Case study

Advanced collateral physiotherapy management for Pneumothorax following Dengue encephalitis: A case study

Abstract:

Dengue fever is a mosquito-borne sickness that has become a serious international public health issue in recent years. A 54 years old male patient, farmer by occupation came to AVBRH on 10TH September 2021 with complaint of fever associated with chills and rigors, slurring of speech 2 days back and 2 episodes of generalized tonic clonic seizures. Dengue was confirmed by the non-structural protein 1 (NS_1) antigen and immunoglobulin M (IgM) antibody test. Radiological investigations revealed encephalitis and pneumothoraxfor which medical management along with inter costal drainage and collateral physiotherapeutic rehabilitation was administered.The goals of the physiotherapy rehabilitation were to reduce bronchospasm, to clear secretions lung fields, to regain full expansion of lungs and best possible functional recovery. Physiotherapy management has shown satisfactory results in regaining pulmonary function. After the completion of the treatment the patient gained maximum re-expansion of the lungs, had no breathing difficulties, the lungs were clear of sputum and was functionally independent.

Keywords: Dengue, Dengue Encephalitis, Respiratory Physiotherapy, Rehabilitation

Introduction:-

Dengue fever is a mosquito-borne sickness that has become a serious international public health issue in recent years.(1)Dengue encephalitis is a distinct condition caused by the dengue virus infiltrating directly into neurons.(2)Dengue virus antigen also found in alveolar lining cells of the lung. Increased permeability of the alveolar-capillary membrane results in edema in the alveoli and interstitial spaces which leads to pulmonary dysfunction.Patients with dengue fever have been documented to have a wide range of respiratory symptoms; the initial symptoms are usually mild to moderate and involve the upper airway.(3)We report a case of dengue patient who develops encephalitis and pneumothorax who underwent medical management along with inter costal drainage and collateral physiotherapeutic rehabilitation.

For pneumothorax, inter costal drainage tube insertion remains the management along with antimicrobial chemotherapy.Intercostal tube drainage is used for this purpose to collect the fluid, blood, and air, allowing the underlying lung to expand. It is a flexible plastic tube that is introduced into the pleural space through the chest wall. Increased respiratory demands, such as increased breathing rate, reduced chest expansion, and dyspnea, arise from the buildup of air.(4)Physiotherapy exercises i.e. breathing exercises are suggested as they maintain chest expansion, decrease dyspnea and assist drainage of fluid.(5) Physiotherapists aim to improve ventilation for people with respiratory disease, and approach this using a variety of techniques.The goals of the treatment were to reduce bronchospasm, to clear secretions lung fields, to regain full expansion of lungs and best possible functional recovery. The aim of

this case report is to assess the effect of physiotherapy as an adjuvant for pneumothorax following dengue encephalitis.

Patient information

A 54 years old male patient, farmer by occupation came to AVBRH on 10TH September 2021 with complaint of fever associated with chills and rigors, slurring of speech 2 days back and 2 episodes of generalized tonic clonic seizures. He was a known case of systemic hypertension and on Telmisartan medication since 6 years. Patient was assessed in the casualty and Rapid antigen test done and patient was shifted to medicine ICU. Following admission lab investigations were done. Dengue was confirmed by the non-structural protein 1 (NS_1) antigen and immunoglobulin M (IgM) antibody test. In view of low platelet counts, patient was transfused with 3 units of random donor platelets. Chest X ray findings revealed Left sided pneumothorax for which respiratory physician call was given, they advised inter costal drainage tube insertion on left side. Physiotherapy call was given to improve lung compliance and maintain bronchial hygiene. During hospital stay, patient's oxygen support from high flow was tapered and patient was taken 10L O2 per minute and then on 4l oxygen via nasal prongs.

List 1: Timeline:

Date of admission	10/09/2021
Date of Physiotherapy Rehabilitation	12/09/2021
Date of discharge	26/09/2021
Date of Follow up	10/10/2021

Clinical evaluation

The patient was conscious and oriented, lying in the supine position.On initial examination, the patient was afebrile and pulse rate was 110 beats per minute, respiratory rate was 20 breaths per minute, blood pressure was 129/89 mm Hg and SpO_2- 97% on 14 liter O_2minute. On inspection chest movements were bilateral symmetrical, the breathing pattern was abdomino-thoracic type. Bilateral pedal edema was present. On numerical pain rating scale patient gives the rating of 5/10 during rest and 8/10 during activity over left chest region. On auscultation bilateral crepitation was heard and reduced air entry on left side.There is hyper resonance note on chest percussion.

Diagnostic assessment and evaluation:

CT brain plain done shows ill-defined subtle hypo density in the bilateral occipital regions and cerebellar hemispheres. HRCT thorax revealed left sided pneumothroax causing passive atelectasis of left upper lobe.

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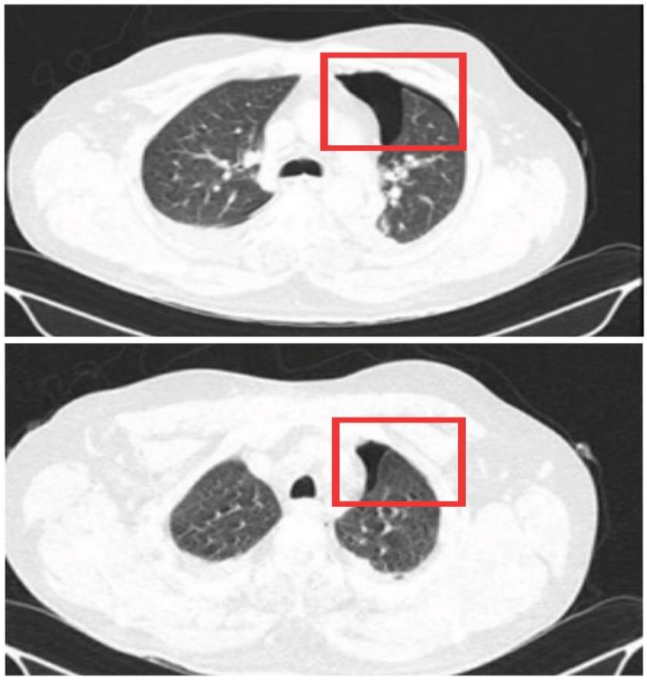

Figure 1: Shows HRCT thorax findings which revealed left sided pneumothroax causing passive atelectasis of left upper lobe.

Therapeutic intervention:

Medical management along with Oxygen therapy was started with adequate fluid intake by saline. Physiotherapy treatment was started. Patient care givers were educated and train about importance of positioning and bed mobility. Active assisted range of motion exercises were given to the patient 10 repetition 3 times per day for bilateral upper and lower limb to maintain the joint and connective tissues mobility, maintain the mechanical elasticity of the muscle, assist the circulation and the vascular dynamics, maintain the patient's awareness of movement and to perceive the memory of movements patterns by stimulating the receptors of kinesthetic sense.

The goals of cardiovascular and pulmonary physiotherapy was to prevent the airway obstruction, To reinflate atelectatic lung areas, improve distribution of ventilation, increase oxygenation maintain airway clearance and enhance overall wellbeing The postural drainage followed by chest physiotherapy was given 2 times a day to drain the accumulation of the pulmonary secretion,the breathing exercises in which the segmental, diaphragmatic and pursed lip breathing are done 10 repetition 3 times per day.

During 2nd week the patient was on 4 L O2 min via nasal prongs, To reduce work of breathing, body positioning were taught, breathing control exercises and relaxation technique were incorporated to the existing management. In order to improve ventilation, thoracic expansion exercise, Active Cycle of breathing technique was given twice a day along with Incentive Spirometer. To maintain muscle and joint integrity and strength, progressive resisted exercise was incorporated 10 repetitions twice a day with half litre water bottle soon progressed to 1 litre. At the end of week, the patient's general condition was improved gradually, mild exercise training was started maintaining 3-4 on Borg's scale which includes standing, marching exercises and progressive in ward ambulation with vitals monitoring.

Follow-up and outcomes:

Physiotherapy was given to patient for 2 weeks; each day consisted of 20 to 30 minutes session in which the above mentioned treatment was provided. Physiotherapy management has shown satisfactory results in regaining pulmonary function.After the completion of the treatment the patient gained maximum re-expansion of the lungs, had no breathing difficulties, the lungs were clear of sputum and was functionally independent.

Outcome measures	Pre rehabilitation	WEEK 1	WEEK 2
Numerical Pain Rating Scale	5/10 on rest 8/10 on activity	2/10 on rest 5/10 on activity	No pain on rest 3/10 on activity
Functional independence measure Score	Maximal assistance	Moderate assistance	Minimal assistance

Six minute walk Distance test.	Unable to perform	210 meters with 4 pause interval	350 meters

Table: 1 Showing Outcome Measures

Discussion:

This case report demonstrated the effect of physiotherapy as an adjunct for the treatment of Pneumothorax following Dengue encephalitis along with medical management.Respiratory physiotherapy has a wide range of applications; its goals are both preventative and therapeutic. The procedure is used as a preventative measure in all patients who are confined to bed and are at danger of bronchial blockage or ventilatory failure, especially those who have had a major operation or are traumatized.It is an essential part of the overall treatment plan of various clinical symptoms for respiratory conditions. It is a multidisciplinary approach for patients with respiratory conditions which have often decreased their overall physical activities. (6,7) The early approach of rehabilitation may act as a preventive measure for associated disuse syndrome making physiotherapy a potentially important aspect of treatment in consideration the patient's prognoses and times under hospitalization. Also, physical therapy has shown promising effects in facilitating patient's discharge by adding functional recovery including patient ambulation. (8)

Conclusion:

The aim of physiotherapy was to return the patient to his best possible functional recovery. Well monitored in-patient physiotherapy management shows brilliant results in bettering the lung function, quality of life, inducing relaxation and early return to pre-disease life in our patient.

Informed consent: A proper informed consent was taken from the patient prior.

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