Dey S, Flather MD, Devlin G (2009). Sex-related differences in the presentation, treatment and outcomes among patients with acute coronary syndromes: the Global Registry of Acute Coronary Events. Global Registry of Acute Coronary Events investigators. Heart, 95(1): 20-26. Epub 2008 May 7.

Everts B, Karlson B, Wahrborg P (1996). Localisation of pain in suspected acute myocardial infarction in relation to final diagnosis, age and sex and site and type of infarction. Heart Lung, 25: 430-37.

Golberg R, Odonnell C, Yarzebski J (1998). Sex differences in symptom presentation associated with myocardial infarction. A population based perspective. Am. Heart J., 136: 189-195.

Gregoratos G (2001).Clinical manifestations of acute myocardial infarction in older patients. Am. J. Geriatr. Cardiol., 10(6): 345-347. Review.

Healy B (1991). The Yentl syndrome. N. Engl. J. Med., 325: 274-276.

Ikeda K, Ide S, Han W (2005). How individual sensitivity to opiates can be predicted by gene analyses. Trends Pharmacol. Sci., 26: 311-317.

Jayes R, Beshansky J, Agostio R (1992). Do patients coronary risk factors predict acute cardiac ischaemia in the Emergency Department? A multicenter study. J. Clin. Epidemiol., 45: 621-26.

Kantos J, Jesse R (1997). Evaluation of chest pain in the emergency department. Curr. Prob. Cardiol., 22(4): 149-236.

Katja W, Markus P, Irene T (2008). Neurocognitive aspects of pain perception. Trends in Cognitive Sci., 12(8): 306-313.

Kim H, Neubert JK, San Miguel A (2004). Genetic influence on variability in human acute experimental pain sensitivity associated with gender, ethnicity and physiological temperament. Pain, 109: 488-496.

Loria V, Dato I, De Maria GL, Biasucci LM (2008). Minerva. Markers of acute coronary syndrome in emergency room. Medicine, 99(5):497-517.

Lotsch J, Geisslinger G (2005). Are mu-opioide receptor polymorphisms important for clinical opioid therapy? Treds Mol. Med., 11: 82-89.

Lusiani L, Perrone A, Pesavento R, Conto G (1994). Prevalence clinical features and acute course of atypical myocardial infarction. Angiology, 45: 49-55.

Madias JE, Chintalapaly G, Choudry M (1995). Correlates and in-hospital outcome of painless presentation of acute myocardial infarction: A retrospective study of a consecutive series of patients admitted to the coronary care unit. J. Investig. Med., 43: 567-574.

Maheshwari A, Laird-Fick HS, Cannon LA, DeHart DJ (2000). Acute MI. Age-related presentations and treatment options. Geriatrics, 55(2): 32-34, 37-40.

McCarty B, Beshansky J, Agostino R (1993). Missed diagnosis of myocardial infarction in the Emergency Department. Results from a multicenter study. Ann. Emerg. Med., 22: 579-682.

Milner KA, Funk M, Richards S (1999). Gender differences in symptom presentation associated. Am. J. Cardiol., 84: 396-399.

Nerve Damage - Long Term Complications: Diabetes - AOL Health; 2007. www.aolhealth.com/diabetes/learn-about-it/.../nerve-damage.

Roger VLL, Farkouh ME, Weston SA, Reeder GS, Jacobsen SJ, Zinsmeister AR,Yawn BP, Kopecky SL, Gabriel SE (2000). Sex differences in evaluating and outcome of unstable angina. JAMA, 283: 646-652.

Rosenfield AG (2001). Women's risk of decision delay in acute myocardial infarction. Implications for research and practice. AACN Clin. Issues, 12: 29-39.

Selke HP, Beshansky JR, Griffith JL (1995). Use of the acute cardiac ischaemia time insensitive predictive instrument (ACI-TIP) to assist with triage of patients with chest pain or other symjptoms suggestive of acute cardiac ischaemia. A multicenter, controlled clinical trai. Ann. Int. Med., 129: 96-102.

Sigurdsson E, Thorgeirsson G, Sigvaldason H (1995). Unrecognised myocardial infarction:Epidemiology, clinical characteristics and the prognostic role of angina pectoris, The Reykjavik Study. Ann. Int. Med., 122: 96-102.

Terkelsen AJ, Andersen OK, Mølgaard H, Hansen J, Jensen TS (2005). Mental stress inhibits pain perception and heart rate variability but not a nociceptive withdrawal reflex. Acta Physiol. Scand., 180(4): 405-414.

Uhl GR, Sora I, Wang Z (1999). The mu opiate receptor as a candidate gene for pain: polymorphisms, variation, nociception and opiate responses. Proc. Natl. Acad. Sci. USA., 96: 7752-7755.

Woon VC, Lim KH (2003). Acute myocardial infarction in the elderly--the differences compared with the young. Singapore Med. J., 44(8): 414-418.

Zbierajewski –Eischeid SJ, Loeb SJ (2009). Myocardial infarction in women: promoting symptom recognition, early diagnosis, and risk assessment. Dimens. Crit. Care Nurs., 28(1): 1-6; quiz 7-8. Review.

Zucker DR, Griffith JL, Beshansky JR (1997). Presentation of acute myocardial infarction in men and women. J. Gen. Int. Med., 12: 79-87.