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Title	"Epilepsy and Stroke Associated with Sickle Cell Anemia in Children of Yemen ,2024 :A Nested Case-Control Study"
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INTRODUCTION

Sickle cell anemia (SCA) is a significant public health concern in Yemen. Studies have reported that the prevalence of sickle cell trait (Hb AS) in Yemen is approximately 2.2%, with higher frequencies observed in the western coastal and mid-western areas. In these regions, the incidence of homozygous SCA (Hb SS) births may reach up to 20 per 10,000 live births [1] . SCA is a significant cause of neurological complications, yet its association with epilepsy remains poorly understood [2].

AIM

This study investigates the prevalence and seizure patterns of epilepsy in pediatric SCA patients. Also to examine the risk of SCA - epilepsy in children with development of stroke

METHODS

A nested - case control study was conducted to compare pediatric had SCA with epilepsy and non - SCA with epilepsy who experienced stroke with patients who did not experience any stroke in 2024 in Hodeidah, Yemen, including a cohort of 1593 children under 15 years old diagnosed with SCA. Epilepsy was identified based on clinical history and para-clinical assessments including electroencephalogram (EEG) recording , while stroke was confirmed using brain magnetic resonance imaging (MRI). The data obtained were analyzed based on descriptive statistics and associated test namely odd ratio (OR) with Confidence Intervals (CI) and Chi square test (significant at _*p*_ - value < 0.05).

RESULTS (1)

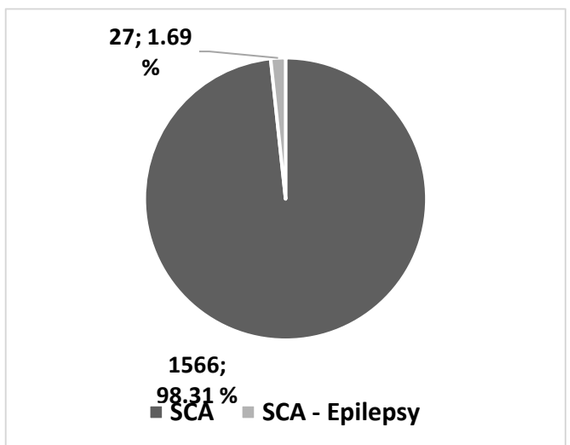

Figure (1) : Among 1593 SCA patients, 27 (1.69%) were diagnosed with epilepsy. Males represented 18 cases (66.66%) and females 9 cases (33.33%). Ages ranged from 1 to 14 years, with a median of 3 years.

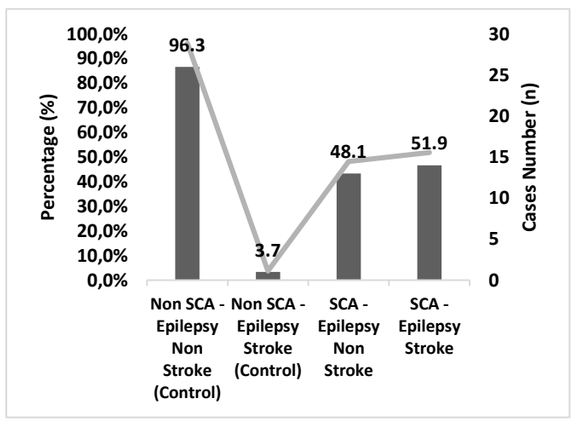

Figure)2(: SCA – Epilepsy patients associated with stroke in nested case control study)n :52 (.14 /27)51.8%(of SCA – Epilepsy had a history of stroke. In addition, the results showed that 26 case)96.29 % (of the epilepsy children patients without SCA didn't developed the stroke. The SCA patients with epilepsy were associated with development of stroke with OR = 28 and 95% CI = 3.31 to 236.85 . And the significant statistical relationship between SCA with epilepsy and stroke) χ^2 : 13.29 ؛*p*-value 0.00026(.

RESULTS (2)

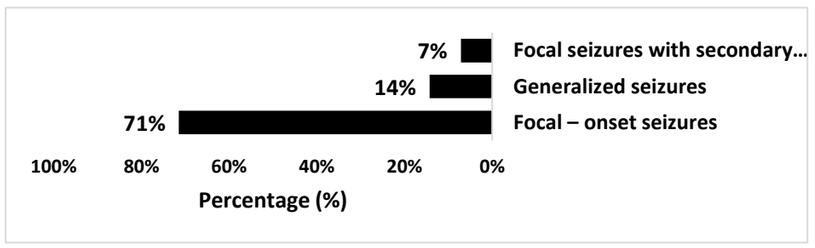

Figure (3) : Patterns of epilepsy in SCA children with stroke

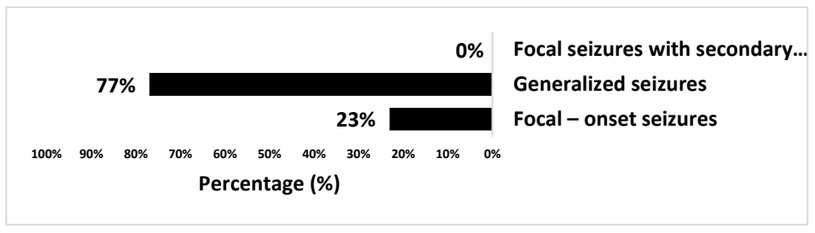

Figure (4) : Patterns of epilepsy in SCA children without stroke

DISCUSSION

Neurological complications are now recognized as major contributors to SCD-related morbidity and mortality. Stotesbury et al. [3] proposed a systems-biology model where macro-circulatory hyperperfusion, focal microcirculatory hypoperfusion, and depleted cerebral reserve lead to vascular instability, compromising oxygen delivery and increasing stroke risk. Farooq and Testai [4] highlighted the diverse neurological complications in SCD, including silent cerebral ischemia, strokes, moyamoya syndrome, PRES, cerebral fat embolism, and venous sinus thrombosis. Hydroxyurea (HU) has proven effective in reducing such events. A Tanzanian study by Moshi et al. [5] reported a drop in stroke prevalence from 12.3% to 2.6% after HU treatment, underscoring its importance in stroke prevention. Nawaiseh et al. [6] conducted a nested case-control study of SCD patients and identified cerebrovascular accidents (CVAs) as a significant risk factor for seizures. Similarly, the Jamaica Sickle Cell Disease Cohort Study by Ali et al. [7] found that epilepsy incidence is two to three times higher in SCD populations than in non-SCD populations.

CONCLUSION

These findings highlight the need for treatment optimization and regular neurological follow-up in children with SCA. Our study emphasizes early epilepsy screening, especially in those with silent infarcts, to prevent long-term neurological complications and improve quality of life.

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