Evaluation of Motor System in Sci and Updates

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This prospective study serves to document clinical picture of 82-hospitalized spinally injured patients in order to highlight their main and basic management strategies via literature review to ensure their timely and precise therapy which serves to reduce mortality rate and complications at chronic stage of illness.
Key Words: Clinical picture-SCI, Paraplegia-Updates, Physiotherapy-SCI, Motor system-SCI

Spinal cord injury is a very important public health problem. Their clinical condition direct health professionals, including medical doctors and Physiotherapist to utilize latest management techniques and knowledge to minimize the ultimate paralysis and prevention of secondary complications. Management in acute phase help to control respiratory infections, mortality rate as well as complications that will develop later on in chronic phase of illness. It is a great help for these patients. This article focus on the same issues with updates from literature review which will help doctors and physiotherapist to plan their treatment for their patients on similar lines to limit resultant losses.

Methodology

This article is based on prospective, clinical trials made on 82 hospitalized, acute spinal cord injured patients from February 1999 to November 1999 at Neuro-surgery departments of Lahore General Hospital Lahore and Mayo Hospital Lahore, Pakistan . Patients were assessed clinically. Motor examination was completed through testing of a key muscle on either side in the 10 paired myotomes. The external anal sphincter was also tested to help determine the completeness of injury. ASIA Impairment scale[1] and trauma motor index were used to assess motor functions[1].

Results

Males were 76 and females 06 with age ranging from12-70 year. Commonest cause was falls(n=26,31.70%) and site of injury was cervical spine(n=48,58.53%),thoracic spine(n=16,21.95%) and Lumbar spine (n=18,19.51%).Thus mode of injury was cervical spine.

Table 1. Clinical picture (n=82) Mean (m)

Variable	Increased (m)	Decreased (m)	Absent (m)	Intact/ normal (m)
Tone	0.66	26.66	---	---
Bulk	00	22	---	0.5
Reflexes	0.66	20.66	06	00
sensations	0.66	1.33	16	2.66
Sphincter	---	---	24.66	02

*Urinary retention occurred in 0.66 patients.

Table 2. Evaluation of motor system

Variable	UL(m)	LL(m)	Total(m)
TMI:			
0	18	68	43
1	02	01	2. 5
2	15	06	10. 5
3	10	04	07
4	01	00	0.5
5	00	00	00
ASIA:			
A	18	68	43
B	00	00	00
C	23	09	16
D	01	02	1. 5
E	00	00	00

*UL stands for upper limb, * TMI for Trauma Motor Index
LL for lower limb, **ASIA for ASIA Impairment Scale,*m for mean.

Table 3. Site of lesion

Variable	Site of lesion?
✸Complete lesion	
1. Paraplegia(22,26.82%)	Lesion belowC8
2. Quadriplegia(20,24.39)	neurological level
3. Right Hemiplegia (04,4.87)	lesion above C8 unilateral lesion below medulla and above C-5 segment causing hemiplegia on affected side.
✸Incomplete lesion	
1. Paraparesis(10,12.19)	Lesion below C8
2. Triplegia(24,29.25%)	neurological level central cord syndrome
Miscellaneous (04,4.87)	

Table e. Level of activity when discharged (n=82)

Level	N %age
Ambulatory.	04(4.87)
Wheel chair.	42(51.21)
Bed.	36(43.90)

Discussion

Despite intensive preventive efforts, acute spinal cord injury remains a significant public health problem [2].It is a very devastating condition typically affecting young males[3] i.e.,(n=76) in this study .It is an incurable disease causing disability and loss of functions in these patients. Only 4.87% patients were ambulatory on

discharged. Majority were on wheel chair i.e.,51.21%(table-IV).This study also gives estimation of site of lesion(table-III).These paralyzed, helpless and dependent patients put a very heavy burden on national economy. So after prevention, maximum efforts should be targeted on limiting the development of complications and mortality rate.

This type of injury involves both the primary and secondary injury mechanisms causing further damage and ultimately loss of functions[2] which can be prevented by administration of a very high doses of Methyl prednisolone sodium succinate given within 8-hours of injury. It significantly reduces the extent of neurological damage in these patients._A recent trial indicates additional benefit by extending the maintenance dose from 24 to 48 hours if start of treatment must be delayed to between 3 and 8 hours after injury [3].

These patients develops Pneumonia and atelactasis shortly after injury, if survived [4]. It is a leading cause of death among these patients[4]. Lateral rotation of the trunk and deep breathing exercises, effectively prevents these complications and decreases consequent mortality rate[4,5].

Physical activity can have added health benefits in SCI as they have a lower risk for developing secondary complications such as urinary tract infection, pressure sores and respiratory illness. It also help to better manage problems such as spasticity, weight gain , chronic neuropathic pain, it improve muscle strength , endurance and mobility, which improve ability to accomplish every day tasks such as transferring and pushing a manual wheelchair. They are also less likely to experience feelings of anxiety, loneliness, depression, stress and sleep well [6].

So these patients can get significant health benefits from a "moderate" (20-30 minutes) amount of physical activity on a regular (every other day) basis rather than strenuous physical activity [6].However, an increase in duration, frequency and intensity of physical activity can further improve health benefits.

For lesion at C1-C2 Level ,breathing exercises (by doing a set of 4 breathing exercises twice in the morning and twice at night) serves to reduce risk of respiratory complications such as pneumonia and increases lung capacity and functions[7].

Neck and shoulder exercises improve strength and endurance by shoulder shrugs and active cervical movements. During ROM, legs and arms should be raised as blood flow will be against gravity[7]. Each part of the body should be exercised passively, actively or with the assistance of equipments and therapist according to the level and severity of injury.

The original Eat Right [8] exercise program begins in week 7 of the 12-week program ,promote low fat, high complex carbohydrate ,adequate fibers and fluid. It serves to maintain body weight ,maintain or improve skin integrity, bowel functions and urological stautus[8]. The aim is to start with a limited amount of aerobic exercise and slowly increase the time spent exercising each week[8].

Spinal cord injury is associated with adaptations to the muscular, skeletal, and spinal systems[9] which can be prevented in acute phase and partially reversible in chronic paralysis[9]. Stretch is most likely to be effective if started before the onset of contracture. Soft tissues most at risk should be targeted, particularly if contracture is likely to impose functionally important limitations[10].These patients also lost sphincter control which can be tackled by sphincter gymnastics[11] as stimulations reach below the injured segment and feed signals into the central nervous system, thus activating vital organs [11].

Ortho-static hypo-tension and its accompanying signs and symptoms , are a common occurrence during the Physiotherapy mobilization of patients with an acute spinal cord injury and were perceived as limiting treatment on 43.2% of occasions out of 58.9% [12]. Patients with tetra-plegia had a higher prevalence of OH and a greater fall in BP than patients with paraplegia, irrespective of whether their lesion was complete or incomplete[12]. Thus appropriate precautions should be followed in therapy.

Another study indicates that low intensity pulsed ultrasound is not beneficial in preventing calcaneal osteoporosis in acute SCI patients [13]because of the inability of US to effectively penetrate the outer cortex of bone due to its acoustic properties[13].However, regular Physical exercises keeps the muscles and bones healthy. Thus indirectly preventing the development of osteoporosis and formation of renal calculi.

Prolonged standing in people with spinal cord injuries (SCI) has the potential to affect a number of health-related areas such as reflex activity, joint range of motion, or well-being[14]. This perceived benefits included improvements in several health-related areas such as well-being, circulation, skin integrity, reflex activity, bowel and bladder function, digestion, sleep, pain, and fatigue. The most common reason that prevented the respondents from standing was the cost of equipment to enable standing[14].this equipment can be substituted by electrical movable couch as well as that of wooden couch fitted with straps at knee, waste and chest.

Quality of life (QOL) is often considered the primary endpoint in research, clinical medicine, and health promotion when impairments are incurable or insufficiently understood[15]. For SCI persons extended life spans and the need for life-long follow-up make it important to expand the outcome parameters of medical care and health services to include QOL measures[15].

In a specialized fertility clinic, a comprehensive, client-focused approach with education, fertility assessment and a range of semen retrieval and assisted reproduction options were offered [16]. The rates of semen retrieval using vibro-ejaculation and electro-ejaculation were 67% and 97% respectively[16]. Micromanipulation in vitro fertilization (IVF) procedures, primarily intra-cytoplasmic sperm injection, were used in 18 couples resulting in a pregnancy rate per cycle of 19%. In the 31 couples there have been a total of 17 pregnancies in 97 cycle attempts for an overall pregnancy rate per cycle of 18% and a cumulative pregnancy rate per couple of 55%. Twelve of the pregnancies have resulted in 14 live births (including two sets of twins), there were three pregnancies ongoing at the date of review and there have been two spontaneous abortions[16].

Risk of cardiovascular, respiratory and urinary tract morbidity was found to be positively associated with age and duration of cigarette use and excessive alcohol consumption[17]. With respect to these three morbidity outcomes in this study, cigarette smoking is the most damaging lifestyle behaviour in the spinal cord-injured population. Attention and resources should be directed towards SCI-specific smoking prevention and cessation program to prevent the development and exacerbation of chronic diseases in this unique population[17].

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