血浆应用指南解读

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血浆总渗透压313毫渗量/升（5330毫米汞柱），其中胶体渗透压不超过1.5毫渗量/升（25毫米汞柱）。

血浆的主要作用是运载血细胞，运输维持人体生命活动所需的物质和体内产生的废物等。

功能:维持血浆胶体渗透压;组成血液缓冲体系;运输营养和代谢物质; 营养功能; 参与凝血和免疫作用。

成分输血指南

新鲜冰冻血浆（FFP）含有全部凝血因子。

作用：扩充血容量，补充凝血因子。适用：① 补充凝血因子；② 大面积创伤、烧伤。

要求与受血者ABO血型相同或相容。

普通冰冻血浆（FP）FFP保存一年后即为普通冰冻血

作用：① 主要用于补充稳定的凝血因子缺乏，如Ⅱ、Ⅶ、Ⅸ、Ⅹ因子缺乏；② 手术、外伤、烧伤、肠梗阻等大出血或血浆大量丢失。

要求与受血者ABO血型相同。

手术及创伤输血指南

新鲜冰冻血浆（FFP）用于凝血因子缺乏的患者。

1. PT 或 APTT＞正常1.5倍，创面弥漫性渗血。
2. 患者急性大出血输入大量库存全血或浓缩红细胞后（出血量或输血量相当于患者自身血容量）。
3. 病史或临床过程表现有先天性或获得性凝血功能障碍。
4. 紧急对抗华法令的抗凝血作用（FFP：5～8ml/kg）

内科输血指南

❖ 新鲜冰冻血浆

用于各种原因（先天性、后天获得性、输入大量陈旧库血等）引起的多种凝血因子Ⅱ、Ⅴ、Ⅶ、Ⅸ、Ⅹ、Ⅺ或抗凝血酶Ⅲ缺乏，并伴有出血表现时输注。一般需输入10～15ml/kg体重新鲜冰冻血浆。

❖ 新鲜液体血浆

主要用于补充多种凝血因子（特别是Ⅷ因子）缺陷及严重肝病患者。

❖ 普通冰冻血浆

主要用于补充稳定的凝血因子。

❖ 围手术期输血和辅助治疗指南

　　——美国麻醉医师学会围手术期输血和辅助治疗特别工作组更新

❖ 血液保护临床实践指南

　　——胸外科医师协会 心血管麻醉医师协会2011年更新

❖ 临床输血实践与规范 第三版

　　——美国血库协会

❖ 输血实践指南 第二版

　　——美国红十字会

❖ 欧洲严重创伤输血处理指南 新版

❖ 指南明确指出，PT、INR、aPTT正常不是输注FFP的指征，其使用主要针对大量微血管出血(即凝血障碍)和凝血因子缺乏：

(1)PT大于正常值1.5倍或INR大于2.0或aPTT大于正常值2倍；

(2)输入超过人体一个血容量的血液(大约70 ml/kg)时，为纠正病人继发的凝血因子缺乏；

(3)用于拮抗华法林治疗；

(4)纠正已知的凝血因子缺乏；

(5)必须使用肝素时病人发生肝素抵抗(抗凝血酶Ⅲ缺乏)。

❖ 指南强调，FFP不用于单纯增加血容量或白蛋白浓度，应防止滥用FFP扩容。FFP通常10~15 ml/kg即可，紧急拮抗华法林5~8 ml/kg即足。

- ❖ 并不适用于没有出血的DIC
- ❖ 最好的适应症是TTP
- ❖ 如果没有严重出血，FFP不可用于逆转华法林的抗凝作用
- ❖ **用于手术或外伤性出血的,应根据凝血功能检测结果而定**
- ❖ 用于凝血因子缺乏症
- ❖ ICU患者凝血时间延长，不可用FFP，而是要用VitK治疗
- ❖ FFP所含VitK依赖凝血因子浓度较低
- ❖ 肝病患者PT超过正常对照4秒以上或需进行有创操作才考虑输注FFP和冷沉淀

PLASMA TRANSFUSION

1. Plasma transfusion is reasonable in patients with serious bleeding in context of multiple or single coagulation factor deficiencies when safer fractionated products are not available. (Level of evidence B)
2. For urgent warfarin reversal, administration of prothrombin complex concentrate (PCC) is preferred,but plasma transfusion is reasonable when adequate levels of Factor VII are not present in PCC. (Level of evidence B)
3. Transfusion of plasma may be considered as part of a massive transfusion algorithm in bleeding patients requiring substantial amounts of red-blood cells. (Level of evidence B)
4. Prophylactic use of plasma in cardiac operations in the absence of coagulopathy is not indicated, does not reduce blood loss and exposes patients to unnecessary risks and complications of allogeneic blood component transfusion. (Level of evidence A)
5. Plasma is not indicated for warfarin reversal or treatment of elevated international normalized ratio in the absence of bleeding. (Level of evidence A)

Plasma might be useful as a priming solution together with red cell concentrates in neonates and small children undergoing cardiopulmonary bypass surgery or membrane oxygenation.	**2 B**
For neonates, exchange transfusions should consist of red cell concentrates and plasma.	**1 C**
Plasma shall not be transfused prophylactically for preventing intracerebral bleeding in premature infants.	**1 A**
Plasma should not be administered to children with hemolytic uremic syndrome with absent coagulopathy.	**1 B**
A partial plasma exchange should not be carried out for neonates with polycythemia and hyperviscosity syndrome.	**1 B**

Evidence Grades of Conditions in which Plasma is Ineffective

Prophylactic postoperative plasma transfusion for patients with cardiopulmonary bypass operations with no microvascularbleeding and without PT values <50% of normal and/or fibrinogen levels <1 g/l	**1 A**
Prophylactic perioperative plasma transfusion for patients with liver transplantation when PT values are >50% of normal	**1 C**
Prophylactic transfusion prior to liver biopsy, paracentesis,thoracocentesis, central vein punctures in patients with hepatopathy and coagulopathy	**1 B**
Prophylactic plasma transfusion to improve prognosis in cases of acute liver failure when no bleeding complications are observed	**1 B**
Disseminated intravascular coagulation (DIC) in the absence of coagulopathy and/or bleeding complications	**1 B**
Partial plasma exchange in neonates with polycythemia and hyperviscosity syndrome	**1 B**
Acute pancreatitis	**1 A**

Evidence Grades of Conditions in which Plasma is Ineffective

Prophylactic plasma transfusion in premature infants	**1 A**
Hemolytic uremic syndrome in children	**1 B**
Burns not involving bleeding complications and absent coagulopathy	**1 B**
Plasma exchange in Guillain-Barré syndrome	**1 A**
Primary volume replacement	
Parenteral nutrition	
Immunoglobulin substitution	
Clotting factor and inhibitor deficiencies that can be treated more effectively using concentrates, e.g. hemophilia A and B and severe coumarin-induced bleeding, except in emergencies when concentrates cannot be made available in a timely manner, or when concentrates are contraindicated (e.g. heparin-induced thrombocytopenia type II).	
Hemostatic disorders that cannot be treated with plasma effectively: thrombocytopenia, platelet dysfunction, hyperfibrinolysis	

1. 细菌污染。

2. 输血相关性急性肺损伤(TRALI)

　　是输血数小时后某些白细胞抗体引起的免疫反应,从而导致非心源性肺水肿。TRALI是输血相关死亡第二大死亡原因,但多数病人在96小时内可以恢复。

3. 感染性疾病

　　人类免疫缺陷病毒(HIV)、丙肝病毒(HCV)和西尼罗河病毒(West Nile)都可以使用核酸技术检出,但疟疾、锥虫病(Chagas)、严重急性呼吸综合征(SARS)和变异型克雅病(Creutzfeldt-Jakob)还无法检测。

4. 输血反应

　　全麻可能会掩盖病人溶血和非溶血输血反应的症状。

5. 免疫反应

　　平时的同型输血几乎都是异型血,人类各种血型的表现性达1×10^{17}之多,异型血的输入导致受血者体内产生抗体,导致输血反应增多或输血无效。

小结

1.血浆的应用对人体有潜在风险

2.血浆输入要遵循原则,血浆的适应症十分有限

3.目前国内血浆的应用遵循指南了吗?

4.输入血浆对维持胶体渗透压有意义吗?

Thank You !

Grade 1 Recommendation

The benefit to the patient is clearly greater than the risks.For negative recommendations: there is clearly no benefit to the patient.

Grade 2 Recommendation

The benefit-to-risk ratio is unclear; decision regarding therapy must be based on the patient's individual circumstances.

Grade 1 Recommendation, Evidence Grade A (1A)

Based on not less than 2 well-designed randomized controlled studies, or 1 well-designed randomized controlled study, in addition to other well-designed prospective nonrandomized or uncontrolled studies, where the data are consistent.

Grade 1 Recommendation, Evidence Grade B (1B)

Based on 1 well-designed randomized controlled study or not less than 2 methodically weak randomized controlled studies, or several well-designed non-randomized or uncontrolled prospective studies, where the data are consistent.

Grade 1 Recommendation, Evidence Grade C (1C)

Based on 1 well-designed non-randomized or uncontrolled prospective study or on several observational studies or on serial case reports, where the data are consistent.

Grade 2 Recommendation, Evidence Grade A (2A)

Based on not less than 2 well-designed randomized controlled studies, or on 1 well-designed controlled study in addition toother well-designed prospective non-randomized or uncontrolled studies, where the data are inconsistent or conflicting.

Grade 2 Recommendation, Evidence Grade B (2B)

Based on 1 well-designed randomized controlled study or on not less than 2 methodically weak randomized controlled studies, or several well-designed non-randomized or uncontrolled prospective studies, where the data are inconsistent or conflicting.

Grade 2 Recommendation, Evidence Grade C (2C)

Based on 1 well-designed non-randomized or uncontrolled study or on several observational studies or on serial case reports or expert opinions, where the data are inconsistent or conflicting.