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ANALYSIS OF QUALITY OF SLEEP AND OUTCOMES IN MILD HEAD INJURY PATIENTS WITH OR WITHOUT RADIOLOGICAL FINDINGS

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ABSTRACT:
INTRODUCTION: Primary cause of long-term or permanent trauma-related disability worldwide is traumatic brain injury (TBI), which is also a global health concern [1]. One of the most prevalent and immediate consequences of TBI is sleep disorders, which seriously impair patients' quality of life (QoL) and rehabilitation [2]. This retrospective study aims to evaluate the quality of sleep and its outcomes with or without radiological findings in ct brain in mild head trauma patients and also with clinical correlations and demographic correlations.
METHODS: Retrospective observational study conducted by Saveetha Medical College during the period of July 2024 to March 2025. The inclusion criteria were only mild head injury patients with GCS>13/15, age>15yrs, non-operative patients and in patients Exclusion criteria included GCS <13/15, Pediatric age group and operated patients and out patients. Various parameters such as history, clinical signs, radiological findings, vitals were employed for assessing quality of sleep using sleep quality index. Software employed for statistical purposes was IBM SPSS software.
RESULTS: Total of 100 patients were reported to the trauma centre during the period of the study. The male-to-female ratio was 1.08:1. Including all age groups, 72% (n-77) fell under mild sleep quality, others 23% (n-23) fell under moderate sleep quality category. Considering both sexes, 68% (n-34) had mild sleep quality index, rest 32% (n-16) had moderate sleep quality. Compared with GCS, Including all age groups, 86% fell under mild sleep quality, others 14% fell under moderate sleep quality category. With all Ct brain findings 68% (n-34) had mild sleep quality index, rest 32% (n-16) had moderate sleep quality. In ct brain normal findings patients, 92% (n-41) had mild sleep index index, rest 18%(n-9) had moderate sleep index index. All patients had stable vitals. None of the patients had severe sleep quality index. Thus it is concluded that 76% had mild sleep quality index and 24% had moderate sleep quality index and none had severe sleep quality index.
CONCLUSION: CT BRAIN can be used as a triaging tool in mild head trauma. Sleep disturbances are a significant issue for many patients having mild head injuries and can contribute to the overall burden of the injury, impacting cognitive, emotional, and physical recovery. Thus Sleep quality index has been employed for assessing degree of severity of disturbances among these patients. Thus it can be concluded from the study that majority of the patients had minimal sleep disturbances and very few had some disturbances, however not affecting their quality of life.

INTRODUCTION:

Traumatic brain injury (TBI) is primary cause of permanent or long-term trauma-related disability worldwide and a global health concern [1]. One of TBI's most prevalent and immediate consequences is sleep disorders, which can seriously impair patients' QoL and rehabilitation [2]. Head injury can range from mild to severe and involves damage to the scalp, skull, or brain. Common causes include falls, accidents, sports injuries, and physical trauma. This retrospective study aims to evaluate quality of sleep and its outcomes compared with CT brain in mild head trauma patients and also with clinical correlations and demographic correlations.

PATIENTS AND METHODS

CT brain is a gold standard technique for mild head trauma patients. Retrospective observational study was carried out in Saveetha Medical College during the period of July 2024 to March 2025. The inclusion criteria were only mild head injury patients with GCS>13/15, age>15yrs, non-operative patients and in patients Exclusion criteria included GCS<13/15, Pediatric age group and operated patients and out patients. Various parameters considered were based on the history, clinical signs, radiological findings, vitals and alive or death were employed for assessing quality of sleep using sleep quality index. Sleep quality index scale is designed for assessing sleep quality

in different populations which have been validated aged above 15yrs. This scale hardly takes 5-10min to complete and is subjective as well. It shows strong reliability with internal consistency of .92 and test-retest reliability of .81. and is strongly associated with “Pittsburgh Sleep Quality Index (PSQI)”. A four-point, such as Likert-type scale, is used. It indicates how often they elicit specific sleep behaviors (0 = “few,” 1 = “some- times,” 2 = “often,” and 3 = “almost always”). Scores on items that belong to factors 2 and 5 (restoration after sleep and satisfaction with sleep) are reversed before being tallied. List of 28 questions was involved, (3) Total scores range from 0-84, scoring as it increases is more prone to sleep disorders. Thus we have divided the group of the people based on the scores (0-28, 29-56, 57-84) as mild, moderate and severe sleep quality index categories. The software used for statistical purposes was IBM SPSS software.

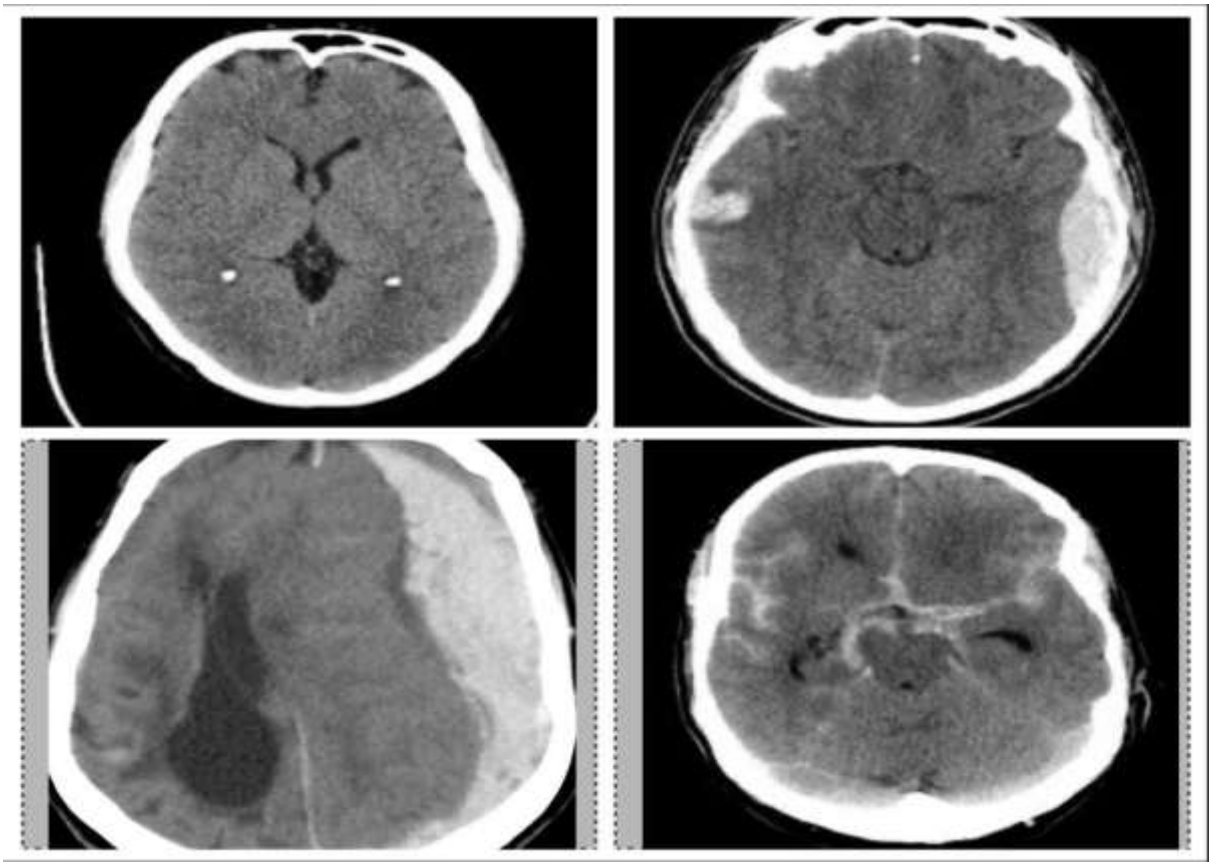

FIG -1: CT BRAIN IMAGING SHOWING NORMAL,EDH,SDH AND SAH RESPECTIVELY.

BACKGROUND OF THE STUDY :

TBI refers to range of injuries involving Retrograde amnesia, giddiness, LOC, seizures, vomitting , severe headache, confusion, disorientation drowsiness or inability to wake up and csf rhinorrhea. These can result due to any external force applied to head or body (4,5). Depending on factors examined at time of injury [e.g., level of responsiveness (e.g., (6), they are categorized as mild, moderate as well as severe head injury. Some patients can have GCS-15/15 but still have findings in radiological findings and can be the other way around too. Thus patients with GCS -15/15 can be affected with mild or moderate sleep disturbances, which occur due to the damage of the normal functioning areas of brain involved in the regulation of sleep such as hypothalamus, brainstem and thalamus. These results as a result of coup injury or contracoup injury, in which hit over one region of the brain has an impact on the opposite site of the brain. This can occur due to primary, secondary or tertiary impacts. Primary refers to immediate damage or initial or direct impac
involved, secondary refers to the delayed damage or results due to indirect impact, due to body response, tertiary refers to the victim being displaced. For eg, if a Pedestrian walking on a road has head injury due to hit on bike, hiiting over bike or car directly refers to primary impact, falling over the bike or car refers to secondary impact and falling in the ground refers to the tertiary impact. However many examples can be elicited in this way.

Thus it can result in inflammation, dysruption ion of the autonomic dysfunction and also result in anxiety, depression etc. The main system involved in the sleep wake cycle is RAAS system, disrupting the system results in several sleep disturbances and disorders.Thalamus and caudal brain injury results in hypersomnia whereas damage to pineal gland leads to insomnia. (7,8,9) Supra Suprachiasmatic damage also results in circadian rhythm damage leading to both insomnia and hypersomnia as a mixed picture. (10) However melatonin also

plays a very important role in sleep. Deprivation of melatonin in turn causes increase in the factors responsible for tumour markers as well as increase in inflammatory markers which may lead to other disorders like breast cancer etc and infections leading to sepsis respectively.

RESULTS -

A total of 100 patients were reported to the trauma centre during the period of the study. The male-to-female ratio was 1.08:1. Most patients 25% (n=25) were in age-group of 15-25 and 22%(n=22) were in the age-group of 26-35 and 23% (N=23) in age group of 36-45 And 13% (n=13) were in the age group 46-55 and 11% (N=11) were in the age group 56-65 And 6%(n=6) were in the age groups above 65yrs. On arrival to emergency department, all patients were found to be stable. On clinical correlation , in patients whose radiological findings are positive (n-50), majority of the patients: 78%(n-39) had GCS -15/15. With no head injury symptoms in 71.79% (n-28), however, 32.35% (n-11) had head injury symptoms such as seizures, retrograde amnesia, LOC and giddiness. Of those who had GCS -14/15 (E4V4M6) 12.5% (n-1) and (E3V5M6) 12.5% (n-1) had head injury symptoms such as seizures and LOC (n-2) while others 77.77% (n-7) had no head injury symptoms . 2 persons (4%) fall under GCS 13/15(E4V4M5) had head injury symptoms such as giddiness and LOC with retrograde amnesia. Every patient had findings in CT brain out of which 22% (n-11) found to have only contusions, 14% (n-7) found to have only EDH, 22% (n-11) found to have only SDH, 20% (n-5) found to have SAH and 26% (n-13) found to have combinations of contusions, EDH, SDH and SAH . In 50 patients radiological findings were found to be negative, all patients had GCS 15/15. However, in patients whose radiological findings were found to be negative (n-50), all patients had GCS-15/15. Two patients had LOC, three patients had seizures and were treated appropriately. No weight gain was seen in any of these patients. 70% (n-35) were found to be taking medications while others 30% (n-15) found to have no medications. 4% of population had history of epilepsy, while 96% were found to have no seizure episodes earlier. 12(24%) individuals have history of smoking, while 76% individuals hav no smoking history. Occupation of the population in the study are as follows: 10% were farmers, 20% were home makers, 18% were IT workers, 6% were students, 14% were business (self employed) 23% were daily wages, 9% were non working population as of now. All patients were found to have stable vitals. All patients are found to be alive.

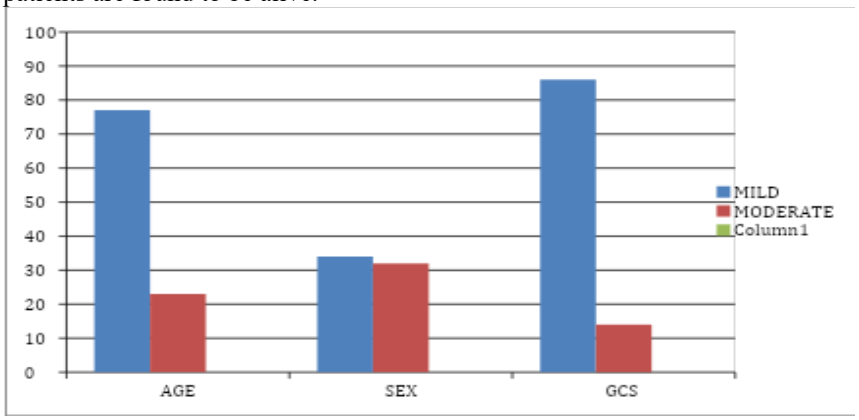

FIG:2 COMPARISON OF DEMOGRAPHIC AND CLINICAL PARAMETERS WITH SLEEP QUALITY INDEX SCALE.

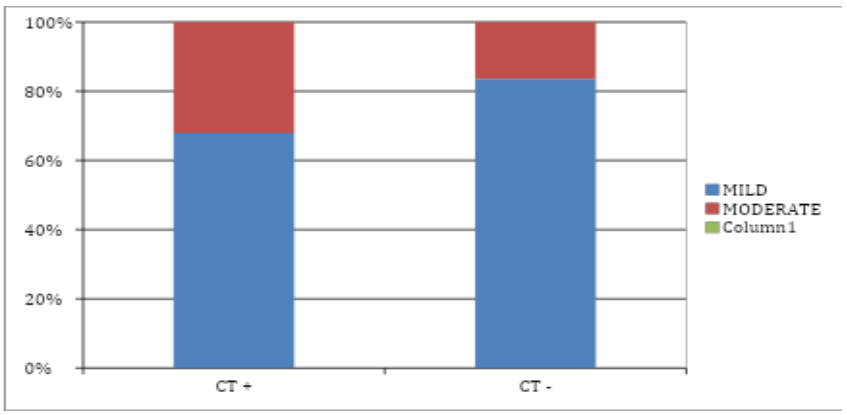

FIG:3 COMPARISON OF SLEEP QUALITY INDEX WITH AND WITHOUT RADIOLOGICAL FINDINGS IN CT BRAIN.

FIG 4: BAR GRAPH SHOWING CT BRAIN FINDINGS IN DIFFERENT HEAD TRAUMA PATIENTS.

CONCLUSION:

CT Brain can be used as a triaging tool in mild head trauma. Sleep disturbances are a significant issue for many patients having mild head injuries and thus contribute to overall burden of the injury, impacting cognitive, emotional, and physical recovery. Sleep disturbances play a major role in Ct brain positive patients in comparison to CT brain negative patients, P-value is found to have more than 0.005 for both the groups in comparison. Thus it is concluded that significant difference in sleep disturbances is seen in CT brain positive patients more than in CT brain negative patients.

REFERENCES-

1. L.C. Schneider Andrea, D. Wang, Prevalence of Disability Associated With Head Injury With Loss of Consciousness in Adults in the United States, Neurology 97 (2) (2021 Jul 13) e124–e135.
2. M. Krueger Evan, A.M. DiGiorgio, J. Jagid, Current Trends in Mild Traumatic Brain Injury, Cureus. 13 (10) (2021 Oct) e18434.
3. Yi, H., Shin, K., & Shin, C. (2006). Development of the sleep quality scale. Journal of sleep Research, 15 (3), 309–316.
4. Kay T, Harrington D, Adams R. American Congress of Rehabilitation Medicine, Head Injury Interdisciplinary Special Interest Group. Definition of mild traumatic brain injury. J Head Trauma Rehabil 1993;8:86-87.
5. Menon DK, Schwab K, Wright DW, Maas AI, Demographics and Clinical Assessment Working Group of the International and Interagency Initiative toward Common Data Elements for Research on Traumatic Brain Injury and Psychological Health. Position statement: definition of traumatic brain injury. Arch Phys Med Rehabil 2010;91:1637-1640.
6. Teasdale G, Jennett B. Assessment of coma and impaired consciousness: a practical scale. Lancet 1974;304:81-84.
7. Shekleton JA, Parcell DL, Redman JR, Phipps-Nelson J, Ponsford JL, Rajaratnam SMW. Sleep disturbance and melatonin levels following traumatic brain injury. Neurology. 2010 May 24;74(21):1732–8.
8. Llompart-Pou, J.A.; Pérez, G.; Raurich, J.M.; Riesco, M.; Brell, M.; Ibáñez, J.; Pérez-Bárcena, J.; Abadal, J.M.; Homar, J.; Burguera, B. Loss of Cortisol Circadian Rhythm in Patients with Traumatic Brain Injury: A Microdialysis Evaluation. Neurocrit. Care 2010, 13, 211–216.
9. .Santos, Kontos AP, Mailliard S, Eagle SR, Holland CL, Suss SJ, et al. White Matter Abnormalities Associated With Prolonged Recovery in Adolescents Following Concussion. Frontiers in Neurology. 2021 Jun 24;12.
10. .Viola-Saltzman M, Musleh C. Traumatic brain injury-induced sleep disorders. Neuropsychiatric Disease and Treatment. 2016 Feb;339.