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Green Plasma in a Male Blood Donor

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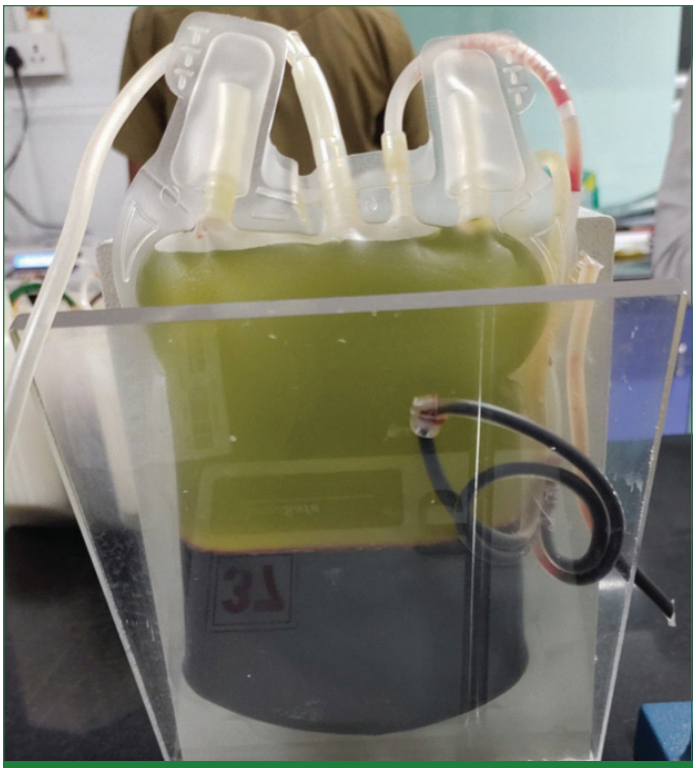
This is a case of a healthy 21-year-old male, a voluntary first-time donor. He reported to be a smoker and alcoholic but had been abstaining since five months. He had no other medical issues and fulfilled all criteria of blood donation eligibility. Physical examination was normal. He was afebrile, his pulse was 72 beats/minute and blood pressure was 120/86 mmHg. A 450 mL whole blood was collected from him in a quadruple bag and separated into components in a refrigerated centrifuge. When the plasma was separated by a manual expressor, it appeared green, as shown in [Table/Fig-1].



[Table/Fig-1]: Green plasma from the donor as seen after centrifugation while using a manual plasma expressor.

The donor was recalled for a detailed history and fresh blood samples for further testing. He had no history of fever or joint pain (suggestive of rheumatoid arthritis), no history of intake of sulphonamides or any other drug. Detailed physical examination was also unremarkable. Repeat samples were collected for complete blood counts, blood culture, serum bilirubin (total, direct and indirect) and serum ceruloplasmin.

On blood examination haemoglobin was 13.6 gm/dL, White Blood Cell (WBC) count was 7500/µL, platelets were 400000/µL, normocytic normochromic blood picture; values for serum bilirubin (total) were 0.5 mg/dL, direct was 0.27 mg/dL and indirect was 0.23 mg/dL; serum ceruloplasmin was 0.49 g/L. Blood culture showed no growth.

Component therapy is the main approach to addressing transfusion necessities in the present times [1]. As such, modern blood collection systems comprise of closed, interconnected sets of multiple bags for the same collection unit. Whole blood is collected in one primary bag of a system, and then various components are separated and stored in designated bags of the same collection set. Component therapy provides a focused approach to transfusion needs and is therefore, safer and more efficacious. Optimal storage of the different components is possible by componentising, as each component has unique storage condition needs. This also contributes to clinical efficacy. By componentising, each unit can benefit upto three patients with needs for specific components [1].

The liquid component of blood, plasma, makes up about 50-55% of the blood and is responsible for several necessary functions, including carrying proteins such as clotting factors. Hence, one of the broad indication for plasma therapy is to supplement proteins to the patient (such as antibodies and clotting factors). Plasma is normally yellowish. However, discoloration has been described, usually in association with derangements of substances such as bilirubin, carotenoids etc. For example, elevated bilirubin may cause the plasma to be dark yellow, haemolysis makes it red or pink, hypercholesterolemia gives it a milky yellow colour [2].

Rare cases of green donor plasma have been reported very sporadically in literature [2-9]. In most cases, the donors have been young females on Oral Contraceptive Pills (OCPs) which are known to elevate serum ceruloplasmin levels explaining the greenish plasma. Reports of male donors with green plasma are even rarer. In the report by Pai S et al., a healthy male donor with normal blood parameters has been described, similar to the current case [2]. The most common causes of green plasma are consumption of sulphonamides, *Pseudomonas aeruginosa* infection and elevation of ceruloplasmin in rheumatoid arthritis and high estrogen states such as pregnancy and OCP consumption [2].

Green plasma often poses a dilemma to blood bank staff as no guidelines exist regarding their use or discard [2]. Most such plasma are discarded at the blood bank itself and some others are discarded because clinicians refuse to transfuse them [4]. However, as seen in all the above cases and this present one, it is possible to evaluate the safety profile of such plasma by the workup suggested. The few tests performed in this case are cheap and widely available. Additionally, coagulation profile, especially factor assays and/or thromboelastography can also be done to demonstrate the coagulation efficacy. The major limitation in the present case was cost constraints due to which further investigation could not be done. The reports referenced here have all deemed green plasma safe to transfuse or fractionate; Cotton BA et al., have even recommended their use in trauma and emergencies due to their hypercoagulability as seen on thromboelastography [10].

To conclude, there is a need of uniformity in national guidelines regarding the fate of collected green plasma to reduce their wastage. This will provide information regarding the phenomenon occurring in both genders, especially males, and an outline of the basic workup to be done to establish safety for transfusion.

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