

Clinical profile and etiological spectrum of acute symptomatic seizures in the elderly populace

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ABSTRACT

Aim. The current study was aimed to analyze the etiology and the clinical spectrum of acute symptomatic seizures (ASS) and the predictors of in-hospital mortality in the elderly population.

Methods. We evaluated ninety-four elderly (≥ 60 years of age) hospitalized patients with ASS for clinical profile, aetiologies and predictors of in-hospital mortality.

Results. Mean age of onset of ASS was 67.63 ± 11.48 years. Main seizure type was focal seizure in 62 (59.7%) cases followed by tonic-clonic seizures in 30 (31.9%) cases. Most common aetiologies in ASS were stroke in 61.7% followed by infective cause in 30.9% of cases. In-hospital mortality in the ASS in the elderly was 21 (22.3%) in our series and the stroke was the most common cause of mortality.

Conclusion. Stroke was the most common etiology of ASS in the elderly and was also related with mortality. It is necessary for us to analysis the causes of ASS in the elderly, in order to reduce the in-hospital mortality.

Keywords: ASS in elderly, acute symptomatic seizures, in-hospital mortality, etiology

Abbreviations:

ASS – Acute symptomatic seizures

ICU – Intensive care units

CNS – Central nervous system

SE – Status epilepticus

INTRODUCTION

Acute symptomatic seizures (ASS) are events that occur in close association with a central nervous system insult. When seizures complicate acute neurological conditions, they add a layer of intricacy to patient management. ASS is more common in the youngest age and in the elderly. The incidence of ASS in patients elder than 60 years is ~100 per 100,000 and rises with each decade of advancing age [1,2]. Up to 30% of instances of the elderly patients with ASS manifest as Status epilepticus (SE) [3]. The elderly account for around 25% of new cases of epilepsy [4]. Epilepsy continues in one-third of patients with ASS [5]. Due to the high prevalence of

comorbidities, concomitant polypharmacy, and age- or disease-related alterations in pharmacodynamics and pharmacokinetics, the elderly represent a distinct treatment population when compared with the adults [6]. ASS have a clearly identifiable, proximate cause, the simultaneous management of the underlying cause and use of antiseizure medication are required for the treatment of ASS.

There is still a knowledge gap about the etiology and outcome among the elderly patients who experience ASS, particularly those from the developing countries. The current study was aimed to (1) find the etiology and the clinical spectrum of ASS and (2) the predictors of in-hospital mortality.

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MATERIAL AND METHODS

We performed a hospital- based, cross-sectional study from July 2017 to September 2019 on the elderly (≥ 60 years of age) patients who were admitted in neurology ward or intensive care unit (ICU) either with ASS or experienced ASS after being admitted for other neurological disorders were prospectively evaluated after obtaining their informed consent. Patients having pseudo seizures, history of epilepsy or epileptic seizures before 60 years were excluded.

ASS were defined as clinical seizures episode in close temporal relationship with an acute central nervous system (CNS) insult, which may be vascular, metabolic, toxic, structural, infectious, or inflammatory [7]. Out of 1976 the elderly patients who were admitted with different neurological disorders during this period, 94 patients fulfilled the inclusion criteria.

Age, gender, seizure semiology, neurological findings, co-morbidities, treatment, and length of hospital stay were all noted as clinical characteristics of the patients. Investigations that were pertinent were conducted, including complete blood count, liver and renal function tests, blood glucose and electrolyte levels, blood gas analysis. Patients were also examined using chest X-rays, ultrasounds abdomen, and echocardiograms and Cerebrospinal

fluid examination when deemed necessary. MRI and CT scans of the brain were performed based on clinical recommendations. The 10-20 system of electrode placement was used to record the electroencephalogram for 30 minutes.

RESULTS

A total of ninety-four elderly patients with acute symptomatic seizures were recruited. Out of which 62 (66.6 %) cases were male and mean age of onset of ASS in years (mean \pm S.D.) were 67.63 ± 11.48 years. Age ranged from 60-90 years. Main seizure type was focal seizure in 62 (59.7%) cases in which focal with bilateral convulsive seizures were most common presentation 30(31.9%) followed by tonic-clonic seizures in 30(31.9) cases. Most common aetiologies in ASS were stroke in 61.7 % (acute infarct in 43.6% and hemorrhagic stroke in 18.1%) followed by infective cause in 30.9% of cases. Mean duration of hospital stay in days (mean \pm S.D.) was 6.49 ± 3.53 days. The clinical characteristics of the patients are shown in Table 1.

In-hospital mortality in the ASS in the elderly was 21 (22.3%) in our series. Amongst them, stroke was the most common cause of mortality (n=13) followed by CNS infections (n=7) and metabolic cause in 1 case. Factors like gender, socioeconomic status, seizure semiology, etiology, comorbidities, duration

TABLE 1. The clinical characteristics of the patients with acute symptomatic seizures

Variables		Frequency N (%) Healthy	Outcome		χ^2	P
			Dead			
Gender	Male	62 (66.6%)	49(79.0)	13(21.0)	0.198	0.794
	Female	32 (34.0%)	24(75.0)	8(25.0)		
Socio-economic status (SES)	Upper class	0 (0.0%)	0 (0.0)	0 (0.0)	1.886	0.380
	Upper middle class	0 (0.0%)	0 (0.0)	0 (0.0)		
	Middle class	18 (19.1%)	15(83.3)	3(16.7)		
	Lower middle class	33 (35.1%)	23(69.7)	10(30.3)		
	Lower class	43 (45.7%)	35(81.4)	8(18.6)		
Type of seizure	Tonic-clonic seizure	30 (31.9%)	22(73.3)	8(26.7)	1.825	0.831
	Tonic	2 (2.1%)	2(100.0)	0(0.0)		
	Focal motor	3 (3.2%)	3(100.0)	0(0.0)		
	Focal motor with dyscognitive	29 (30.9%)	23(79.3)	6(20.7)		
	Focal with bilateral conclusive	30 (31.9%)	23(76.7)	7(23.3)		
Co- morbidities	Hypertension	56 (59.6%)	43(76.8)	13(23.2)	0.061	1.000
	Diabetes Mellitus	20 (21.3%)	15(75.0)	5(25.0)	0.104	0.766
	Dyslipidemia	7 (7.4%)	6(85.7)	1(14.3)	0.283	0.692
	Coronary Artery Disease	7 (7.4%)	6(85.7)	1(14.3)	0.238	0.692
	None	34 (36.2%)	46(76.7)	14(23.3)	0.094	0.803
Hospital stay (days)	1-4	15 (16.0%)	11(73.3)	4(26.7)	0.193	0.737
	≥ 4	79 (84.0%)	62(78.5)	17(21.5)		
Etiology	Infectious	29 (30.9%)	22 (75.9)	7 (24.1)	0.65	1.00
	Vascular	58 (61.7%)	45 (77.6)	13 (22.4)		
	Metabolic	5 (5.3%)	4 (80.0)	1 (20.0)		
	Cryptogenic	2 (2.1%)	2 (100.0)	0 (0.0)		

TABLE 2. Risk factors for mortality: Multiple logistic regressions

Risk factors		Outcome		UAOR (95 % CI)	p	AOR (95% CI)	p
		Healthy	Death				
Gender	Male	49(79.0)	13(21.0)	1.26 (0.46-3.43)	0.657	1.26 (0.43-3.75)	0.673
	Female	24(75.0)	8(25.0)				
SES	Middle	15(83.3)	3(16.7)	0.94 (0.49- 1.73)	0.849	0.96 (0.48-1.91)	0.911
	Lower middle	23(69.7)	10(30.3)				
	Lower	35(81.4)	8(18.6)				
Type of seizure	Tonic- clonic	22(73.3)	8(26.7)	0.96 (0.72-1.28)	0.764	0.93 (0.69-1.27)	0.667
	Tonic	2(100.0)	0(0.0)				
	Focal motor	3(100.0)	0(0.0)				
	Focal motor with dyscognitive	23(79.3)	6(20.7)				
	Focal with b/l conclusive	23(76.7)	7(23.3)				
Hypertension		43(76.8)	13(23.2)	0.88 (0.33-2.39)	0.805	1.08 (0.14-8.38)	0.941
Diabetes Mellitus		15(75.0)	5(25.0)	0.83 (0.26-2.62)	0.748	1.03 (0.25-4.35)	0.963
Dyslipidemia		6(85.7)	1(14.3)	1.79 (0.20-15.77)	0.599	1.93 (0.19-19.91)	0.580
Coronary Artery Disease		6(85.7)	1(14.3)	1.79 (0.20-15.77)	0.759	2.39 (0.22-26.60)	0.476
No co-morbidity		46(76.7)	14(23.3)	0.85 (0.31-2.37)	0.759	0.66 (0.06-7.11)	0.734
Hospital stay	1-4 days	11(73.3)	4(26.7)	0.75 (0.21-2.67)	0.662	0.78 (0.21-3.01)	0.728
	≥ 4 days	62(78.5)	17(21.5)				
Etiology	Infectious	22(75.9)	7(24.1)	0.78 (0.35-1.74)	0.550	0.71 (0.28-1.76)	0.458
	Vascular	45(77.6)	13(22.4)				
	Metabolic	4(80.0)	1(20.0)				
	Cryptogenic	2(100.0)	0(0.0)				

of stay in hospital, were not significantly associated with mortality on multivariate analysis (Table 2).

DISCUSSION

Although ASS cannot technically be classified as epilepsy, they are a common symptom in the elderly patients and raise the likelihood that they may develop epilepsy.

In our study, ASS was experienced in 4% of the elderly patients hospitalized in neurology wards and ICU with various acute neurological diseases. In another study 2.1% of admissions were related to new-onset seizures occurring with acute neurological disorders in patients aged ranged from 6 months to 80 years [8]. New-onset seizures were observed in 0.8% of patients admitted to medical and surgical ICUs, according to a retrospective research from the Mayo Clinic [9]. A review by Bleck et al. [10] noted that 3.5% of patients with critical medical illness had new-onset seizures. Due to the study's inclusion of exclusively the elderly patients, ASS occurred more frequently in our study.

In our study, stroke was the most frequent cause of ASS in the elderly, accounting for 61% of cases. With advancing age incidence of stroke increases.

The most frequent cause of ASS in the elderly is cerebrovascular diseases which accounts for 28–58% of cases [11,12]. In another study on neuroimaging in a cohort of the elderly with new onset seizures in the patients with focal lesions (98), infarcts (45), hemorrhages (18), granuloma (16), were the common etiologies [13]. In ischemic strokes, the degree of the initial neurological deficit, the degree of long-term disability, the involvement of many sites or a larger lesion, cortical damage, and hippocampal involvement all indicate the likelihood of having post-stroke seizures [14]. Early post-stroke seizures are known to be at increased risk due to embolic stroke [15].

In our analysis, infectious causes accounted for 36.2% of cases, making them the second most frequent cause of ASS. In another study CNS infections accounted for 32% ($n = 21/66$) of the etiology [8]. One study from south India found that 36% of cases of ASS were caused by neuro infection, the majority of which was neurocysticercosis [16].

In our series in-hospital mortality in the ASS in the elderly was 22.3% and the stroke was the most common cause of mortality. Similar to this, there is a high short-term risk of death associated with ASS (about 20% in the first month after ASS). When compared to younger people (17.7% in Washington

Heights and 11.2% in Rochester), mortality was significantly more prevalent in those 65 years and older (28.4% in Washington Heights and 40.5% in Rochester) [17]. A study has shown that ASS are the most common risk factors of SE and/or cluster seizures in the elderly, which is a neurologic emergency; [18] this phenomenon increases the risk of neurologic emergency for the elderly.

The study population was from the neurology ward and ICU and does not include all the etiology related with neurosurgery and obstetrician department, it was a single-Centre, hospital-based study, it

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does not represent the general population are the limitation of our study.

CONCLUSION

ASS was experienced in 4% of the elderly patients hospitalized in neurology ward and ICU. In-hospital mortality in the ASS in the elderly was 22.3% in our series Stroke was the most frequent etiology of ASS in the elderly and was also related with mortality. Therefore, to reduce the in-hospital mortality it is necessary for us to analysis the causes of ASS in the elderly.

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