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Altered level of consciousness in the emergency department before and after coronavirus disease-19: A four-year multicenter study

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Abstract

Background: New-onset altered level of consciousness (ALC) is a frequent and critical presentation in emergency departments (EDs), requiring prompt recognition and management. The coronavirus disease-19 pandemic has significantly affected emergency care systems, yet its impact on ALC remains poorly understood. This study aimed to compare the etiology, patient flow, and outcomes of ALC before (BC) and after (AC) the COVID-19 pandemic. *Methods:* In this retrospective multicenter study, board-certified faculty from emergency medicine, internal medicine, and neurology reviewed 17,913 patients with ALC from four university-affiliated EDs serving a population of approximately five million individuals in South Korea. Patients were classified into BC (February 2018 – January 2020) and AC (March 2021 – February 2023). ALCs in the ED were categorized into 10 etiologies by multidisciplinary consensus review. *Results:* The incidence of ALC in the ED was 3.1%. The incidence of ALC increased significantly from 2.5% in BC to 3.7% in AC ($P<0.001$). Metabolic cause was the most common etiology (24.8%), followed by systemic infection (18.0%). Intracranial etiologies accounted for 29.7% of the total. Admission rate increased from 54.5% to 59.3% ($P<0.001$), while ICU admissions declined and ED deaths rose. Overall mortality increased from 13.5% to 18.4% ($P < 0.001$), and post-admission mortality from 16.3% to 21.3% ($P<0.001$). The highest mortality was associated with ALCs due to cardiogenic and vascular etiologies (26.8%).
Conclusion: The observed shifts in etiologies, patient flow, and mortality between BC and AC reflect pandemic-driven changes in emergency care, underscoring the need for multidisciplinary strategies and scalable emergency care systems.

Keywords: Emergency department, emergency medical services, consciousness disorders, neurologic manifestations, COVID-19

INTRODUCTION

A new-onset altered level of consciousness (ALC), characterized by non-physiological changes in arousal or attention, poses a significant challenge in the emergency department (ED). ALC has been reported to account for approximately 4-10 % of ED visits.[1] As a potentially life-threatening condition, ALC requires prompt recognition and immediate management to prevent deterioration or irreversible damage.

ALC in the ED is not a diagnosis but rather a symptom with a diverse spectrum, including confusion, disorientation, lethargy, somnolence, unresponsiveness, coma, agitation, inattention, hallucinations, delusions, psychosis, or inappropriate behavior.[2] This wide range of manifestations has contributed to heterogeneity and inconsistency in previous studies.[3-8] Earlier investigations were limited by short study durations. The period analyzed was only 14 days in one study in the early days[9], another study had a short study period of 4 months[2], and a recent study evaluated only 47 days.[10] Some studies set limited inclusion criteria such as trauma[11], or elderly patients only.[9] Single-department analyses had lacking multidisciplinary perspectives.[2,4,11] In addition, there was a study that adopted chief complaint rather than objective examination as the criteria for ALC.[7]

The COVID-19 pandemic has significantly impacted the healthcare system as well as the

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socio-economic landscape. However, studies examining ALCs in the post-pandemic period remain scarce and the outcomes are inconsistent. While some studies noted a decline in ED utilization[12,13], others have reported increased mortality following the pandemic.[14-16] These discrepancies underscore the need to reevaluate ALC triage in the post-COVID-19 era. In order to provide insights into the changes of ALC in the ED, we aimed to investigate the etiology, dispositions from the ED, and outcomes of patients with ALC in the ED, comparing before (BC) and after the COVID-19 (AC) pandemic.

METHODS

This is a retrospective multicenter study conducted at four university-affiliated hospitals serving a population of approximately five million individuals in Daegu (a metropolitan city) and the adjacent regions of Gyeongsangbuk-do province and parts of Gyeongsangnam-do provinces in South Korea. The EDs of the participating hospitals operate 24 hours a day, 365 days a year, and provide immediate access to diagnostic modalities, including blood tests, X-rays, electrocardiography, electroencephalography, transthoracic echocardiography, computed tomography, and magnetic resonance imaging. In addition, emergency interventions such as surgery, extracorporeal membrane oxygenation, ultrasound-guided procedures, and endovascular treatment for cerebrovascular diseases are available at any time if needed. To investigate the characteristics of ALC in the ED and compare the periods before and after the COVID-19 pandemic, the study period was divided into two temporal groups: the BC period, defined as February 2018 to January 2020, and the AC period, defined as March 2021 to February 2023. The intermediate period from February 2020 to February 2021—characterized by substantial disruptions such as policy shifts, temporary ED closures, resource shortages, and workforce reductions—was excluded from analysis due to its instability and inconsistency.

Comparisons between the BC and AC groups were performed using Student's t-test for continuous variables and the chi-square test for categorical variables. A P-value < 0.05 was considered statistically significant. All statistical analyses were performed using IBM SPSS Statistics for Windows, version 22.0 (IBM Corp., Armonk, NY, USA). The study protocol was approved by the Institutional Review Boards of all four participating hospitals, and the requirement for written informed consent was waived due to the retrospective nature of the study.

Patients

All patients' Glasgow Coma Scale (GCS) scores were assessed at initial presentation by the first attending physician, who was either a faculty member or a chief resident in the department of emergency medicine. ALC was defined as the presence of at least one of the following: (1) GCS score <15; (2) impaired orientation to person, place, or time; (3) other findings identified and judged as ALC by the initial examiner. The exclusion criteria were as follows: (1) initial GCS score =15; (2) age <18 years; (3) transfer during hospitalization from another hospital; (4) cardiac arrest or death on arrival; and (5) revisit within 48 hours after ED discharge.

Classification and arrangement of the etiologies

Each patient presenting with ALC in the ED underwent a comprehensive review of their medical records, and the etiology was classified according to a 10-category system[17]: (1) Metabolic cause, such as uremia, hypoglycemia, hyperglycemia, electrolyte imbalance (e.g., hyponatremia or hypernatremia), and hepatic encephalopathy; (2) Systemic infection, such as sepsis or systemic inflammatory response from pneumonia, urinary tract infection, and intra-abdominal infections without central nervous system involvement; (3) Cardiogenic and vascular (C&V), including heart failure, arrhythmia, myocardial infarction, hypertensive encephalopathy, hypovolemic shock, or aortic dissection, excluding primary cerebrovascular causes; (4) Stroke, referring to ischemic or hemorrhagic cerebrovascular events confirmed by neuroimaging and clinical signs; (5) Traumatic brain injury (TBI), involving external head trauma such as concussion, skull fracture, or intracranial hemorrhage; (6) Seizure, defined as ictal or postictal states with or without EEG confirmation, psychogenic non-epileptic seizure as well; (7) Central nervous system (CNS) infection, including bacterial or viral encephalitis, tuberculous meningoencephalitis, or brain abscess, supported by cerebrospinal fluid analysis or imaging; (8) Toxic, such as alcohol, illicit drugs, prescription medication overdose (e.g., opioids, benzodiazepines), or carbon monoxide poisoning; (9) Psychiatric disorder, comprising functional unresponsiveness, catatonia, or dissociative episodes without identifiable organic

pathology; and (10) Undetermined, when no definitive etiology was established despite thorough evaluation or when multiple coexisting causes precluded classification into a single category. Notably, the etiology was determined at the time of the patient's discharge from the ED. The classification process was conducted by a multidisciplinary consortium composed of board-certified professors in emergency medicine, internal medicine, and neurology. The consortium held monthly meetings with all members present and made scheduled visits to each hospital to review the electronic medical records on-site. Through detailed, case-by-case discussions, the consortium reached a consensus on the etiology assignment. Although this process was challenging and time-consuming, it was rigorously maintained to ensure reliability throughout this study period.

RESULTS

Demographic characteristics

A total of 583,353 patients visited the EDs of the four participating hospitals during the study period, with 315,526 patients in BC and 267,827 in AC (Figure. 1). Following the application of inclusion and exclusion criteria, 17,913 patients with ALC were included in the analysis: 7,988 in BC group and 9,925 in AC group. The overall incidence of ALC was 3.1% of all ED visits, and it was significantly higher in AC than in BC period (3.7% vs. 2.5%, P<0.001). The mean age was 66.64±18.07 years overall, higher in AC (BC vs. AC, 65.50±17.91 vs. 67.55±18.16, P<0.001; Table 1). The proportion of elderly aged 60 years or older in AC surpassed that in BC (BC vs. AC, [n=5282, 66.1 %] vs. [n=7044, 71.0 %], P<0.001). The average length of stay in the ED was 14.66±19.48 hours and was significantly shorter in AC compared to BC (13.91±17.74 vs. 15.59±21.41 hours, P<0.001). The mean length of admission was 17.97±23.36 days, with no significant difference between the two periods. Among the etiologies, Metabolic cause showed a significant reduction in ED stay from 18:58±24:22 in BC to 15:44±19:38 in AC (P<0.001). Similarly, Systemic infection-related ALC showed a reduction from 25:14±27:29 to 18:43±19:44 (P<0.001), and the Undetermined group decreased from 14:06±17:43 to 11:58±15:00 (P=0.032).

Etiologic distribution

The most frequent etiology of ALC was metabolic cause, accounting for 24.8% of the total, with no significant difference between BC and AC (24.7% vs. 24.8%, P=0.842; Figure 2 and Table 3). Systemic infection was the second most common etiology, and its proportion increased significantly from 17.3% in BC to 18.7% in AC (P=0.015).

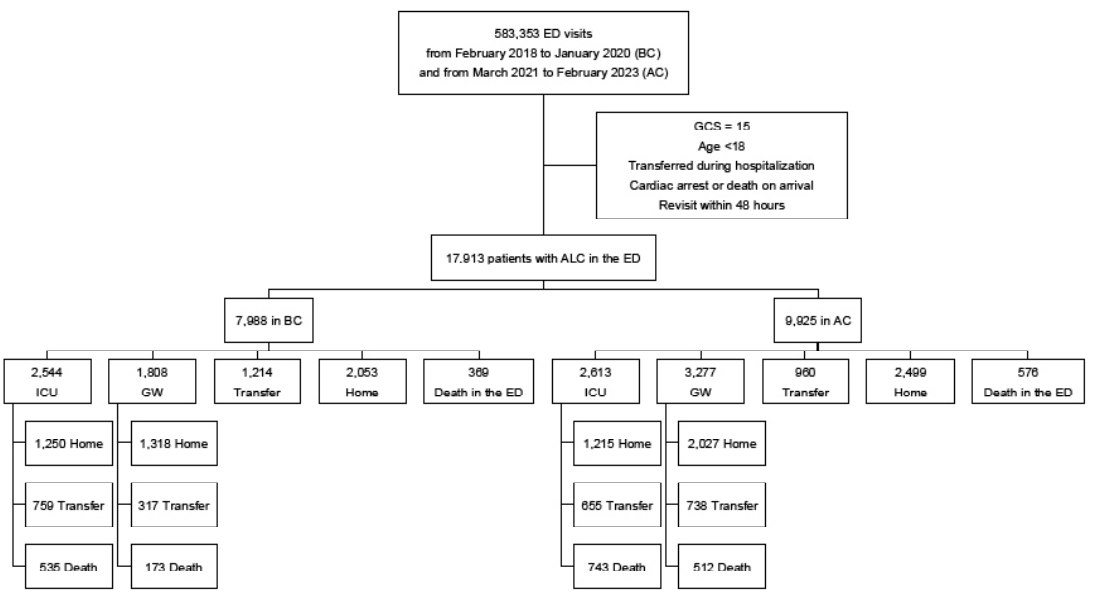

Figure 1. Flowchart of patients including dispositions and destinations.
ED: emergency department; GCS: Glasgow Coma Scale; ALC: altered level of consciousness; GW: general ward; ICU: intensive care unit; Transfer: transferred to another hospital.

Table 1: Demographic data and length of stay in the emergency department

Variables	Total (*n*=17913)	BC (*n*=7988)	AC (*n*=9925)	*P*
Female, n (%)	8532 (47.6)	3690 (46.2)	4842 (48.8)	0.001*
Age (years±SD)	66.64±18.07	65.50±17.91	67.55±18.16	<0.001
⩽29	920 (5.1)	410 (5.1)	510 (5.1)	
30-39	846 (4.7)	400 (5.0)	446 (4.5)	
40-49	1410 (7.9)	727 (9.1)	683 (6.9)	
50-59	2411 (13.5)	1169 (14.6)	1242 (12.5)	<0.001*
60-69	2991 (16.7)	1345 (16.8)	1646 (16.6)	
70-79	4093 (22.8)	1859 (23.3)	2234 (22.5)	
80-89	4407 (24.6)	1780 (22.3)	2627(26.5)	
90	835 (4.7)	298 (3.7)	537 (5.4)	
Length of stay in the ED (HH:MM)	14.39±19.48	15.59±21.41	13.91±17.44	<0.001
Metabolic cause	17:10±21:55	18:58±24:22	15:44±19:38	<0.001
Systemic infection	21:30±23:34	25:14±27:29	18:43±19:44	<0.001
C&V	12:37±19:46	13:41±18:23	12:01±20:30	0.230
Stroke	07:48±12:04	07:31±13:49	08:04±10:04	0.261
TBI	07:01±10:00	07:04±10:39	06:59±09:20	0.839
Toxic	15:05±18:45	14:52±18:33	15:15±18:54	0.610
Seizure	14:01±16:51	13:47±17:02	14:15±16:40	0.675
CNS infection	19:44±17:27	18:25±17:21	21:39±17:31	0.206
Psychiatric disorder	12:09±13:34	12:28±15:20	11:54±12:01	0.735
Undetermined	12.42±16:00	14:06±17.43	11:58±15:00	0.032
Length of admission (days)	17.97±23.36	18.26±24.76	17.76±22.27	0.280

All statistics are t-test, except for *: Chi-square test. BC: before COVID-19; AC: after COVID-19; SD: standard deviation; ED: emergency department; C&V: cardiogenic and vascular; TBI: traumatic brain injury; CNS: central nervous system.

Stroke, the most common intracranial etiology, ranked fourth, accounting for 13.1 % of the total. It held the third position in BC (14.6 %) but dropped to the fourth in AC (11.9 %) (*P*<0.001). The frequency of TBI also declined from 11.3% to 9.1% (*P*<0.001), and seizure decreased from 6.1% to 4.9% (*P*<0.001). In contrast, C&V increased from 3.7% to 5.4% (*P*<0.001). CNS infection decreased from 1.4% in BC to 0.8% in AC (*P*<0.001). The proportion of undetermined etiologies significantly increased from 5.5% in BC to 8.4% in AC (*P*<0.001). No significant difference was observed in the frequency of toxic (14.0% vs. 14.5%, *P*=0.384) or psychiatric causes

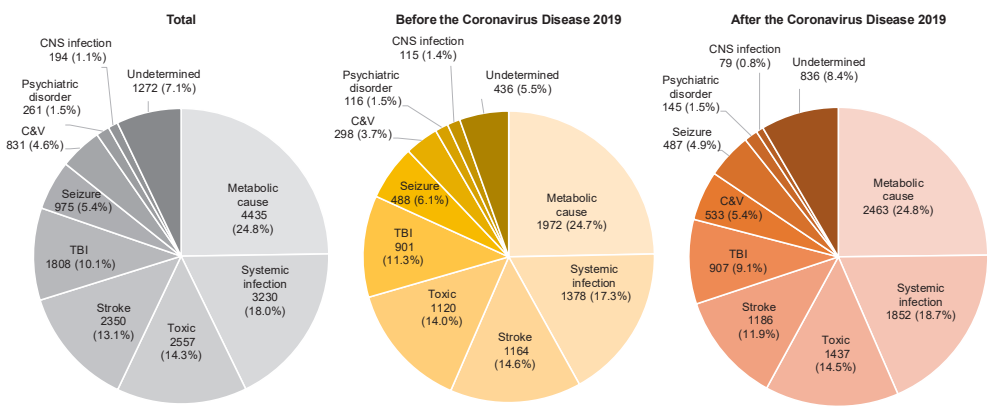

Figure 2. Etiology of altered level of consciousness in the emergency department.
Data are presented as n (%). CNS: central nervous system; C&V: cardiogenic & vascular; TBI: traumatic brain injury.

Table 2: Dispositions and destinations of patients with altered level of consciousness

	Total	BC	AC	*P*
Dispositions from the ED	(N=17913)	(*n*=7988)	(*n*=9925)	
Intensive care unit	5157 (28.8)	2544 (31.8)	2613 (26.3)	<0.001
General ward	5085 (28.4)	1808 (22.6)	3277 (33.0)	<0.001
Home	4552 (25.4)	2053 (25.7)	2499 (25.2)	0.425
Transfer	2174 (12.1)	1214 (15.2)	960 (9.7)	<0.001
Death in the ED	945 (5.3)	369 (4.6)	576 (5.8)	<0.001
Destinations on discharge after admission	(N=10242)	(*n*=4352)	(*n*=5890)	
Home	5810 (56.7)	2568 (59.0)	3242 (55.0)	<0.001
Transfer	2469 (24.1)	1076 (24.7)	1393 (23.7)	0.209
Death	1963 (19.2)	708 (16.3)	1255 (21.3)	<0.001

Chi-square test; Numbers are *n* (%). BC: before COVID-19; AC: after COVID-19; ED: emergency department, Transfer: transferred to another hospital.

(both 1.5%, *P*=0.961).

The three major extra-cranial etiologies (i.e., metabolic cause, systemic infection, and toxic) accounted for 57.1 % (*n*=10,222) of the total, with 56.0 % and 58.0 % in BC and AC, respectively. The intracranial etiologies, including stroke, TBI, seizure, and CNS infection, were 29.7 % (*n*=5327), consisting of 33.4 % and 26.8 % in BC and AC, respectively.

Dispositions and in-hospital outcome

Among all ALC patients, 57.2% were admitted to the hospital in overall (Table 2, Figure 1), and the admission rate was significantly higher in AC group compared to BC group (59.3% vs. 54.5%, *P*<0.001). General ward (GW) admission increased from 22.6% in BC to 33.0% in AC (*P*<0.001), while intensive care unit (ICU) admission decreased from 31.8% to 26.3% (*P*<0.001). Transfer to other hospitals declined from 15.2% in BC to 9.7% in AC (*P*<0.001), while the rate of discharge directly from the ED remained unchanged (25.7% vs. 25.2%, *P*=0.425).

The ED mortality rate increased significantly from 4.6% in BC to 5.8% in AC (*P*<0.001). Among these deaths, the most frequent etiologies were metabolic cause and systemic infections.

Table 3: Comparison of Etiologies and Mortality between BC and AC

	Total N=17913, (%)	Etiology BC (%)	Etiology AC (%)	*P* (BC vs. AC)	Mortality BC (%)	Mortality AC (%)	*P* (BC vs. AC)
Metabolic	4435 (24.8)	24.7	24.8	0.842	13.1	20.8	<0.001
Systemic infection	3230 (18.0)	17.3	18.7	0.015	21.0	25.3	0.004
Toxic	2557 (14.3)	14.0	14.5	0.384	2.2	3.8	0.022
Stroke	2350 (13.1)	14.6	11.9	<0.001	14.8	24.7	<0.001
TBI	1808 (10.1)	11.3	9.1	<0.001	19.2	19.0	0.898
Seizure	975 (5.4)	6.1	4.9	<0.001	2.7	4.7	0.088
C&V	831 (4.6)	3.7	5.4	<0.001	24.8	28.0	0.330
Psychiatric disorder	261 (1.5)	1.5	1.5	0.961	1.7	2.8	0.579
CNS infection	194 (1.1)	1.4	0.8	<0.001	18.3	20.3	0.729
Undetermined	1272 (7.1)	5.5	8.4	<0.001	11.0	16.5	0.008

Chi-square test; Numbers are n (%).
BC: before the COVID-19; AC: after the COVID-19; C&V: Cardiogenic and vascular; TBI: traumatic brain injury; CNS: central nervous system.

Following admission, the proportion of patients discharged home decreased from 59.0% in BC to 55.0% in AC (P<0.001), while in-hospital mortality increased from 16.3% to 21.3% (P<0.001).

Overall and etiology-specific mortality

The overall mortality rate among ALC patients was 16.2%, with a significant increase in AC group compared to BC group (18.4% vs. 13.5%, P<0.001). The odds of death in AC were higher than in BC for both overall mortality (odds ratio [OR], 1.272; 95% confidence interval [CI], 1.112–1.455) and post-admission mortality (OR, 1.394; 95% CI, 1.259–1.543). Admission to the ICU was consistently associated with higher mortality than GW admission (OR, 2.116; 95% CI, 1.910–2.344), with similar findings in BC and AC subgroups. The mortality rate associated with metabolic cause increased significantly from 13.1% in BC to 20.8% in AC (P<0.001). Systemic infections also showed an increase from 21.0% to 25.3% (P=0.004). Mortality related to stroke increased from 14.8% to 24.7% (P<0.001), while Toxic increased from 2.2% to 3.8% (P=0.022). The mortality of patients with undetermined etiologies rose significantly from 11.0% to 16.5% (P=0.008). The mortality associated with C&V causes remained the highest among all etiologies (26.8%), although the difference between the two periods was not statistically significant (24.8% vs. 28.0%, P=0.330).

DISCUSSION

In our study, we observed the changes in the etiology, patient flow, and outcomes of ALC between BC and AC. To the best of our knowledge, this study includes the most extensive population related to ALC in the ED and marks the first investigation on comparing BC and AC, and demonstrated that COVID-19 shifted the burden of ALC in the ED and increased in-hospital mortality.

ALC accounted for 3.1% of all ED visits. This should be interpreted in the context of South Korea's healthcare environment, where the low entry threshold for EDs results in a higher proportion of mild cases. South Korea operates a mandatory government-operated health insurance system that covers the entire population, ensuring a robust healthcare delivery system with low private payment.

The mean ages reported in previous studies ranged from 49 to 69[4,5,7,8,18], compatible with our study. Nevertheless, a closer look at previous studies shows that the mean age is higher in recent studies compared to earlier studies. The mean ages were reported as 49 and 45 in 2002 and in 2008, respectively.[4,6] Subsequently, Forsberg *et al*. and Xiao *et al.* reported 59 and 51 in 2009 and 2012, respectively.[5,8] Data from the late 2010s showed that the mean age reached the late 60s.[7,18] Our study also showed that the patients are aging and proportion of the 60 and above increased.

The overall length of stay in the ED was shortened in AC, which suggests improved patient distribution and disposition from the ED. Changes in administrative and healthcare delivery systems in AC facilitated earlier decisions for hospitalization, thereby reduced ED stay time. Metabolic cause and Systemic infection showed approximately 4- and 6-hour reductions, respectively. In addition, the COVID-19 policy caused additional inconveniences for transfers in AC (e.g., redoing COVID-19 screening tests for negative results, additional infection prevention measures, and longer wait times for transfer). As a result, both medical staff and caretakers may have avoided transfers, which could have led to an increase in hospitalization rates at the hospital. Nevertheless, the average length of hospitalization for ALC patients showed no difference between BC and AC, suggesting the medical significance of ALC that cannot be influenced by the policies.

In AC, there was a decrease in the proportion of ICU admissions, while GW admissions showed a significant increase due to the abovementioned reasons. It does not imply a decrease in critical patients with ALC requiring ICU management. The leading etiology sent to the ICU was stroke (see Supplementary Table S1), and the allocation of ICU involves issues regarding the distribution of limited medical resources. (i.e., the limited number of ICU beds). This distribution analysis focuses on the increased hospitalization rate to either the ICU or GW for patients with ALC, alongside a decrease in transfer and an increase in death in the ED. The decreased transfer also represents herding behavior in the healthcare delivery system[19,20], while death in the ED implies death pending ICU admission. Consequently, we need alignment in the healthcare delivery system between the classes of hospitals and enhancement of bed turnover rates of ICU in university hospitals.

The mortality rates in this study were consistent with previous studies, ranging from 7 % to 27 %.[3,5,6] We observed that C&V had the highest mortality rate in BC, followed by Systemic infection. This pattern persisted in AC, but the Stroke and Metabolic cause became the third and fourth. In

general medical disorders, an increase in mortality has already been reported in AC.[14-16] The increased ALC due to Systemic infection can be explained by the increased incidence of sepsis or septic shock associated with COVID-19 infection.[21-24] A history of COVID-19 infection has been reported to be a risk factor for higher mortality of metabolic cause and stroke.[25-27] Regarding C&V, it has reported that COVID-19 is associated with myocarditis, myocardial infarction, dysrhythmia, and heart failure[28-30], which could result in cardiogenic shock. Moreover, recent studies reported that COVID-19 vaccination were associated with the risk of cardiogenic shock.[31-33] Besides, we surmise that the increased mortality rate of Toxic is more likely a secondary effect of the increase in psychological distress. According to our classification criteria, Toxic encompasses ALCs caused by toxic materials (alcohol, insecticides ingestion, or sedatives), regardless of the intent. Previous studies reported that depression and suicide increased in AC.[34-38] We also experienced that there has been an increase in binge drinking, insecticides ingestion, or drug overuse associated with feelings of hopelessness after the onset of COVID-19.

In previous studies[3-8,10,11], the intracranial etiologies (e.g., neurological, stroke, and seizure) has been recognized as the leading etiology of ALC in the ED. However, our study demonstrated that the major etiologies are extra-cranial. This does not diminish the significance of intracranial etiology; instead, it emphasizes the need for a multidisciplinary approach to addressing ALC in the ED without underestimating intracranial causes. In addition, it is notable that Undetermined accounted for more than 7 % of the total, while the unknown etiologies, so-called "Others" or "Miscellaneous," accounted for 3 % to 9 % in previous studies.[3,7,8] The significant numbers suggest that the cause of ALC in the ED can remain inconclusive despite an intensive assessment lasting more than 10 hours and may require additional medical access.

There are several limitations in this study. First, selection bias could not be excluded because of the retrospective design. Second, a single ethnic background should be considered. Third, the etiologies of ALC in the ED were provisional and might differ from the definitive diagnoses. Lastly, the interpretation should be contextualized within the healthcare landscape in South Korea. However, this study provides a comprehensive exploration of ALC in the ED, including the change of etiology, demographic shift, disposition, and prognosis based on data from approximately 18,000 cases from 4 university hospitals for four years.

Our findings imply that resource constraints and shifts in ED utilization patterns during COVID-19 may have long-term consequences on care quality for ALC patients. The incidence of ALC in the ED increased in AC era. The increase in extracranial etiologies, rise in mortality, and reduced inter-hospital transfers suggest that the pandemic has reshaped the clinical presentation and management of ALC. Our findings emphasize the persistent vulnerability of ALC patients and the need for responsive, scalable ED systems. Given the complexity and heterogeneity of ALC, a multidisciplinary approach should be considered standard in ED assessment. Further research is warranted to optimize critical care infrastructure and resource allocation in response to the evolving demands of ALC in the ED.

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DISCLOSURE

Ethics: The Institutional Review Boards of Daegu Catholic University Medical Center (CR-20–217), Keimyung University Dongsan Medical Center (2022-09-068), Kyungpook National University Hospital (2020–11-060), and Yeungnam University Medical Center (2021–06-059) approved this study. Written consent was waived due to the retrospective study design.

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Conflicts of interest: None

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Supplementary Table 1. Dispositions of the patients with altered level of consciousness in the emergency department

Overall study period											
Dispositions from the ED	Total *n* (% of *N*=17913)	Metabolic cause	Systemic infection	Toxic	Stroke	TBI	Seizure	C&V	Psychiatric disorder	CNS infection	Undetermined
		n (% of each destinations)									
GW	5085 (28.4)	1572 (30.9)	1419 (27.9)	345 (6.8)	632 (12.4)	202 (4.0)	354 (7.0)	258 (5.1)	57 (1.1)	85 (1.7)	161 (3.2)
ICU	5157 (28.8)	922 (17.9)	710 (13.8)	471 (9.1)	1268 (24.6)	927 (18.0)	192 (3.7)	400 (7.8)	6 (0.1)	97 (1.9)	164 (3.2)
Transfer	2174 (12.1)	549 (25.3)	533 (24.5)	205 (9.4)	255 (11.7)	255 (11.7)	117 (5.4)	35 (1.6)	15 (0.7)	7 (0.3)	203 (9.3)
Home	4552 (25.4)	1063 (23.4)	299 (6.6)	1505 (33.1)	140 (3.1)	368 (8.1)	305 (6.7)	65 (1.4)	180 (4.0)	5 (0.1)	622 (13.7)
Death	945 (5.3)	329 (34.8)	269 (28.5)	31 (3.3)	55 (5.8)	56 (5.9)	7 (0.7)	73 (7.7)	3 (0.3)	0	122 (12.9)
Stay time in the ED	14:39±19:28	17:10±21:55	21:30±23:34	15:05±18:45	7:48±12:04	7:01±10:00	14:01±16:51	12:37±19:46	12:09±13:34	19:44±17:27	12:42±16:00
Before the coronavirus disease 2019 pandemic											
Dispositions from the ED	Total *n* (% of *N*=7988)	Metabolic cause	Systemic infection	Toxic	Stroke	TBI	Seizure	C&V	Psychiatric disorder	CNS infection	Undetermined
		n (% of each destinations)									
GW	1808 (22.6)	548 (30.3)	480 (26.5)	129 (7.1)	237 (13.1)	61 (3.4)	183 (10.1)	53 (2.9)	20 (1.1)	49 (2.7)	48 (2.7)
ICU	2544 (31.8)	418 (16.4)	368 (14.5)	169 (6.6)	685 (26.9)	510 (20.0)	95 (3.7)	175 (6.9)	4 (0.2)	59 (2.3)	61 (2.4)
Transfer	1214 (15.2)	317 (26.1)	289 (23.8)	140 (11.5)	160 (13.2)	132 (10.9)	55 (4.5)	21 (1.7)	10 (0.8)	4 (0.3)	86 (7.1)
Home	2053 (25.7)	552 (26.9)	116 (5.7)	677 (33.0)	66 (3.2)	177 (8.6)	153 (7.5)	21 (1.0)	80 (3.9)	3 (0.1)	208 (10.1)
Death	369 (4.6)	137 (37.1)	125 (33.9)	5 (1.4)	16 (4.3)	21 (5.7)	2 (0.5)	28 (7.6)	2 (0.5)	0	33 (8.9)
Stay time in the ED	15:59±21:41	18:58±24:22	25:14±27:29	14:52±18:33	07:30±13:49	07:04±10:39	13:47±17:02	13:41±18:23	12:28±15:20	18:25±17:21	14:06±17:43
After the coronavirus disease 2019 pandemic											
Dispositions from the ED	Total *n* (% of *N* = 9925)	Metabolic cause	Systemic infection	Toxic	Stroke	TBI	Seizure	C&V	Psychiatric disorder	CNS infection	Undetermined
		n (% of each destinations)									
GW	3277 (33.0)	1024 (31.2)	939 (28.7)	216 (6.6)	395 (12.1)	141 (4.3)	171 (5.2)	205 (6.3)	37 (1.1)	36 (1.1)	113 (3.4)
ICU	2613 (26.3)	504 (19.3)	342 (13.1)	302 (11.6)	583 (22.3)	417 (16.0)	97 (3.7)	225 (8.6)	2 (0.1)	38 (1.5)	103 (3.9)
Transfer	960 (9.7)	232 (24.2)	244 (25.4)	65 (6.8)	95 (9.9)	123 (12.8)	62 (6.5)	14 (1.5)	5 (0.5)	3 (0.3)	117 (12.2)
Home	2499 (25.2)	511 (20.4)	183 (7.3)	828 (33.1)	74 (3.0)	191 (7.6)	152 (6.1)	44 (1.8)	100 (4.0)	2 (0.1)	414 (16.6)
Death	576 (5.8)	192 (33.3)	144 (25.0)	26 (4.5)	39 (6.8)	35 (6.1)	5 (0.9)	45 (7.8)	1 (0.2)	0	89 (15.5)
Stay time in the ED	13.91±17.74	15:44±19:38	18:43±19:44	15:15±18:54	08:04±10:04	06:59±09:20	14:15±16:40	12:01±20:30	11:54±12:01	21:39±17:31	11:58±15:00

Numbers are *n* (%). ED: emergency department; TBI: Traumatic brain injury; C&V: Cardiogenic and vascular; CNS: Central nervous system; GW: general ward; ICU: intensive care unit; Transfer: transferred to another hospital.