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Rehabilitation Outcomes of Electrical Muscle Stimulator in Spinal Cord Injury Presenting with Monoparesis, Paraparesis Associated with ERB'S PALSY

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Abstract:
In today's harsh environment chances of accident and trauma and fall are very common in today's life irresponsibility are commonly found in today's world.
My patient was fall from a 70 feet height and they undergo with the T12 fracture and screw fixation is done and they suffer from paraparesis and monoparesis left hand and also found injury to the brachial plexus and suffer from ERB'S PALSY. And there is no history of HYPERTENSION, T.B, AND THYROID. Bladder and bowel are intact.
And the patient was in coma for last 2 week after they fall from the height. Then after a month they are conscious oriented.
And in the MRI findings there is subtle suspicious mild enlargement with T2/STIR high signal seen involving superior and middle and inferior trunks of left brachial plexus
Diffuse muscle edema involving supraspinatus, infraspinatus, and subscapular muscle.
Mild posterior bulge of C3-C4, C4-C5 and C5-C6 disc compressing anterior subarachoid space and ventral nerve root.
NERVE CONDUCTION VELOCITY TEST (N.C.V) left side upper increased distal latsency low amplitude and decreased CMAP in radial nerves.
Left side upper limb suprascapular nerves not recorded. Sensory nerve conduction study affecting radial motor nerves left side upper limb.

Keywords: electrical muscle stimulator, active movements, ERB'S PALSY, isometrics.

BACKGROUND

Spinal cord injury is a damage to the nerve that sends signal to the brain and the body due to this there is temporary and permanent changes seen in sensation, movement and body functioning are get disturb.
There are two types of SCI complete and incomplete
Complete SCI: there is a total loss of sensory and motor function.
Incomplete: there is a partial loss.
The spinal cord injury is relation to trauma and it was a frequent cause. Although trauma may involve spinal cord alone, the vertebral column also injured at the same time. There is a classification of spinal

injuries is one that divides into fracture-dislocation, pure fracture, and pure dislocation. And the frequency of these classification is about 3:1:1.

Some uncommon cause of spinal cord injury is bullet, shrapnel, and stab wound, direct blow to the spine. Most spinal injuries are the result of force applied at a distance from the site of spinal fracture and dislocation.

When the hyperextension injury occur the mechanism is one of the vertical compression with the head is in extension position. And the stress is on the posterior part of the mid cervical vertebrae C4 to C6 laminae and pedicles which may fracture unilateral and bilateral. Hyperextension injury occurs without damage or misalignment of vertebrae seen radiologically.

Another mechanism of spinal cord injury involving extreme flexion and extension of neck and so its called whiplashed injury and commonly seen in automobiles accidents. when vehicle is stuck from behind. And in this condition the occipitonuchal and the sternocleidomastoid muscle and other neck structure are affected.

SPINAL CORD SYNDROMES:

There Disease of the spinal cord may frequently cause a quadriplegia, paraplegia, monoplegia, and sensory damage in the nervous system. are some special patterns of spinal cord diseases that are the location for the major ascending and the descending pathway of spinal cord. Most fibers tracts are included the posterior column and spinocerebellar and pyramidal tracts are found the side of the body they innervate. That tracts produce characteristics syndrome that provide clues to the underlying diseases.

BROWN-SEQUARD HEMICORD SYNDROME: in this condition ipsilateral weakness and loss of joint position sense with contralateral loss of pain and temperature are diagnose in the patient.

CENTRAL CORD SYNDROME: in this syndrome the grey matter nerve cells surrounding the central canal gets damage. This may develop the arm weakness out of proportion to leg weakness. And sensory loss, mild loss of pain and temperature sensation over the shoulder, lower neck, and upper trunk.

ANTERIOR SPINAL ARTERY SYNDROME: infarction of the cord result in diminished flow in artery. And result in extensive bilateral tissue destruction. All spinal cord functions motor, sensory, are lost below the level of lesion.

FORAMEN MAGNUM SYNDROME: lesion in foramen magnum interrupt intersecting pyramidal tract fibers resulting in weakness of legs and weakness of ipsilateral shoulder and arm.

INTRAMEDULLARY AND EXTRAMEDULLARY SYNDROME: intramedullary process arising within the substance of the cord, from extramedullary ones that compress the spinal cord or its vascular supply.in extramedullary lesions radicular pain is prominent and there is early sacral loss and spastic weakness in legs.

Intramedullary lesions produced localized burning pain.

ETIOLOGY:

The etiology of the spinal cord injury can be classified into two

The traumatic injury 70% and the non-traumatic injury 30%. The traumatic injuries can be caused due accidents, fall from a height, violence and sports injuries.

Non traumatic injuries can be caused due to degenerative conditions like disc herniation, spinal stenosis, spondylosis, tumors, and other infectious condition.

CASE DESCRIPTION:

Assessment: so firstly we have a subjective assessment in which the age of the patient is 32 years male and working as a laborer. And the complaints was an operated case of fracture T12 screw fixation. With paraparesis with monoparesis of left hand. And also he has a brachial plexuses injury and have a Erbs palsy.

History of presenting illness: patient was alright few months back when patient had a history of fall from a height and undergoes T12 screw fixation than patient took discharge and come with the complaint of paraparesis and monoparesis of left hand.

Past history: history of T12 screw fixation (4 month back) and No history of hypertension, thyroid, T.B, and also History of drug allergy: N.S , Family history: N.S , Personal history: bowel and bladder intact.

OBJECTIVE ASSESSMENT: when taking the General examination: pulse- 84/min, B.P- 128/70, R.R-18/min , Temperature- afebrile , Pallor- negative, Jaundice- negative , Edema- negative , Cyanosis- negative, Clubbing- negative, JVP- negative.

Systemic examination: R.S-B/L AE positive, B/L pupil reactive- negative, CVS- S1S2 positive, GCS-E4V5M6, POWER- L.L right side 3/5, Left side 2/5, U.L right side 5/5, Left side 3/5, CNS- conscious orientation.

Physiotherapy management:- in first 2 days passive movements should be done than after 3 days active movements and active assisted movements should be done. EMS should be place on the each limb for 10 min with active movements, after 2 week when the patient achieved muscle power than we start sit to stand training, after 3 to 4 week gait training should be started with support.

Uniqueness of the study: patient is having a symptoms of ERB'S PALSY and paresis condition with very poor muscle power and rom decreases. For the treatment protocol electrical muscle stimulator with asked the patient to do active movements are applied for re educated the muscles for their function, and also for muscle power achievement isometric with isometric ball should be done. And some passive movement should also be done to increase the ROM and muscle power. After the patient gain muscle power so after that we started the sit to stand training, and then focuses on the gait tranning with walker, then start gait tranning in parallel bar.

Electrical muscle stimulator should be applied for 10-10 min for each limbs with active movements everyday. In after 1 weak ROM increases. the flexion of the hip is only 10 degree but after 1 weak of this protocol 40-to-50-degree flexion are achieved. In continuation start working on the muscle power with isometric ball knee isometric, ankle isometric, with 3 sets 10 rep with 10 seconds hold.

Result: with the help of EMS with active movements ROM starts increases and improvement is seen within 3 to 4 days. The isometrics exercises increases the muscle power within 3 weak the patient start walking with support of the walker. Active assisted and passive movements also help in increases the ROM. The left hip flexion was found only 5 degree when applying the EMS with active movement after 3 days 15 degree improvement of hip flexion are found. When the patient asked to do back isometric because of the weakness of muscles after exercises their body start shivering. After 3 days of performing isometric exercise they get normal and the body not tremble.

DISCUSSION: and then after 3 weeks, when discussing with the patient about the treatment protocol and the relief so the patient told me that they can't able to raise their leg and they get shivering while doing the isometric in the starting of 3 to 4 days but now they not shiver and they are able to do the leg movement and they are also able to walk with support they get 80% relief in their condition.

This means that applying the electrical muscles stimulator technique with active movements on a patient of spinal cord injury has been very beneficial and better result are found with this technique.

CONCLUSION:

the patient was admitted to other hospital then he come with the screw fixation at T12 level and there he found a monoparesis and paraparesis with brachial plexus injury with ERB'S palsy of left hand. For the treatment protocol applied EMS and ask the patient when the feel the contraction they have to do an active movement the EMS will apply everyday in each affected limb for 10 mins. Then isometric exercise 10 rep each with 10 to 15 sec hold. With EMS ROM increases from 5 degree to 15 degree in 3 days. After 2 to 3 weeks the patient is able to walk with support of the walker this technique is very beneficial in improving the life of the patient

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