

## Discolouration of plasma in therapeutic plasma exchange

A 26-year-old married pregnant women with gestational age of 22 weeks presented to intensive medical care unit with history of acute flaccid ascending quadriparesis without sensory involvement for three days duration. Basic Investigations like complete hemogram, serum electrolytes, renal, and liver function tests were normal and no obvious evidence of autoimmune disease. On examination, her vitals were stable, she had quadriparesis without neck or diaphragmatic involvement. Having ruled out hypokalemia, with high clinical suspicion of Guillain Barre syndrome (GBS), patient was subjected to nerve conduction studies which showed Acute Motor and Sensory Axonal Neuropathy (AMSAN) variant of GBS. Patient was taken for Therapeutic plasma exchange (TPE) in our Nephrology unit after obtaining written consent from the patient. Coagulation profile, calcium, and magnesium were normal prior to TPE.

Under aseptic precautions, a non-tunneled non-cuffed double lumen polyurethane hemodialysis catheter was inserted into right internal jugular vein and TPE was started with the use of appropriate surface area polysulfone plasma filter. We decided to do one plasma volume exchange guardedly in view of pregnancy and GBS which pose high risk for hypotensive episodes. Calculating by Kaplan's formula, one plasma volume for the patient came to around 2 liters and we decided to remove 2 liters of plasma replacing with 70 percent colloid and 30 percent crystalloid.

To our surprise, the color of the separated plasma was greenish brown [Figure 1] and a similar finding was observed in the supernatant of centrifuged blood. We checked for hemolysis and hyperbilirubinemia, but nothing was suggestive to explain the color of the plasma. There was no recent history of exposure to



Figure 1: Color of the removed plasma during first TPE was green

drugs or dyes except for iron and folic acid supplements. Serum ceruloplasmin level was 88 mg/dl (normal, 20–35 mg/dl), ANA was negative, complements were normal. We provided 5 sessions of TPE on alternate day basis. The color of the plasma faded from green color to golden yellow during subsequent TPE which was in concurrence with drop in serum ceruloplasmin levels to 30 mg/dl after five TPE sessions. Patient tolerated all sessions of TPE and recovered completely without any residual weakness. Fetus was viable throughout the course of treatment.

### Discussion

Evidence for the existence of green color plasma dates back to 1960.<sup>[1,2]</sup> Tovey and Lathe were able to confirm elevated ceruloplasmin levels in the green plasma units in their study.<sup>[1]</sup> Ceruloplasmin is a plasma glycoprotein that functions as a carrier for copper and its levels can be elevated in high-estrogen states such as pregnancy and oral contraceptive use and in rheumatoid arthritis.<sup>[3]</sup> Wolf *et al.* also found high normal or elevated ceruloplasmin levels in 15 donors, all of whom were taking oral contraceptives and all of whom had extremely green plasma.<sup>[2]</sup> Exposure to sulphonamides can also cause green discoloration of plasma<sup>[4]</sup> however that was not the case in our patient. Since pregnancy is a state of acute phase reaction, ceruloplasmin being an acute phase reactant increases in serum particularly during 2<sup>nd</sup> and 3<sup>rd</sup> trimester of normal pregnancy as observed by Friedman *et al.*<sup>[5]</sup> This case report is an endeavor to spotlight the cause of green color plasma which was described in olden literature and to avoid apprehension among treating physicians by imparting knowledge on physiological and pathological causes of greenish discoloration of plasma.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

### Conflicts of interest

There are no conflicts of interest.

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