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A life-saving therapy in Class I HELLP syndrome: Therapeutic plasma exchange

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ABSTRACT

HELLP syndrome, which can affect multiple organ systems and cause maternal and fetal mortality, is a serious complication of pregnancy characterized by microangiopathic hemolytic anemia, elevation of liver enzymes, and thrombocytopenia. Delivering the infant usually suffices for the treatment of this syndrome. In cases with Class I HELLP syndrome, however, the clinical picture may rapidly deteriorate despite delivery. In this paper we presented the outcomes with the use of therapeutic plasma exchange in cases with class I HELLP syndrome. This study included 21 patients diagnosed with the Class I HELLP syndrome at Inonu University Faculty of Medicine, Department of Hematology between 2011 and 2014. A central venous catheter was placed and plasma exchange therapy was begun in patients unresponsive to delivery, steroid, and supportive therapy (blood and blood products, antihypertensive therapy, intravenous fluid administration, and antibiotics) within 24 hours after the diagnosis of Class I HELLP syndrome according to the Mississippi Criteria. All patients underwent therapeutic plasma exchange for three sessions each with a 1:1 volume. Hemogram and biochemical parameters of the patients were evaluated before and after the procedure. According to results, there was a statistically significant decrease in total bilirubin, LDH, AST, and ALT levels whereas a significant increase in platelet count was observed. Hemoglobin levels were increased, although this increase was not statistically significant. HELLP syndrome is primarily treated with the delivery of infant; however, some cases may show disease progression despite completion of delivery. As a potential cause of both maternal and fetal mortality, HELLP syndrome condition should be aggressively treated. Therapeutic plasma exchange is one of the available treatment options. Our study has found that postpartum use of plasma exchange therapy within 24 hours is an efficient and lifesaving treatment choice in Class I HELLP syndrome.

1. Introduction

HELLP syndrome, which can affect multiple organ systems and cause maternal and fetal mortality, is a serious complication of pregnancy characterized by microangiopathic hemolytic anemia, elevation of liver enzymes, and thrombocytopenia. HELLP Syndrome is an acronym where the letters in the word are the first letters of Hemolysis, Elevated Liver Enzymes, and Low Platelet Count [1]. Martin et al. described 3 risk categories of HELLP syndrome according to the Mississippi classification based on the platelet count: class I: <50.000/microliter (μl), class II: 50.000–100.000/μl, class III: 100.000–150.000/μl [2]. Maternal mortality in HELLP syndrome changes between 1 and 25%, and it is usually due to the severity of disease, delayed diagnosis, presence of infection, and acute renal failure [3].

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Most maternal deaths occur among women with class 1 HELLP syndrome [4].

The main treatment in HELLP syndrome is to stabilize the patient clinically prior to delivery. In clinically mild cases, watchful waiting following high dose corticosteroid therapy until after 34th week to allow full maturation of fetal development is the recommended approach [5,6]. In severe cases, however, delivery should be completed within at most 24–48 hours by accelerating the fetal lung maturation after corticosteroid therapy administered in the same period. Platelet count returns to normal within 24 hours in a majority of patients; however, a low platelet count may persist beyond delivery [7] in some cases.

Lactate dehydrogenase is a marker of hemolysis. Besides, stage of the disease advances at HELLP syndrome as thrombocytopenia gets more apparent. For this reason, best parameters to be used for follow-up of HELLP syndrome (as they are measured more objectively compared to clinical presentation of the patient) are the increase in platelet count after therapeutic plasmapheresis and a decrease in LDH [8].

The maternal mortality rate is about 1.1% with HELLP syndrome. The infant morbidity and mortality rate is anywhere from 10 to 60% depending on many factors such as gestation of pregnancy, severity of symptoms and the promptness of treatment. Most deaths in patients with HELLP syndrome occur with class 1 disease (60%), and neurologic abnormality due mostly to cerebral hemorrhage/stroke is the most common system involved at autopsy (45%) [8–10]. It has been shown that therapeutic plasma exchange may be effective in HELLP syndrome not responsive to delivery. Plasma exchange therapy was successfully used in patients who have organ failure or refractory to treatment [11,12]. Plasmapheresis can replace a patient's plasma by a donor plasma and remove lots of harmful substances in the bloodstream. It also replaces the coagulating factors, albumin and biologically active substances that normally have to be carried out by the liver cells. Plasmapheresis in theory can lead to the removal of ammonia, endotoxins, bilirubin, and inflammatory cytokines from the circulation. Also, injection of large volumes of FFP (fresh frozen plasma) in this method can help to improve the DIC, and removing renin angiotensin and other vasoactive factors may improve renal function [13]. All these advantages improve hepatic, renal and neurologic function in patients with HELLP syndrome. Therefore, this treatment especially considering the advanced cases of HELLP syndrome is very important.

Our purpose was to investigate the effects of the postpartum use of plasma exchange therapy within 24 hours on outcomes of patients with Class I HELLP syndrome.

2. Methods

This study included a total of 21 patients with Class I HELLP syndrome who underwent therapeutic plasma exchange at Inonu University Faculty of Medicine, Department of Hematology between 2011 and 2014. The patients were followed at the intensive care unit until after their laboratory and clinical symptoms returned to normal upon delivery. The study was approved by the Ethical Committee of Inonu University Medical School, and written informed consent was obtained from the patients or their relatives. The criteria required for the diagnosis of HELLP syndrome included signs of hemolysis (LDH > 600 U/L, increased total bilirubin, presence of fragmented erythrocytes (schistocytes) in peripheral smear), impaired liver function tests (AST > 70 U/L), and a low platelet count (<150.000/μL). Thrombocyte count was confirmed by a peripheral smear in each patient. The differential diagnoses included other disorders with microangiopathic hemolytic anemia (thrombotic thrombocytopenic purpura, hemolytic uremic syndrome, disseminated intravascular coagulation, fatty liver of pregnancy, preeclampsia and eclampsia). ADAMTS13 level could not be studied, owing to lack of equipment. HELLP syndrome was diagnosed based on the findings of clinical and laboratory examinations. The diagnosis was confirmed by a favorable response given by all patients to therapeutic plasma exchange.

A central venous catheter was placed and plasma exchange therapy was begun in patients unresponsive to delivery, steroid, and supportive therapy (blood and blood products, antihypertensive therapy, intravenous fluid administration, and antibiotics) within 24 hours after the diagnosis of Class 1 HELLP syndrome according to the Mississippi Criteria [2]. Fresh frozen plasma was used as the replacement fluid in therapeutic plasma exchange procedure. Each patient underwent three sessions of therapeutic plasma exchange on average with a Spectra Optia, and plasmapheresis was continued until clinical recovery and the platelet count was over treshold for spontaneous bleeding. This threshold platelet count was accepted over 50.000/μL.

Patients' characteristics including age, numbers of pregnancy and abortion, methods of delivery, blood pressure, state of consciousness, and presence of epileptic attacks were recorded. All patients were evaluated in terms of Glasgow Coma Score [14]. Additionally, serum aspartate aminotransferase (AST), alanine aminotransferase (ALT), blood urea nitrogen (BUN), creatinine (Cr), calcium (Ca), phosphorus, serum total bilirubin levels, lactic dehydrogenase (LDH), total protein, albumin, hemoglobin (Hgb), leukocyte and platelet counts, prothrombine time (PT), international normalized ratio (INR), activated partial thromboplastin time (aPTT), D-dimers and fibrinogen levels were determined daily and the worst values were taken for statistical comparison. The complete blood count test was performed with a Beckman Coulter Immage (Beckman Coulter, California, USA) device using the impedance method; Hgb was measured with the photometric method and the leucocyte subgroups with the laser method; serum BUN and creatinine were measured with Aeroset Abbott (Abbott Laboratories, Minnesota, USA) device using the spectrophotometric method. Mortality rate, causes of death, complications including renal failure, dialysis requirement, hepatic impairment, disseminated intravascular coagulopathy (DIC), and infection were recorded.

Statistical analyses were performed using SPSS 17.0 software package. Shapiro–Wilk test was used to test the normality of distribution of the quantitative data. Wilcoxon test was used to test the differences between the measured parameters before and after therapeutic plasma exchange.

3. Results

Four (19.04%) patients delivered via vaginal route and 17 (80.96%) via caesarean section. Three patients (14.2%) were primigravida while 18 (85.8%) patients were multigravida. The

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