Etiology, Clinical Profile and Outcome of Encephalopathy in Elderly

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Abstract

**Background:** Diagnosis and delay in management of encephalopathy in elderly patients is challenging due to the paucity of presenting symptoms and signs.

**Methods:** This was an observational study conducted over a period of one year (1.2.2016 to 31.1.2017) on all elderly patients presenting with encephalopathy. Their demographic profile along with clinical presentation, laboratory, imaging results and final outcome were recorded and analysed.

**Results:** There were 251 elderly patients who presented with encephalopathy, 110 (43.82\%) of whom were females. Majority of these patients i.e. 186 (74.10\%) were in the age group of 60-75 years with a mean age of 70.78 years. There were 112 (44.62\%) patients who presented to the hospital within 6 hours of commencement of the altered mental status (AMS). Multiple etiologies for encephalopathy were present in 75 (29.88\%) patients with the commonest being neurological in 97 (38.65\%) patients, infection/sepsis in 92 (36.65\%) patients and metabolic in 84 (33.47\%) patients. Hyponatraemia was the commonest cause of metabolic encephalopathy present in 38 (45.24\%) patients followed by hypoglycemia in 25 (29.76\%) patients. Pneumonia was the commonest infection present in 41 (44.57\%) patients. There were 48 (19.12\%) deaths with 38 (79.17\%) of them having one or more co-morbidities. Early presentation to hospital (within 6 hours of commencement of symptoms), higher GCS and conscious level at presentation were the good prognostic markers of outcome in these elderly patients. However patients with septic encephalopathy were found to have worst prognosis.

**Conclusion:** The common etiologies of encephalopathy in the elderly were neurological (38.65\%) followed by infection (36.65\%) and metabolic (33.47\%). The mortality rate was 19.12\%. Seeking medical aid within 6 hours of commencement of altered sensorium along with timely diagnosis could reduce the mortality and improve outcomes.

Materials and Methods

This observational study was conducted in the Department of General Medicine and allied specialities of the Christian Medical College and hospital Ludhiana, over a period of one year (2016-17). All elderly patients above the age of 60 years who met any one of the following criteria for encephalopathy namely, GCS < 15; not alert or disoriented to time, place and person; unresponsive to verbal or physical stimulation; unable to stay awake or confused were included in the study. Exclusion criteria included, patients with major trauma, post operative patients and those with underlying psychiatric illness.

After a detailed history, the demographic data, clinical presentation, laboratory investigations and imaging data at the time of admission were recorded and analysed along with the final outcome. Statistical analysis was performed using SPSS software and this data was compared using chi square test with significance level of $p < 0.05$.

Results

There were 251 elderly patients presenting with encephalopathy, 110 (43.82\%) of whom were females. Majority of the elderly patients i.e. 186 (74.10\%) were in the age group of 60-75 years. There were 51 (20.32\%) patients in the age group of 76-85 years and 14 (5.58\%) patients aged >85 years. The mean age was 70.78 years with the oldest patient being 94 years. Co-morbidities included hypertension in 153 (60.96\%) patients, diabetes mellitus in 114 (45.42\%) patients, ischemic heart disease (IHD) in 47 (18.73\%) patients, chronic kidney disease (CKD) in 40 (15.94\%) patients and chronic obstructive pulmonary disease (COPD) and chronic liver disease (CLD) in 13 (18\%) patients each. There were only 27 (10.76\%) elderly patients with no known co-morbidities at the time of presentation.

There were 112 (44.62\%) patients who presented within 6 hours of commencement of altered mental status (AMS) (Figure 1), with a mean duration of AMS being 12.9 hours. There were 159 (63.35\%) patients
who presented in a drowsy state and 33 (13.15%) patients who presented in coma (Figure 2). History of fever was present in 87 (34.6%) patients. The presenting symptoms other than AMS were vomiting in 54 (21.51%) patients, motor weakness in 42 (16.73%) and breathlessness in 39 (15.54%) patients. Physical examination was normal in 71 (28.29%) patients. Irregular pulse was noted in 27 (10.76%) patients. There were 84 (33.47%) patients with abnormal neurological findings with motor weakness being the commonest, present in 69 (27.49%) patients followed by neck rigidity in 13 (5.18%), facial nerve palsy in 7 (2.79%), gaze preference changes present in 31 (12.35%) patients and atrial fibrillation in 24 (9.56%) patients (Table 2).

Laboratory abnormalities noted were, anemia in 84 (59.57%) males and 80 (72.73%) females, leukocytosis in 150 (59.76%) patients and thrombocytopenia in 58 (23.11%) patients. Hyponatremia (Na < 135 mEq/L) was present in 79/110 (72.73%) patients and thrombocytopenia in 80 (72.73%) females, leukocytosis in 150 (59.76%) patients and hyponatremia in 39/50 (78%) patients with ischemic changes present in 31 (12.35%) patients and atrial fibrillation in 24 (9.56%) patients (Table 2).

Etiology of encephalopathy in these elderly patients was multi factorial in 75 (29.88%) with a neurological cause being the commonest present in 97 (38.65%) patients (Figure 3). Cerebrovascular accident (CVA) was diagnosed in 58 (59.79%) of these patients with ischemic stroke diagnosed in 42/58 (72.41%) patients.

Amongst the 84 (33.47%) patients with metabolic encephalopathy, hyponatremia was the commonest present in 38 (45.24%) patients with the lowest sodium recorded as 100 mEq/L. Hypoglycemia was present in 25 (29.76%) patients with the lowest recorded blood sugar of <20 mg/dL. Amongst the 13 (15.48%) patients with hyperglycemic emergencies, 2 (15.38%) patients had diabetic ketoacidosis (DKA) and 11 (84.61%) had hyperglycemic hyperosmolar state (HHS). The highest recorded blood sugar was 1047 mg/dL. There were 54 (21.51%) patients with CKD, COPD, cardiac or liver diseases presenting as encephalopathy with urosepsis. Recurrent hypoglycemia was the cause of death in 3 (1.26%) patients.

The various infections causing encephalopathy were pneumonia in 41 (44.57%), UTI in 31 (33.70%), gastrointestinal infection in 9 (9.78%), skin and soft tissue infections (SSTI) in 7 (7.61%) patients and Dengue in 2 (2.17%) patients.

There were 48 (19.12%) elderly patients with encephalopathy who expired, 34 (70.83%) of whom were males. Infection was the commonest cause of death identified in 31 (64.58%) patients with 18 (58.06%) patients diagnosed with pneumonia and 7 (22.58%) patients with urosepsis. Etiology of pneumonia could be established in 5 patients with one patient having H1N1 and 4 patients having bacterial infection. E. coli was the commonest organism in patients with urosepsis.

Discussion

In this study, a total of 251 elderly patients were admitted with encephalopathy, 141 (56.18%) of whom were males. Nirhale, et al and Xiao H,
et al also found a male preponderance in their studies. The comorbidities encountered were hypertension in 153 (60.96%) and Diabetes mellitus in 114 (45.42%). In contrast, Hiremath RS, et al, in their study found, Diabetes and hypertension to be present in only 40 (43.48%) patients with infection. Other presenting symptoms were, vomiting in 54 (21.51%), motor weakness in 42 (16.73%) and breathlessness in 39 (15.54%) patients. Sarin SM, et al also observed other presenting symptoms like vomiting, headache, fever and seizures. There were 159 (63.35%) patients who presented in a drowsy state, 52 (20.72%) in stuporous state and 33 (13.15%) in coma (Figure 2) which is in contrast to studies by Kekek, et al and Xiao, et al where 40% of the patients presented in deep sleep and 46% patients presented in deep coma respectively. This difference may be due to a high prevalence of neurological diseases in these studies.

Abnormalities on neuroimaging were present in 89/135 (65.93%) patients (Table 2) with 41/89 (46.06%) of the patients having acute cerebral / cerebellar infarction and 16/89 (17.97%) patients having intracranial hemorrhage. However Xiao, et al noted that 63% of patients had negative neuroimaging. This stresses the need for a good clinical assessment and judicious use of neuroimaging in elderly patients with encephalopathy. Abnormal ECG was present in 121 (48.21%) patients (Table 2) which was lower than that found in the study by Kekek, et al where ECG abnormalities were present in 73% of patients with AMS. Abnormal EEG findings were present in 39 (78%) patients (Table 2) which was comparable to the figures found in the study by Zehtabchi S, et al (70%).

The etiology of encephalopathy was found to be multi factorial in 75 (29.88%) patients, a single etiology for encephalopathy could be determined. There were 97 (38.65%) patients with a neurological cause for encephalopathy, 92 (36.65%) patients with an infectious cause and 84 (33.47%) patients with a metabolic cause for encephalopathy (Figure 3). Similar findings were noted in the study by Leong LB, et al wherein the common etiological factors for encephalopathy in elderly were neurological in 22.7%, infections in 14% and metabolic in 7.8% in patients. Amongst the metabolic etiologies, hyponatremia was the commonest derangement present in 38 (45.24%) patients followed by hypoglycemia in 25 (29.76%) patients. In a survey study from Thailand, Sathirapanya P, et al noted dysglycemic disorders (hypoglycemia and hyperglycemia) and electrolytes imbalances as the major causes of metabolic encephalopathy.

Hiremath, et al also observed 3 cases each of diabetic ketoacidosis and hypoglycemia coma and 2 cases of hyponatremia as cause of non traumatic coma. In a study by Sarin SM, et al in patients with non traumatic coma, 45% had CVA and CNS infections were present in 12.5%. However in an Ethiopian study by Melka A, et al, CNS infections were the commonest cause for non traumatic altered consciousness, present in 55% patients.

There were 48 (19.12%) elderly patients who expired during their hospital stay which was higher than the mortality in a study by Leong LB, et al (11%). The commonest cause of death in elderly with encephalopathy was infections i.e. 31/48 (64.58%) patients, 18 (37.5%) of whom had pneumonia and 7 (14.58%) had urosepsis (Figure 4). However, Leong LB, et al found the possible causes of mortality in elderly patients presenting with encephalopathy to be neurological in 68% followed by infections in 20%. A study on non traumatic coma in the geriatric population by Nirhale S, et al also showed mortality rates to be high in patients with CVA (44%). A study to determine the outcome of nontraumatic coma by Sarin SM, et al showed that patients with neurological (69.44%) and infectious (68.75%) etiology had higher mortality rates when compared to those with metabolic encephalopathy (35.29%).

In this study, the important prognostic factors correlating with outcome in these elderly patients with encephalopathy were, duration of AMS, GCS score, level of consciousness and etiology (Table 3). It was also observed that, 38 (79.17%) of patients who expired
had one or more co-morbidities with hypertension being the commonest. Seeking medical attention at the earliest would help in better outcome in these elderly persons with encephalopathy.

**Conclusion**

This study revealed that infections were the commonest cause of death in elderly patients presenting with encephalopathy with pneumonia being the commonest infection. Vaccination of the elderly with pneumococcal and influenza vaccines would thus help to reduce the mortality due to infections in patients presenting with encephalopathy. Since elderly patients have paucity of symptoms and signs and hence present late, the need for early diagnosis and treatment would facilitate better outcomes.

**References**