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Gender Difference in Acute Myocardial Infarction Patients Receiving Phase 1 Cardiac Rehabilitation

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原著

急性心肌梗塞病人接受第一期心臟復健之性別差異

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研究目的：心血管疾病之致病機轉、流行病學、診斷、處置及預後之性別差異已被廣為探討，不同性別接受心臟復健亦有所影響，然而少有研究針對急性心肌梗塞病人接受第一期心臟復健作性別差異探討。本文欲利用台灣健保資料庫，分析急性心肌梗塞後接受第一期心臟復健病人其年齡分布、共病症及醫療處置之性別差異探討，期可提供心臟復健團隊成員在日後擬定訓練計畫時之參考依據。

研究方法：利用台灣健保資料庫住院復健檔，收集 1998 年到 2011 年的資料，擷取國際疾病分類號碼第九版(ICD-9-CM)主診斷代碼申報為 410，定義為急性心肌梗塞，並於住院中接受心臟復健(申報碼 CPT5)者。分析男性與女性之年齡差異、老年比例、查爾森共病症指數及各共病症所佔比例。

結果：於 1998-2011 年共收集了 8189 位因急性心肌梗塞住院，並接受第一期心臟復健的病人，平均年齡 65.65±12.59 歲，六十五歲以上之老年人有 4475(54.64%)人，其中有 1032(12.6%)人大於等於八十歲。性別差異方面，男性較多，佔 6266(76.52%)人，平均年齡較女性為低(64.36±12.79 vs 69.85±10.90, p<.0001)。女性中老年人所佔比例較高(70.31% vs.49.84%, p<.0001)，且共病症較嚴重。查爾森共病症中，較常見之共病為糖尿病(39.36%)、充血性心臟衰竭(25.83%)、腦血管疾病(10.89%)、慢性肺部疾病(7.64%)、中度或重度腎臟疾病(7.31%)。以上共病症中，男性伴有慢性肺部疾病之比例較女性為高；女性伴有充血性心臟衰竭、腦血管疾病、風濕性疾病、糖尿病及其併發症、腎臟病變皆較男性為多。

結論：本研究利用台灣健保資料庫分析急性心肌梗塞病人接受第一期心臟復健之性別差異，發現女性所佔比例較少，但其平均年齡較高、較多比例為多重共病症、查爾森共病症指數較高，亦有較高比例併有糖尿病、充血性心臟衰竭、腦血管疾病等預後較差之共病，此可做為運動處方擬定與訓練目標設定之參考，並建議女性急性心肌梗塞病人應更積極接受第一期心臟復健以改善預後。(台灣復健醫誌 2014；42(4)：198 - 205)

關鍵詞：性別差異(gender difference)，急性心肌梗塞(acute myocardial infarction)，第一期心臟復健(phase 1 cardiac rehabilitation)

前言

心臟血管疾病自 2000 年後躍居台灣地區十大死因前三名，^[1]其中又以心肌梗塞之影響最鉅。近二十年

間，心肌梗塞之發生年齡逐年上升，^[2]老年心肌梗塞病人於出院時 52.9%為失能(disabled)狀態，^[3]並因此造成後續社會及醫療資源之耗用。^[4]

心臟復健已證實可降低罹病後死亡率約 25%，且可降低相關危險因子及心肌梗塞之復發，恢復日常生

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活功能並提升病人生活品質。^[5,6]在住院期間接受第一期心臟復健之心肌梗塞病人可提高心率變異率(heart rate variability)、提升副交感神經與整體自主神經活性、^[7]降低梗塞後心因性死亡率；^[8,9]冠狀動脈繞道手術之病人若接受第一期心臟復健可降低住院天數並減少術後併發症，^[10,11]第一期心臟復健對急性心肌梗塞病人之功能回復及減少失能扮演重要之角色。

性別差異對心血管疾病之致病機轉、流行病學、診斷、處置及預後的影響已廣為研究。^[12-18]女性罹患急性心肌梗塞普遍接受較少藥物或侵入性治療，且與男性相比有較差的預後，同時承擔更高之死亡風險。^[12,19]Lzawa 等人針對參與第二期心臟復健之病人比較其性別差異之影響，發現女性年齡普遍較高、教育以及身體質量指數上均比男生差、生理表現於最大攝氧量或是肌力表現上均不如男性；對參與第二期心臟復健有較高的焦慮及疲憊(exhaustion)表現，加上本身運動能力不佳，影響對復健活動的參與度；且本身共病症較多較嚴重，在接受心肺復健的比例上和男性相比也有明顯差距。^[20]

目前少有研究探討急性心肌梗塞後第一期心臟復健之性別差異，因此本文欲利用台灣健保資料庫，分析急性心肌梗塞後接受第一期心臟復健病人其年齡分布、共病症及醫療處置之性別差異探討，期可提供心臟復健團隊成員在日後擬定訓練計畫時之參考依據。

材料與方法

利用台灣健保資料庫住院復健檔，收集 1998 年到 2011 年的資料，擷取國際疾病分類號碼第九版(ICD-9-CM)主診斷代碼申報為 410.xx 定義為急性心肌梗塞，並於住院中接受心臟復健(申報碼 CPT5)者。若同一病人於此期間有多次急性心肌梗塞住院且接受第一期心臟復健之記錄，則以第一筆住院申報資料作分析(index hospitalization)。

查爾森共病症指數(Charlson comorbidity index)為一廣泛使用之共病症嚴重指數，以次級資料庫中疾病分類號碼第九版(ICD-9-CM)之應用性亦被確立，^[21-23]本文採用 Deyo 提出之方法認定查爾森共病症指數。^[22]以當次住院及過去一年間之所有診斷碼作為查爾森共病症之診斷依據。

本研究採用統計套裝軟體 SAS 9.3 進行資料處理與分析，以描述性統計為主要分析方法。為分析男性與女性各變數之差異，年齡和查爾森共病症指數採用學生氏 t 檢驗(Student's t-test)分析兩組之差異；類別變數如年齡分層、介入方式、共病疾病等，以皮爾森卡

方檢定(Pearson's Chi-square test)分析兩組之差異。所有結果都以雙尾 p 值(two-tailed p value)小於 0.0001 定義為統計上有意義之差異。

結 果

於 1998-2011 年共收集了 8189 位因急性心肌梗塞住院並接受第一期心臟復健的病人，平均年齡 65.65 ± 12.59 歲，六十五歲以上之老年人有 4475 人，佔 54.64%。其中有 1032 人大於等於八十歲，佔 12.6%。醫療利用方面，5968 人(72.88%)於醫學中心接受治療，且以北部地區為最多(57.53%)，東部地區僅佔 0.9%。性別差異方面，男性較多，佔 6266 人(76.52%)，男性平均年齡較女性為低 (64.36 ± 12.79 vs 69.85 ± 10.90 , $p < .0001$)。急性心肌梗塞後接受冠狀動脈繞道手術或經皮冠狀動脈成型術者男女性別並無明顯差異。女性中老年人所佔比例較高(70.31% vs. 49.84%, $p < .0001$)，且共病症較嚴重。依查爾森共病症指數分析，24.23%的女性其共病指數大於等於 3，而男性中 38.64%共病指數為 0，如表一所示。

查爾森共病症中，接受第一期心臟復健之急性心肌梗塞病人常見共病為糖尿病(39.36%)、充血性心臟衰竭(25.83%)、腦血管疾病(10.89%)、慢性肺部疾病(7.64%)、中度或重度腎臟疾病(7.31%)。以上共病症中，男性伴有慢性肺部疾病之共病比例較女性為高，達顯著差異；女性伴有充血性心臟衰竭、腦血管疾病、風濕性疾病、糖尿病及其併發症、腎臟病變皆較男性為多，並達顯著差異，如表二所示。

討 論

本研究利用台灣健保資料庫分析急性心肌梗塞病人接受第一期心臟復健之性別差異，發現以男性為多數。女性雖然所佔比例較少，但其平均年齡較高且有較多的合併症。女性有較高比例併有鬱血性心臟衰竭、腦血管疾病、風濕性疾病、腎臟病變、糖尿病及其併發症，男性有較高比例併有慢性肺部疾病。

造成以上男女性差異之情形有多重原因。從生理病理觀點，睪固酮對血壓和心血管疾病有不良影響，^[24]相反的，雌激素及黃體激素對血管功能有保護作用，可改善動脈壁損傷反應和抑制動脈粥樣硬化；^[25]故女性停經後因缺少賀爾蒙保護，造成血管功能的調節不良，若併有心理社會因素例如憂鬱或壓力等造成自主神經功能(autonomic function)調節失能而影響賀爾蒙分泌，皆使得心血管疾病罹病率在高齡女性急速增

表一 男性與女性兩組基本資料之比較

	女性 (1923 人)	男性 (6266 人)	p 值
平均年齡(平均±標準差)	69.85±10.90	64.36±12.79	<.0001
老年人(大於 65 歲)	1352(70.31)	3123(49.84)	<.0001
就醫所在地			
北部	1082(56.25)	3629(57.92)	0.0112
中部	338(17.57)	1075(17.15)	
南部	474(24.67)	1519(24.24)	
東部	29(1.51)	43(0.69)	
接受經皮冠狀動脈成型術	268(13.94)	1057(16.87)	0.0023
接受冠狀動脈繞道手術	10(0.52)	30(0.62)	0.6106
平均查爾森共病症指數* (平均±標準差)	1.77±1.78	1.22±1.56	<.0001
查爾森共病症指數分層			<.0001
0	438(22.78)	2421(38.64)	
1	662(34.43)	2066(32.97)	
2	357(18.56)	861(13.74)	
≥3	466(24.23)	918(14.65)	

*查爾森共病症指數不包含心肌梗塞。

表二 查爾森共病症於心肌梗塞後接受第一期心臟復健之分布比例與男性及女性兩組間之比較

	總人數 (8189 人) 人數(%)	女性 (1923 人) 人數(%)	男性 (6266 人) 人數(%)	p 值
充血性心臟衰竭(congestive heart failure)	2115(25.83)	646(33.59)	1469(23.44)	<.0001
周邊血管疾病(peripheral vascular disease)	156(1.90)	36(1.87)	120(1.92)	0.9039
腦血管疾病(cerebrovascular disease)	892(10.89)	271(14.09)	621(9.91)	<.0001
失智症(dementia)	65(0.79)	21(1.09)	44(0.70)	0.0920
慢性肺部疾病(chronic pulmonary disease)	626(7.64)	99(5.15)	527(8.41)	<.0001
風濕性疾病(rheumatologic disease)	35(0.43)	22(1.14)	13(0.24)	<.0001
潰瘍性疾病(ulcer disease)	466(5.69)	120(6.24)	346(5.52)	0.2342
輕度肝臟疾患(mild liver disease)	48(0.59)	10(0.52)	38(0.61)	0.6641
糖尿病(diabetes)	3223(39.36)	1019(52.99)	2204(35.17)	<.0001
半身麻痺或下身麻痺(hemiplegia or paraplegia)	88(1.07)	33(1.72)	55(0.88)	0.0018
中度或重度腎臟疾病(moderate or severe renal disease)	599(7.31)	205(10.66)	394(6.29)	<.0001
糖尿病伴隨慢性併發症(DM with chronic complication)	566(6.91)	230(11.96)	336(5.36)	<.0001
惡性腫瘤，包括白血病及淋巴瘤(malignancy, including lymphoma and leukemia)	199(2.43)	46(23.12)	153(2.44)	0.9016
中度或重度肝臟疾病(moderate or severe liver disease)	13(0.16)	2(0.10)	11(0.18)	0.4906
轉移性腫瘤(metastatic solid tumor)	40(0.49)	10(0.52)	30(0.48)	0.8205
後天免疫缺乏症候群(AIDS)	3(0.04)	1(0.05)	2(0.03)	0.6873

加。^[26]同理，腦部血管疾病亦有性別差異性，高血壓及心源性疾病為女性腦中風病人之特有發病因子。^[27]以上可解釋本研究之發現：接受第一期心臟復健之女性急性心肌梗塞病人較高齡且有較高的比例伴有血管性併發症。

男性罹患急性心肌梗塞之發生率及盛行率都較女性為高，^[28]Lee 以 1999 至 2008 年台灣健保資料庫住院檔研究因急性心肌梗塞住院的病人中，女性佔 27.6%，^[29]而本文急性心肌梗塞後接受第一期心臟復健之病人中，女性為 23.46%，可推論有較多的女性急性心肌梗塞病人住院中未接受第一期心臟復健。過去文獻針對急性心肌梗塞病人醫療處置之性別差異多著重於急性期處理，女性接受較少的藥物治療，^[30]較少的侵入性治療，^[31]甚至有較多的機會被延遲治療。^[32]心肌梗塞後之第二期心臟復健利用亦有性別差異，女性的轉介率偏低，即使是接受冠狀動脈繞道手術後亦只有 20%。^[33]本文發現女性心肌梗塞病人轉介至第一期心臟復健之利用率亦有偏低之情形，然影響轉介的原因則應進一步的研究。

本研究發現心肌梗塞後接受第一期心臟復健之女性平均年齡為 69 歲，明顯高於男性平均年齡之 64 歲，然此年齡差距少於急性心肌梗塞發生率之性別年齡差異，女性心肌梗塞平均發病年齡較同年男性平均晚 8 年左右。^[15]是否因更高齡女性罹病者較少接受第一期心臟復健甚或年齡是否為影響心臟復健轉介之因子之一，皆需更進一步的研究。

共病症對急性心肌梗塞之預後有極大的影響，長短期的存活率與共病嚴重度有直接關連，有三個以上共病之多重共病症病人的住院天數及醫療費用，為無共病症者之兩倍以上。^[34]查爾森共病症指數已證實可做為急性冠症之預後指標，共病指數越高，住院天數越長；^[35]且女性的共病症指數較男性為高，^[36]此點與本研究結果相符。然國內外針對急性心肌梗塞病人研究發現，多重共病症之發生比例約佔 6%~12%，^[34, 37, 38]而本文以急性心肌梗塞後接受第一期心臟復健為對象，多重共病症發生比例 16.9%相較為高，可推論多重共病症應為影響心臟復健轉介原因之一。

急性心肌梗塞於住院中存活者之平均查爾森共病指數為 1.37，^[36]若伴有充血性心臟衰竭、糖尿病、腎臟疾病或轉移性腫瘤則有較高的住院中及一年後死亡率。Radovanovic 分析急性心肌梗塞住院病人之查爾森共病盛行率，依序為陳舊性心肌梗塞(18%)、糖尿病(14.7%)、中度或重度腎臟疾病(7.1%)、腦血管疾病(6.0%)、慢性肺部疾病(6.0%)、周邊血管疾病(5.4%)、

充血性心臟衰竭(3.6%)。^[39]本研究發現接受第一期心臟復健病人的查爾森共病盛行率以糖尿病最多，高達 39.35%；充血性心臟衰竭次之，達 25.83%；第三位為腦血管疾病佔 10.89%，以上皆高於盛行率。糖尿病患者急性心肌梗塞後有較高的死亡率，在 28 天與一年之死亡率為無糖尿病患者之 1.5 至 2 倍，^[40]女性心肌梗塞病人伴有糖尿病的比例較高，住院天數較久。^[41]由此可知，急性心肌梗塞後轉介第一期心臟復健的病人，女性可能有較高的死亡率，較差的心臟功能，亦可能伴有較多的運動功能障礙，故臨床醫師於開立運動處方時，應謹慎將病人之共病情形列入考量。本研究亦發現，女性急性心肌梗塞接受第一期心肺復健之平均共病症指數為 1.77，高於住院中存活者之平均查爾森共病指數，且伴有充血性心臟衰竭、糖尿病、腎臟疾病之比例亦明顯高於男性病人，以上皆代表較高的住院中死亡率及一年後死亡率，故女性於急性心肌梗塞後更應積極接受第一期心臟復健以改善預後。

本研究之研究限制因採用全民健保資料庫，對於未加入保險之病人即無法取得其資訊，且無法得知病人之身體質量指數(body mass index, BMI)，運動習慣，菸酒使用情形、家族史或社會經濟指標等致病及預後影響因子。又本文僅分析主診斷代碼申報為 410.xx 之病人，然主次診斷碼之排序有人為認知之差異，亦無法避免申報代碼錯誤(coding error)的可能，皆會影響本文之結果。此外，心臟復健介入分析方面，僅依治療碼(CPT5)之申報來判斷病人是否接受復健治療，無法得知復健處方之頻率、強度及訓練活動類型等，亦無法得知心臟復健介入的時間點。若病人接受復健治療，但其申報碼並非心肺復健(CPT5)亦不納入本研究範圍，故本研究母群體有低估之可能。以上皆會對本研究之結果有所影響，故應小心解讀。

結 論

本研究利用台灣健保資料庫分析急性心肌梗塞病人接受第一期心臟復健之性別差異，發現女性所佔比例較少，但其平均年齡較高、較多比例為多重共病症、查爾森共病症指數較高。復健治療團隊應瞭解此情形並詳細評估開立合適之心臟復健處方、擬定運動訓練計畫及預後評估。且女性有較高比例併有糖尿病、充血性心臟衰竭、腦血管疾病等預後較差之共病，更應積極接受第一期心臟復健。

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Gender Difference in Acute Myocardial Infarction Patients Receiving Phase 1 Cardiac Rehabilitation

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Purpose: The effects of gender difference on the pathogenesis, epidemiology, diagnosis, treatment, and prognosis of cardiovascular diseases have been widely examined. In addition, gender differences influence cardiac rehabilitation; however, few studies have investigated the effect of gender difference on phase 1 cardiac rehabilitation patients. Therefore, this study explored gender difference in acute myocardial infarction patients who received phase 1 cardiac rehabilitation based on data collected from the National Health Insurance Research Database. For our analysis, we focused on the age distribution, comorbidities, and medical treatment of these patients. The study results are expected to serve as a reference for cardiac rehabilitation staff when developing training programs for patients.

Method: Data spanning from 1998 to 2011 were collected from the inpatient rehabilitation profiles in the database. We defined acute myocardial infarction according to the primary diagnostic code 410 of the International Classification of Diseases, Ninth Revision, Clinical Modification, and targeted inpatients who received cardiac rehabilitation treatment. We analyzed the age difference, proportion of elderly people, Charlson comorbidity index score, and proportion of other comorbidities in patients of both genders.

Results: We collected data spanning from 1998 to 2011 on 8189 patients who were hospitalized for acute myocardial infarction and who received phase 1 cardiac rehabilitation treatment. The average age of the patients was 65.65 ± 12.59 years. Among the patients, 4475 (54.64%) were elderly patients aged 65 years or older, and 1032 (12.6%) were aged 80 years or older. Regarding gender difference, the male patients accounted for most of the population, with a total number of 6266 (76.52%), and their average age was lower than that of the female patients (64.36 ± 12.79 y vs 69.85 ± 10.90 y, $p < .0001$). Among the female patients, the proportion of elderly people was high (70.31% vs 49.84%, $p < .0001$), and the condition of comorbidities was severe. Regarding the Charlson comorbidities, common diseases included diabetes (39.36%), congestive heart failure (25.83%), cerebrovascular disease (10.89%), chronic lung disease (7.64%), and moderate or severe kidney disease (7.31%). The proportion of male patients with chronic lung disease was higher than that of female patients. In addition, the proportion of female patients with congestive heart failure, cerebrovascular disease, rheumatic disease, diabetes and its complications, and kidney disease was higher than that of male patients.

Conclusion: This study adopted data from the National Health Insurance Research Database and analyzed gender difference in acute myocardial infarction patients who received cardiac rehabilitation. The results showed that the female patients accounted for a lower proportion compared with the male patients; however, the average age of the female patients was higher, and they exhibited multiple comorbidities, a higher Charlson comorbidity index score, and higher proportion of comorbidities with poor prognoses, including diabetes, congestive heart failure, and cerebrovascular disease. These findings can be used as a reference for developing exercise prescriptions and training targets. Based on the study results, we recommend female patients with acute myocardial infarction to improve their prognosis conditions by accepting phase 1 cardiac rehabilitation. (Tw J Phys Med Rehabil 2014; 42(4): 198 - 205)

Key Words: gender difference, acute myocardial infarction, phase 1 cardiac rehabilitation