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Original Contributions

PROGNOSIS IN PATIENTS PRESENTING WITH NON-TRAUMATIC COMA

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□ **Abstract—Background: Studies of patients presenting with coma are limited, and little is known about the prognosis of these cases. Objective: The aim of this study was to investigate the acute and long-term prognosis after an episode of non-traumatic coma. Methods: Adults admitted consecutively to an emergency department in Stockholm, Sweden between February 2003 and May 2005 with a Glasgow Coma Scale (GCS) score of 10 or below were enrolled prospectively. All available data were used to explore the cause of the impaired consciousness on admission. Patients surviving hospitalization were followed-up for 2 years regarding survival. Results: The final study population of 865 patients had the following eight different coma etiologies: poisoning (n = 329), stroke (n = 213), epilepsy (n = 113), circulatory failure (n = 60), infection (n = 56), metabolic disorder (n = 44), respiratory insufficiency (n = 33), and intracranial malignancy (n = 17). The hospital mortality rate among the 865 patients was 26.5%, varying from 0.9% for epilepsy to 71.7% for circulatory failure. The accumulated total 2-year mortality rate was 43.0%, varying from 13.7% for poisoning to 88.2% for malignancy. The level of consciousness on admission also influenced the prognosis: a GCS score of 3–6 was associated with a significantly higher hospital mortality rate than a GCS score of 7–10. Conclusion: The prognosis in patients presenting with non-traumatic coma is serious and depends largely on both the level of consciousness on admission and the etiology of the coma. Adding the suspected coma etiology to the routine coma grading of these emergencies may more accurately predict their prognosis. © 2012 Elsevier Inc.**

□ **Keywords—coma; emergency medicine; mortality; prognosis; unconsciousness**

INTRODUCTION

Approximately 1% of patients admitted to the emergency department (ED) have impaired consciousness and constitute a high-risk group (1–4). It was recently reported that hospital mortality was 2.8% in the poisoning group and 39% in the group with other diagnosis underlying the reduced level of consciousness on admission to the ED (4). In the management of patients presenting with coma, several etiologies with different prognoses have to be considered; for example, poisoning, metabolic disorders, acute manifestations of cerebrovascular disease, epilepsy, circulatory shock, respiratory failure, and severe infection. The acute and long-term prognoses in patients with these different conditions are of great importance for triage and treatment decisions. The number of published studies of patients presenting with coma has been surprisingly small. We have found only three reports on studies in which the clinical courses of patients admitted unresponsive to the ED have been followed-up (2–4). In one of these studies, patients with various kinds of changes in their mental status were included, and in another one, poisoning was an exclusion criterion (2,3). In addition, Sacco et al. investigated comatose intensive care patients and reported on their short-term

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Table 1. Acute and Total Accumulated Long-term Mortality Rates for the Whole Study Population and for the Eight Different Coma Etiologies

Coma Etiologies	Number (%)	Proportion Male %	Mean Age, Years	Hospital Mortality %	Total 1-Year Mortality %	Total 2-Year Mortality %	Age-matched 1-Year Mortality in the Swedish Population (7)
Poisoning	329 (38.0)	55.6	44	2.4	10.9	13.7	0.11%
Stroke	213 (24.6)	43.7	74	60.6	70.9	73.7	2.2%
Epilepsy	113 (13.1)	55.8	61	0.9	15.9	23.9	0.8%
Circulatory	60 (6.9)	65	71	71.7	85.0	86.7	2.2%
Infection	56 (6.5)	62.5	68	26.6	51.8	60.1	1.3%
Metabolic	44 (5.1)	40.1	57	15.9	31.8	40.9	0.5%
Respiratory	33 (3.8)	45.5	78	60.6	72.7	75.8	3.7%
Malignancy	17 (2.0)	52.9	65	29.4	76.5	88.2	1.3%
Study population	865 (100)	52.6	59	26.5	38.9	43.0	0.5%

prognosis (5). The aim of the present follow-up study of prospectively enrolled consecutive emergencies was to investigate the short- and long-term prognoses after an episode of non-traumatic coma.

MATERIALS AND METHODS

Adults admitted consecutively to the non-surgical ED at either of two major teaching hospitals in Stockholm between February 2003 and May 2005 with a Glasgow Coma Scale (GCS) score of 10 or below were prospectively included (6). This reduced level of consciousness should have been maintained for at least 30 min before inclusion. On admission to the ED, the GCS score was entered into a study protocol by specially trained nurses. The total patient population enrolled in the present study is identical to that of a recently published investigation (4). All available clinical and laboratory data, as well as history information recorded at any time in the clinical course and autopsy information in several instances, were used to ascertain the cause of the impaired consciousness on admission. These coma etiologies were classified into eight categories as follows: poisoning, epilepsy (status epilepticus, seizures, or postictal state), stroke (intracranial hemorrhage or infarction), circulatory failure (post cardiac arrest or circulatory shock), infection (meningitis, encephalitis, or sepsis), metabolic disorder (hypo/hyperglycemia, hyponatremia, hypothermia, or hepatic failure), malignancy (intracranial tumor), and respiratory insufficiency. Ten patients displayed clinical indications of more than one condition that might have explained the reduced level of consciousness on admission. In these cases we chose the most plausible single reason for the coma. The patients who survived the hospital period were followed-up regarding survival for 2 years after discharge from hospital. If a patient had died, the cause of death was found either in the medical record or through the records of the National Swedish Board of Health and Welfare.

For all hospital survivors, Cox's regression analysis was used to evaluate the influence of the different coma etiology categories on the 2-year follow-up mortality. Hazard ratios (HR) with 95% confidence intervals (CI) between the different categories were adjusted for age and gender inequalities. Kaplan-Meier curves were used to illustrate the mortality during the 2-year follow-up. The study population was also divided into two groups depending on the degree of consciousness on admission: one group with a GCS score of 3–6 on admission and one with a GCS score of 7–10. Cox's regression analysis was again used to compare the mortality rates of these two groups. Analyses were performed with SAS 9.2 (SAS Institute Inc., Cary, NC), and the Kaplan-Meier curve was produced by Statistica 8.0 (StatSoft Inc., Tulsa, OK). p Values < 0.05 were considered to indicate statistical significance. The study was approved by the local ethics committee.

RESULTS

A total of 938 patients were enrolled during the inclusion period. Seventy-three patients (7.8%) were excluded for the following reasons: 40 because their coma etiology was still not clear at hospital discharge, 25 due to unknown identity, and 8 because their unconsciousness was shown to have been of a psychogenic nature. The remaining 865 patients had a mean age of 59 years (15–98), and 52.6% were male. Poisoning, stroke, and epilepsy were the most common causes of unconsciousness on admission. Thirty percent of the study population was treated at an intensive care unit, and 17% received artificial ventilation during the hospital period. The mean hospital stay varied between the different coma etiology categories, from 2 days for the patients with poisoning to 12 days for the infection category. The total hospital mortality rate among the 865 patients was 26.5% (229 deaths). Table 1 presents the age and gender distribu-