A Survey Study of Etiology of Altered Consciousness in the Emergency Department

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Background: *Altered consciousness (AC) is a common presenting problem in the Emergency Department (ED), the causes of which can be either intracranial or extracranial in origin.*
Objective: *To determine the common etiologies of AC among patients in the ED of a medical teaching hospital and to build up a proper differential diagnosis.*
Material and Method: *A retrospective review of the medical records of patients who presented with AC in the ED between January and August 2004 was conducted. Patient characteristics and demographic data as well as the etiologies of AC were presented in descriptive pattern.*
Results: *There were 350 patients, of whom 67 (19.1%) were admitted, 38(10.9%) were transferred to other hospitals due to full occupancy, 35(10%) died in the ED, and the rest (60%) were discharged and re-evaluated. The mean age was 60.3 years old with 57.1% males and 42.9% females. The etiologies included neurological disorders (29.1%), endocrine/metabolic derangement (20.8%), infectious diseases and sepsis (18.8%), cardiovascular disorders (10%), psychiatric illness (8.8%), pulmonary (7.1%), and toxicological causes (5.1%).*
Conclusion: *Though neurological disorders or intracranial causes were the most common etiology of AC in the ED, they accounted for only one-third of all cases in the ED. The larger proportion of AC cases was extracranial abnormalities including adverse effects from current medications.*

Keywords*: Consciousness disorders, Emergency service, hospital, Emergency medical services*

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Consciousness is described as the state of realizing self and environment and consists of two components; the level and the content of consciousness. Level of consciousness refers to the degree of mental alertness, while the content of consciousness refers to the orientation of the perceptions of both the self and the environment including cognition.

Altered consciousness (AC), a state of impairment of either level or content of consciousness, is a major problem in the Emergency Department (ED). The incidence varies from 4% to 10%[1-4]. It is an emergency medical condition that needs proper evaluation and appropriate initial management in the ED.

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AC can be caused by either intracranial or extracranial disorders. Selecting the most appropriate and straight-forward investigation for etiological diagnosis is a major clinical challenge due to the limitation of clinical information and no more time to be spent in the ED practice. This small pilot study was primarily aimed to investigate the incidence and etiology of AC in patients who attended the ED in a medical teaching center. The secondary aim was the development of clinical guidelines for managing patients with AC in the ED later.

Material and Method

The medical records of all the patients aged 15 or over who presented with AC in the ED from January to August 2004 were included for a retrospective review. Patients' demographic data, past medical

illness and current medicines used, type of disposition from the ED, and the causes of AC were collected for descriptive analysis. The results were described as a crude frequency and percentage.

The hospital as the site of the present study is a tertiary care and a medical teaching center. There are 836 in-patient beds available with an occupancy rate of 95%. Among these, 148 beds are under the services of the Department of Internal Medicine.

Results

The ED of the hospital serves 3,500- 5,000 non-traumatic cases every month, and during the study period 23,277 cases of non-traumatic causes attended the ED. The number of cases aged 15 or over forming the target group of the present study was 18,127 cases (77.8%).

Patient characteristics

Three hundred and fifty cases with AC were identified and included in the present study. These accounted for 1.9% of the total ED cases over the study period. There were 200 male and 150 female patients noted (57.1% vs. 42.9%). The mean age of the study group was 60.3 years (range 20-95 years).

Two hundred and seventy eight cases (79.4%) had an altered level of consciousness and 72 cases (21.6%) had an alteration in their content of consciousness, which almost all of them were delirium, a mental disorder secondary from systemic illness. Psychiatric consultation was frequently requested firstly in cases of delirium that caused the definite diagnosis to be delayed. In most cases (70%), focal neurological deficit or meningeal signs were absent. Among those who did present with focal neurological deficit, 90% had cerebrovascular disorders, focal cerebral infection (8%) and cerebral neoplasm accounted for the remainder (2%). Computerized topographic scan (CT scan) of the brain was requested in all of these cases both for diagnosis and in exclusion of a silent cerebral lesion. Abnormal finding on CT scan, which was correlated to the clinical abnormality, was found in all cases of focal neurological deficit, but it was less than ten percent of cases without focal neurological deficit. Toxicological assays were done in only cases in which clinical information suggested.

Forty-nine percent of the AC patients attended the ED during the morning shift (8 am to 4 pm) with the other 32% and 19% percent of the cases attended during the evening shifts (4 pm to midnight) and night shifts (midnight to 8 pm) respectively.

Types of disposition

Sixty-seven patients (19.1%) had been admitted into the hospital's inpatient wards for further investigation; thirty-eight patients (10.9%) were transferred to other nearby hospitals due to there being full inpatient wards. Thirty-five patients (10%) were pronounced dead on arrival at the ED or after having had attempted resuscitation and the rest of the patients (60%) were discharged home because the AC was reversible either with or without treatment. These patients were then scheduled to re-attend at the out patient services for additional tests and treatments by a specialist. The major cause of deaths were suspected to be primarily cardiovascular causes such as acute myocardial infarction or malignant cardiac arrhythmia, though the definite causes could not be identified in all cases.

Etiologies of altered consciousness

The final diagnoses after additional evaluations of these ED patients were mostly neurological disorders (n = 102, 29.1%). Among these patients, cerebrovascular disease was the most common cause (75%), followed by cerebral infections (14.6%) and seizure disorders (10.4%). Endocrinopathy and metabolic derangements were found in 73 cases (20.8%), systemic infections or sepsis for 66 cases (18.8%) of the patients, cardiovascular diseases for 35 cases (10%), psychiatric illness for 31 cases (8.8%), pulmonary disorders for 25 cases (7.1%) and

Table 1. Characteristic of patients with altered consciousness (AC) and etiologies of AC in the emergency department (ED)

Characteristics	n (%)
Total cases of AC: Total cases of ED	350:18,127 (1.9)
Male : Female	200:150 (57.1:42.9)
Mean age (range) (yrs)	60.3 (20-95)
Alteration in level of consciousness	278 (79.4)
Alteration in content of consciousness	72 (21.6)
Etiologies	
Neurological disorders	102 (29.1)
Endocrinopathy and metabolic disorders	73 (20.8)
Sepsis	66 (18.8)
Cardiovascular disorders	35 (10)
Pulmonary disorders	25 (7.1)
Psychiatric disorders	31 (8.8)
Adverse effect of drugs used or toxicological effect	18 (5.1)

intoxication including adverse effects of currently used medicines for 18 cases (5.1%), as demonstrated in Table 1. Dysglycemic disorders (hypoglycemia or hyperglycemia), azotemia and electrolytes imbalance were the major causes of endocrinopathy and metabolic disorders.

Discussion

Altered consciousness (AC) is really a major challenging medical emergency. Nearly all of the AC cases need to be admitted for further investigation and definite treatment.

The elderly form a special group of patients who are more likely to present with this disorder due to their pre-existing unstable medical or mental conditions; and hence usually need more comprehensive clinical evaluation, cause-directed decision to select the appropriate diagnostic tests and proper care. Some studies have reported that nearly a quarter of the elderly in the community showed some form of altered mental state and the numbers progressively increase with age[5-8]. It has been estimated that patients over 64 years old account for 15% of all ED visits annually in the United States; a figure that is predicted to rise to between 25% and 30% over the next thirty years[9]. Naughton et al found in their study that only 40% of ED patients who were older than seventy had intact cognition[7]. As the results of these findings, emergency physicians may be unavoidably faced with a large burden of elderly cases presenting with AC in the near future. Like previous studies, the majority of our sample was elderly patients who had had a past medical illness or taken some medicines for their illness. One study found a high prevalence of active central nervous system drugs were being used among the elderly living in the community (79%) with benzodiazepines accounting for 35% of those drugs[10]. This poses yet another major risk factor by itself for developing AC in the elderly.

Cases of AC are usually considered to be caused by intracranial lesions primarily but a variety of extracranial abnormalities including adverse effects from currently used medication can produce cerebral dysfunction in both the level and the content of consciousness. A study by O'Keefe identified that of the elderly AC cases presented in an ED, 33% were caused by structural brain lesions, 65% were due to toxicological causes and metabolic derangements, and 2% were the result of psychiatric diseases[11]. Another similar study to the authors' operated in an ED at an university hospital also showed that neurological disorders were the most common cause of AC (28%)[11]. Though neurological or intracranial causes are the most common cause of the disorder in both the authors' and other studies, they still comprised only one third of all the cases of AC presented in the ED when the differentiation between an intracranial or extracranial cause was the considered point.

Selecting the appropriate initial diagnostic tests for detecting the definite etiology is crucial because of the difference in the process employed and the time spent on investigating intracranial and extracranial causes of AC. Most of the physicians concentrated too much on the brain imaging which some of them had no clinical relevance. When comparing the incidence of intracranial versus extracranial causes of AC in the ED, the findings have shown that extracranial causes were more frequently identified. This may suggest that for those patients with AC who present in the ED an extensive evaluation to detect the extracranial abnormalities may be more fruitful except among those associated with a definite focal neurological deficit whom will then need cranial imaging studies to detect the structural brain lesions immediately. However, a detailed medical history and examination are an essential for clinical assessment and selecting appropriate investigation tools for accurate diagnosis. Kanich and Emer's report has confirmed the usefulness of medical information for approaching the most likely etiological diagnosis of AC[12].

Among the neurological disorders identified in the present study, stroke was the major subgroup. Apart from AC, most came to the ED with associated focal neurological deficit, so the diagnosis was not problematic. Central nervous system infection and seizure disorder were then the second and third most common causes of neurological disorders, which could present either with or without focal neurological disorder.

Altered level of consciousness was more common than alteration of content of consciousness in the present study. Impaired cognition or content of consciousness including confusion or delirium cannot be overlooked in managing elderly patients specifically in the ED because it often causes a high mortality rate. A significant error unexpectedly occurs when it is considered as a psychiatric illness and time is wasted on a psychiatric consultation. A previous study has shown that 5% of the cases transported to emergency medical services that were over 60 years of age and those had impaired cognition would acquire a mortality rate as high as 28.9%[4]. Other studies have

revealed the incidence of delirium among ED elderly cases was between 9.6% and 24% depending on the different ages of the cases[6,13], with the incidence being much higher in the more advanced aged group. Some studies have even shown that, on detailed mental evaluation, as many as 10%-20% of community dwelling normal elderly people have some degree of cognitive impairment[14,15]. This may be a predisposing factor for developing acute confusion when some specific factors are super-imposed on it.

There were some limitations in the present study due to the study design, material and method. Missing information and clinical details were quite common in this retrospective study design. One possible cause of missed data is that for most cases the provisional diagnosis was made after the initial evaluation rather than specifically recording the presenting symptoms at the ED. A second source of missing samples and incomplete clinical details were those cases that were transferred out and so were unable to be re-admitted to the hospital services.

In conclusion, this short retrospective review of cases presenting with altered consciousness at the ED of a teaching hospital showed the overall clinical features of this group of patients. Like other previous studies, neurological or intracranial abnormality was the most common etiology of AC. Nevertheless, this accounts for only a small proportion of altered consciousness cases in the emergency setting. Careful history taking combined with an optimum time spent for clinical evaluation to differentiate the causes are crucial before selecting the appropriate investigations and making a definite diagnosis. The elderly was a special group of patients who need a more extensive and holistic clinical approach. Impaired cognition or delirium in the elderly should not be overlooked or miss diagnosed as a psychiatric disorder since it will cause a higher mortality rate unintentionally.

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การศึกษาสำรวจสาเหตุของภาวะไม่รู้สึกตัวในห้องฉุกเฉิน

พรชัย สถิรปัญญา, นริศ สมิตาสิน, กิตติ ลิ่มอภิชาต, สุวรรณา เศรษฐวัชราวานิช, คณิตพงษ์ ปราบพาล

ภูมิหลัง: *ภาวะไม่รู้สึกตัวเป็นสาเหตุที่พบบ่อยในห้องฉุกเฉิน สาเหตุพบได้ทั้งโรคจากภายในและภายนอกสมอง*
วัตถุประสงค์: *เพื่อทำการสำรวจหาสาเหตุที่พบบ่อยของภาวะไม่รู้สึกตัวในห้องฉุกเฉินของโรงพยาบาลของโรงเรียนแพทย์แห่งหนึ่ง และเพื่อหาแนวทางการวินิจฉัยแยกโรคที่เหมาะสม*
วัสดุและวิธีการ: *ทำการศึกษาข้อมูลย้อนหลังของผู้ป่วยที่มาด้วยภาวะไม่รู้สึกตัวในห้องฉุกเฉินของโรงพยาบาลระหว่างเดือนมกราคม ถึงสิงหาคม พ.ศ. 2547 ข้อมูลด้านคุณลักษณะประชากรและสาเหตุของภาวะไม่รู้สึกตัวถูกนำเสนอในรูปแบบเชิงพรรณนา*
ผลการศึกษา: *มีผู้ป่วยทั้งสิ้น 350 ราย 67 ราย (ร้อยละ19.1) ถูกรับไว้รักษาต่อในโรงพยาบาล 38 ราย (ร้อยละ 10.9) ถูกส่งตัวไปรับการรักษายังโรงพยาบาลข้างเคียง 35 ราย (ร้อยละ 10) เสียชีวิตเมื่อถึงห้องฉุกเฉิน ที่เหลือ (ร้อยละ 60) ถูกจำหน่ายและนัดกลับมาเพื่อการตรวจวินิจฉัยเพิ่มเติมภายหลัง อายุเฉลี่ยของผู้ป่วยคือ 60.3 ปี โดยมีผู้ป่วยชายร้อยละ 57.1 และผู้ป่วยหญิงร้อยละ 42.9 สาเหตุของภาวะไม่รู้สึกตัวประกอบด้วย ความผิดปกติทางระบบประสาท (ร้อยละ 29.1) ความผิดปกติทางระบบต่อมไร้ท่อและเมตาบอลิสม (ร้อยละ 20.8) ภาวะติดเชื้อและโลหิตเป็นพิษ (ร้อยละ 18.8) ความผิดปกติของหัวใจและหลอดเลือด (ร้อยละ 10) ความผิดปกติทางจิตเวช (ร้อยละ 8.8) ความผิดปกติของปอด และทางเดินหายใจ (ร้อยละ 7.1) ผลข้างเคียงจากยาและพิษจากสารพิษ (ร้อยละ 5.1)*
สรุป: *แม้ว่าสาเหตุจากความผิดปกติทางระบบประสาท หรือ ความผิดปกติในสมองจะพบบ่อยที่สุดในผู้ป่วยที่มาด้วยภาวะไม่รู้สึกตัวที่ห้องฉุกเฉินก็ตาม แต่ก็ประกอบขึ้นเป็นเพียงหนึ่งในสามของสาเหตุทั้งหมด สาเหตุส่วนใหญ่ยังมาจากภาวะความผิดปกตินอกสมองรวมถึงผลอันไม่พึงประสงค์จากยาที่รับประทานอยู่*