Introduction:
In most cases presenting with hypoglycemia in emergency departments (EDs), the etiology of the hypoglycemia is almost identified. However, about 10% of cases, the etiology of hypoglycemia cannot be determined.

Methods:
This is a 2-year prospective observational study. A total of 232 patients were transported to our ED with hypoglycemia. After the investigation, a rapid ACTH loading test (synthetic 1-24 ACTH 250 μg iv.) was performed on 21 patients with unexplained hypoglycemia; i.e., 250 μg ACTH was administered intravenously and blood specimens were collected before loading, at 30 min and 60 min after ACTH administration. We adopted a peak serum cortisol level < 18 μg/dl or a delta cortisol of < 9 μg/dl for the diagnosis of adrenal insufficiency.

Results:
Among the patients, 163 of 232 (70.3%) were using antidiabetic drugs, 15 (6.5%) were using hypoglycemia-relevant drugs, 12 (5.2%) suffered from digestive absorption failure including malnutrition, 10 (4.3%) had been consuming alcohol, 9 (3.9%) suffered from malignancy, and 2 (0.9%) suffered from insulin autoimmune syndrome. Initially, an etiology was unknown in 21 of 232 (9.1%) patients. Rapid ACTH test revealed the adrenal insufficiency in 19 (8.2%) among them. Administration of hydrocortisone in adrenal insufficiency patients promptly improved hypoglycemia. In those patients, serum sodium level was lower (Na; 134 vs. 139 mEq/l, P<0.001) and serum potassium level was higher (K; 4.7 vs. 3.9 mEq/l, P<0.001) than in the other hypoglycemic patients, respectively. There was no significant difference in baseline plasma glucose level on ED between the groups of patients (28 vs. 26 mg/dl, P=0.34).

Conclusion:
The probability of adrenal insufficiency was much greater than that of the better-known insulinoma as a cause of hypoglycemia. When protracted hypoglycemia of unknown etiology is recognized, we recommend that the patient is checked for adrenal function using the rapid ACTH loading test.