ejpmr, 2017,4(07), 668-670

SJIF Impact Factor 4.161

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

CLINICO-ANATOMICAL CORRELATION OF ALTERED SLEEP RHYTHM IN STROKE VICTIMS

H. Poornima*

Additional Professor, Department of General Medicine, Government Medical College, Alappuzha, Kerala, India.

Corresponding Author: Dr. H. Poornima

Additional Professor, Department of General Medicine, Government Medical College, Alappuzha, Kerala, India.

Article Received on 14/05/2017 **Article Revised on 02/06/2017** **Article Accepted on 23/06/2017**

ABSTRACT

Background: We have observed a change in sleep pattern of stroke patients which is extremely difficult for the caretaker. Management is difficult because continuous sleep during night with drugs interferes with rehabilitation. Purpose of the study is to find out whether there is any pattern of sleep change in right or left hemiplegia and whether it can be correlated with site of infarct. Brainstem strokes are excluded because they can directly involve the wakefulness pathway. **Method:** 60 patients admitted with hemiplegia in the department of medicine were selected of whom 30 cases were of right hemiplegia and 30 cases were of left hemiplegia. 30 cases of hospital admissions for minor ailment like viral feverwere taken as controls. CT scan of the brain was taken to find out the arterial territory. Sleep disturbance was verified according to the General Curriculum of sleep. **Results:** 80%of patients with left hemiplegia and 13.33% with right hemiplegia had sleep abnormalities. The commonest sleep abnormality was early morning awakening in 76.9% case of left hemiplegia. Other abnormalities were broken-up sleep, reversal of sleep rhythm, late sleep onset, excessive daytime sleep and decreased sleep. Right hemiplegia patients showed very little sleep abnormalities, except reversal of sleep rhythm in one patient and broken up sleep in the other. **Conclusion:** Sleep rhythm abnormality is likely to be a part of the structural abnormality in stroke.

KEYWORDS: Sleep rhythm, Stroke, Clinico-anatomical correlation.

INTRODUCTION

Sleep is the physiological state of altered consciousness from which patient can be aroused to full state of wakefulness both spontaneously and in response to external stimuli. Sleep, although a state of altered consciousness is a normal variation in consciousness. The psychological and physiological effects of sleep and its benefits have been eloquently expressed by Tristram Shandy; "It is the refuge of the unfortunate - the enfranchisement of the prisoner, the downy lap of the hopeless, the weary, the brokenhearted; of all the soft delicious functions of nature this is the chiefest; what a happiness it is to man, when the anxieties and passions of the day are over."

Stroke survivors with sustained physical disabilities report poorer sleep and experience greater levels of sleepiness.[1] Observations of the human sleep-wake cycle show it to be age-linked. The new born baby sleeps from 16 to 20 hours / day, child for 10 to 12 hours, total sleep time drops to 9 to 10 hours at age 10 and to 7 to 8 hours during adolescence, gradual decline to 6.5 hours develop in adult life. There are wide individual differences in length and depth of sleep due apparently to genetic factors, early life conditioning, the amount of physical activity and particularly psychological states.

Pattern of sleep, which in terrestrial life is adjusted to 24 hour day, also varies in the different epochs of life. The circadian rhythm, with predominance of daytime wakefulness and nighttime sleep, begins to appear only after a few weeks of postnatal life of the full term infant. As the child matures, the morning nap is omitted, and then the afternoon nap. By the fourth or fifth year sleep becomes consolidated to a single long nocturnal period.

Neurochemistry of sleep

Evidence from animal studies indicate that the physiologic mechanisms governing NREM and REM sleep lie in the pontine reticular formation and are influenced by acetyl choline and two biogenic amines 5-hydroxytryptamine (serotonin) and norepineprine. Serotoninergic neurons are located in and near the midline or raphe regions of the pons. The lower groups raphe cells project to the medulla and spinal cord; the more rostral groups project to the medial temporal (limbic) cortex and the dorsal raphe nuclei project to the neostriatum, cerebral and cerebellar cortices and thalamus. Norepinephrine rich neurons are concentrated in the locus ceruleans and related nuclei in the central tegmentum of the caudal mesenchephalon as well as in the other lateral - ventral tegmental regions. These neurons project downward to lateral horn cells of spinal cord via centrally located tegmental tracts to pedunculopontine group of nuclei and lateral dorsal tegmental group. The cholinergic cell groups project rostrally, but the precise anatomy of this projection system has not been identified. Cells from these comprise parts of the ascending reticular activating system.

Hobson s reciprocal - interaction hypothesis

Hobson originally proposed that the basic oscillation of the sleep cycle is the result of reciprocal interaction of excitatory and inhibitory neurotransmitters. Single cell recordings from the pontine reticular formation have suggested that there are two interconnected neuronal populations whose levels of activity fluctuate periodically and reciprocally. During wakefulness, according to this theory, the activity of aminergic inhibition is high. Because of the high aminergic inhibition, the activity of the cholinergic neurons is low. During NREM sleep, aminergic inhibition gradually declines and cholinergic excitation increases; REM sleep occurs when the shift is complete. Despite the undoubted heuristic value of Hobson's reciprocal-interaction hypothesis, some of its features remain controversial. Although it is generally agreed that echogenic mechanisms selectively promote REM sleep and itscomponents -Rapid eyemovements, absence activity in the antigravity muscles (i.e., atonia) and desynchronized EEG- the role of amines has been more difficult to establish. Thus lesions of the locus ceruleus and raphe nuclei do not abolish or increase REM sleep. A considerable body of pharmacologic data suggests that a decrease in nonamine causes an increase in REM activity and vice versa. A variety of sleep promoting substances has been identified. These include Prostaglandin D 2, delta sleep inducing peptide, muranyl dipeptide, interleukin ,fatty acid ,primary amides and melatonin and the hypnoxic effect is commonly limited to NREM sleep or slow wave sleep, although peptides that increase REM sleep have been reported. Many putative "sleep factors "including interleukin-1 and prostaglandin D 2 are immunologically active as well , suggesting a link between immune function and sleep-wake status. The alerting influence of caffeine implicates adenosine,whereas the hypnotic effect of benzodiazepines and barbiturates suggest a role for endogenous ligands of the GABA - A receptor complex.

MATERIALS AND METHODS

60 patients admitted with hemiplegia in the department of medicine were selected of whom 30 cases were of right hemiplegia and 30 cases were of left hemiplegia. 30 cases of hospital admissions for minor ailment [e.g.: viral fever] were taken as controls. Patients exposed to drugs of addiction or chronic tranquilizer abuses were excluded from the study. Those with history suggestive of primary hypothalamic involvement and those suffering from chronic obstructive pulmonary disease or chronic metabolic diseases which have effect on sleep were also excluded. Simple bedside proforma containing details about stroke and stroke risk factors with all details were filled up. Sleep disturbance was verified according to the General Curriculum of sleep. The observation was made in 60 hemiplegia patients who fulfilled the inclusion criteria. Out of 60 patients, 42 [70%] were males and the remaining 18 [30%] were females. Age distribution ranged from 31 to 80 years. The variation is from 31 to 76 years among male patients and 36 to 80 years among female patients.

Out of the 42 male patients, 16 were right hemiplegia and remaining 26 were suffering from left hemiplegia. Among female patients, the figures were 4 and 14 respectively. Out of the 42 male patients, 14 were in the anterior cerebral artery [ACA] territory and remaining 28 were in the middle cerebral artery [MCA] Territory. Among the 18 female patients, all were in the middle cerebral artery [MCA] Territory. Sleep pattern was studied and analysed with respect to sleep rhythm, broken up sleep, time of sleep onset, early morning awakening, increased somnolence, less sleep than the past.

RESULTS AND DISCUSSION

In this study, we have analysed 60 patients, who are age matched. 30 cases ofright hemiplegia and 30 cases of left hemiplegia were studied. They were grouped as patients having strokes in MCA distribution and patients having strokes in ACA Territory.

The first interesting observation made was that 80 percent of patients in left hemiplegia had sleep abnormalities. This observation is similar to that by Wallace et al.[2] Only four out of 30 patients with right hemiplegia had sleep abnormalities. The commonest type of sleep abnormality seen was early morning awakening in 76.9% cases among left hemiplegia and maximum number of patients belongs to the age group above 60 years.Day time sleepiness was the most common abnormality observed by Wallace et al.[2] In our study the next common abnormality was broken-up sleep and then, reversal of sleep rhythm, late sleep onset, excessive daytime sleep and decreased sleep in the order of frequency. Sleep apnoea and snoring are the most common types of sleep disturbances noted in patients with stroke by Zejneba, et al.[3] In those with left hemiplegia, the striking observation was the significant absence of insomnia. Right hemiplegia patients showed very little sleep abnormalities, except reversal of sleep rhythm in one patient and broken up sleep in the other. Patient with reversal of sleep rhythm belonged to ACA territory involvement and the other with broken up sleep in MCA territory.

The above data reveals that sleep rhythm abnormality is likely to be part of the structural abnormality due to the stroke as well as the psycho-somatic complications experienced by these patients.

CONCLUSION

The present study was undertaken to find out whether there is any pattern of sleep change in right or left hemiplegia and whether it can be correlated with site of infarct. Brainstem strokes are excluded because they can directly involve the wakefulness pathway.

This small study indicates that definite sleep abnormality is present in stroke patients. They are more common in older age group. Left hemiplegics are more affected than right hemiplegics. These abnormalities interfere with planning and execution of rehabilitatory measures. This suggests the need for regular sleep assessment in stroke patients, look for systemic factors, which may be operating as well as the need for a social psychologist. This study again suggests the importance of early initiation of rehabilitatory measures including reduced number of hours spent in the bed.

REFERENCES

1. Sterr, Annette, et al. "Time to wake-up: sleep problems and daytime sleepiness in long-term stroke survivors." Brain Injury, 2008; 22.7-8; 575-579.
2. Wallace, Douglas M., Alberto R. Ramos, and Tatjana Rundek. "Sleep disorders and stroke." International Journal of Stroke, 2012; 7(3): 231-242.
3. Pasic, Zejneba, et al. "Incidence and types of sleep disorders in patients with stroke." Medical Archives, 2011; 65(4): 225.