行政院國家科學委員會專題研究計畫成果報告

男女性在腰椎骨分佈及其老化時變動之差異

Gender differences in the distribution of bone mass in the third lumbar vertebra and its age-related changes

計畫編號：NSC 89-2314-B-002-084

執行期限：88 **年** 08 **月** 01 **日至** 89 **年** 07 **月** 31 **日**

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一、中文摘要

骨密度測量可有效預測日後發生骨折之風險。目前脊椎骨之骨密度測量，一般是以正面方式測量，測量之部位包括脊椎體(vertebral body, VB)**及其後方之脊突等**(posterior segment, PS)**，唯脊椎骨之骨質疏鬆壓迫性骨折，幾全發生在** VB **。若** VB **與** PS **之骨量分佈產生變異，正面測量只能測得總量**(VB **與** PS **之和)將降低其預測骨折風險之能力。本研究以側面測量方式，分別測量** VB **與** PS **之骨量，在** 65 **位男性及** 112 **女性觀察年齡、停經及性別對** VB **佔骨總量比率之影響。結果顯示在停經年齡前，女性之比率**(mean±SEM: 39.1±0.9%)**較同齡男性**(50.0±1.7%)**為低**(p<0.0001)**。在停經年齡之後，女性隨老化** VB **佔總骨量之比率逐年減少**(**每年** 0.22%, p=0.0001)**，但在男性則與年輕時無異。此外，本研究也顯示總骨量在男性均隨年齡減少，但各年齡層之男性均較女性為多。是以女性在總骨量已較男性為少之狀況下，在停經後因** VB **內之海綿骨較多，損耗較快，反而有更低之** VB **所佔總量比率，不利於抗壓之需求。此因素應是停後女性易有壓迫性骨折之原因之一。此外，因男女性之骨量分佈狀況不同，以傳統正面方式測量骨密度時，宜考量性別及年齡因素，才能準確評估脊椎體壓迫性骨折之風險。**

關鍵詞：脊椎骨、骨量分佈、年齡、性別

Abstract

Compression fractures occur mainly at the vertebral body. Variations in the distribution of bone mass in a vertebra, if undefined, may bias the ability of the acquired bone mineral density values, which was usually measured posteroanteriorly, to predict the risk of fractures. To evaluate the effects of age and gender on the distribution of bone mineral content in the third lumbar vertebrae. We performed a cross sectional study on the distribution of bone mineral content in the third lumbar vertebrae. The bone mineral content of the whole L3 including the L3 vertebral body and the posterior segment was measured using a lateral approach with a dual energy x-ray absorptiometer on 177 healthy Taiwanese adults including 65 men, and 55 premenopausal and 57 postmenopausal women. The proportion of bone mineral content (BMC) in the vertebral body was significantly lower in premenopausal women than in age-matched men (39.1±0.9% vs. 50.0±1.7%, P< 0.0001). Furthermore, while postmenopausal women showed a decreased proportion of BMC in the vertebral body with increased age (about -0.0022 per year, p=0.0001), premenopausal women and men showed a sustained proportion. Thus, the proportion of BMC distributed in the body of L3 vertebrae was lower in women than in men. The discrepancy of this parameter between the genders was even larger with increased ages.

Key words: gender, age, L3 vertebral body, bone content distribution.

二、緣由與目的

以雙光子式吸光測定腰椎骨密度，可精確反映該部分骨骼之力學強度[1, 9, 18]**並預測發生腰椎骨折之風險**[12]**。此種檢查通常以正面方式檢測，測得之部位包括脊椎**

骨體(vertebral body,簡稱 VB)及後側之部份(posterior segments，簡稱 PS)。但脊椎骨之骨密度亦能以側面方式測試，可以分別測定 VB 及 PS 所含之骨量。國外之研究者[4]曾以該法測量年輕之男女性；確實觀察到年輕男性 VB 與 VB+PS 之比值(即 VB/total ratio 簡稱 VBTR)，較年輕女性為高。由於 VB 含大量海綿骨，PS 則以皮質骨為主，中老年時，流失之速度可能兩者不盡相同，而且男女性之狀況也可能不同。本研究以側面測量方式，測定在不同年齡及不同姓別之男、女性之 VBTR，以觀察年齡、停經與性別對 VBTR 之影響。其目的也在於顯示傳統之正面測量可能忽略姓別及年齡之差異造成之偏差。

三、研究方式

本研究以 Norland XR-26 式雙光子吸光儀檢測 65 位男性及 112 位女性，年齡均為 22 至 86 歲。112 位女性中 57 位已停經。除以側面分別測定第三腰椎 VB 及 PS 的骨量(bone mineral content, BMC)外，也以正面之傳統方式測定第三腰椎之 BMC。然後以多變項迴歸分析統計之。

四、結果與討論：

圖 A 可見男性以正面方式測得之 BMC (空方型) 在各年齡均較女性為高 (實心及虛心之圓點)，高出約 30%。男女性之 BMC 均依年齡之增加而漸減。圖 B 可見男性在各年齡所呈現之 VBTR 均較同年齡女性為高，而且不因年齡老化而改變，均約為 0.5。女性則在停經前此值為 0.39，停經後則因老化漸降，每年 VBTR 減少 0.22% (p=0.0001)。至 80 歲時 VBTR 值約為 0.3。由此可見女性骨量在各年齡均較同齡男性為少。但因停經因素，海綿骨耗損較多，不但沒有補償女性 VB 內骨量較少之狀況，反而在易遭壓迫變形的脊椎體，骨量減少更嚴重。本研究之結果有助於瞭解女性在停經後，發生骨質疏鬆性脊椎體壓迫性骨折之病因，也提供數據，供此較不同年齡、不同性別之國人使用。在做一般之正面 BMC 測量時, 可校正男女性及年齡之差異，以真實反映 VB 之骨密度。

五、成果自許：

本研究因具有原創性，先前幾乎沒有相同之報告，而且順利依規劃完成，得到學術及實用上有價值之數據，已整理成原創性論文，投稿至國際骨科優良雜誌 Spine，並已經被接受刊出。

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