

出國報告（出國類別：國際會議）

2018 年雅加達國際神經外科論壇國際會議

服務機關：臺中榮民總醫院

姓名職稱：神經醫學中心 鄭文郁醫師

派赴國家：印尼

出國期間：107 年 5 月 2 日至 107 年 5 月 7 日

報告日期：107 年 7 月 4 日

摘要

1. 頸椎退化病變性是相當常見的退化性關節疾病。頸椎退化性脊髓病變在老年人群中很常見,其臨床特徵表明存在脊髓壓迫和功能障礙,常見臨床症狀為感覺異常、行動不便、下半身癱瘓、步態僵硬、手腳動作失去靈巧性、廣泛性無力、或頻尿、尿失禁等。多節性頸椎退化性脊髓病變之治療,在臨床上主要以手術治療為主。
2. 手術方式分為前位手術,後位手術及合併手術治療。
3. 以證據基礎和臨床經驗之角度,探討對病患達到疾病治療之最好方式。
4. 結論：脊髓的手術減壓適用於確定的多節性頸椎退化性脊髓病變之頸椎病患者。

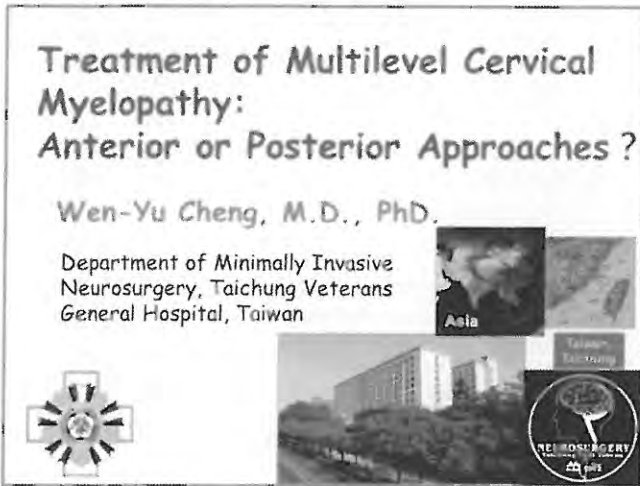
關鍵字：多節性頸椎退化性脊髓病變, 前位手術, 後位手術

一、目的

1. 介紹多節性頸椎退化性脊髓病變的病患手術選擇的適應症及手術技巧。
2. 介紹本院治療成果。

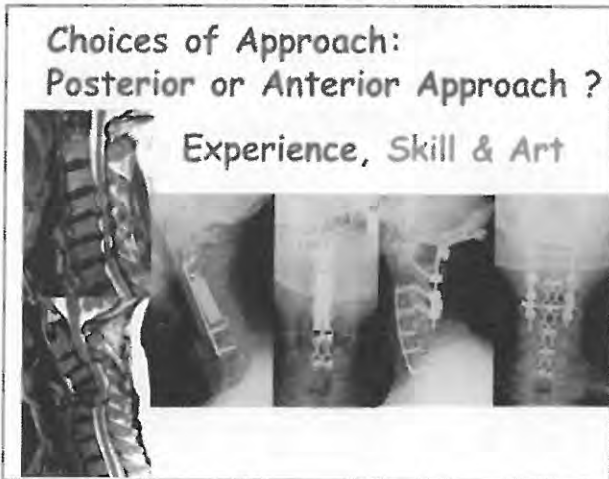
二、過程

1. 口頭論文發表多節性頸椎退化性脊髓病變治療之臺中榮總經驗。

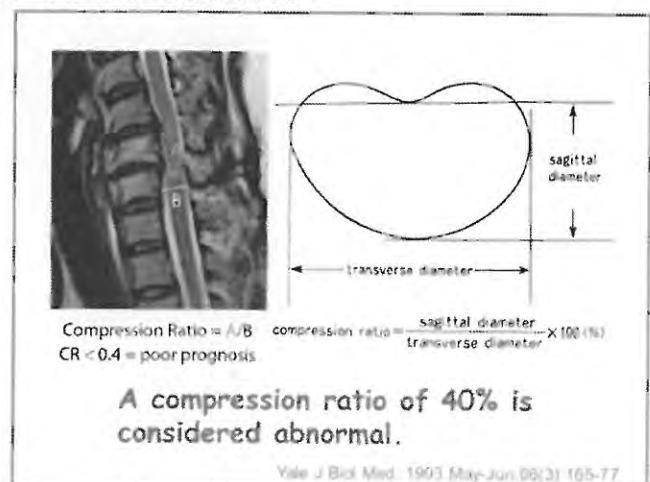
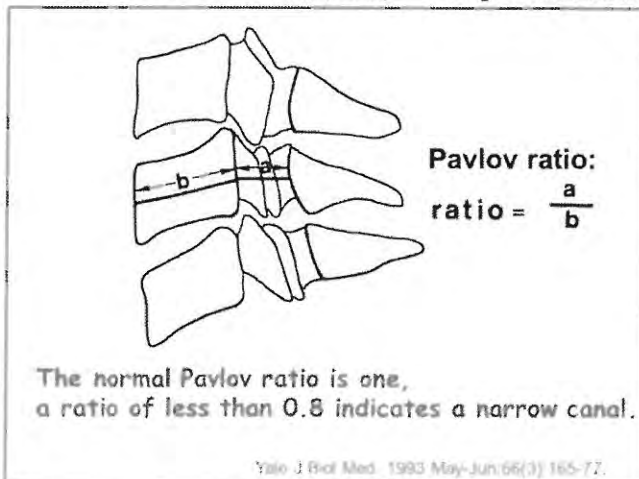


2. 過程

- (1) 式分為前位手術,後位手術及合併手術治療,手術之選擇須以證據基礎和臨床經驗之角度,對病患達到疾病治療之最好方式。



- (2) Pavlov ratio 小於 0.8; Compression ratio 小於 40%表示脊椎腔狹小:

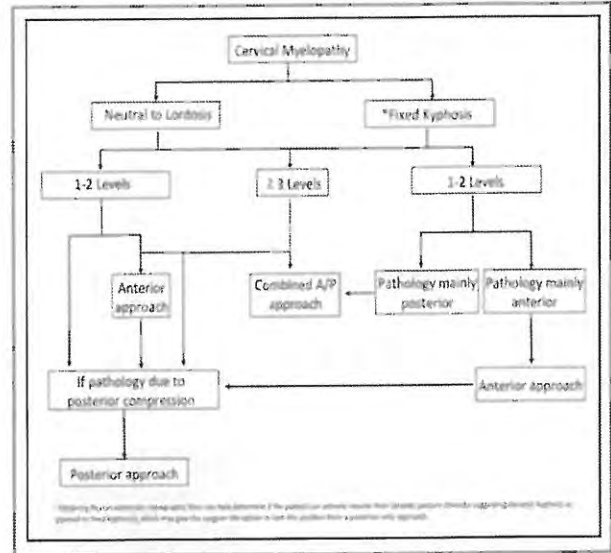


(3) 治療術式選擇概念

Simplified Treatment Algorithm for CSM

	1 or 2 levels of compression	3+ levels of compression
> 10 rigid Kyphosis	③ Anterior alone (ACDF/corpectomy /hybrid)	⑤ Combined AnteroPosterior •Anterior to correct kyphosis/decompress •Posterior to Decompress
< 10 rigid kyphosis		④ Posterior alone Laminoplasty VS Laminectomy + Fusion

John Hopkins NS



(4) 結論：脊髓的手術減壓適用於確定的多節性頸椎退化性脊髓病變之頸椎病患者，所以針對病患手術方式的選擇就相對重要，如何改善手術技巧及減少併發症，也是未來努力的方向。

會議議程

14.15 - 15.20 Coding JKN for Spine Cases
Friendly and Simple Room
Moderator: Muhammad Firdaus Soenary & Yudi Fawwaz Niwoho

14.15 - 14.25 Kebijakan JKN Terkini Kain - Kajian

14.25 - 14.35 Factors of Pending Claim in JKN Spine Cases
Moderator: Muhammad Firdaus Soenary & Yudi Fawwaz Niwoho

14.35 - 14.45 Coding JKN for Spine Cases in Type B Hospital
Yudi Fawwaz Niwoho

14.45 - 14.55 Readmap of Preparation and Postdischarge of New Tarif of JKN to Neurospine Indonesia
Juni Wahyudi

14.55 - 15.05 Spine Fusion Procedure in BPJS Era
Bryu Dewanto

15.05 - 15.20 Discussion

15.20 - 15.25 Keynote Lecture and Closing
Friendly and Simple Room
Moderator: Djoko Riadi & Junichi Mizuno (Japan)

15.25 - 15.35 Surgical Approach to Lumbar Degenerative Diseases - Junichi Mizuno (Japan)

15.35 - 15.45 Closing Remarks - Chairman of IJNIF, Eko Agus Subagio

15.45 - 16.00 Coffee Break

SYMPOSIUM untuk Dokter Umum
Sabtu, 5 Mei 2017 di Hotel Ramia Kalapa Gading
Symposium Perancangan Penyakit Tulang Belakang untuk Dokter Umum
Trendy Room

07.00 - 08.00 Registrasi
Pembukaan dan Acara PERSEPSI JAKA
Dr. dr. Wawan Mulyawan, SpBS, SpKR, AAK

08.00 - 10.00 Sesi 1
Moderator: dr. Heri Amudun, SpBS (KI) & dr. Astri Awanis, SpBS
Diagnosis Penyakit Tulang Belakang
Dr. dr. Tiara Aninditha, SpBK (KI)

08.00 - 08.30 Staf Pengajar Departemen Neurologi, FKUI, RSUPN/Ci Cipto Mangunkusumo, Jakarta
Imaging Pada Penyakit Tulang Belakang
dr. Rahmad Mulyadi, SpRad (KI)

08.30 - 09.30 Staf Pengajar Departemen Radiologi, FKUI, RSUPN/Ci Cipto Mangunkusumo, Jakarta
Algoritma Nyeri Tulang Belakang
dr. Mahdian Nur Nasution, SpBS

09.00 - 09.30 Anil Bedah Saraf di Klinik Nyeri Tulang Belakang

09.30 - 10.00 Dekat

10.00 - 10.15 Coffee Break

10.15 - 12.15 Sesi 2
Moderator: dr. Made Agus Mahendra, SpBS & dr. Mahdian Nur Nasution, SpBS
Keperawatan Penyakit Tulang Belakang Non Trauma
Dr. dr. Muhammad Saekhu, SpBS (KI)

10.15 - 10.45 Koordinator Neurospine Departemen Bedah Saraf, RSUPN/Ci Cipto Mangunkusumo, Jakarta
Tatakelola Pasien pada Cedera Saraf

10.45 - 11.15 Dr. dr. Wawan Mulyawan, SpBS, SpKR, AAK
Pakar Neurospine: Sunda Brain and Spine Center, Jakarta
Rehabilitasi Medis pada Penyakit Tulang Belakang
dr. Luth Karuna Wahyuni, SpKFR (KI)

11.15 - 11.45 Kepala Departemen Rehabilitasi Medik, RSUPN/Ci Cipto Mangunkusumo, Jakarta

11.45 - 12.15 Dekat

12.15 - 12.30 Penutupan

12.30 - 13.30 Makan Siang

The 1st Jakarta International Neurosurgery Forum (IJNIF)
in conjunction with
The 1st Congress of Indonesian Neurospine Society and 4th Indonesia Spine Update
May 4th - 5th, 2018, Ramia Hotel Kalapa Gading, Jakarta

LOOKING TO THE BEST AND FURIOUS: SPINE HEALTH FOR BETTER QUALITY OF LIFE

SYMPOSIUM Day 1
Friday, 4th May 2018, Ramia Hotel Kalapa Gading

07.00 - 08.00 Re-Registration
Friendly and Simple Room
Opening Ceremony
Speech by:
1. Chairman of Organizing Committee - Wawan Mulyawan
2. Congress Chairman of Indonesian Neurospine Society - Muhammad Saekhu
3. President of Indonesian Neurospine Society (INS) - Abdul Hafid Bajamal
Inauguration of Indonesian Neurospine Society by President of Indonesian Neurosurgical Society (INS)
Chairman of Indonesian Neurospine Society, Eko Agus Subagio

Speech by Vice Governor of DKI Jakarta - Sandiaga Uno
Plenary Lecture 1

08.45 - 10.00 Friendly and Simple Room
Neurospine: Past, Present and Future
Moderator: Eko Agus Subagio & Wawan Mulyawan

08.45 - 09.00 Strategi Pengembangan dan Perbaikan Kompetensi Neurospine di Indonesia - Setyo Widi Nugroho

09.00 - 09.15 Strategi Pengembangan dan Perbaikan Kompetensi Neurospine di Indonesia - Abdul Hafid Bajamal

09.15 - 09.30 Perencanaan Saraf Saraf Tulang Belakang di Indonesia - RM Padmasanjaya

09.30 - 09.45 Bioethics in Neuro Spinal Pain Care - Andi Asyraf Islam

09.45 - 10.05 Spinal Instrumentation and Patient Safety - Endro Sasuko

10.00 - 10.15 Coffee Break

Plenary Lecture 2

10.15 - 11.15 Friendly and Simple Room
Moderator: Djoko Riadi & Tautan Budi Setyosukanto
Image-Guided Spinal Surgery and Robotics in MIS: Where are we Now?
Chung-Chyi Shen (Taiwan)

10.30 - 11.45 Endoscopic Access to Re-Entry Thoracic Spine (PET) vs. Thoracoscopy - Jun Ho Lee (South Korea)
Minimally Invasive Spine Surgery for Thoracic Lumbar Spinal Fracture: How to Select Cases?
Shankar Gopinath (USA)

11.00 - 11.15 Microscope-assisted Minimally Invasive Kyphosis Surgery with a Tubular Retractor System for Intraspinal Tumors: 388 Cases Report - Chunhui Chen (China)

11.15 - 11.30 Friday Pray & Lunch

Plenary Lecture 3

11.30 - 14.30 Friendly and Simple Room
Moderator: Wiyawan Manuabandito & Mahdian Nur Nasution

11.30 - 11.45 Cervical Fracture: What should we Operate? - Shankar Gopinath (USA)

11.45 - 12.00 The Feasibility of Optimal Surgical Result Prediction According to the Degree of Rotator Shift and Multisegment Cervical Total Disc Replacement - Jun Ho Lee (South Korea)

12.00 - 12.15 Anemphysis in Lumbar Fusion Surgery - Eko Agus Subagio

14:30 - 15:45	SS 1 Minimal Invasive/Endoscopy Friendly and Simple Room Moderator: Fahid Yudhoyono & Zainy Hamzah PEDI (Percutaneous Endoscopic Transforaminal Discectomy): Caudal Piloni Spondyl in the Endoscopy - Jun Ho Lee (South Korea) PEDI (Endoscopic Lumbar) Wiryawan Murtosudarmo Analysis of Clinical Results of Three Offsets Review of Percutaneous Endoscopic Transforaminal Lumbar Discectomy for Lumbar Hemisection Disk - Fahid Yudhoyono	SS 2 Deformity Surgery Happy Room Moderator: Muhammad Faria & Afhan Priyanbodo Permana Surgical Treatment for Spondylolisthesis Trikarna Gde Bagus Mahadewa Our Surgical Strategy for Adult Spinal Deformity with Osteoporosis - Yasuhiko Nakajima (Japan) Surgical Stabilization of Cervical Fractures Resulted in Atypical Spinalities - Muhammad Faria	18:45 - 19:30 SS 7 Trauma 2 Friendly and Simple Room Moderator: Alfred Sutrisno & Chandra Setiawan Delayed Neurological Deficit after Traumatic Cervical Fracture - Yessya Yustus How to Manage Thoracic Lumbar Compression Fracture - Alfred Sutrisno History of Neurological Deficit after Long Spine Surgery Treatment in Spinal Cord Injury - Much. Targibi Alatas Controversies in Managing of Thoracic Lumbar Upper Burst Fractures - Saiful Edihan Situmorang 19:40 - 19:55 Discussion	18:45 - 19:30 Management of Deep Cervical Spinal Myeloma - Abdul Hafid Basalam SS 8 Postlaminectomy Happy Room Moderator: Yessya Yustus Zulfarizanto & Afhan Priyanbodo Permana Toluidine Coat - Saiful Ashari Adult Toluidine Coat - Afhan Priyanbodo Permana Spinal Anesthetic Cycle in Children - Wisnu Suryaningtyas Spinal Tumor in Pediatric Patient - Muhammad Saefudin Discussion
15:45 - 16:15	SS 2 Spinal Pain Friendly and Simple Room Moderator: Mahdian Nur Nasution & Yudi Yuwana Wibisono Scoliosis and Spina are not The Signs of HNP - Ali Shahab Pain-evaluation Index in Cervical Cervical Zygapophysial Joint Pain Release with Michel Smith Block - Fahid Yudhoyono Conservative Approach of Cervical Transversary of Lumbar Facetoma	SS 4 Complication of Spinal Surgery Happy Room Moderator: Mohamed Saefudin & Azri Avianti Fire Surgical Spontaneous, Diagnosis and Management - Mohamed Saefudin Cervical Lateral Mass Screw: Pitfalls and Fracture - Abdul Hafid Basalam Failed Fusion: Diagnosis and Management - Eko Agus Subagio	19:55 - 20:10 Discussion SS 9 Vascular Friendly and Simple Room Moderator: Abrar Acham & Harsan Spinal Epidural Hematoma Caused by Spinal dVA Fistula - Afhan Priyanbodo Permana Minimally Invasive Treatment for Posterior Circulation Anomalous - Harsan Spinal Vascular Malformation - Abrar Acham	19:55 - 20:10 Discussion SS 10 Tumor Happy Room Moderator: Fadhil & Sumbar M. Tunggal Maneradja Surgical Management of Spinal Metastatic Tumor - Muhammad Saefudin Surgery of Intradural Tumor - Julius July TBK Muhammad Firdaus Soenaryo Spinal Cord Intradural Tumoroma - Fadhil
16:15 - 16:45	SS 3 Spinal Pain Friendly and Simple Room Moderator: Rully Hanafi Dahlan & Bedar Agus Mahadewa Inggus 16:15 - 16:25 Breath: Focus Surgery - Seffine Elzein Delayed Treatment of Spinal Cord Injury in Young - Jusuf Sulaiman Stabilization Fracture Osteoid Type 2 with Lateral Mass C1 and Pedicle Screw C2 in Trauma Cervical - Nadrullah 16:45 - 16:55 Cervical Laminectomy with Lateral Mass Screw Fixator in Trauma - Happy Kurnia Brotaman Cervical Spine Tumor Management - Rully Hanafi Dahlan	SS 6 T10 Spine Happy Room Moderator: Djoko Riadi & Chandra Setiawan Spinal TB: Diagnosis and Management - Muhammad Saefudin Delayed Treatment of Cervical - Djoko Riadi Are TB Drug for Tuberculosis Spondylitis - Chandra Setiawan Management of The Cervical Spine Tuberculosis - Sabri Ibrahim	20:15 - 20:45 Discussion SS 11 Technique Note Friendly and Simple Room Moderator: Much. Targibi Alatas & Azri Avianti ACDF and KOCF: Indication and Techniques - Muhammad Saefudin The Power of Lumbar Block Surgery - Ryan Setiawan (USA) Anterior Retrograde Lumbar Approach for Anterior Cervical Vertebra Lesion - Saiful Edihan Situmorang	20:15 - 20:45 Discussion SS 12 Degenerative Happy Room Moderator: Saefudin Widi Nugroho & Dewa Pulu Wimu Wardhana Management of Cervical Spinal Myelopathy - Kartha Basudiganta (Malaysia) Using Good Quality of Bone for Cervical Hemisection - Riche Darmayanti Lumbar Microsurgery - Agus Yudianto Cervical Microsurgery - Agus Yudianto Spondylolysis among Various Technique of the Cervical Laminectomy - Dewa Pulu Wimu Wardhana Unilateral Approach to Block Decompression - Mulyawan Techniqued for Treating Lumbar Stenosis - Wawan Widayawan Discussion
16:45 - 17:20	SS 5 Trauma 1 Friendly and Simple Room Moderator: Rully Hanafi Dahlan & Bedar Agus Mahadewa Inggus 16:15 - 16:25 Breath: Focus Surgery - Seffine Elzein Delayed Treatment of Spinal Cord Injury in Young - Jusuf Sulaiman Stabilization Fracture Osteoid Type 2 with Lateral Mass C1 and Pedicle Screw C2 in Trauma Cervical - Nadrullah 16:45 - 16:55 Cervical Laminectomy with Lateral Mass Screw Fixator in Trauma - Happy Kurnia Brotaman Cervical Spine Tumor Management - Rully Hanafi Dahlan 17:00 - 17:20 Discussion 17:20 - Finish Indonesian Neurospine Society Meeting	SS 7 Trauma 1 Friendly and Simple Room Moderator: Rully Hanafi Dahlan & Bedar Agus Mahadewa Inggus 16:15 - 16:25 Breath: Focus Surgery - Seffine Elzein Delayed Treatment of Spinal Cord Injury in Young - Jusuf Sulaiman Stabilization Fracture Osteoid Type 2 with Lateral Mass C1 and Pedicle Screw C2 in Trauma Cervical - Nadrullah 16:45 - 16:55 Cervical Laminectomy with Lateral Mass Screw Fixator in Trauma - Happy Kurnia Brotaman Cervical Spine Tumor Management - Rully Hanafi Dahlan 17:00 - 17:20 Discussion 17:20 - Finish Indonesian Neurospine Society Meeting	SS 8 Postlaminectomy Happy Room Moderator: Yessya Yustus Zulfarizanto & Afhan Priyanbodo Permana Toluidine Coat - Saiful Ashari Adult Toluidine Coat - Afhan Priyanbodo Permana Spinal Anesthetic Cycle in Children - Wisnu Suryaningtyas Spinal Tumor in Pediatric Patient - Muhammad Saefudin Discussion	20:45 - 21:00 Discussion SS 13 Degenerative Happy Room Moderator: Saefudin Widi Nugroho & Dewa Pulu Wimu Wardhana Management of Cervical Spinal Myelopathy - Kartha Basudiganta (Malaysia) Using Good Quality of Bone for Cervical Hemisection - Riche Darmayanti Lumbar Microsurgery - Agus Yudianto Cervical Microsurgery - Agus Yudianto Spondylolysis among Various Technique of the Cervical Laminectomy - Dewa Pulu Wimu Wardhana Unilateral Approach to Block Decompression - Mulyawan Techniqued for Treating Lumbar Stenosis - Wawan Widayawan Discussion
17:20 - 17:30	Discussion	Discussion	Discussion	
Symposium Day 2 Saturday, 17 May 2015, Nams Hotel Kelapa Gading				
17:30 - 18:00	Re-Registration	17:30 - 18:00	Discussion	
18:00 - 18:30	Primary Lecture 4 Friendly and Simple Room Moderator: Triakarna Gde Bagus Mahadewa & Ridha Dhamayanti Percutaneous Endoscopic Thoracic Discectomy: Transforaminal Approach - Sang Ho Lee (South Korea)	18:00 - 18:30	Discussion	
18:30 - 19:00	Discussion	18:30 - 19:00	Discussion	

三、心得

台中榮總神經外科從 1990 年開始發展微創手術,與傳統開放式手術相比,微創手術方法可以更快、更安全,並且能縮短恢復時間,對肌肉和軟組織的創傷較少。從此次的會議中,我們可以看到國際上各國進步,不論是手術或者是硬體上的發展,有很多值得我們學習的。雖然目前印尼在頸椎手術技術和設備上不及台灣,但是其發展微創脊椎手術之精神值得敬佩。

人才的培育在未來也十分重要,在此次會議上,我看到很多印尼的年輕醫師的報告,對微創手術充滿熱誠和創新。台灣在環境影響下,大部分年輕醫師對此領域有興趣,但對於較困難之手術則望而卻步,對未來是一大隱憂,所以如何改善日益惡化的醫療環境,使更多年輕醫師投入此領域,是須要大家一起共同努力的。目前台中榮總微創性神經外科,定期和學會舉辦教育訓練,希望在人才培育方面,盡一點微薄之力。

四、建議事項

1. 透過論文發表方式,增進國內及國際交流,提供台中榮總經驗,亦可了解其他國際間專家的治療狀況,相互交流,使治療上與世界同步。
2. 多鼓勵年輕醫師參與學術活動及論文發表,對人才的培育有所助益。除此之外,希望醫院能提供協助舉辦手術訓練班,使年輕醫師在上刀前,有接受一些手術訓練,也可增加其開刀的自信心和興趣。
3. 醫院鼓勵短期進修,對於新技術的學習很有幫助,是一個很好的政策,也是對於促進台中榮總和國際知名專家交流的良好方式。所謂活到老學到老,即使是資深醫師,也須多充實自己,才有更多的能力指導年輕一輩的醫師。
4. 增設手術設備及特殊器械,提高手術安全性和精準度。因為神經外科是重裝備學科,且手術十分精細,為提高病人安全及成功率,如何在有限的經費中增設手術的設備十分重要,也希望未來能和國際並駕齊驅。
5. 醫學中心應該是發展困難手術,針對特殊領域,希望醫院給予支持,成立專業治療團隊,使台中榮總成為有特色的醫院。例如:想到頸椎的治療,就想到台中榮總。

Treatment of Multilevel Cervical Myelopathy: Anterior or Posterior Approaches?

Wen-Yu Cheng, M.D., PhD.

Department of Minimally Invasive Neurosurgery, Taichung Veterans General Hospital, Taiwan



Incidence of Cervical Myelopathy

- Cervical spondylotic myelopathy is the most common type of cord lesion affecting middle-aged and elderly populations.
- Most common in 7th decade of life
- More common in men than women (~ 2:1)



Clinical Presentation

- Patient usually over 60 years of age
- Myelopathy in younger patients usually associated with disc pathology, trauma, or inflammatory disease
- Acute presentation secondary to a fall or trauma often has features of central cord syndrome:
 - ✓ Motor more than Sensory
 - ✓ Upper more than Lower
 - ✓ Distal more than Proximal

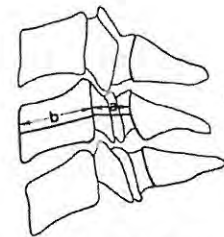
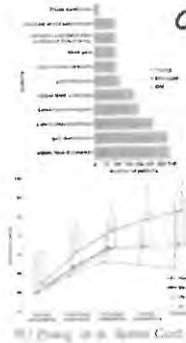
Choices of Approach: Posterior or Anterior Approach?

Experience, Skill & Art



Cervical Myelopathy

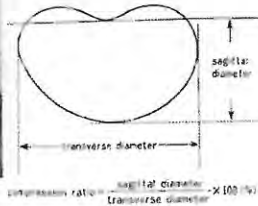
- The severity of CSM increased with increasing age.
- Age was inversely correlated with recovery.
- Six months post operation was the prime time for the recovery of spinal cord function.



Pavlov ratio:
ratio = $\frac{a}{b}$

The normal Pavlov ratio is one, a ratio of less than 0.8 indicates a narrow canal.

Spine J Biol Med. 1999 May;4(4):162-165-17



Compression Ratio = $\frac{a}{b}$
CR < 0.4 = poor prognosis

A compression ratio of 40% is considered abnormal.

Spine J Biol Med. 1999 May;4(4):162-165-17

Poor prognostic indicators

- Progression of signs and symptoms.
- Presence of myelopathy for six months or longer.
- Compression ratio approaching 0.4 or transverse area of the spinal cord of 40 square millimeters or less.
- Improvement is unusual with nonoperative treatment and almost all patients progressively worsen.

Spine J Biol Med. 1999 May;4(4):162-165-17

The Goal of Spinal Surgery

- Decompression
 - ✓ Discectomy, Corpectomy
 - ✓ Laminectomy, laminoplasty
- "Decompression from the compression site"
- Stability
 - ✓ Fusion
 - ✓ Instrumentation
 - ✓ Arthroplasty

Simplified Treatment Algorithm for CSM

	1 or 2 levels of compression	3+ levels of compression
> 10 rigid Kyphosis	<p>③ Anterior alone (ACDF/corpectomy /hybrid)</p>	<p>① Combined AnteroPosterior •Anterior to correct kyphosis/decompress •Posterior to Decompress</p>
< 10 rigid kyphosis		<p>④ Posterior alone Laminoplasty vs Laminectomy + Fusion</p>

John Hopkins NS

Cervical spine sagittal alignment (local kyphotic angle)



>13 degrees kyphosis is a contraindication of posterior decompression John Hopkins NS

Postoperative K-line conversion from negative to positive is independently associated with a better surgical outcome after posterior decompression with instrumented fusion for K-line negative cervical ossification of the posterior ligament

Atsuo Koda, Takao Kuroki, Junya Sato, Yusuki Ima, Atsuhiko Kitamura, Seiji Ohsumi, Sumbitha Ohta, Kazuhiko Nagai, Tetsuya Aoe, Hiroshi Nagata, Taro Furuyama, Hiroshi Kurokawa, Yoji Ito, Katsuya Higashima, Masashi Yamazaki

Spine J Biol Med. 2004 Jun;9(6):561-567

Abstract
Objective: Postoperative conversion from negative to positive K-line angle is associated with a better surgical outcome after posterior decompression with instrumented fusion for K-line negative cervical ossification of the posterior ligament.
Methods: The severity of cervical ossification of the posterior ligament (COP) was classified into three grades (grade 0, 1, 2) based on the K-line angle. The K-line angle was measured on the sagittal MRI scans. The K-line angle was measured on the sagittal MRI scans. The K-line angle was measured on the sagittal MRI scans. The K-line angle was measured on the sagittal MRI scans.
Results: The conversion from negative to positive K-line angle was significantly associated with a better surgical outcome after posterior decompression with instrumented fusion for K-line negative cervical ossification of the posterior ligament.
Conclusion: Postoperative conversion from negative to positive K-line angle is independently associated with a better surgical outcome after posterior decompression with instrumented fusion for K-line negative cervical ossification of the posterior ligament.



The K-line is a straight line from the midpoints of the vertebral canal at C2 and C7

Figure: Lateral radiograph showing the K-line (solid line) connecting the midpoints of the vertebral canal at C2 and C7 (line 1, 2, 3, 4, 5, 6, 7). Lateral radiograph showing the visualization of the posterior longitudinal ligament not exceeding the K-line (1, 2, 3, 4, 5, 6, 7).

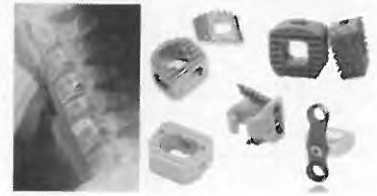
Conclusion

- ADF is one of the suitable surgical treatments for K-line (-) OPLL. However, adequate management of ADF-specific perioperative complications is needed.
- LMP should not be used for K-line (-) cervical OPLL.
- Both ADF and PDF are applicable for K-line (-) OPLL according to indications set by each institute and surgical decisions.
- LMP or PDF is a possible alternative procedure for K-line (+) OPLL.
- Postoperative K-line conversion from (-) to (+) is a factor independently associated with a better surgical outcome.

European Spine Journal pp 1-8 Masuo Kudo

Anterior Approach

- Anterior cervical discectomy fusion (ACDF)
- Anterior cervical corpectomy fusion (ACCF)
- Anterior cervical discectomy with ADR



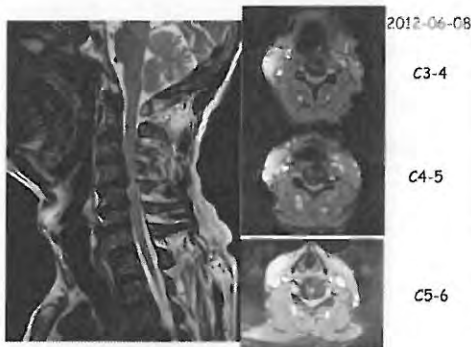
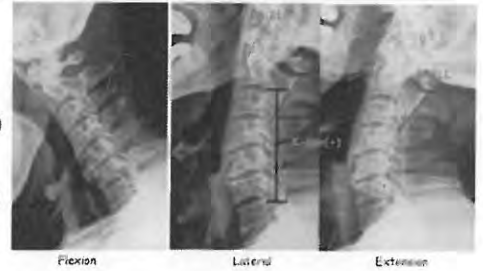
Advantages of Anterior Approach

- Directly decompression
- Correct kyphosis and reconstruct cervical alignment
- Relieve cord compression which is caused by cervical kyphosis
- Restore the height of the decompressed segments
- Prevent further degeneration and neurological deterioration over the fused segments

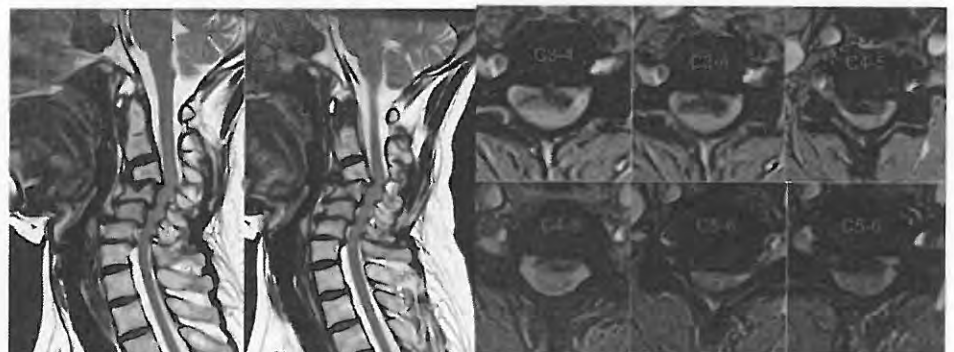
Disadvantages of the Anterior Approach

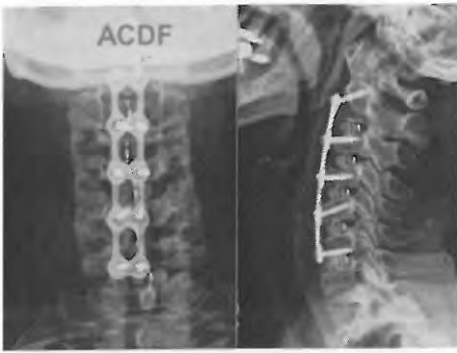
- Requirement for meticulous surgical technique
- longer surgery time
- greater intraoperative haemorrhage
- potential complications of dural injury and instrumented fusion such as pseudarthrosis
- adjacent level spondylotic degeneration (ASD)
- graft dislodgement
- The risk of dysphagia, recurrent laryngeal nerve injury, dysphonia, dyspnoea, esophageal fistula, impairment of laryngeal, or other pericervical organs

Case 1: 66 y/o male with neck pain with radiation to bilateral upper limbs for 4 months
Dx: OPLL with Myelopathy



Case 2: 68 y/o male with neck pain with radiation to bilateral upper limbs for 3 years and unstable gait for 5 months
Dx: Cervical Spondylotic Myelopathy





Consequences of Fusion Adjacent segment disease (ASD)

The incidence of revision surgery Long-term follow-up studies

- Hilibrand et al. (7%),
- Ishihara et al. (6%),
- Li et al. (6.7%),
- King et al. (2.5%)

Hilibrand AS, et al. Spine J. 2004;14(8 Suppl):1908-15
Ishihara H et al. Spine J. 2004;14(8):824-8
Li et al. Journal of Orthopaedic Surgery and Research (2016) 11:5
King J JT. ET AL. Neurosurgery. 2009;65(6):1011-22.

Adjacent Lesion Case 3:



5 years after autologous bone fusion

Case 4: Chen X X, 56 y/o, Male

1. Unstable gait for one year
 2. Neck pain with radiation to bilateral upper limbs for 2 years
 3. ACDF C5-6,6-7 for 2 years,
ACDF C3-4 for 1 year,
Laminoplasty C3-7 for 6 months
- S/S: Myelopathy and spastic gait
muscle power: grade 4, 4 limbs
muscle atrophy: L† upper limbs



local kyphotic angle
14 degrees



Posterior approach

- Laminectomy alone
- Laminectomy with fusion
- Laminoplasty

Posterior decompression +/- fusion

- Preferred if extent of decompression is more than 4 vertebral levels
- Significant posterior contribution to stenosis
- If good cervical lordosis, then favor laminoplasty over laminectomy and fusion
- Cervical kyphosis or decision already made to perform fusion, favor laminectomy and fusion

Disadvantages of the posterior approach

- Do not remove the anterior compressive pathology
- Wound complications is higher
- Patients often complain of neck pain

Posterior approach

Laminectomy alone

- many complications
- ✓ segmental instability,
- ✓ postlaminectomy kyphosis,
- ✓ perineural scar formation,
- ✓ less of cervical motion,
- ✓ delayed neurologic deterioration



Howells. Use of 3-level laminectomy, laminectomy with fusion or laminectomy with anterior corpectomy for posterior presacral fixation. J Neurosurg (Number 1999, Volume 2001).

Posterior approach

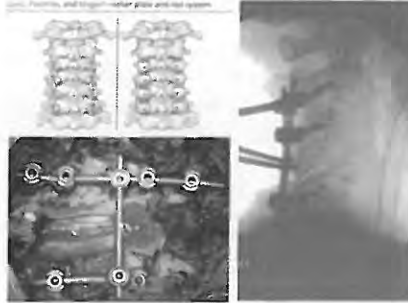
Laminectomy with fusion
the most popular instruments
are modern lateral mass and
pedicle screw fixation



- ✓ to stabilize the residual structure and prevent postlaminectomy kyphosis.
- ✓ to allow reliable new bone formation around a stable scaffold

Posteriorly, due to their configurations, pedicle screws with hooks or laminoplasty has reduced vertebral osteomyelitis, for posterior approach according to COMI (Kumar 1995, Heller 2001).

Lateral Mass Screws



Posterior approach

Laminoplasty

As an alternative to laminectomy, laminoplasty is a simpler procedure and is now more common

- ✓ laminoplasty was shown to have a lower incidence of complications
- ✓ superior clinical outcomes based on objective and subjective evaluation (Heller 2001)
- ✓ Laminoplasty may reduce the rate of postlaminectomy kyphosis in contrast with laminectomy alone (Kamioka 1989)
- ✓ adjacent segment degeneration without restricting cervical range of movement (Shaffrey 1999)
- ✓ preserves posterior structures excluding partial ligamentum flavum resection (Mitsunaga 2012)

Laminoplasty

Unilateral open-door technique



Bilateral open-door technique



Case5: Wu X X, 66 y/o, male

1. Neck pain with radiation to bilateral upper limbs for 2 years and unstable gait for 3 months

2. Lhermitte's sign (+)

Hoffman's sign of right hand (+), DTR, (+++).

Sensory impairment : C4, C6;

Muscle power: R/L : Gr: 4/4

Dx: Multilevel CSM



MRI of C-spine



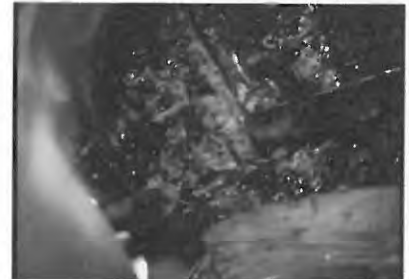
Laminoplasty:

unilateral open-door technique



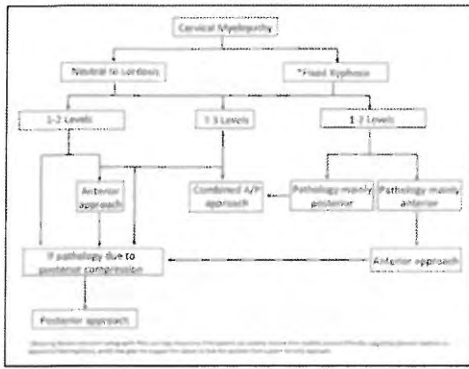
Laminoplasty:

unilateral open-door technique



ACDF (3 months later)





Sharma, Balasubramanian, et al. *Spinal Cord*. 2017; 55: 745-752 (8)

Take-home messages

- Cervical spondylosis and canal stenosis are common in the elderly population
- Clinical features of cervical myelopathy indicate the presence of spinal cord compression and dysfunction
- The natural history of this condition is variable
- Surgical decompression of the spinal cord is indicated for patients with established cervical myelopathy