Timing & modalities of urgent spine decompression

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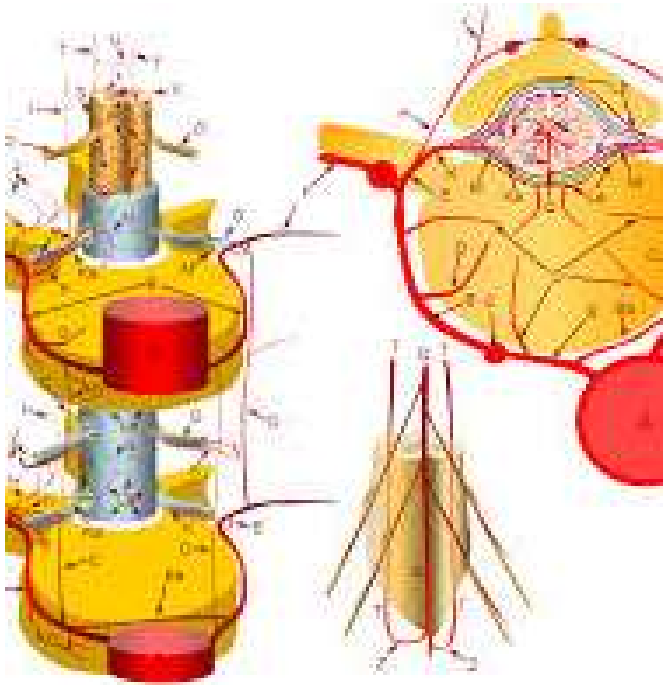
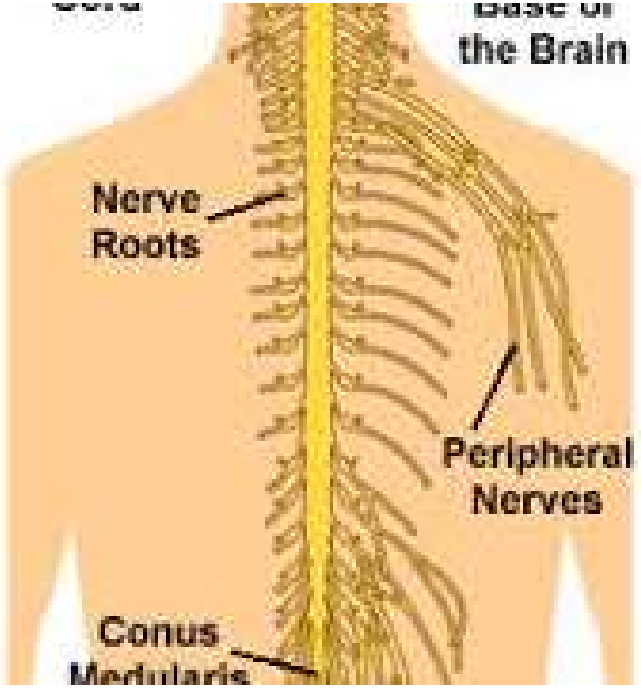
AFRICA HEALTH 2019

Tuesday 28th May 2019

Gallagher Convention Centre





Basic spinal anatomy

Pathophysiology of spinal cord injuries in trauma

Role of direct trauma *at the time* of injury = *PRIMARY INJURY*

- Direct laceration/contusion of spinal parenchyma
- May be assessed by immediate post-injury neurological deficit
- Caused by high and low energy mechanisms alike

Role of ongoing pressure *after the time* of injury = *SECONDARY INJURY*

Systemic factors

- Airway, breathing, circulation, glucose etc

Local factors

- Compression both intrinsic & extrinsic
  - Mass lesions and unstable fractures
  - Ischaemia & infarction
  - Tissue swelling and vicious circle

Decompression

Decompression aims to reverse secondary injury to the cord

It has no effect on primary injury

What compresses spinal tissue following trauma?

- Bone, discs and ligaments
- Swollen spinal cord
- Haematoma
- Foreign bodies

(a)

(b)

Decompressive interventions in acute traumatic cord injury

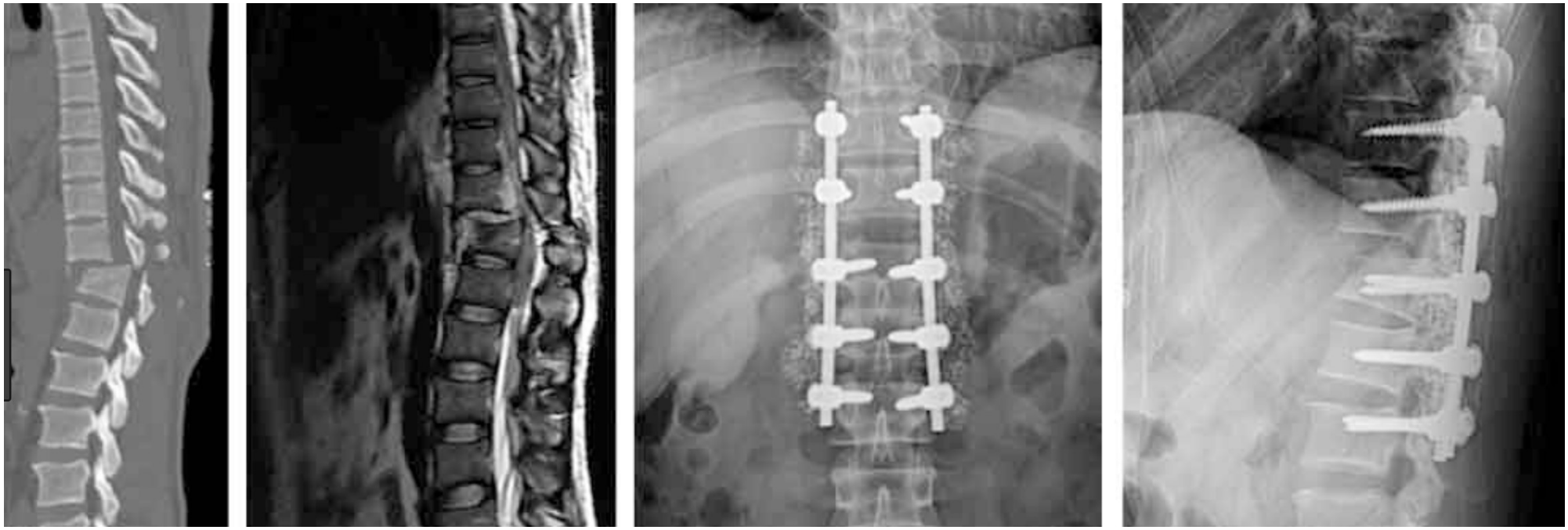
Traction

- Direct surgical access to the area of compression
- Decompresses bony and haematoma compression
- Rapid institution

Direct surgical decompression +/- stabilization

- Realigns the vertebral column
- Reduces or eliminates bony and ligamentous cord compression
- Stability

Cervical traction



Spinal decompression and fusion surgery

Debate: *"Early decompression in spinal trauma will achieve better neurological results@*

For

- Logical that reducing the time of secondary cord injury will help
- Traction reduces bony deformities and decompresses rapidly
- Decompression and fusion where necessary reduces ongoing damage

Against

- Primary injury is the main issue in cord damage and is not helped by early or any surgery
- Injudicious surgery at all hours may be dangerous and harmful
- No agreement on definition of "early"

Systematic Review

AOSPINE

Global Spine Journal
2017, Vol. 7(5) 455-1155

DOI: 10.1177/2192682117701716
journals.sagepub.com/home/gsj

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Timing of Decompression in Patients With Acute Spinal Cord Injury: A Systematic Review

Jefferson R. Wilson, MD, PhD[1,2], Lindsay A. Tetreault, PhD[3,4], Brian K. Kwon[5], Paul M. Arnold, MD[6], Thomas E. Mroz, MD[7], Christopher Shaffrey, MD[8], James S. Harrop, MD[9], Jens R. Chapman, MD[10], Steve Casha, MD, PhD[11], Andrea C. Skelly, PhD[12], Haley K. Holmer, MPH[12], Erika D. Brodt, BS[12], and Michael G. Fehlings, MD, PhD, FRCSC, FACS[1,2]

Acta Orthopaedica et Traumatologica Turcica 52 (2018) 101–108

Contents lists available at ScienceDirect

Acta Orthopaedica et Traumatologica Turcica

journal homepage: https://www.elsevier.com/locate/aott

Early surgical decompression within 8 hours for traumatic spinal cord injury: Is it beneficial? A meta-analysis

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Published in final edited form as:
Front Biol (Beijing). 2014 February 1; 9(2): 127–136. doi:10.1007/s11515-014-1297-z.

Surgical decompression in acute spinal cord injury: A review of clinical evidence, animal model studies, and potential future directions of investigation

Yiping Li[1,*], **Chandler L. Walker**[1,*], **Yi Ping Zhang**[2], **Christopher B. Shields**[2,†], and **Xiao-Ming Xu**[1,†]

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World Neurosurg. 2016 Mar;87:124-31. doi: 10.1016/j.wneu.2015.11.098. Epub 2015 Dec 25.

Is Urgent Decompression Superior to Delayed Surgery for Traumatic Spinal Cord Injury? A Meta-Analysis.

Liu JM[1], Long XH[1], Zhou Y[1], Peng HW[2], Liu ZL[3], Huang SH[1].

Author information

Abstract

PLoS One. 2012;7(2):e32037. doi: 10.1371/journal.pone.0032037. Epub 2012 Feb 23.

Early versus delayed decompression for traumatic cervical spinal cord injury: results of the Surgical Timing in Acute Spinal Cord Injury Study (STASCIS).

Fehlings MG[1], Vaccaro A, Wilson JR, Singh A, W Cadotte D, Harrop JS, Aarabi B, Shaffrey C, Dvorak M, Fisher C, Arnold P, Massicotte EM, Lewis S, Rampersaud R.

Author information

Prognosis after early (<24 hour) decompression

Better prognosis

- Low energy trauma
- Good immediate post trauma neurological function
- Non penetrating injury
- Cervical area trauma
- Central cord syndrome

Poorer prognosis

- High energy trauma
- Poor/complete immediate post trauma neurological function
- Penetrating injury
- Non-cervical spinal level

In conclusion

Prompt resuscitation, immobilization and decompression of spine injuries is appropriate in all cases

Prognosis is determined by multiple factors