Rehabilitation Practice and Science

Volume 19
Issue 1 *Taiwan Journal of Physical Medicine and Rehabilitation (TJPMR)*

Article 12

12-1-1991

# Low Back Pain in Geriatric Patients: CT Scan Assessment

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# 老年下背痛患者腰椎電腦斷層攝影之研究

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下背痛是老年人至復健科門診求診時常見之主訴，在年輕時即有下背痛症狀的患者往往至老年時變慢性且加劇。台中榮民總醫院自1988年9月至1990年9月間對門診及住院之下背痛病人共作過1828人次的電腦斷層攝影檢查，其中65歲以上者，共計有478人次，男性397人次，女性81人次。

經統計整理，腰椎變化以退化性椎間盤(degeneration disc)爲最多，共計941節，小面關節骨質增生(facet joint spurs)居次位203節，椎體骨質增生(vertebral body spurs)因致壓迫神經孔或神經管者佔52節，椎間盤突出(herniated disc)者佔85節。然而亦有43例雖有下背痛之症狀，但卻來發現任何異常結構。本研究發現退化性椎間盤變化與小面關節骨質增生具有顯著性的關係，且後者可能是退化性椎間盤病變致病的主因，但因缺乏同年齡之對照組檢查結果之比較，此一結論仍有待進一步驗証。

關鍵詞：下背痛，電腦斷層攝影，退化性椎間盤，小面關節骨質增生、椎體骨質增生

## 前言

下背痛是常困擾老人之問題，其發生率僅次於上呼吸道感染[1]。據估計在美國每年花費於治療65歲以上老年人下背痛的費用大約是美金二仟萬元左右[2][3]。老年人下背痛以x光攝影檢查常見之發現爲破損或空洞化之椎間盤，脊椎體前及側骨質增生（俗稱骨刺），接合不良(malalignments)及脊椎側彎(scoliosis)或是脊柱前滑位及後滑位(anterior & retro-spondylolisthesis)[1]。病人或一般醫事人員亦經常以爲以上發現即爲其造成下背痛的原因。然而據Frymoy er J.W[4]研究顯示，傳統x光攝影檢查對下背痛的診斷幫助約只有1/2000。另據Richard[5]研究亦指出98％接受x光攝影者只有良性反應，而無診斷價值。直到1972年電腦斷層攝影發明後才提供一個更好的脊椎病灶診斷工具[6]。

隨著歲月年齡的增加，腰椎椎間盤會進行一連串的病理變化，最早之變化爲椎間盤容積減少，漸演變至兩脊椎間的不穩定，包括後面的兩小面關節的垂直受力增加，而演變至贅骨增生及小面關節骨增生(facet joint spur)關節囊及黃韌帶(ligamentum flavum)、脊椎板(lamina)等之增生[7][11][12]。總括來說，椎間盤的退化(degenerative disc)，贅骨增生(hypertrophic spurring)及小面關節的炎性變化(osteoarthritis of the facet joint)均可能引起類似的下背痛症狀。如果壓迫到兩側的神經根出口稱之爲側椎孔狹窄症(lateral spinal stenosis)或是直接壓迫薦髓(conus medullaris)、馬尾(cauda equina)者稱中心性神經管狹窄症(central spinal stenosis)[7]。

## 材料與方法

本研究報告對象爲台中榮民總醫院自1988年9月間住院及門診下背痛病人所作之1828人次之腰椎電腦斷層攝影。病人之主訴症狀包括下背痛、單側或兩側下肢酸麻感(numbness)、下肢

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輻射痛 (radiating pain) 爲主要、有些病人以間歇性跛足 (intermittent claudication)、大小便失禁 (urine and stool incontinence) 表現，其中以 65 歲以上老人共計 478 人次，男性佔 397 人次，女性佔 81 人次，分析之重點爲腰椎之五節段退化性變化如椎間盤退化、椎體骨質增生、小面關節骨質增生，椎管狹窄、神經孔壓迫、及椎間盤突出、壓迫性骨折、脊椎滑位及惡性腫瘤等作一番統計。本研究結果使用 SPSS/PC+ 統計軟體，以百分比及非獨立樣本比例數之卡方試驗 (Chi-Square test for nonindependent proportions) 進行統計分析。

## 結 果

經過分析統計 478 人次之電腦斷層攝影，報告共計有退化性椎間盤 941 節，椎體骨質增生計有 52 節，椎間盤突出計有 85 節，小面關節骨質增生計有 203 節，而以上病變進而造成椎間孔狹窄者計 189 節，椎管狹窄者計 291 節，脊椎滑位有 29 節，壓迫性骨折共 30 節。（如 Table 1）

四種主要造成椎間孔狹窄及椎管狹窄的退化性變化；退化性椎間盤、椎體骨質增生、小面關節骨質增生，椎間盤突出在各節之節數及比例。(如 Fig.1 至 Fig.4)

本研究另外要探討的主題是這四種退化性變化之間相關關係的分析。從 Table 2 及 Table 3 可發現退化性椎間盤與小面關節骨質增生在全節段言具相關性（ p 值 <0.05，此相關性在第三節段、第四節段與第五節段間尤其顯著（如 Table 4-6）

Fig.1 Degeneration Disc

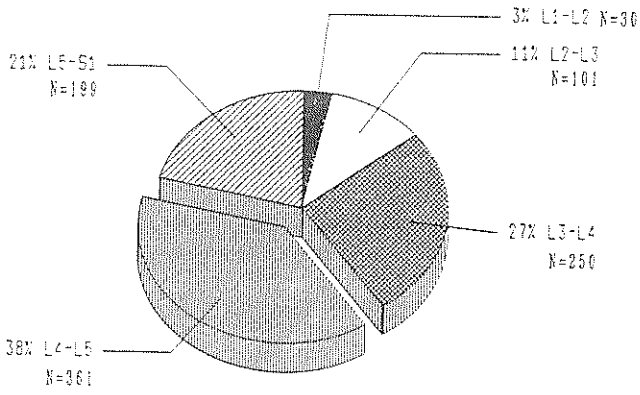


Fig.2 Facet Joint Spur

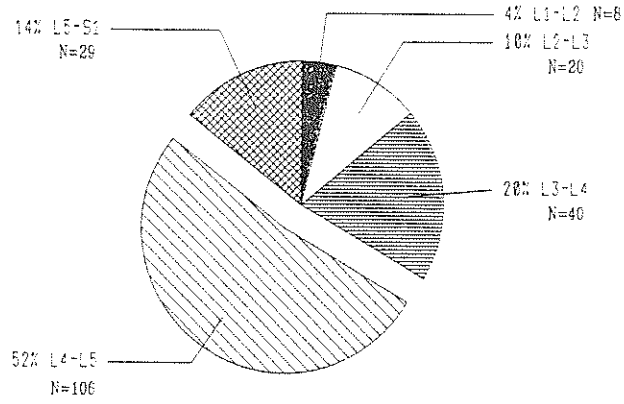


Fig.3 Herniation Disc

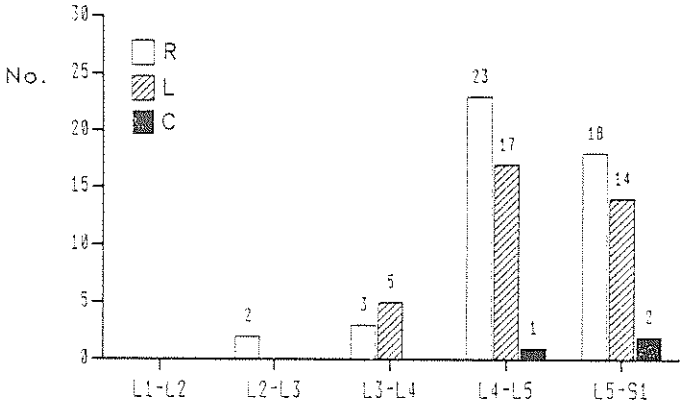


Fig.4 Vertebral Body Spur

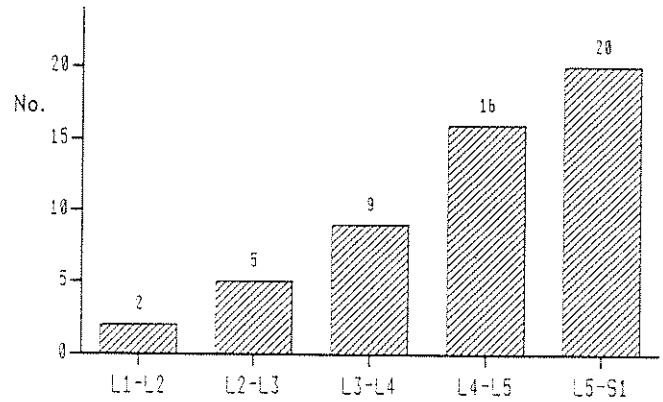

Table 1 Distribution of degenerative changes among segments

| Lecel | *D. D | B. S | F. S | H. D | I. N. F | S. C. S | L. H | L. I | Neo | Co. F | O. p |
|---|---|---|---|---|---|---|---|---|---|---|---|
| L1-L2(I) | 30 | 2 | 8 | 0 | 2 | 3 | 0 | 1 | 6 | 11 | 1 |
| L2-L3(II) | 101 | 5 | 20 | 2 | 9 | 30 | 0 | 1 | 3 | 10 | 2 |
| L3-L4(III) | 250 | 9 | 40 | 8 | 26 | 75 | 10 | 11 | 1 | 6 | 14 |
| L4-L5(IV) | 361 | 16 | 106 | 41 | 72 | 150 | 38 | 14 | 1 | 1 | 21 |
| L5-S1(V) | 199 | 20 | 29 | 34 | 80 | 33 | 10 | 12 | 1 | 2 | 10 |
| Total | 941 | 52 | 203 | 85 | 189 | 291 | 58 | 39 | 12 | 30 | 48 |

*D. D：Degenerative Disc 退化性椎間盤
*B. S ：Vertebral Body Spur椎體骨質增生
F. S ：Facet Joint Spur小面關節骨質增生
H. D ：Herniated Disc 椎間盤突出
I. N. F：Intervertebral Neuroforamen Narrowing椎間孔狹窄
S. C. S：Spinal Canal Stenosis椎管狹窄
L. H ：Ligamentum Flavum Hypertrophy黃韌帶增生
L. I ：Spondylolisthesis脊椎滑位
Neo ：Neoplasia(Tumor or malignancy, metastasis)贅生瘤
Co. F ：Compression Fracture壓迫性骨折
O. p ：Operation手術

Table 2 Relationship between 4 DJD Signs
(Total semgents)

| F. s | | + | - | P Valve |
|---|---|---|---|---|
| D. D | + | 123(95. 3%) | 284(81. 4%) | |
| | - | 6( 4. 7%) | 65(18. 6%) | 0. 0002 |
| B. S | + | 20(15. 5%) | 22( 6. 3%) | |
| | - | 109(84. 5%) | 327(93. 7%) | 0. 0003 |
| H. D | + | 11(14. 7%) | 118(29. 3%) | |
| | - | 64(85. 3%) | 285(70. 7%) | 0. 0133 |

By Yates correction Chi-Square test

Table 3 Relationship between 4 DJD signs
(Total semgents)

| P valve | D. D | B. S | F. S | H. D |
|---|---|---|---|---|
| D. D | - | | | |
| B. S | NS | - | | |
| F. S | 0. 0002 | 0. 0003 | - | |
| H. D | NS | NS | 0. 0133 | |

NS:p valve >0. 05
By Yates correction Chi-Square test

Table 4 Relationship between 4 DJD Signs
(Total semgents L3-L4)

| F. S | | + | - | P Valve |
|---|---|---|---|---|
| D. D | + | 32(80. 0%) | 218(81. 4%) | |
| | - | 8(20. 0%) | 202(18. 6%) | 0. 0005 |
| Total | | 40 | 438 | |
| B. S | + | 5(12. 5%) | 4( 0. 9%) | |
| | - | 35(87. 5%) | 434(99. 1%) | 0. 0000 |
| Total | | 40 | 438 | |

By Yates correction Chi-Square test

Table 5 Relationship between 4 DJD Signs
(Total semgents L4-L5)

| F. S | | + | - | P Valve |
|---|---|---|---|---|
| D. D | + | 97(91. 5%) | 264(71. 0%) | 0. 0005 |
| | - | 9( 8. 5%) | 108(29. 0%) | |
| Total | | 106 | 372 | |

By Yates correction Chi-Square test

Table 6 Relationship between 4 DJD Signs
(Total semgents L5-S1)

| F. S. | | + | - | P Valve |
|---|---|---|---|---|
| D. D | + | 23(79. 3%) | 176(39. 2%) | 0. 0001 |
| | - | 6(20. 7%) | 273(60. 8%) | |
| Total | | 29 | 449 | |

By Yates correction Chi-Square test

就全節段言，小面關節骨質增生與椎體骨質增生之間似亦存在相關性（$p< 0.05$ Table 3），然而此相關性只存在於第三節段，且兩者均陽性率者只有5節，故不列入討論。

就全節段而言，小面關節骨質增生與椎間盤突出似亦存在相關性，但在變化最多的第三、四、五節段均不具相關性，故認爲其相關性並不存在。

就椎間孔狹窄而言，左側狹窄91節（佔48.1％）比右側狹窄80節（佔42.3％）爲多，二側均狹窄者只有18節（佔9.6％）。其中以第五節段（80節）最多，再次爲第四節段（72節）次之。

就椎管狹窄言，以第四節段150節（51.2％）最多，次爲第三節段75節（2 5.8％）這成原因已知可能爲退化性椎間盤、椎體骨質增生、小面關節椎體骨質生、椎間盤突出或黃韌帶增生、腫瘤[7]等原因造成。

就椎體骨質增生言，其數目遠較退化性椎間盤（941節）爲少，亦較小面關節骨質增生（203節）爲少。

就壓迫性骨折言，Table 1表示在第一腰椎及第二腰椎最多。老年人壓迫性骨折多爲骨質疏鬆症(osteoporosis)及腫瘤引起[8]。

就脊椎滑位言，以第四節段（第四、五腰椎間）最多，此結果與Fitzgerald et所作統計報告相同[9]。

就惡性腫瘤言，本研究共發現12節，所佔的比例約0.5％。Fernbach[10]對259例50歲以上病人具下背痛或坐骨神經痛患者研究顯示原發性腫瘤或續發性腫瘤約佔7％。

就電腦斷層攝影發現爲陰性率言，即病人具臨床症狀而無發現者共有43例占9％，其中男性35例，女性8例。

就腰椎病變言，接受手術者共有48節，佔總數約2％。

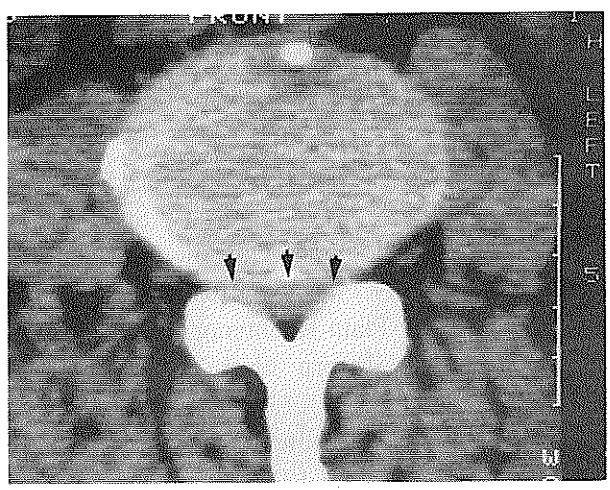

Fig.5 至 Fig.8 CT scan finding
Fig.5 —Bulging out disc

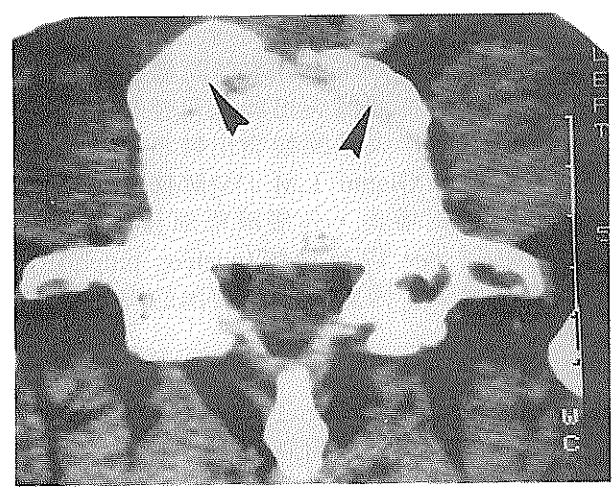

Fig.6 —Anterior vertebral body spur

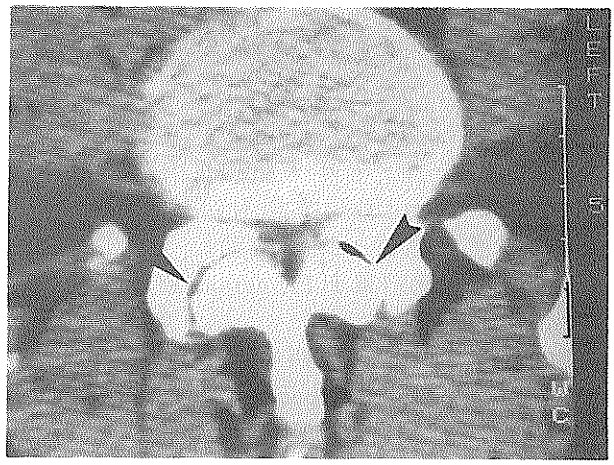

Fig.7 —Facet joint hypertrophy spur with spinal stenosis

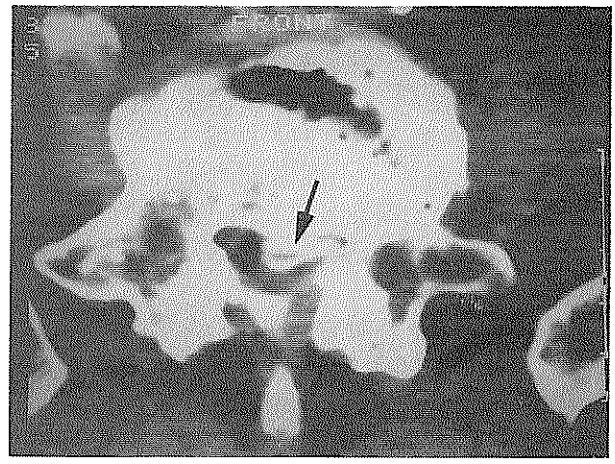

Fig.8 Calcificated herniation disc

## 結 論

就四種最常見退化性脊椎之徵象：(1)退化性椎間盤(2)椎體骨質增生(3)小面關節骨質增生(4)椎間盤突出。我們得到退化性椎間盤與小面關節病變之間存有最密切之關係，據Oppenheimer[13]指出退化性椎間盤可導至小面關節活動及位置的改變，Abel[14]亦有同樣報告。

本研究發現椎間盤突出與退化性椎間盤相較爲少，顯示老年人椎間盤突出較不常見，其中可能原因因據Gianni L.M [15]解釋其中可能原因是隨著年紀增長，外層纖維環(annulus fibrosus)隨之退化，內層髓核(nucleus pulposus)壓力亦隨之減少，因此椎間盤突出的可能性亦降低[15]。

本研究之統計結果顯示罹患下背痛老年人之電腦斷層檢查可見較多之椎間盤退化及小面關節病變之現象，而一般俗稱之骨刺，即椎體骨質增生，並不多見。然而前兩者是否即爲老年人下背痛常見之原因仍須與同年齡層無背痛者之斷層檢查結果比較之後方能下定論；而此亦爲以後研究之目標。此研究單純以下背痛老年人的影像爲研究對象，臨床上仍建議以腰部功能性評估爲主要依據，方不失爲一完整之復健醫療行爲。

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# Low Back Pain in Geriatric Patients
## -- CT Scan Assessment

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Low back pain is the most common clinical complaint next to upper respiratory tract infection in aged people. Previous episodes of low back pain in young adults predispose to exacerbation and chronic problems in the elderly. This study was carried out on 478 cases aged above 65 who took computerized tomography of lumbar spine at Taichung Veterans General Hospital from Sep. 1988 to Sep. 1990. These cases consisted of 391 males and 81 females. According to the final statistics, the most prominent changes in lumbar spine were degeneration disc 941 segments and facets joint spurs 203 segments, followed by vertebral body spurs compressing intervertebral neuroforamen or spinal canal 52 segments, and with herniation disc compression 85 segments.

Analysis of the total numbers from the degeneration discs and the facet joint spurs disclosed that the two above degeneration signs were positively correlated. ($p<0.05$)

In this study, intervertebral neuroforamen compression was found to be on the Rt side in 80 segments (42.3%) on the Lt side in 91 segments (48.1%), and on bilateral sides in the 18 segments (9.6%) which made a total of 189 segments. The most common site was segment V (L5-S1) 80 cases (42.3%).

In this series most of the low back pain of geriatrics originated from the degeneration discs and facet joint spurs, the so-called bony spur (vertebral body spur) just plays a minimal role in the pathogenesis of low back pain in the elderly. We conclude that all the staff of rehabilitation (including the doctors and therapists) must fully understand the pathogenesis of low back pain and prescribe a complete program of treatment, including hot packing, lumbar traction, manipulation, posture guide dir ADL training all contribute to the relief of intradiscal pressure and lead to the remission of low back pain in the geriatrics.

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