

CASE REPORT

The role of plasmapheresis in adult respiratory distressed syndrome due to meningococemia with disseminated intravascular coagulation - a case report

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Abstract

Background: The aim of the present case report is to assess the efficiency of plasmapheresis in patients detected with meningococemia since this procedure seems to lower circulating levels of endotoxin while it may also eliminate activated complement, clotting factors and lysosomal enzymes resulting from thromboplastin and activated granulocytes.

Objective: Pay attention to plasmapheresis in Adult Respiratory Distressed Syndrome (ARDS) due to meningococemia with disseminated intravascular coagulation (DIC).

Material and methods: A 23-year-old woman with no prior medical history has been monitored for 14 days after being admitted with a 12-hour history of vomiting, headache, confusion, and hypothermia (35.6°C).

Results: Plasmapheresis had been used as adjunctive therapy during septic shock.

Conclusion: Patient was treated with five sessions of plasmapheresis and recovered without sequelae. No complications associated with this procedure were observed.

Keywords

Plasmapheresis, Adult Respiratory Distressed Syndrome, Meningococcal septicemia

1 Introduction

Extreme inflammation, depletion of natural anticoagulants and upregulation of procoagulant proteins are the main characteristics in case of sepsis and septic shock. Simultaneously, sepsis and septic shock constitute primary causes of mortality in intensive care units (ICU). In this direction, plasmapheresis represents a procedure which may possibly improve survival of patients in septic shock. Thus, this case report aims at providing an assessment of the efficiency of plasmapheresis in the case of patients detected with meningococemia.

2 Case presentation

A 23-year-old woman with no prior medical history has been monitored for 14 days after being admitted to the ICU with a 12-hour history of vomiting, headache, confusion, and hypothermia (35.6°C). Upon admission, her Glasgow Coma Scale (GCS) score was 9/15. She had a typical petechial rash and widespread ecchymosis. In the following two hours the patient displayed severe symptoms of hypotension, impaired peripheral circulation and acute respiratory failure with refractory hypoxemia. Therefore, the procedure of intermittent positive pressure ventilation with positive end-expiratory pressure was initiated. During the next 24 hours a full-blown ARDS occurred while the patient was in circulatory collapse. On the second day her renal function deteriorated and continuous venovenous hemodiafiltration (CVVHDF) was applied. Meningococemia was detected using a polymerase chain reaction (PCR) test.

During the following days she manifested a severe diffuse intravascular coagulopathy characterized by a marked reduction in the absolute number of platelets (see the Table).

Table. Laboratory parameters during the course of the disease

Laboratory parameters	1 st Day	7 th Day	8 th Day	9 th Day	12 th Day	13 th Day	14 th Day
Hematocrit (%)	30	32	29.8	29	28	28	25
Hemoglobin (g/dl)	9.2	11.5	10	10	9,4	9,2	8
Platelet count (per mm ³)	40.000	9.000	33.000	57.000	50.000	56.000	84.000
APTT sec	70	35	39	30	35	40	44
INR	1.8	1.2	1.2	1.2	1.2	1.2	1.2
D-dimers	10,000	8,000	6,700	8,700	7,500	2,790	2,000

Despite the daily transfusions with platelets, the marked bleeding from the oral cavity, puncture sites as well as from the vagina led to the deterioration of patient's clinical status. On the seventh day the patient received a conventional sepsis treatment and the plasmapheresis procedure was performed through veno-venous access and by employing a PF-0, 5 (Lvov, Russia) and a DK2-0.3 (Rjazam, Russia) continuous flow. Additionally, Heparin doses of 200 U/Kg bodyweight were applied as an anticoagulant. An equal volume of fresh-frozen plasma received from healthy donors (diluted with 5% human albumin solution) replaced the volume of 40-ml/kg bodyweight of patient's plasma during each session. Five sessions (7th, 8th, 9th, 12th, 13th day) with a mean duration of 150 min were applied to the patient (2,500 ml mean exchange plasma volume). On the 14th day bleeding ceased and the number of platelets restored. On the 15th day she was extubated and on the 21st day she was transferred to the ward.

3 Discussion

The activation of complement and blood cells by endotoxin may represent possible sources of associated pathophysiological changes in meningococcal septicemia^[1]. The procedure of plasmapheresis not only lowers circulating levels of endotoxin but also eliminates activated complement, clotting factors and lysosomal enzymes resulting from thromboplastin and activated granulocytes^[2]. In this sense, the above procedure may reestablish coagulation abnormalities and subsequently it leads to the normalization of DIC and clotting parameters. Previous studies revealed that in cases of patients with sepsis or fulminant meningococcal septicemia, plasmapheresis may safely be applied^[3-6].

Our patient was treated with five sessions of plasmapheresis and recovered without sequelae. No complications associated with this procedure were observed. Even though plasmapheresis is considered to be an expensive technique and not easy to provide 24 × 7, the positive outcome in the case of our patient clearly justifies our decision.

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