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ORIGINAL RESEARCH

Acute Spinal Cord Injury And Surgical Management In Tertirary Care Center: A Prospective Study

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Abstract
A prospective study of 50 patient in span of 2 years for educating regarding surgical benefit for acute spinal cord injury associated with grading of ASIA grading and AO Classification. 33 patients had been operated and 17 patients kept for conservative management. Patient with surgery found out to have better outcome with quad/paraplegic in comparison of pain relief, early ambulation &preventing bedsore. Patient with incomplete neurological deficit, improved motor function with preventing secondary injuries. Our study shows that incomplete deficit and early surgery can provide better functional outcome, complete deficits and surgery will help to alleviate pain and early wheel chair ambulation.

Keywords- paraplegic, quadriplegic, sci, spinal cord injury, surgery, medical, steroid.

Introduction

TSCI (Traumatic Spinal Cord Injury) occurs due to either RTA (Road Traffic Accident) or History of fall from height. It represents significant challenge, profound injury & impairment with substantial irreversible or severe damage and functional motor and sensory limitations.1,2 Lesions in thoracic region lead to paralysis of paraparesis/plebian, while cervical region linked to quadriparesis/plegia. Life expectancy of patient with TSCI depends on damage as well as preserving functions.3,4. MRI is preferred diagnostic tool for identifying spinal pathologies, cord oedema, contusion, haemorrhages, pressure and transaction. CT reveals bony traumatic changes. X-ray reveals suspicion with diagnosis for spinal cord injuries.5 Early management starts from site of trauma to reaching to tertiary hospital. Optimal management of SCI depends on specialised knowledge with dedicated trauma unit with proper mobilization and appropriate treatment of each individual. Rehabilitation is also one part of this major treatment for relief of symptoms and avoiding daily life obstacles by patient.6

TSCI caused by initially primary injury done by trauma causing primary damage to neurons of spinal cord followed by secondary injury that will causes damage to further neurons by making its as acute, subacute & chronic phases. According to diagram produced by Anjum et al 7 showing that neuroinflammation is initially profound in 72 hours,

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after that it will change into further phases as given in diagram below.

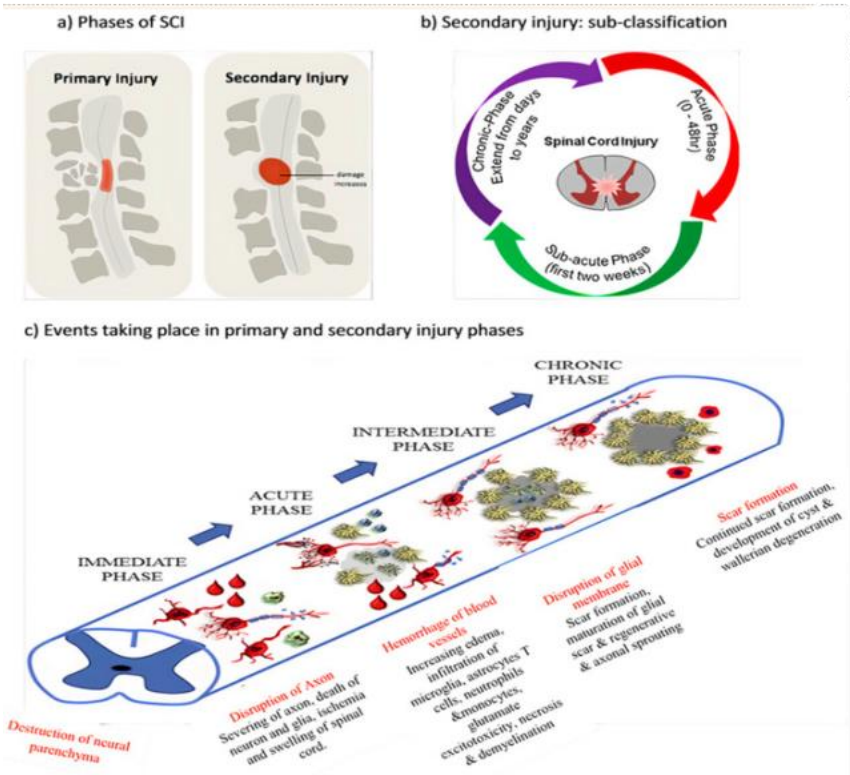

Fig.1: TSCI cascade of injury with phases explained in diagram in simple manner.

Specific site of spinal cord injury influences specific functional abnormality according to function or tracts that crossing or crossed. Cervical region upper limbs neuros are towards centre while that of lower limb are situated peripherally in sensory pathways, while injury to cortical and spinal pathways injury will cause losing motor function.6

Various different aspects regarding spinal cord injury being mentioned below.6,8,9

1.complete transection of cord
2. central cord syndrome
3. anterior cord syndrome
4. posterior cord syndrome
5. brown Sequard syndrome
6. conus medullaris syndrome

ASIA impairment scale is employed for SCI for trauma and generalised early and faster & meticulous evaluation all over the world. It helps in evaluating for severity and degree of TSCI. Grade from A to E. As complete injury with loss of motor and sensory function to normal motor and sensory examination.10,11 stable or impartial deficits patient will experience better outcomes compared to receiving delayed surgery. Early decompression and stabilization are necessary for enhanced motor & sensory faster recovery.12

Material and methods

Aim & objective – assessment & management TSCI.
-Outcome of TSCI.
Study design- prospective study
Study population – 50 patients
Inclusion – all patient with spinal injury
Exclusion- trauma more than 3 weeks.???(days)
Follow up after 1 month. (post operatively & conservatively)
Informed consent was obtained before surgery and after at follow up for education purposes.
Stat analysis – IBMspss,$p<0.05$

Results

Table no.1 gender

Gender	Number
Males	43
Females	7
Total	50

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Table no.2 Occupation

Profession	Number
Farmer	20
Housewives	3
Labourer	11
Retired	2
Retired army professional	2
Salesman	1
Security officer	1
Student	6
Teacher	3
Technician	1
Total	50

Table no. 3 mechanism of injury

Mechanism of injury	Number
Fall from height	34
Road traffic accident	13
Sports injury	3
Total	50

Table no. 4 polytrauma

Injuries associated with comorbidities and mortality		Number
Concomitant head injury (Brain involved)	Right frontal haemorrhagic contusion with right frontal SAH	2
	Right tentorial SAH	1
	Small left frontal acute subdural haemorrhage	1
	Total	4
Chest involved with spinal injury	Bilateral haemothorax with rib fracture (8^{th} rib)	1
	Left clavicle and rib fracture (6^{th} rib)	1
	Left pneumothorax with left side flail chest	1
	Multiple left rib fractures	2
	Total	10
Abdominal organ involvement: Hepatic contusion		1
Long bones		5

Table no. 5 MRI Findings

MRI Scan findings	Number
Cervical: C1-C7	19
Upper Dorsal: D1- D6	5
Lower Dorsal: D7- D12	10
Lumbar: L1- L5	20

Table no. 6 surgery

Type of surgery	Number
Anterior cervical discoidectomy with fixation	11
Cervical traction	1
Laminectomy with pedicle screw fixation	20
Posterior cervical laminectomy	1

Table no. 7 morbidity

Outcome	Number
Death	7
Morbidity (Paraplegia, Quadriplegia)	13
Improvement	30
Total	50

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Table no .8 ASIA grading pre op n post op.

ASIA grading	Pre-Operative		Post-Operative	
	Number	Percentage	Number	Percentage
Grade A	21	42	21	42
Grade B	0	0	0	0
Grade C	2	4	2	4
Grade D	6	12	3	6
Grade E	21	42	24	48
p-value	0.255			

Discussion

In present study, done in centre, showing that Male gender is the most specific in trauma due to various outdoor activities and alcohol consumption and not following traffic rules at time of trauma. male gender was seldom Ely affected and compared to Study done by Naiket et al13 , Bhadneet et al14 & Kafleet et al15 showing similar percentage.

Occupation status showing mostly belongs to Farmer followed by labourers followed by students. Sinha et al 16, Mathur et al 17 & Debebe et al 18 showing similar findings.

Mechanism of injury showing fall from height followed by RTA followed by sports injury similarly compared with Debebe et al 18 and RTA commonly done in Bhadneet et al 14 & Kafleet et al15.

20 patients diagnosed as a case of polytrauma in our study which compared to Kafleet et al15, Singh et al16, Mathur et al17 showing similar findings.

Kafleeet et al15 and Debebe et al18 showing similar finding MRI for Operative procedure but only included cervical and lumbar vertebrae. Dorsal vertebras were excluded from this study. Naiket et al 13 showing included whole spine better compared to our study.

Surgical management was compared with Kafleet et al 15 as anterior cervical disectomy followed by pedicle screw fixation, similar to our study.

Compared to Bhadneet et al14 & Mahmood et al 19, our study showing less mortality.

Our study showing that patient who have incomplete deficitand operated as early as possible showing better functional outcome compared to complete deficits.

Conclusion

TSCI represent public health challenge in developing and developed countries. Associated morbidity and mortality is relatively higher. Strict traffic rules, zero tolerance for alcohol and improving road safety protocols will help to decreases chances of TSCI in population. In our study, it showing that appropriate patient selection, pre operative patient's condition with complete thorough history with ASIA grading helps to improve outcome of the surgery and post operative patient satisfaction. Early surgery and providing stabilization in quadriplegic\paraplegic patients, it decreases pain and early wheel chair ambulation. While incomplete deficit will provide improving motor functions with preventing further secondary injuries. Optimal stabilization can be done in non-surgical patient with due care.

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