

A Novel Approach to Facilitate Arousal Following Infectious Encephalitis in Acute Setup – A Case Report

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ABSTRACT

Encephalitis is the inflammatory disease of brain parenchyma that manifests with a spectrum of disorders including altered consciousness, impaired cognition, associated neurological impairments, aphasia, behavioral abnormalities leading to an increase in economic burden as well as delayed prognosis. However, initiating early rehabilitation to promote arousal that is task based and has associated personal salience to the patient can pay way to early arousal and shorter length of stay in acute unit. We developed a subject specific integrated multisensory stimulation technique (SSIMS) to facilitate arousal following encephalitis in acute setup. We observed improvement on Glasgow's coma scale and Coma recovery scale following 7 days of intervention. Early task based functional therapy to target arousal along with conventional therapy can pay way to better outcomes.

Keywords: Case report, Early rehabilitation, Functional therapy, Parenchymal disorders of brain, Task oriented

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INTRODUCTION

Infectious encephalitis is an inflammatory disease of the brain parenchyma leading to loss of consciousness and significant chronic neurological deficits. The recovery from encephalitis varies from a rapid and complete recovery within days to a prolonged or incomplete recovery, for which rehabilitation is as a basic foundation of care which is started once the patient is out of acute setting. Prophylactic physical therapy for chest care, bed sore, and deep venous thrombosis along with passive movements is the main stay of treatment in acute care.

However, early and effective neurological rehabilitation can improve the prognosis of viral encephalitis patients with focal neurological deficits. Timely intervention/treatment has the capability to improve both patient prognosis and quality of life which can have important clinical and social implications.

Despite the number of persistent deficits associated with infectious encephalitis, early rehabilitation in terms of early stimulation to facilitate arousal and early mobilization protocol are sparsely documented. Hence, initiating early rehabilitation which integrates multisensory stimulation to enhance arousal, task-based therapy with added personal salience, delivered in a functional position may pay way to better outcomes. Hence, we designed a subject specific integrated multisensory stimulation program (SSIMS) to facilitate arousal in acute setup that incorporates personal, professional and recreational task from the client's life with added personal salience and is delivered in functional position in acute setup and assessed its effect on arousal in a case of encephalitis.

CASE STUDY

A 12-year-old female patient presented to emergency department with complaints of fever associated with chills and rigors for 2 days followed by altered sensorium for 1 day. There was history of up rolling of eyeball. Tonic clonic movements were initially on right side of the body with involvement of face. Subsequently she developed multiple episodes of seizures without gaining consciousness, affecting the whole-body (tonic clonic type).

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No history of any fall/head injury/prior infection or any other constitutional symptoms. On examination neck stiffness and Kernig's sign were present. Plantars: Bilaterally up going, Pulse Rate: 70 beats per minute, Blood Pressure: 110/70 mmHg, Spo2: 100% on Room Air, Respiratory Rate: 19 Breaths per Minute, Temperature: 100°F, RS: AE+ B/L. GCS: E1V1M5, and Pupil: B/L equal. Patient was unconscious but arousable, could not comprehend, reflexive movements and a decorticate posture was present. Generalized hypertonia was noticed. Lumbar puncture was done and CSF Examination revealed clear, colorless, Culture incubation condition: at 37c under aerobic and CO₂ enriched atmosphere, Gram stain: No organism seen, ZN stain: Acid fast bacilli were not seen and no organism were isolated. Medical treatment was done in form of antibiotic s, antiviral (Acyclovir), steroids, antiepileptic, osmotic diuretic, anticoagulant, analgesic, O₂ support, physiotherapy, and with other supportive medications.

Physiotherapy management in acute care in ICU (Novel program): A detail history about likes and dislikes about the patient was obtained from parents. The tasks that had personal salience with the patient and which were feasible to be performed in acute setup were selected. Three tasks out of her daily living were selected.

1. Personal task: Doing nail art and coloring nails in different pattern. The patient was made to sit in functional position

on bed with head up and back supported. Mother was asked to speak about different colors of nail polish (auditory stimulation), she was made to feel the bottle of nail paint, her nails (tactile sensory stimulation) passively her eye lids were kept passively open and she was made to look at various colors of nail paint (visual stimulation) the bottle was opened and she was made to smell the nail paint (olfactory stimulation).

2. Professional task: Doing English SUBJECT Homework and solving Maze and Puzzles. She was made to feel the pages of notebook and the impressions on next page, made to hold the pencil and rubber, mother spoke about her grades and school friends, her English teacher and the way she appreciated her performance, a video telephonic call was arranged with her English subject teacher during the treatment program.
3. Recreational task: Watching and Playing Garba: She was made to feel the texture of the embroidery work done on her favorite dress, made to listen to her favorite folk song via headphones, the gifts she won during past years garba competition was discussed by mother and father. She was made to smell the prashadam that she usually had. A cotton bud dipped in the prashadam was stroked across the lower lip (Gustatory stimulation).

The same task was performed multiple times in 1 session till the response became sluggish/45 min/session thrice a day. It was therapist guided and family mediated. Pre and post session Vitals and GCS were documented, responses were noted and any adverse events were informed.

Conventional physiotherapy in the form of whole-body passive movements with positioning and frequent turning to sides was given by therapist once a day.

RESULTS AND DISCUSSION

There was an improvement in the GCS from day 1 in ICU to Day 7. The scores improved from E2V1M4 to E3V4M5. This improvement could be attributed to the natural course of disease as well as spontaneous recovery considering the etiology of disease. However, there were certain responses which were noted specifically only during the administration of the SSIMS program, which could have contributed to arousal and over all function. There were certain responses which were noted that includes hyperpnea, grunting of mouth, and rowing of eyeballs. Vitals increased from baseline initially after administering the treatment but it returned back to baseline within 3–5 min post-treatment. Therefore, SSIMS was considered as a safe and feasible program to implement in acute care. There were no adverse events noted.

Our improvement is in line with the study that states early and effective neurological rehabilitation can improve the prognosis of viral encephalitis patients with focal neurological deficits.^[1] The added personal salience with autobiographical content may have improved arousal.^[2] Enriching the environment with added personal salience may have attributed to a favorable outcome. The potential mechanism could be that the plasticity recovery permits the brain to modify its organization and function.^[3] Improvement of plasticity occurs through exogenous factors, such as environmental or sensory stimulation.^[3] Minor changes observed during the administration of the SSIMS were beyond the scope of GCS scale and hence there was a need to optimally select the outcome measure which is sensitive and specific in detecting minor changes in the arousal. GCS scores extrapolates the result and hence sensory stimulation assessment measure or a neuro behavioral scale could have given better idea. There is a need to further investigate the effectiveness of SSIMS program by working on a larger sample size.

CONCLUSION

However, we conclude that this subject had an improvement in arousal with early stimulation by Subject specific integrated multisensory stimulation along with conventional physiotherapy which was safe and feasible to be implemented in acute care.

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