

---

## Causes of Acute Confusional State in Medical Consultations for Elderly Patients

Adil Adnan Al-Naemee\*  
MBChB, FICMS.

Nameer Mohammed Taher Al-Taleb\*  
MBChB, FICMS.

Akram Al-Mahdawi\*  
MBChB, CABM. FRCP

---

### Abstract

**Objective:** Assessment of the causes of acute confusional state in elderly patients in medical consultation of physicians for neurologists in what is considered as obscure cases.

**Methods:** This is an observational prospective study that enrolled 100 elderly patients with acute confessional state regarding medical consultations to the neurologist in obscure cases in Al-Yarmouk teaching hospital in Baghdad-Iraq during the period between the 1<sup>st</sup> of June, 2004 to 31<sup>st</sup> of May, 2006. All of the patients have been subjected to thorough clinical assessment and laboratory investigations.

**Results:** This study reveals slight female predominance that represent 56% of cases with acute confusional state. The mean age of patients was 70 years. The most common risk factors are dementia: 35%, pre existing brain disease: 40%, sensory deprivation: 55%. The mortality rate is 35%. Case distribution was as follow: community acquired acute confusional state represent 70% of cases while hospital acquired acute confusional state represented 30% of cases. The most common causes were: infection; 30%, metabolic; 25.7% & neurological; 25.7%.

**Conclusions:** This study reveals that the causes of A.C.S. in old age patients are of huge number & the commonest are infection, metabolic, & central nervous system disorders.

**Keywords:** Delirium, confusion, elderly, neurology, medical, consultation

---

### Introduction

Acute confessional state (A.C.S.) is a common accompaniment physical illness in old age that may complicate different type of disorders. It is associated with significant morbidity & mortality.<sup>[1]</sup>

It is a rapid onset of cognitive impairment with altered arousal<sup>[1]</sup> characterized by predominant involvement of attention, orientation and recent memory in a patient who is at least responsive to some stimuli by purposeful manner<sup>[2, 3, 4]</sup>.

Prevalence of A.C.S. is 10-20 % & incidence is 4-10% of general medical admission. The incidence increased to 18% in intensive care unit admission<sup>[1]</sup>. It is found in 80% of terminal disease. For elderly patients the incidence is 35-50%. Half of patients have A.C.S. at their presentation while other develops it during hospital period.<sup>[1]</sup> It leads to death in 35% of patients. The risk of death increases 20 times greater than in patients without A.C.S. Although it's said that it is transient but in about one third of patients it persists for about 3-6 months and even for a longer period.

In its mild form A.C.S. is easily missed therefore sensitive methods are needed for detection. In mild states the patient appears alert, roughly oriented and the case is easily missed while the underlying disease is in progression; unless the examiner carefully looks for it. Even with careful examination, cases in early stage will pass unrecognized due to the fluctuating nature of the syndrome. It is estimated that the physicians have a detection rate of only 35%, while with psychiatrics

and neurologists especially if they apply the Confusional Assessment Method (C.A.M.) the detection rate reach to 90 %<sup>[3,4,5,6]</sup>. C.A.M. is considered as the best accurate method for diagnosis. **It includes the following criteria:**

- 1-Acute change in mental state with fluctuating course.
- 2- Inattention.
- 3- Disorganized thinking: it involves any of; orientation, content of thinking or illogical ideas.
- 4- Altered level of consciousness and psychomotor activity: alert or drowsy.

Diagnosis involve; 1+2+either 3 or 4.

The typical cases of A.C.S. of systemic illness like metabolic, systemic infection –etc. are characterized by:

- 1-Gradual onset of deterioration in level of consciousness.
- 2-Symmetrical neurological manifestations.
- 3-Movement abnormalities especially tremor and asterexis.
- 4-Presence of physical illness that is known to cause A.C.S.

Most of physician consultations were done when cases with atypical presentations (from the above mentioned criteria) the aim of which was diagnosis or exclusion of a C.N.S. disease as being responsible for the presentation. Additional difficulties included: The presence of misleading features like neck spasm from already present cervical pain or the presence of lateralizing features from an old C.V.A., and The associated severely impaired comprehension in some cases that make

the patient uncooperative and the clinical examination difficult or non conclusive<sup>[7,8,9]</sup>.

### Patients & methods:

This is a prospective observational study that has enrolled 100 selected patients above 60 years of age with A.C.S. who admitted Al-Yarmouk teaching hospital-Baghdad \ Iraq, during the period between 1<sup>st</sup> of June, 2004 to the 31 of May, 2006. All of the patients had been examined by a neurologist in request of a physician's consultation to cases considered as obscure cases. The patients had been fully assessed with clinical and laboratory investigations: Blood count, ESR, glucose, urea, creatinine, electrolyte, liver function test, thyroid function test, ECG, cardiac echo-study, X-Ray,

ultrasound, ANA, anti-dsDNA, neuroimage; CT, MRI and Lumber puncture

### Result:

This study enrolled 100 elderly patients with age above 60year & the mean age was 70years. Sex: Male; 46 patients and female; 54. Table (1). The rate of death is 40%. Most of them were the oldest patients and the cases that associated with sepsis, end organ damage especially hepatic failure & cancer. Risk factors were as follow: dementia; 35%, pre existing brain disease; 40%, & impaired vision; 60% of patients. The result point that the distribution of the causes is as the following: For the total cases, the most common causes are infection; 34%, neurological disorders; 22%, metabolic; 18% & drug effect; 14%. This is demonstrated in table (2)

**Table (1) Age & Sex distribution of cases**

| Age        | male | Female | Total |
|------------|------|--------|-------|
| 60-64 year | 5    | 6      | 11    |
| 65-69 year | 17   | 19     | 36    |
| 75-79 year | 4    | 6      | 10    |
| 80 year    | 2    | 3      | 5     |
|            | 46   | 54     | 100   |

**Table (2) total cases of A.C.S. in both community & hospital acquired cases**

| Disorder                 | Community acquired cases | Hospital acquired cases | Total no. of patients | %   |
|--------------------------|--------------------------|-------------------------|-----------------------|-----|
| Infection                | 21                       | 13                      | 34                    | 34  |
| C.N.S. disease           | 18                       | 4                       | 22                    | 22  |
| Metabolic                | 18                       | 0                       | 18                    | 18  |
| Drugs effect             | 4                        | 10                      | 14                    | 14  |
| Cancers                  | 1                        | 0                       | 1                     | 1   |
| S.L.E.                   | 1                        | 0                       | 1                     | 1   |
| Worsening of the disease | 0                        | 3                       | 3                     | 3   |
| Unknown causes           | 7                        | 0                       | 7                     | 7   |
| total                    | 70                       | 30                      | 100                   | 100 |

Hospital acquired A.C.S. represent 30% of cases. Of which infection and drug side effects are the most common causes. Infection; 43.3%, drug; 33.3%, C.N.S. diseases; 13.3%, and worsening of the presenting disease; 10%.

This is demonstrated in table (3)

Regarding systemic infectious causes, table (4) demonstrate that pneumonia is the commonest infection that lead to A.C.S. & represent 53.8% infectious cases.

**Table (3) Causes of hospital acquired A.C.S.**

| Causes                          | Patients no. | %    |
|---------------------------------|--------------|------|
| Nasocomial infection            | 13           | 43.3 |
| Drugs                           | 10           | 33.3 |
| C.N.S.                          | 4            | 13.3 |
| Worsening of Presenting disease | 3            | 10   |
| Total no.                       | 30           | 100  |

Table (4) hospital acquired systemic infection

| Disease   | No of patient | Percent of each infection to total hospital acquired infection | Percent of each infection to total hospital acquired cases | Percent of each infection to total A.C.S. cases |
|-----------|---------------|----------------------------------------------------------------|------------------------------------------------------------|-------------------------------------------------|
| Pneumonia | 7             | 53.8                                                           | 23.3                                                       | 7                                               |
| U.T.I.    | 1             | 7.6                                                            | 3.3                                                        | 1                                               |
| Bedsore   | 1             | 7.                                                             | 3.3                                                        | 1                                               |
| Sepsis    | 4             | 30.7                                                           | 13.3                                                       | 4                                               |
| Total     | 13            | 100                                                            | 43.3                                                       | 13                                              |

Regarding drugs, table (5) demonstrate that sedative is the commonest cause. Regarding neurological disorders, table (6) demonstrate that C.V.A. is the commonest cause & represent 75%

of neurological cases. Regarding worsening of the presenting disease, table (7) demonstrates that incorrect diagnosis is the commonest cause.

Table (5) hospital cases of A.C.S. caused by drugs.

| Drug                   | No of patients | Percent of each drug to total no. of drug cases | Percent of each drug to total hospital acquired cases | Percent of each drug to total No A.C.S. cases |
|------------------------|----------------|-------------------------------------------------|-------------------------------------------------------|-----------------------------------------------|
| Sedative               | 5              | 50                                              | 16.6                                                  | 5                                             |
| Anticholinergic        | 3              | 30                                              | 10                                                    | 3                                             |
| Antiparkinsonian drugs | 2              | 20                                              | 6.6                                                   | 2                                             |
| Total                  | 10             | 100                                             | 33.3                                                  | 10                                            |

Table (6) neurological disease in hospital acquired cases.

| Disease        | No. of patient | Percent of each disease to total neurological hospital cases | Percent of each disease to total hospital cases | Percent of each disease to total A.C.S. cases |
|----------------|----------------|--------------------------------------------------------------|-------------------------------------------------|-----------------------------------------------|
| C.V.A. due to; | 3              | 75                                                           | 10                                              | 3                                             |
| -warfarine     | 1              | 25                                                           | 3.3                                             | 1                                             |
| -hypotension   | 1              | 25                                                           | 3.3                                             | 1                                             |
| -accidental    | 1              | 25                                                           | 3.3                                             | 1                                             |
| Meningitis     | 1              | 25                                                           | 3.3                                             | 1                                             |
| Total          | 4              | 100                                                          | 13.                                             | 4                                             |

Table (7) worsening cases in hospital

|                          | No. of patient | Percent of each disease to total worsening case | Percent of each disease to total hospital acquired cases | Percent of each disease to total A.C.S. cases |
|--------------------------|----------------|-------------------------------------------------|----------------------------------------------------------|-----------------------------------------------|
| Incorrect diagnosis      | 2              | 66.6                                            | 2.85                                                     | 2                                             |
| -typhoid                 | 1              | 33.3                                            | 1.42                                                     | 1                                             |
| -T.B.                    | 1              | 33.3                                            | 1.42                                                     | 1                                             |
| Inappropriate management | 1              | 33.3                                            | 1.42                                                     | 1                                             |
| Total                    | 3              | 100                                             | 10                                                       | 3                                             |

Cases with A.C.S. as presenting feature; represent 70% of cases.

Infection, metabolic and neurological diseases represent the majority of cases. Infection; 30%, metabolic; 25.7%, neurological; 25.7% This is demonstrated in table (8) Regarding infection, table

(9) demonstrate that chest infection is the commonest cause & represent 38% of infectious causes in community acquired cases. Regarding drugs, table (10) demonstrate that phenothiazine is the commonest cause & represent 50% of cases. Regarding metabolic cases

**Table (8) Causes of community acquired A.C.S.**

| Causes                    | Patients no. | Percentage |
|---------------------------|--------------|------------|
| Infection                 | 21           | 30         |
| Neurological              | 18           | 25.7       |
| Metabolic                 | 18           | 25.7       |
| Cancer                    | 1            | 1.42       |
| Connective tissue disease | 1            | 1.42       |
| Drug toxicity             | 4            | 5.71       |
| Unknown cause             | 7            | 10         |
| Total                     | 70           | 100        |

**Table (9) community acquired infection leading to A.C.S.**

| Causes      | No of Patients | % of Each infection to total Community Infection | Percent of each infection to total community acquired cases | Percent of each infection to total A.C.S. cases |
|-------------|----------------|--------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------|
| Pneumonia   | 8              | 38                                               | 11.4                                                        | 8                                               |
| G.I.T.      | 1              | 4.7                                              | 1.4                                                         | 1                                               |
| U.T.I.      | 1              | 4.7                                              | 1.4                                                         | 1                                               |
| Bedsore     | 1              | 4.7                                              | 1.4                                                         | 1                                               |
| Septicemia  | 3              | 14.2                                             | 4.2                                                         | 3                                               |
| T.B.        | 3              | 14.2                                             | 4.2                                                         | 3                                               |
| Brucellosis | 1              | 4.7                                              | 1.4                                                         | 1                                               |
| Typhoid     | 3              | 14.2                                             | 4.2                                                         | 3                                               |
| Total       | 21             | 100                                              | 30                                                          | 21                                              |

**Table (10) metabolic causes of A.C.S. in community acquired cases**

| Disease         | No of patient | Percent of each disease to total metabolic cases | Percent of each disease to total community acquired cases | Percent of each disease to total A.C.S.cases |
|-----------------|---------------|--------------------------------------------------|-----------------------------------------------------------|----------------------------------------------|
| Renal failure   | 5             | 27.7                                             | 7.1                                                       | 5                                            |
| Hepatic failure | 4             | 22.2                                             | 5.7                                                       | 4                                            |
| Cardiac failure | 4             | 22.2                                             | 5.7                                                       | 4                                            |
| C.O.P.D.        | 1             | 5.5                                              | 1.4                                                       | 1                                            |
| Hyponatremia    | 1             | 5.5                                              | 1.4                                                       | 1                                            |
| Hypocalcemia    | 1             | 5.5                                              | 1.4                                                       | 1                                            |
| Hypothyroidism  | 1             | 5.5                                              | 1.4                                                       | 1                                            |
| Hypoglycemia    | 1             | 5.5                                              | 1.4                                                       | 1                                            |
| Total           | 18            | 100                                              | 25.7                                                      | 1                                            |

table (11) demonstrates that renal impairment is the commonest cause & represents 27.7% of metabolic cases. Regarding neurological cases,

table (12) demonstrate that C.V.A. is the commonest & represent 55.5% of cases.

**Table (11) community acquired C.N.S. diseases leading to A.C.S.**

| Disease         | No. of patients | Percent of each disease to total C.N.S .disease | Percent of each disease to total community cases | Percent of each disease to total A.C.S. cases |
|-----------------|-----------------|-------------------------------------------------|--------------------------------------------------|-----------------------------------------------|
| C.V.A.          | 10              | 55.5                                            | 14.2                                             | 10                                            |
| Meningitis      | 6               | 33.3                                            | 8.5                                              | 6                                             |
| S.D.H.          | 1               | 5.5                                             | 1.4                                              | 1                                             |
| Leptomeningitis | 1               | 5.5                                             | 1.4                                              | 1                                             |
| Total           | 18              | 100                                             | 25.7                                             | 18                                            |

**Table (12) community acquired drug induced cases**

| Drug            | No. of patient | Percent of each case to total drug cases | Percent of each case total community cases | Percent of each case to total A.C.S. cases |
|-----------------|----------------|------------------------------------------|--------------------------------------------|--------------------------------------------|
| Phenothiazine   | 2              | 50                                       | 2.8                                        | 2                                          |
| Antiepileptic   | 1              | 25                                       | 1.4                                        | 1                                          |
| Anticholinergic | 1              | 25                                       | 1.4                                        | 1                                          |
| Total           | 4              | 100                                      | 5.7                                        | 4                                          |

### Discussion

The female to male ratio is similar in this study to what mentioned in that of David E Nowels who account the female to 59% of cases and in this study female account for 54 %.<sup>[10,11,12,13]</sup>

This study points that the percentage of hospital acquired A.C.S. is 30% while that of cases presenting to hospital as A.C.S. is 70%. This defers from the general known percentage which give 50% for each <sup>[1]</sup>.

The cause for this deference explained by the sample selection ,since the causes for hospital acquired A.C.S. involve drugs as major causes which is not known to cause lateralizing features ,and Nasocomial infection which is suspected by the physician for any hospitalized patients, so the number of such consultations is to be less than the other group.

### In hospital acquired A.C.S:

Infection and drugs represent the major causes in this study this is similar to what is mentioned by Wofford <sup>[14,15,16,17]</sup> who point that infection represents 42% and in this study it is represent 43.3%. Drugs are responsible for 30% of cases& this is comparable to CECIL text book <sup>[22]</sup> which points that drug represent 10-40% and neurological cause in this study is similar to what is mentioned by Wofford who point that neurological cause represent 10.6 % and this is similar to this study.

Worsening of the original presenting disease: no comparable study. This is mostly due to the over diagnosis of the commonest disease which lead to incorrect diagnosis and management that lead to worsening of patients health that may manifest as A.C.S.

### In cases with A.C.S is the presenting cause for admission:

Infection: the result in this study is similar to that mentioned by Wofford<sup>[18,19,20,21]</sup> who show that

infection represent 26% of cases and in this study it is responsible for 30% .For nonspecific infection there is no comparable study but the result was similar to that of geriatric medicine given by Scott T-Wilber study <sup>[15]</sup> who gave the picture as follow: Chest infection; 31%, U.T.I.; 22% mainly as pyelonephritis, cellulites; 5%, sepsis; 18% and other of less frequency. In a study done by Manepalli he showed that U.T.I .alone can be responsible for 16% of all causes of A.C.S.<sup>[11]</sup>. For infectious diseases the result in this study is comparable to the incidence of these diseases in general population where typhoid is more than tuberculosis which is more than brucellosis. For metabolic causes: the result in this study is comparable to that of Wofford who show that metabolic is responsible for 23% of cases. Endocrine disorders the result in this study is similar to that of Michel Elie who shows that endocrine is responsible for 4.6% <sup>[3]</sup>. For drugs toxicity: the result of this study is higher than that of Michel Elie <sup>[3]</sup> who points that toxicity is responsible for 2.3% of cases. While in our study it is 5.7%. This explained by higher health education and care in the developed country. Neurological cause: the result of this study is comparable to many other studies Michel Elie showed that it is responsible for 30% of cases. Wofford showed that it is responsible for 20%. Kanich <sup>[14]</sup> showed that it is responsible for 28% .For Idiopathic: in this study the percent of idiopathic cases is 10% this is high percent In comparison to Wofford, Michel and Kanich studies as thy give neglectable value for idiopathic. May be we miss much cases of; drug induced causes: because unavailability of serum level measurement, C.N.S. vasculitis: because of the unavailability cerebral angiography as well as Systemic disorder and infection: because lack of biochemical markers and serological investigations.

### References;

- 1-Brice Pitt, Delirium. journal of geriatric psychiatry and neurology. V 46. P14 -21  
Http://www.repsych.a.c.uk/po-plications/askell/emOAP/ch3.pdf
- 2-Michael J. Aminoff , David A. Greenberg, Roger P. Simon, Clinical Neurology ,a Lange medical book , 5<sup>th</sup> Edition. 2004.
- 3-Michel Elie, prevalence and detection of delirium in elderly emergency department patients. Canadian Medical Association Journal . 2000 Oct. 17;163(8):977-981.
- 4-General principles of aging. Chapter 19: delirium.www.Geriatricsreviewsyllabus.org/content/agscontent/to-sylhtm
- 5-Linda Leo-Summer, A multicomponent intervention to prevent delirium in hospitalized older patients. NEJM, Vol.340:669-676 March 4,1999 number 9.
- 6-Victor M, Adam R., Roppera A. Principles of neurology. 8<sup>th</sup> Edition, New York, McGraw Hill, 2005.
- 7-K.Alagiakrishnan, An approach to drug induced delirium in the elderly.  
Postgraduate Medical Journal 2004;80:388-393.
- 8-Isselbacher et al (eds), HARRISON, principle of internal medicine 16<sup>th</sup> Edition New York McGraw Hill, Inc.2005
- 9-Christophfer, Haslett, Edwin R. Chilvers et al; John A.A. Hunter, Davidson s Principles and practice of medicine. 19<sup>th</sup> Edition, Churchill Livingstone,2002.
- 10-Martin Samuels, Neurohematology. American Academy of neurology. 2002.
- 11-Manepalli J, Prevalence of delirium and urinary tract infection in a psychogeriatric unit. Journal of Geriatric Psychiatry Neurol.1990 Oct-Dec;3 (4):198-202.
- 12-D.R.Laurence, P.N. Bennet, Clinical Pharmacology, ELBS, Ninth edition 2003.
- 13-David E Nowels, Confusion and delirium study. Journal of palliative medicine. Vol.5 number 2, 10\02 :687-695.
- 14-Kanich W, Altered mental status: evaluation and etiology in the emergency department. American Journal of Emergency Medicine .2002;20 (7):613-617.
- 15-A.G.S. RASP Scott T Wilber, Geriatric Emergency Medicine. Emergency Medical Research Center, Summa Health System Akron OH.
- 16-Wofford J L, Acute cognitive impairment in elderly emergency department patient. American Journal of emergency medicine 1996;14:649-653.
- 17-Jen Mc Cusker, Delirium in older patients and subsequent cognitive and functional status. Canadian Medical Association Journal 2001.Sept.4; 165 (5):575-583.
- 18-O Keefe, Prognostic significance of delirium in old patient's .Journal of American Geriatric Society.1997.
- 19-Farell , misdiagnosis of delirium and depression in medically ill elderly patients. Archive of internal medicine.
- 20-Wofford J L, Emergency medical transport of the elderly patients. American Journal of emergency medicine 1995; 13:297-300.
- 21-O Keefe, elderly patients with altered mental status. Emerg. Med. Clin. North Am.1998; 16(4): 701-715.
- 22-Goldman, Ausiello, CECIL, text book of medicine 22<sup>nd</sup> Edition, Philadelphia, W.B. Saunders company, 2004.

---

**\* MOH**

**\*\* Professor & Consultant Neurologist, Chairman of the Scientific Council of Neurology.**