



12-1-1995

A spinal cord injured patient complicated with huge bladder stones and vesico-ureteral reflux

Lu-Wen Chen

Liu-Ing Bih

Liang-Fang Chen

Hwa Ting

Follow this and additional works at: <https://rps.researchcommons.org/journal>

 Part of the [Rehabilitation and Therapy Commons](#)

Recommended Citation

Chen, Lu-Wen; Bih, Liu-Ing; Chen, Liang-Fang; and Ting, Hwa (1995) "A spinal cord injured patient complicated with huge bladder stones and vesico-ureteral reflux," *Rehabilitation Practice and Science*: Vol. 23: Iss. 1, Article 20.

DOI: <https://doi.org/10.6315/3005-3846.1981>

Available at: <https://rps.researchcommons.org/journal/vol23/iss1/20>

This Case Report is brought to you for free and open access by Rehabilitation Practice and Science. It has been accepted for inclusion in Rehabilitation Practice and Science by an authorized editor of Rehabilitation Practice and Science. For more information, please contact twpmrscore@gmail.com.

脊髓損傷併發膀胱結石及膀胱輸尿管逆流—病例報告

陳律文 畢柳鶯 陳玲芳* 丁 化

25歲男性病人，民國七十四年因第一腰椎骨折致雙下肢麻痺及神經性膀胱功能障礙。受傷後逐漸恢復到可持雙側腋下拐杖獨立行走，但逼尿肌反射一直沒有恢復，因此長期放置尿道內留置尿管。受傷七年來因反覆尿路感染，經常前往各醫院求診，從未做過泌尿系統影像檢查。來本院檢查時發現有五顆栗子大小膀胱結石及兩側膀胱輸尿管逆流。開刀取出五顆結石共重81克，分析其成分含磷酸氫鎂83%及草酸鈣17%。手術後尿路感染得到控制，然而病人逼尿肌無力，肌電圖顯示尿道外擴約肌收縮力強，且其膀胱輸尿管逆流在膀胱內壓不到20cmH₂O即已發生，因此給予留置尿管處置。出院四個月後追蹤檢查仍有膀胱輸尿管逆流，故建議做尿道擴約肌切開手術。手術後六個月追蹤檢查，只發現有短暫性左側輸尿管逆流，解尿後殘尿量少於50ml，也沒有顯影液留在上尿路系統。近六個月來病人只發生過一次尿路感染，目前其健康情況及生活品質得到明顯改善，病人非常滿意。

關鍵詞：脊髓損傷(spinal cord injury)，膀胱結石(vesical calculi)，膀胱輸尿管逆流(vesico-ureteric reflux)，擴約肌切開手術(sphincterotomy)

前 言

脊髓損傷會造成神經性膀胱功能障礙而引起排尿困難或尿失禁。神經病變並不會直接影響腎臟的製造尿液功能及輸尿管的排泄尿液功能〔1〕，但是脊髓損傷後會產生尿道之阻塞、膀胱壓力過高、殘尿過多、膀胱壁變形（小樑化、假憩室）等狀況，間接影響到上尿路系統的排泄能力，因此產生尿路感染、尿路結石、膀胱輸尿管逆流、慢性腎盂炎、水腎等併發症的機會很高。嚴重時甚至造成腎衰竭，而成為脊髓損傷後期的主要死因〔2-4〕。脊髓損傷病人有上述泌尿併發症時，因感覺功能障礙常常沒有伴隨典型症狀，再者腎臟只要有20-30%的正常組織就能維持正常的血中BUN，Cr濃度。因此唯有定期做泌尿腎臟功能檢查才能及早發現併發症，保全腎臟功能〔5〕。本篇報告一位第一腰椎骨折造成神經性膀胱功能障礙已經七年，因反覆尿路感染經常前往各醫院求診，卻從未做過泌尿系統影像檢查，以致在本院檢查時已有五顆巨大膀胱結石，兩側膀胱輸尿管逆流及左側腎功能低下等併發症的病例。文中將討論其治療

過程及效果。

病例報告

本病例為一25歲男性病人，七年前因車禍造成第一腰椎骨折及雙下肢麻痺，目前已恢復到可持雙側腋下拐杖步行。患者受傷後長期放尿道內留置尿管，因經常發生尿路感染（尿液混濁、發燒）而前往各醫院診治，但除了驗尿及膀胱壓檢查外，沒有做過其他泌尿腎臟功能檢查。民國81年住院時理學檢查發現病人雙髖及雙踝無力，肌力分別為Grade 2/5及0/5，下肢肌腱反射消失。肛門反射(anal reflex)及球海綿體肌反射(bulbocavernosus reflex)正常，肛門擴約肌張力過強，冰水試驗(ice water test)為陰性反應。血中BUN為11 mg/dl、Cr為1.0 mg/dl。尿液分析有嚴重膿尿症，尿液培養有Proteus mirabilis及Staphylococcus aureus生長，其菌落數超過100,000/ml。KUB可看到五顆膀胱結石【圖一】，膀胱顯影發現有兩側膀胱輸尿管逆流，右側為Gr. 3/5〔6〕左側為Gr. 5/5【圖二】。靜脈尿路攝影顯示腎盂、腎盞及輸尿管無明顯病變。

投稿日期：83年6月30日 覆審日期：83年10月29日 接受日期：83年11月9日

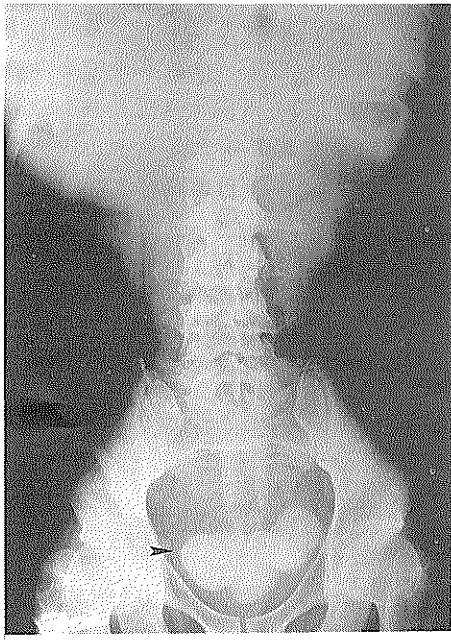
台中市立復健醫院復健科

彰化基督教醫院*

抽印本索取地址：畢柳鶯，台中市立復健醫院，台中市太原路三段1142號

電話：(04)2393855 轉 3165

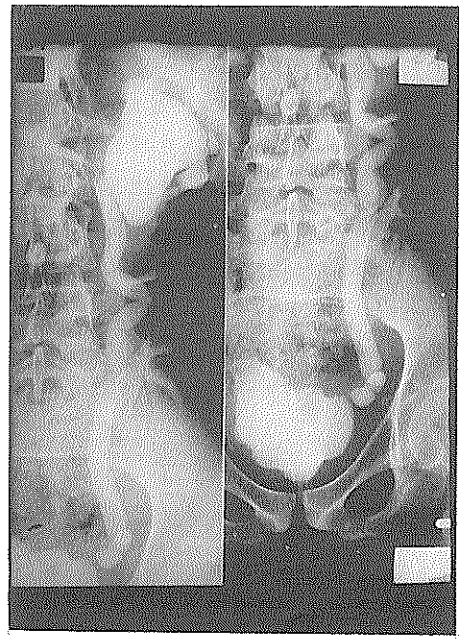
手術取出膀胱結石五顆共重81 gm，其成份含磷酸氨鎂($MgNH_4PO_4$) 83%及草酸鈣($Ca\ oxalate$) 17%。手術後尿路感染得到明顯改善，繼續留置尿管。術後四個月追蹤檢查發現膀胱內壓15 cmH_2O 時左側有膀胱輸尿管逆流，18 cmH_2O 時右側也有逆流發生。膀胱壓檢查顯示無逼尿肌反射及收縮，膀胱適應性(compliance)良好，外擴約肌呈持續收縮現象，Ure-choline test 為陰性反應。



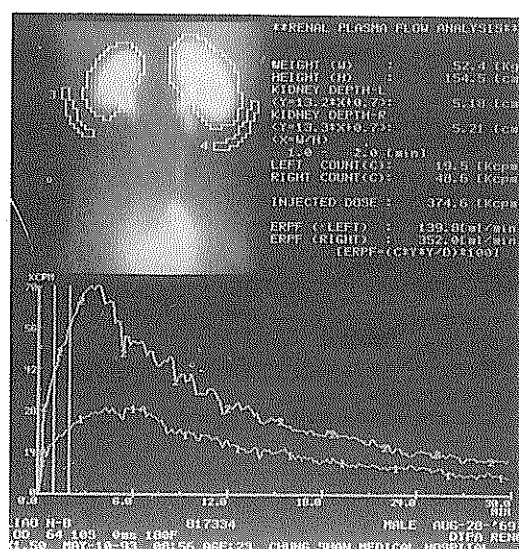
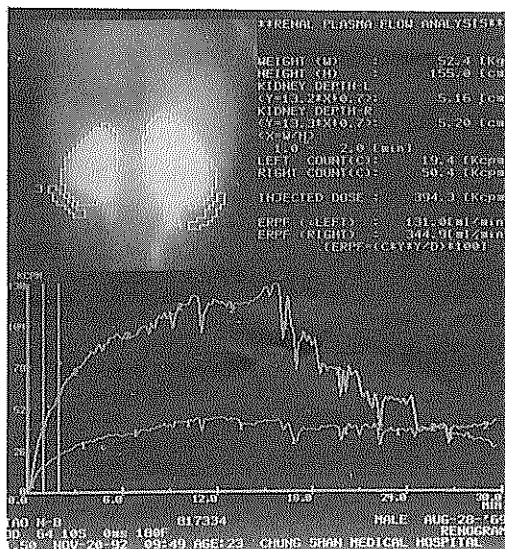
圖一：KUB見到五顆膀胱結石

與病人討論後，決定做尿道擴約肌切開手術。手術後病人有尿失禁現象，平時需穿戴陰莖集尿袋，殘尿量少於 50 ml。術後一個月的膀胱顯影檢查仍有兩側低壓力膀胱輸尿管逆流，但同位素腎臟掃描的排泄曲線已不再有阻塞現象【圖三】，腎臟超音波顯示左腎較正常為小，右腎代償性增大，兩側皆沒有腎盂或腎盞的擴張。

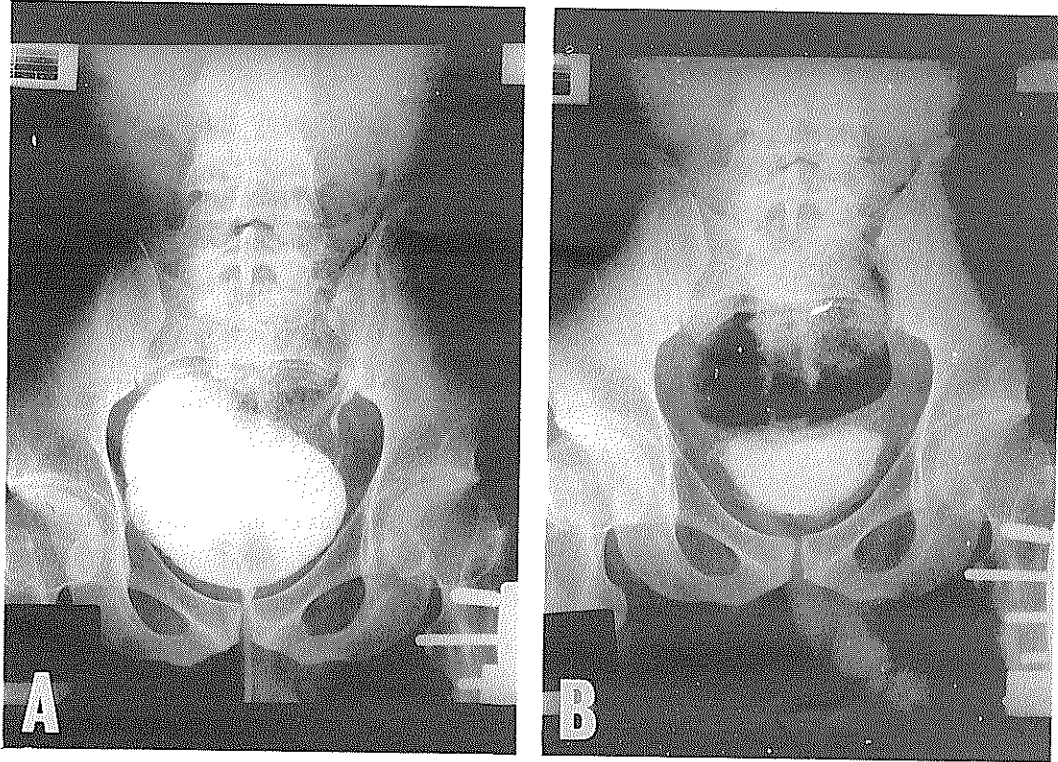
術後半年繼續在門診追蹤，腎臟超音波仍無腎盂



圖二：膀胱顯影所見左側膀胱輸尿管逆流



圖三：(A) 手術前同位素腎臟掃描兩側皆為阻塞型排泄曲線，左腎功能低下 (B) 手術後同位素之排泄曲線恢復正常，但左腎ERPF值並未回升



圖四：(A) 膀胱顯影見到左側輸尿管逆流 (B) 解尿後殘尿很少且逆流消失

腎盂擴張，膀胱攝影顯示左側有短暫性 Gr. 2/5 輸尿管逆流【圖四】，解完尿時消失。病人平常戴陰莖集尿袋，尿液清澈，殘尿量約為 50 ml，手術後半年中只發生一次尿路感染，其健康狀況及生活品質得到明顯改善。

討 論

脊髓損傷病人很容易併發尿路結石，其相關因素包括尿滯留、尿路感染及留置尿管〔7〕。其好發期間為受傷後早期，此與受傷後一年半內有大量的鈣質從尿液排出有關〔8〕。本病例長期放置尿管又有反覆尿路感染，有尿路結石的高危險因子，膀胱結石應是很早就發生，然七年中從未照過X-光或超音波，故能形成如此巨大的膀胱結石。由此可見脊髓損傷後每半年至一年照 KUB 是很重要的。脊髓損傷者的膀胱結石，若發現的早大多數可用膀胱鏡取出，此病例因結石多且大，須以膀胱切開術取出。脊髓損傷者的尿路結石以感染性結石(struvite)為最多佔98%〔9〕，其成因是尿路有尿素分解細菌(urea-splitting bacteria)的感染造成尿液呈鹼性，使磷酸氨鎂(magnesium ammonium phosphate)、磷酸鈣(calcium phosphate)等形成結晶進而產生結石〔10〕。主要的尿素分解細菌包括Proteus, Staphylococcus, Klebsiella 及

Pseudomonas等〔10〕，本病例的結石成分83%為磷酸氨鎂，尿液細菌培養有Proteus及Staphylococcus的生長，情況非常吻合。

膀胱輸尿管逆流是脊髓損傷病人常見的併發症，其發生的原因不是很清楚，經常被提及的包括高膀胱內壓、膀胱炎及結石、輸尿管附近的假憩室(pseudodiverticulum)造成輸尿管瓣膜的破壞等〔11,12〕。此病人的逼尿肌無收縮能力，膀胱壁適應性也很好，長期的膀胱結石及尿路感染應是造成兩側膀胱輸尿管逆流的主要原因，我們因此期望取出結石，控制感染後輸尿管之逆流能得到改善。病人尿道擴約肌收縮力強，逼尿肌無法收縮，因此建議病人繼續留置尿管。出院四個月後追蹤發現膀胱輸尿管逆流並未改善，而臨床上病人已無尿路感染，尿路也沒有阻塞的情形。Fellows及Lamid也認為留置尿管雖保持尿液排泄通暢但並無法避免膀胱輸尿管逆流，對治療輸尿管逆流及保存腎臟功能而言其效果也不好〔13,14〕。除了留置尿管以外，反逆流手術(antireflux surgery)、膀胱擴大術(bladder augmentation)、擴約肌切開術(sphincterotomy)及間歇導尿也是常被提及的治療膀胱輸尿管逆流方法〔14,15〕。反逆流手術用於神經性膀胱障礙的效果不理想，而膀胱擴大術屬於大手術，適用於膀胱容量太小、膀胱壓力太高的情況〔15〕，故尚不需考慮以上兩種手術。病人的膀胱壓力不高似可考慮間

導尿，但由於其輸尿管逆流在膀胱壓低於20cmH₂O時即已發生，恐在兩次導尿之間腹部稍受外力就有逆流產生，因此建議病人作擴約肌切開手術。手術方法是從膀胱頸延伸到尿道的外擴約肌在十二點鐘位置切開，使尿道的阻力盡量降低，腹部用力就能排空尿液。擴約肌切開術較常應用於逼尿肌過度反射伴隨逼尿肌外擴約肌共濟失調(detrusor-sphincter dyssynergy)的病例〔16,17〕。Light 報告擴約肌切開術後逼尿肌收縮不良的病例，手術效果不佳〔18〕；然而Malament及Ross在研究中提到擴約肌切開術對逼尿肌無反射的病人也有幫助〔19,20〕。此病人手術後有壓迫性尿失禁(stress incontinence)，殘尿量少於50ml，半年後膀胱輸尿管逆流明顯改善，很少再有尿路感染，顯示逼尿肌不能收縮並未影響擴約肌切開術的效果。

膀胱輸尿管逆流使具感染性的尿液回流到腎臟，造成慢性腎盂炎，加上尿液回流的壓力(back pressure)壓迫腎皮質，皆可能危害腎功能〔21〕。病人在手術前的同位素腎掃描(radioisotope renography)顯示左腎功能低下，右腎功能代償性增高，兩側的ERPF(effective renal plasma flow)分別為131 ml/min, 344.9 ml/min，且兩側皆為阻塞型排泄曲線(obstructive excretory curves)。擴約肌切開手術後一個月追蹤的腎臟掃描結果兩側的排泄曲線皆正常，但左腎功能的破壞已無法恢復，其ERPF值幾乎和術前一樣，由此更說明了定期檢查、早期診斷對保存腎功能的重要性。同位素腎掃描可以精確測量個別腎臟的功能，且對尿路系統的排泄機能也有動態的評估功能〔22〕；對脊髓損傷病人而言，不論是用於篩檢上尿路系統併發症或追蹤泌尿腎臟功能都是很有價值的檢查工具。

結 論

1. 脊髓損傷後一年半以內，尿路結石的發生率最高，以感染性結石最為常見，應定期檢查才能及早診斷及治療。
2. 尿路感染及結石會造成膀胱輸尿管逆流，破壞腎功能，若時間太久其變化為不可逆。
3. 留置尿管雖可保持尿液排泄通暢，卻不一定能治療膀胱輸尿管逆流。
4. 尿道擴約肌切開可以改善膀胱輸尿管逆流，即使逼尿肌無法收縮仍可能有效。
5. 同位素腎掃描不但能測得個別腎臟功能，且能評估上尿路系統之排泄狀況，是監督脊髓損傷病人泌尿腎臟功能之有效工具。

參考文獻

1. O'Reilly PH. Introduction and general considerations. In O'Reilly PH eds. Obstructive uropathy. London: Springer-Verlag, 1985:3-12.
2. Geisler WO, Josse AT, Wynne-Jones M. Survival in trauma tictransverse myelitis. Paraplegia 1977; 14: 262-75.
3. Nyquist RH, Burs E. Mortality and survival in traumatic myelopathy during 19 years, from 1946 to 1965. Paraplegia 1967; 5: 22-48.
4. Donnelly J, Hackler RH, and Bunts RC. Present urologic status of the World War II paraplegic: 25-year follow-up. Comparison with status of the 20-year Korean War paraplegic and 5-year Vietnam paraplegic. J Urol 1972; 108: 558-62.
5. Lloyd LK. Long-term follow up of neurogenic bladder. Phys Med Rehabil North Am 1993; 4(2): 391-409.
6. International Reflux Study Committee 1981 medical versus surgical treatment of primary vesicoureteral reflux: A prospective international reflux study in children. J Urol 1981; 125: 277-83.
7. Stover SL. Management of bacteriuria and infection in neurogenic bladder. Phys Med Rehabil North Am 1993; 4(2): 343-62.
8. Burr RG. Urinary composition in patients with spinal cord lesions. Arch Phys Med Rehabil 1978; 59: 84-88.
9. DeVivo MJ, Fine PR. Predicting renal calculus occurrence in spinal cord injury patients. Arch Phys Med Rehabil 1986; 67: 722-5.
10. Shortliffe LD, Spingelman SS. Infection stones---evaluation and management. Urol Clin North Am 1986; 13(4): 717-26.
11. Bunts RC. Vesicoureteral reflux in paraplegic patients. J Urol 1958; 79: 747-50.
12. Staskin DR. Hydroureteronephrosis after spinal cord injury: Effects of lower urinary tract dysfunction on upper tract anatomy. Urol Clin North Am 1991; 18: 309-16.
13. Fellows GJ, Silver JR. Long-term follow-up of paraplegic patients with vesico-ureteric reflux. Paraplegia 1976; 14: 130-4.
14. Lamid S. Long-term follow-up of spinal cord injury patients with vesicoureteral reflux. Paraplegia 1988;

- 26: 27-34.
15. Nasrallah PF, Aliabadi HA. Bladder augmentation in patients with neurogenic bladder and vesicoureteral reflux. *J Urol* 1991; 146: 563-6.
 16. Borges PM, Hackler RH. The urological status of the Vietnam war paraplegic: A 15-year prospective follow-up. *J Urol* 1982; 127: 710.
 17. Burgdoerfer H, Bohatyrewicz A. Bladder outlet resistance decreasing operations in spinal cord damaged patients with vesico-ureteral reflux. *Paraplegia* 1992; 30: 256-60.
 18. Light JK, Beric A, Wise PG. Predictive criteria for failed sphincterotomy in spinal cord injury patients. *J Urol* 1987; 138: 1201-4.
 19. Malament M. External sphincterotomy in neurogenic bladder dysfunction. *J Urol* 1972; 108: 554-7.
 20. Ross JC, Gibbon NOK, Sunder GS. Division of the external urethral sphincter in the neuropathic bladder: a twenty year's review. 1976; 48: 649-56.
 21. Walker RD. Renal functional changes associated with vesicoureteral reflux. *Urol Clin North Am* 1990; 17: 307-16.
 22. Lloyd LK, Dubovsky EV, Bueschen AJ, Witten DM, Scott JW, Kuhlemeier K, et al. Comprehensive renal scintillation procedures in spinal cord injury: comparison with excretory urography. *J Urol* 1981; 126: 10-3.

A spinal cord injured patient complicated with huge bladder stones and vesico-ureteral reflux

Lu-Wen Chen, Liu-Ing Bih, Liang-Fang Chen*,

Hwa Ting

A 25 years old male patient suffered from L1 compression fracture with weakness of both lower extremities and neurogenic bladder dysfunction 7 years prior to admission. Motor recovery over both lower extremities developed gradually that he could walk with bilateral axillary crutches later. However, the detrusor reflex did not restore so that a transurethral catheter had been left ever since he was injured. Frequent urinary tract infection manifested with fever and cloudy urine occurred off and on in the past years. Neither regular follow up nor urinary tract imaging study had been performed. Upon admission to our hospital, 5 bladder stones measuring up to $3.5 \times 2.5 \times 1.5$ cm³ and bilateral vesico-ureteral reflux (GrIII/V) were revealed. Cystolithotomy was done, stones weighed 81 gms with 83% magnesium ammonium phosphate and 17% calcium phosphate in composition. The urinary tract infection was under control after surgery. Cystometry study showed detrusor areflexia with sustained urethral sphincter contraction, and the vesico-ureteral reflux (VUR) occurred in low intravesical pressure, an transurethral indwelling catheter was applied.

Four months after discharge, cystogram study revealed persistent bilateral low pressure VUR, and urethral sphincterotomy was therefore performed. After surgery, the post-voiding residuals was less than 50 ml. However, an external urinal was applied for stress incontinence. A cystogram study was followed 6 months later, and transient GrII VUR was found over the left ureter, radioisotope renogram study showed prompt excretion of the isotope. Six months after sphincterotomy, only one episode of urinary tract infection was noted. The patient is very satisfied with the significant improvement of life quality and health situation.

As what we try to emphasize, regular follow up of urinary tract function and imaging study are essential for early diagnosis of urological complications in spinal cord injured patients. Urethral sphincterotomy is one of the effective treatments for VUR even in the absence of detrusor contraction.