

Results of double filtration plasmapheresis (DFPP) for immuno-modulatory treatment of neurological diseases and for desensitization before ABO-incompatible kidney transplant

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Introduction

Therapeutic plasma exchange is recommended by the American Society For Apheresis as a standard of care for some neurological diseases (categories I to III, grades 1 to 2) and for ABO-incompatible solid organ transplant (category II, grades 1B to 2B). Double filtration plasmapheresis (DFPP) is a selective plasma exchange technique that removes high-molecular-weight molecules, minimizing albumin loss.

Methods

Between October 2022 and January 2025, ten patients underwent DFPP treatment with Plasmapher/Apherlungs system at Santissima Annunziata Hospital, Savigliano (Italy), ASL CN1. Nine out of ten patients were treated with DFPP for neurological diseases ranging from acute inflammatory demyelinating polyneuropathy (56% of the patients) to autoimmune encephalitis, myasthenia gravis, paraneoplastic encephalopathy and optic neuro-myelitis (11% each). One patient underwent DFPP for desensitization before an ABO-incompatible kidney transplant. Median patients' age was 50 years. Median number of DFPP sessions was four, ranging from 2 to 6 sessions on alternate days. The medium volume of treatment was 1.5 times the plasma volume. Plasma fractionator EvafluxTM 3A20 was used. Anticoagulation was obtained by continuous administration of unfractionated heparin. Central venous catheters were placed before DFPP in all the patients treated for neurological diseases, whereas a pre-existing arteriovenous fistula was suitable for the patient undergoing desensitization.

Results

Nine out of ten patients completed the treatment. In a single case DFPP was prematurely discontinued because of a rapid onset heparin-induced thrombocytopenia that presented with extracorporeal circuit clotting and required heparin withholding, anticoagulant treatment and delayed removal of the central venous catheter. Neither minor nor major bleeding events occurred. Iatrogenic hypoalbuminemia was mild and did not require any correction. Treatment response was judged by neurology consultants. Effectiveness of DFPP in desensitization was assessed by pre- and post-procedural monitoring of haemolysin and anti-ABO immunoglobulin titres.

Conclusions

DFPP is a promising, therapeutic option for immune-mediated, neurological diseases and for desensitization before ABO-incompatible kidney transplant. In our case series, all the patients obtained significant clinical benefit or adequate removal of anti-erythrocyte antibodies. No life-threatening complications occurred, although a case of heparin-induced thrombocytopenia compelled to premature stop of DFPP. Overall, our results prompt further use of DFPP for immuno-modulatory treatment.