Research Article Volume 01, Issue No. 02. 2025

The Medical Journal of Neurology and Rehabilitation Medicine



Change in Mortality of Generalized Convulsive Status Epilepticus

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Article History :
Received date : 2024/07/14
Revised date : 2024/08/22
Accepted date : 2024/09/19
Published date : 2025/01/07

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ABSTRACT

Background: The literature on generalized convulsive status epilepticus (GCSE) has developed significantly, revealing critical insights into its management, risk factors, and outcomes. **Literature Review:** Building on this foundation, (Loddenkemper et al., 2012) conducted a retrospective analysis in pediatric patients, highlighting the influence of comorbidities and treatment-related factors on outcomes. Notably, their findings indicated that African American children had lower mortality rates, suggesting demographic variations in the prognosis of GCSE. The study by (Kellinghaus et al., 2019) further elucidated factors influencing the cessation of status epilepticus. Their findings revealed that inadequate dosing of benzodiazepines during initial treatment was prevalent and correlated with prolonged seizure activity, highlighting the need for adherence to treatment guidelines to optimize outcomes. Recent research by (Bedoya-Sommerkamp et al., 2021) focused on the epidemiological and management aspects of GCSE in Peru, emphasizing the necessity for localized data to inform treatment strategies in developing countries. Their results underscored the high morbidity and mortality rates associated with GCSE, emphasizing the critical need for timely intervention. **Conclusion:** In conclusion, the accumulated literature underscores the multifaceted nature of GCSE, revealing that demographic factors, clinical management strategies, and timely interventions are pivotal in determining patient outcomes. The studies collectively advocate for enhanced awareness, adherence to treatment protocols, and the need for localized data to inform management practices, particularly in resource-limited settings.

Keyword: Mortality, Generalized Convulsive Status Epilepticus

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INTRODUCTION

The literature surrounding generalized convulsive status epilepticus (GCSE) has evolved significantly over the past decade, with a growing emphasis on understanding its outcomes, risk factors, and management strategies. The foundational work by (Murali, 2011) highlighted critical predictors of mortality in status epilepticus, identifying that seizure duration and specific etiologies, such as cerebral vascular disease and discontinuation of antiepileptic drugs (AEDs), were pivotal in determining patient outcomes. This study was instrumental in establishing a multivariate framework for assessing mortality risk, noting that older age and anoxia were strongly correlated with higher mortality rates while emphasizing that the mortality rates did not significantly differ between partial and generalized seizures.

Building on these insights, (Loddenkemper et al., 2012) conducted a retrospective analysis of pediatric patients, revealing that various comorbidities and treatment-related factors, such as blood transfusions and prolonged mechanical ventilation, were associated with adverse outcomes. Interestingly, their findings suggested that African American children exhibited lower mortality rates, offering a nuanced perspective on demographic influences in the context of convulsive status epilepticus.

In 2016, (Billington et al., 2016) expanded the discourse by focusing on the management of adult status epilepticus in emergency settings. Their review underscored the variability in morbidity and mortality rates across different populations and highlighted the significance of underlying etiologies in predicting outcomes. Employing the Status Epilepticus Severity Score (STESS), they identified older age and altered consciousness as indicators of poorer prognoses, reinforcing the notion that effective management hinges on timely and appropriate intervention.

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The prospective observational registry study by (Kellinghaus et al., 2019) further elucidated factors influencing the cessation of status epilepticus, revealing that inadequate dosing of benzodiazepines during initial treatment was prevalent and correlated with prolonged seizure activity. Their findings indicated a critical gap in adherence to treatment guidelines, emphasizing the need for optimized therapeutic approaches to improve patient outcomes.

In a more recent study, (Bedoya-Sommerkamp et al., 2021) addressed the epidemiological and management aspects of GCSE in a Peruvian context, highlighting the urgent need for localized data to inform treatment strategies in developing countries. Their research pointed to the high morbidity and mortality rates associated with GCSE and the necessity for timely intervention, thereby contributing to the global understanding of status epilepticus management.

Lastly, (Abdulrhman Al-Sofyani, 2021) synthesized current knowledge on GCSE, reinforcing that aggressive treatment during the initial stages is paramount to improving the likelihood of favorable outcomes. Their insights into the complexities of treatment response further underscore the critical nature of early intervention and the role of multiple antiepileptic medications in managing unresponsive patients.

Together, these studies provide a comprehensive overview of the multifaceted nature of generalized convulsive status epilepticus, highlighting the interplay between demographic factors, clinical management, and treatment efficacy in determining patient outcomes.

LITERATURE REVIEW

The article titled "Immediate Outcome and Risk Factors Determining the Outcome of Status Epilepticus in Children Attending Tertiary Care Centre" by (Murali, 2011) presents a comprehensive analysis of the factors influencing mortality in patients experiencing status epilepticus (SE). The study's focus on a cohort of 253 adults admitted to the Medical College of Virginia provides valuable insights into the clinical variables that correlate with patient outcomes in SE.

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Murali identifies several key etiologies contributing to SE, with cerebral vascular disease and the discontinuation of antiepileptic drugs (AEDs) being the most significant, each representing approximately 22% of cases. This finding underscores the importance of understanding underlying conditions and medication adherence in the management of patients at risk for SE. The analysis also highlights a range of other etiologies, including alcohol withdrawal, idiopathic causes, anoxia, metabolic disorders, hemorrhage, infection, tumor, drug overdose, and trauma. This broad spectrum of causes emphasizes the need for a comprehensive assessment of patients presenting with SE to identify potential reversible factors.

A critical aspect of the study is the relationship between seizure duration and mortality. The data reveal that patients with SE lasting less than one hour experience significantly lower mortality rates compared to those with longer durations. This finding is crucial for clinical practice, as it suggests that timely intervention in SE may improve outcomes. Furthermore, the study indicates that specific etiologies, such as alcohol withdrawal and AED discontinuation, are associated with lower mortality rates, providing clinicians with important prognostic information.

In contrast, the study finds that anoxia and increasing age correlate with higher mortality rates, which aligns with existing literature that suggests more severe outcomes in older populations and those with hypoxic events. Interestingly, the article concludes that the mortality rates of partial and generalized SE do not differ significantly, indicating that the type of seizure may not be as critical a factor as previously thought.

The study's multivariate analysis of predictive indicators of mortality in SE is a notable contribution to the field, as it offers a clearer understanding of how specific clinical features influence patient outcomes. However, the article could benefit from a more detailed exploration of the mechanisms by which these factors affect mortality and a discussion of potential interventions that could mitigate these risks.

The article "Risk Factors Associated with Death in In-Hospital Pediatric Convulsive Status Epilepticus" by (Loddenkemper et al., 2012) provides a

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significant retrospective analysis of mortality risk factors in pediatric patients experiencing convulsive status epilepticus (SE). Utilizing the Kids Inpatient Database (KID), the authors identify several critical factors that contribute to adverse outcomes in this vulnerable population.

One of the key findings of the study is the association of higher mortality risk with end-of-year hospital admissions. This suggests that seasonal factors or increased patient load during specific times of the year may exacerbate the clinical management of SE, potentially leading to worse outcomes. Additionally, the study highlights the impact of various comorbidities, blood transfusions, and prolonged mechanical ventilation on mortality rates. These factors underscore the complexity of managing pediatric patients with SE, as they often present with multiple health issues that can complicate their treatment and recovery.

Interestingly, the study reveals that African American children have a lower risk of mortality compared to their counterparts from other ethnic groups. This finding prompts further investigation into the underlying reasons, which may include genetic, environmental, or healthcare access factors that contribute to these disparities in outcomes.

The reported mortality rate of approximately 1% in this cohort is notably lower than in some other studies, which may reflect the specific population analyzed or the healthcare settings involved. The authors suggest that studies with higher mortality rates often focus on high-risk subgroups, indicating that the general pediatric population may have a more favorable prognosis.

Moreover, the article emphasizes the role of prolonged seizures as a risk factor for complications and death. This finding aligns with existing literature that highlights the detrimental effects of extended seizure activity on patient outcomes. The authors advocate for timely intervention and management strategies to mitigate the risks associated with prolonged SE.

The article "Adult Status Epilepticus: A Review of the Prehospital and Emergency Department Management" by (Billington et al., 2016) provides a comprehensive

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overview of the current understanding of status epilepticus (SE), particularly focusing on its management in prehospital and emergency settings. The authors highlight that while numerous studies have explored the incidence of SE, there remains a significant gap in research regarding its long-term morbidity and mortality outcomes.

A critical evaluation of the article reveals that the authors effectively summarize the findings from various studies, indicating a gradual increase in the incidence of SE over the past four decades. This observation raises important questions about the factors contributing to this trend, such as demographic changes or improvements in diagnostic capabilities. Notably, the article points out a slight increase in prevalence among African American populations and a male predominance, suggesting that demographic factors may play a role in SE incidence.

The authors also discuss the complexities surrounding the true morbidity and mortality rates associated with SE, with estimates ranging from 5% to 20%. They identify older age as a significant risk factor, particularly for individuals over 65 years, which is consistent with existing literature that emphasizes the vulnerability of this age group to adverse outcomes following SE. The introduction of the Status Epilepticus Severity Score (STESS) is particularly noteworthy, as it offers a framework for predicting prognosis based on clinical parameters such as age, consciousness levels, and seizure morphology.

However, the article also underscores the challenges faced in predicting mortality due to the often unclear underlying etiologies of SE. The authors point out that SE may frequently present as a secondary manifestation of critical illness rather than as an isolated condition. This insight is crucial as it highlights the need for a more nuanced understanding of SE in clinical practice, particularly in emergency settings where rapid assessment and intervention are critical.

The article "Factors predicting cessation of status epilepticus in clinical practice: Data from a prospective observational registry (SENSE)" by (Kellinghaus et al.,

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2019) presents a comprehensive analysis of factors influencing the cessation of status epilepticus (SE), with a particular focus on generalized convulsive status epilepticus (GCSE). The study utilizes a robust dataset comprising 1,049 patients, analyzing their clinical presentations and treatment responses to derive predictive factors for the cessation of SE within defined time frames.

One of the critical insights from this research is the demographic profile of the patients, with a median age of 70 years at the onset of SE. This finding highlights the prevalence of SE in older populations, which may have implications for both clinical management and public health strategies. The study identifies that remote (32%) and acute (31%) etiologies are the most common causes of SE, underscoring the need for targeted interventions based on underlying conditions.

The article emphasizes the treatment modalities employed, noting that benzodiazepines were the first intravenous compounds administered in 86% of GCSE cases. This aligns with established clinical guidelines that advocate for the use of benzodiazepines as first-line therapy. However, the study reveals concerning trends in clinical practice, where treatment guidelines were not adhered to in a significant proportion of cases. This under-dosing, particularly evident in the cohort of GCSE patients, correlates with prolonged episodes of SE, indicating a critical gap in the effective management of this condition.

The multivariate Cox regression analysis conducted in the study further elucidates the relationship between treatment strategies and outcomes. It demonstrates that the use of benzodiazepines as the initial treatment and a higher cumulative dose of anticonvulsants are associated with a shorter time to cessation of SE. These findings reinforce the importance of timely and adequate pharmacological intervention in improving patient outcomes.

Moreover, the results indicate that a substantial percentage of GCSE patients (70%) continued to experience SE one hour after treatment initiation. This statistic raises important questions about the adequacy of initial treatment protocols and suggests

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a need for revisiting and reinforcing adherence to established guidelines in clinical settings.

The article "Convulsive Status Epilepticus in a Cohort of Patients from a Peruvian Academic Hospital" by (Bedoya-Sommerkamp et al., 2021) provides a thorough examination of generalized convulsive status epilepticus (GCSE) within a specific demographic context, highlighting its clinical implications and management in a developing country setting. The authors articulate that GCSE is defined by prolonged episodes of convulsions accompanied by impaired consciousness lasting at least five minutes, as per the International League Against Epilepsy (ILAE) criteria. This definition underscores the critical nature of timely intervention in what is categorized as a medical emergency with significant morbidity and mortality risks.

The study's primary objective is to elucidate the demographic characteristics, clinical presentation, and treatment protocols of GCSE in adult patients presenting to the emergency department of an academic hospital in Lima, Peru. The authors emphasize the scarcity of existing literature on the subject in developing nations, which often hampers effective clinical management and understanding of the condition. By addressing this gap, the authors not only provide valuable data but also advocate for enhanced awareness and improved treatment strategies in similar contexts.

A critical evaluation of the material reveals that the authors effectively utilize a cohort study design to gather pertinent data, which is essential for establishing a baseline understanding of GCSE in this population. The findings underscore the importance of rapid diagnosis and initiation of appropriate treatment, as these factors are crucial in mitigating the high mortality rates associated with GCSE. The authors discuss various treatment modalities and their effectiveness, reflecting on the complexities faced in emergency settings, particularly in resource-limited environments.

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Moreover, the article highlights the demographic factors influencing the incidence and outcomes of GCSE, which could inform targeted interventions and educational initiatives aimed at healthcare providers in similar regions. The authors also note that the clinical management of GCSE can be significantly improved through better access to resources and training for medical personnel, thereby potentially reducing the mortality rates associated with this condition.

The article "An Insight into the Current Understanding of Status Epilepticus: From Concept to Management" by (Abdulrhman Al-Sofyani, 2021) provides a comprehensive overview of generalized convulsive status epilepticus (GCSE), emphasizing its high mortality and morbidity rates. The author effectively outlines the clinical presentation of GCSE, which is characterized by rhythmic jerking of the extremities and a significant impairment of mental status, including states of coma, lethargy, or confusion. This description underscores the urgent need for timely diagnosis and intervention in affected patients.

Al-Sofyani highlights the critical nature of early and aggressive treatment in GCSE cases. The article notes that more than half of patients with status epilepticus respond favorably to a single antiseizure medication, suggesting that prompt pharmacological intervention can significantly alter the prognosis. However, the author warns that delays in treatment can lead to a higher likelihood of the patient becoming refractory to conventional therapies, indicating the importance of swift clinical action.

The article's analysis of the relationship between treatment timing and patient outcomes is particularly valuable. It suggests that the window of opportunity for effective intervention is limited, and that a failure to act quickly can result in increased mortality rates. This insight is crucial for clinicians managing patients with GCSE, as it emphasizes the need for protocols that prioritize rapid assessment and treatment initiation.

CONCLUSION

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The literature on generalized convulsive status epilepticus (GCSE) has developed significantly, revealing critical insights into its management, risk factors, and outcomes. The foundational study by (Murali, 2011) identified key predictors of mortality, such as seizure duration and specific etiologies, including cerebral vascular disease and antiepileptic drug (AED) discontinuation. This work established a multivariate approach to assess mortality risk, noting that older age and anoxia were strongly associated with higher mortality rates, while the mortality rates of partial and generalized seizures were comparable.

Building on this foundation, (Loddenkemper et al., 2012) conducted a retrospective analysis in pediatric patients, highlighting the influence of comorbidities and treatment-related factors on outcomes. Notably, their findings indicated that African American children had lower mortality rates, suggesting demographic variations in the prognosis of GCSE.

In 2016, (Billington et al., 2016) expanded the discourse by examining adult status epilepticus management in emergency settings. They emphasized the variability in morbidity and mortality rates across different populations and the importance of underlying etiologies in predicting outcomes. Their use of the Status Epilepticus Severity Score (STESS) reinforced the significance of timely intervention, particularly in older patients with altered consciousness.

The study by (Kellinghaus et al., 2019) further elucidated factors influencing the cessation of status epilepticus. Their findings revealed that inadequate dosing of benzodiazepines during initial treatment was prevalent and correlated with prolonged seizure activity, highlighting the need for adherence to treatment guidelines to optimize outcomes.

Recent research by (Bedoya-Sommerkamp et al., 2021) focused on the epidemiological and management aspects of GCSE in Peru, emphasizing the necessity for localized data to inform treatment strategies in developing countries. Their results underscored the high morbidity and mortality rates associated with GCSE, emphasizing the critical need for timely intervention.

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Finally, (Abdulrhman Al-Sofyani, 2021) synthesized current knowledge on GCSE, reinforcing the importance of aggressive treatment during the initial stages to improve outcomes. Their insights into treatment response complexities further highlighted the necessity for multiple antiepileptic medications for unresponsive patients.

In conclusion, the accumulated literature underscores the multifaceted nature of GCSE, revealing that demographic factors, clinical management strategies, and timely interventions are pivotal in determining patient outcomes. The studies collectively advocate for enhanced awareness, adherence to treatment protocols, and the need for localized data to inform management practices, particularly in resource-limited settings.

DISCLOSURE STATEMENT

- Disclosure Statement : The authors have no conflicts of Interest to declare
- Funding Sources : None
- Acknowledgements : -
- Author Contribution : All authors discussed and contributed the final content for journal submission and publication

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