Study of Clinical Profile and Outcome of Metabolic Encephalopathy in Patients Admitted at HSK Hospital, Bagalkot, Karnataka

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ABSTRACT

BACKGROUND

Metabolic encephalopathy (ME) is one of the most frequently encountered and broadly defined diagnoses by the physicians in the intensive care setting. ME is a clinical state characterized by cerebral dysfunction in the absence of structural brain disease. The causes are many and often multifactorial. The purpose of study was to evaluate various causes, clinical profile, and outcome in patients with ME.

METHODS

This is a hospital based, observational, cross sectional study, conducted in ICU of Department of General medicine, S.N. Medical College, Bagalkot. Patients with head trauma, organic causes of altered sensorium, psychiatric conditions were excluded.

RESULTS

Mean age was 51.22 ± 17.24 years. Majority were males. Diabetes was the most common comorbidity found followed by cirrhosis of liver and hypertension. Septic causes were found to be the most common aetiology. 80.7 % recovered from the disease and death was noted in 19.3 % patients.

CONCLUSIONS

All the patients with ME had altered level of consciousness with fever being the most common symptom. Most of them were males, most common aetiology was septic cause, and recovery was seen in about 80.7 % of patients.

KEYWORDS

Metabolic Encephalopathy, Altered Sensorium, Sepsis

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BACKGROUND

Metabolic encephalopathy (ME) is a clinical state characterized by cerebral dysfunction in the absence of structural brain disease. The causes are many and often multifactorial but include infections, metabolic disorders, mitochondrial disorders, raised ICT, chronic progressive trauma, poor nutrition, hypoxia, or prolonged exposure to toxic elements. When the aetiology is identified, then an aetiology-specific term is used (For e.g. hepatic encephalopathy, hypoxic ischemic encephalopathy). Frequently there are several potential factors contributing to it and a broader term is used (i.e. metabolic encephalopathy).[1]

It is usually defined as "a diffuse cerebral dysfunction, typically manifesting as changes in cortical functions and as disorders of consciousness, ranging from confusion to coma."[2] ME is one of the most frequently encountered and broadly defined diagnoses by the physicians in the intensive care setting. The common aetiologies of ME are systemic illness such as diabetes, hepatic failure, renal failure, heart failure, sepsis, electrolyte disturbances, and Wernicke encephalopathy.[3] Clinical presentation can vary from subtle executive dysfunction with cognitive deficits and personality changes to coma with decorticate or decerebrate posturing.[4]

There are very few studies describing the pattern of causes, clinical diagnosis and profile and outcome of patients with ME in a General Medical ICU and even less in this region of North Karnataka. Knowledge of the most frequent aetiologies and the associated outcomes might improve the management of these patients.

Objectives

1. To know about the various causes (aetiology), clinical profile and the outcomes of such patients with ME.
2. To describe the clinical profile of the patients with regards to age, gender, co-morbidities, clinical diagnosis.
3. To determine the outcome of the patients with respect to length of stay, recovery or death.

METHODS

This is a hospital based, observational, cross sectional study, conducted in ICU of Department of General medicine, S N Medical College, Bagalkot. The present study was conducted among 150 patients presenting with altered or fluctuating levels of consciousness during admission or any time through the course of their stay in the Medical ICU. Taking the prevalence rate of delirium as 53.6 % in ICU setting from a recent study, the sample size was calculated to be 150.

Inclusion Criteria

- Patients having altered level of consciousness, admitted in medical ICU at HSK Hospital Bagalkot.

Exclusion Criteria

- Patients with trauma to the head.
- Patients with organic causes of altered consciousness, delirium including stroke, CNS infections.
- Patients with known psychiatric conditions which may mimic delirium.
- Patients on mechanical ventilator who have been sedated within the past 24 hours.

Statistical Analysis

Data obtained was entered in Microsoft Excel worksheet and analysis was performed using SPSS software (Trial version 21). Descriptive statistical analysis has been carried out in the present study. Categorical variables were represented as percentages / proportions and quantitative variables were represented as mean and standard deviation. chi-square test has been used to find out significant association. P value < 0.05 is considered as statistical significance at 95 % confidence interval.

RESULTS

The present study was conducted among 150 patients.

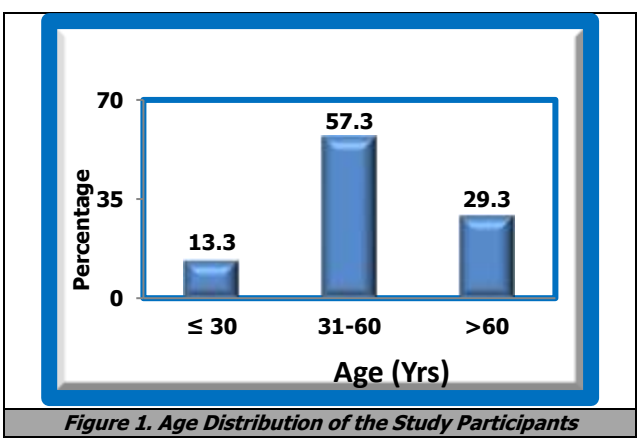

Figure 1. Age Distribution of the Study Participants

Regarding age distribution, more than half of the study participants belonged to the age group of 31 - 60 years (57.3 %). Remaining 29.3 % of them were more than 60 years and 13.3 % were ≤ 30 years. The mean age of the study population was estimated to be 51.22 ± 17.24 years.

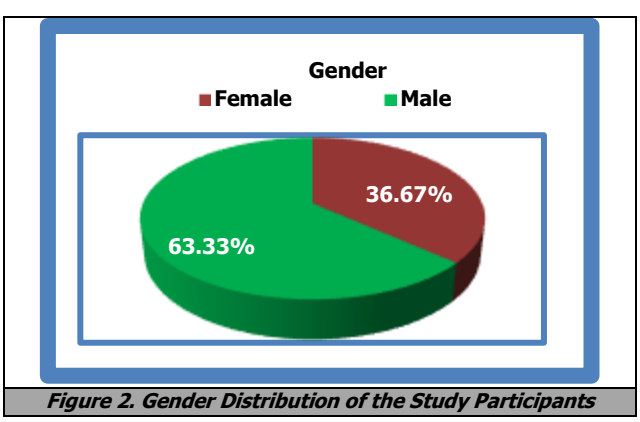

Figure 2. Gender Distribution of the Study Participants

Majority of them were males (63.3 %) and females were 36.7 %. With regarding to clinical profile among the study participant's seizures were noted in 4.7 % patients, fever in 49.3 % patients, focal deficit with dysarthria and weakness of all the 4 limbs was noted in one patient (0.7 %).

Among the study participants, Diabetes was present in 34.7 % patients, Hypertension in 16.7 % patients, renal disease in 10.7 % patients, History of Chronic obstructive pulmonary disease (COPD) / Asthma present in 11.3 % patients, Cirrhosis of liver present in 23.3 % patients.

Among the study participants, mean haemoglobin was calculated to be 10.34 ± 2.94 gm / dl. Severe anaemia (< 7) was noted in 12 % patients.

Mean WBC Count was estimated to be 15405.33 ± 9646.70. 35.3 % patients were having normal WBC count. Leucocytosis was noted in 61.3 % and Leukopenia in 3.3 % patients. Mean Random blood sugar was calculated to be 166.23 ± 134.79 mg / dl. 7.3 % patients were having Hypoglycaemia and Hyperglycaemia was seen in 24.7 % patients. Mean blood urea was calculated to be 63.49 ± 49.44 mg / dL. Raised blood urea of > 40 mg / dL was noted in 54 % patients. Mean serum creatinine was calculated to be 2.24 ± 2.45 mg / dL. Raised serum creatinine of > 1.2 mg / dL was noted in 54.7 % patients. Mean serum sodium was calculated to be 134.12 ± 7.76 mEq / L.41. 3 % patients were observed to have Hyponatremia and Hypernatremia was noted in 0.7 % patients. 58 % patients were having normal sodium levels. Liver function test (LFT) was deranged in 44.7 % patients.

Septic causes were found to be the most common aetiology of encephalopathy present in 26 % patients. This was followed by hepatic causes in 20.7 %, diabetic ketoacidosis in 12 %, and hypoxia in 11.3 % and uremic encephalopathy in 9.3 % patients. Hypertensive encephalopathy was noted in 6.7 % patients. Other causes were hypoglycaemia (5.3 %), hyponatremia (5.3 %) and hypercapnia (3.3 %). [Fig. 1]

Among the study participants, majority of them had a long stay of more than 7 days in the hospital. (73.3 %) Regardless of the cause of the metabolic encephalopathy, 80.7 % had recovered from the disease, and death was noted in 19.3 % of the patients.

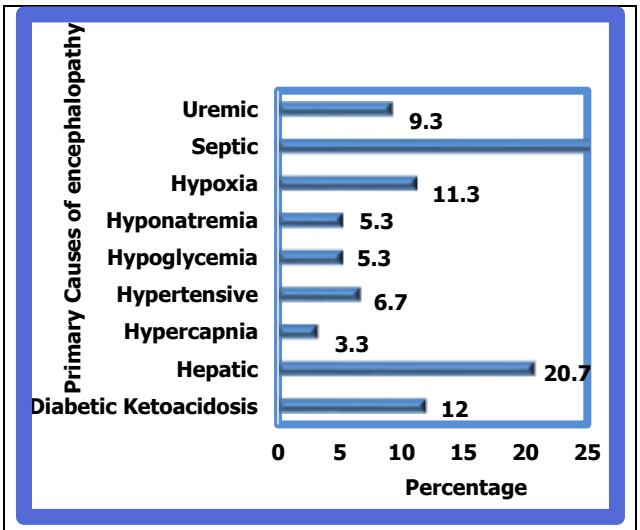

Figure 3. Primary Causes of Encephalopathy in the Study Population

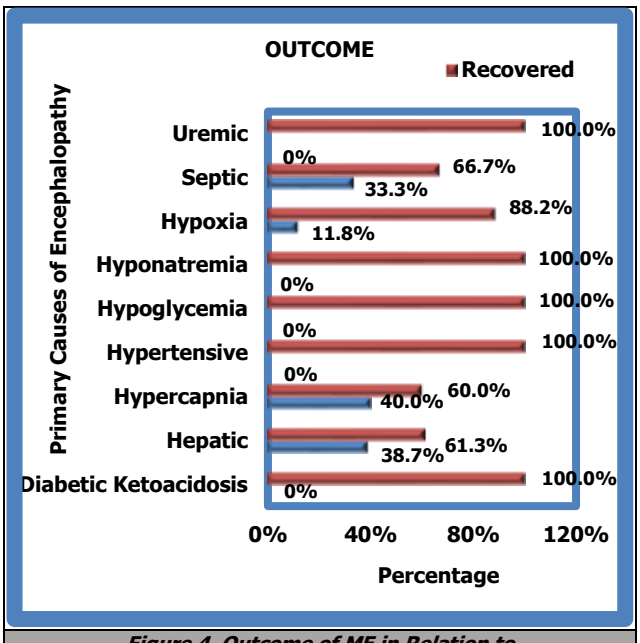

Figure 4. Outcome of ME in Relation to Aetiology of Metabolic Encephalopathy

Analysis of the outcome of metabolic encephalopathy in relation to aetiology of ME, revealed that causes of encephalopathy, secondary to diabetic ketoacidosis, hypertensive encephalopathy, uremic encephalopathy, hyponatremia and hypoglycaemia had complete recovery. While in patients with hypercapnia, hepatic and septic encephalopathy, around 60 % of the patients had complete recovery, and 40 % had died. While in patients with Hypoxic encephalopathy, only 11.8 % patients died and remaining 88.2 % had recovered. [Fig. 2] This difference between aetiology of metabolic encephalopathy and outcome was found to be statistically significant with a P value of < 0.001.

DISCUSSION

In the present study, mean age of the study population was estimated to be 51.22 ± 17.24 years. Regarding age distribution, more than half of the study participants belonged to the age group of 31 - 60 years (57.3 %). The study findings matched with the conclusions of Jali SN et al. in their study, where the study participants in the age group of 31 - 60 years were more than 50 %. 32 % of them were above the age of 60 years and 14 % were less than 30 years.[5]

Present study shows that majority of them were males (63.3 %) and females were 36.7 %. In the study conducted by Jali SN et al. found that there were 64 % males and 36 % females, with the male female ratio being 1.5:1.[5] Another study at B.M. Hospital, Mysore by Ramesh S Hiremath et al. found that male to female ratio was 1.94:1.[6]

Regarding the presenting complaints in the current study, all the patients had altered level of consciousness. Fever was the most common symptom present in 49.3 % patients. Seizures were noted in 4.7 % patients and focal deficit with dysarthria and weakness of all the 4 limbs was noted in one patient alone.

While in the study conducted at Guwahati Medical College, Assam by Sarin S. M. et al. reported that apart from unconsciousness, major presenting complaints in the patients included vomiting, fever, headache, behavioural changes, and seizure and alcohol / substance abuse.[7]

The study findings differed with the conclusions of other results as in the study of Jali SN et al. which stated that Hypertension forms the most common risk factor (33 %), followed by diabetes (28 %), alcohol consumption (25 %) and CKD (chronic kidney disease) in 7 % cases.[5]

In the current study, laboratory investigations revealed that severe anaemia was noted in 12 % patients and 56 % were having anaemia. Leucocytosis was noted in 61.3 % and Leukopenia in 3.3 % patients. On random blood sugar testing, 7.3 % patients had Hypoglycaemia and Hyperglycaemia with > 180 mg / dl was noted in 24.7 % patients.

Kidney function tests, showed that Raised blood urea of > 40 mg / dL was noted in 54 % patients and raised serum creatinine of > 1.2 mg / dL was noted in 54.7 % patients. 41.3 % patients were observed to have Hyponatremia and Hypernatremia was noted in 0.7 % patients. LFT was deranged in 44.7 % patients.

In the study conducted by Rasamoelina Ndrantoniaina. et al. showed that Hyperglycaemia greater than 2 g / l was noted in 29.79 % of patients and hypoglycaemia in 14.18 % patients. Anaemia was present in 7.09 %. Leucocytosis was observed in 25.53 % and leukopenia in 1.41 % patients. Hyponatremia (20.56 %), hypokalaemia (15.6 %), and hypochloremia (11.34 %) were the most observed electrolyte abnormalities.

With regard to various causes of ME, septic causes were found to be most common aetiology of encephalopathy present in 26 % patients. This was followed by hepatic causes in 20.7 %, diabetic ketoacidosis in 12 %, and hypoxia in 11.3 % and uremic encephalopathy in 9.3 % patients. Hypertensive encephalopathy was noted in 6.7 % patients. Other causes were hypoglycaemia (5.3 %), hyponatremia (5.3 %) and hypercapnia (3.3 %).

In the study conducted by Jali SN et al. revealed that metabolic causes (28 %) stood second in the aetiology of the altered sensorium, next to Cerebrovascular accident (CVA).[5]

Regarding the duration of stay in hospital, majority of the study participants had a long stay of more than 7 days in the hospital (73.3 %). Unrelatedly to the cause of the ME, 80.7 % of the study participants recovered from the disease, and death was noted in 19.3 % of the patients. In the present study, age and gender did not have any significant association with the outcome of the disease. Deaths were reportedly higher in patients with cirrhosis, with severe anaemia, raised blood urea levels and those with deranged liver function tests. This association was found to be statistically significant with a P value of < 0.05.

While analysis of the outcome of ME in relation to aetiology of ME, revealed that causes of encephalopathy, secondary to diabetic ketoacidosis, hypertensive encephalopathy, uremic encephalopathy, hyponatremia and hypoglycaemia had complete recovery. This difference between various causes of metabolic encephalopathy and outcome was found to be statistically significant with a P value of < 0.001.

In the study conducted by Jali SN et al. concluded that metabolic causes and younger age indicated a better prognosis and patients with low (Glasgow Coma Score) GCS score of 3 to 4 had poorer prognosis.[5]

Strengths

- The study is one of its kind conducted to evaluate the various causes of ME, its clinical profile and outcome of the patients with respect to length of stay, recovery or death.
- Multiple parameters were assessed in one study.

Limitations

- Limited number of subjects, because of high cost of laboratory tests and the results may vary if done in a large number of subjects
- It is a single centre study.
- Being a hospital-based study, there is bias factor in selection of subjects. Only symptomatic patients who presented to hospital were studied and the study population might not be representative of the population of Bagalkot.
- Brain imaging and CSF study could not be performed in all cases to rule out organic brain injury. Diagnosis of the cases was mainly based on clinical history and examination aided by laboratory investigations.

CONCLUSIONS

- In this study, all the patients had altered levels of consciousness on admission. Fever was the most common symptom present in 49.3 % patients. Seizures were noted in 4.7 % patients and focal deficit with dysarthria and weakness of all the 4 limbs was noted in one patient alone.
- Majority of the study participants were middle aged
- Most of them were males (63.3 %)
- Septic causes were found to be the most common aetiology of encephalopathy present in 26 % patients. This was followed by hepatic causes in 20.7 %, diabetic ketoacidosis in 12 %, and hypoxia in 11.3 % and uremic encephalopathy in 9.3 % patients. Hypertensive encephalopathy was noted in 6.7 % patients. Other causes were hypoglycaemia (5.3 %), hyponatremia (5.3 %) and hypercapnia (3.3 %).
- Majority of the study participants had a long stay of more than 7 days in the hospital. (73.3 %).
- Most of the cases of ME had recovered from the disease (80.7 %), and the study showed that aetiology of ME does not have a significant association with the outcome of the disease.
- Deaths were higher in patients with cirrhosis, with severe anaemia, raised blood urea levels, and those with deranged LFT.

Data sharing statement provided by the authors is available with the full text of this article at jebmh.com.
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