PLASMA TRANSFUSION IN PRE HOSPITAL CARE

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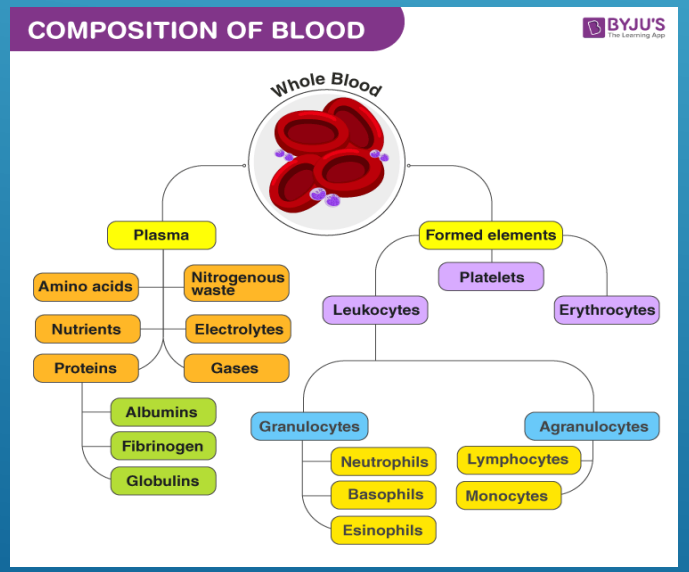
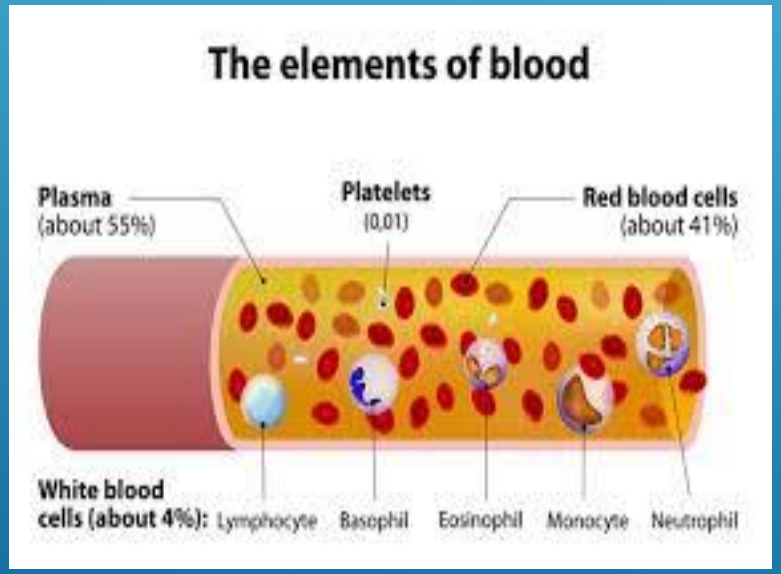
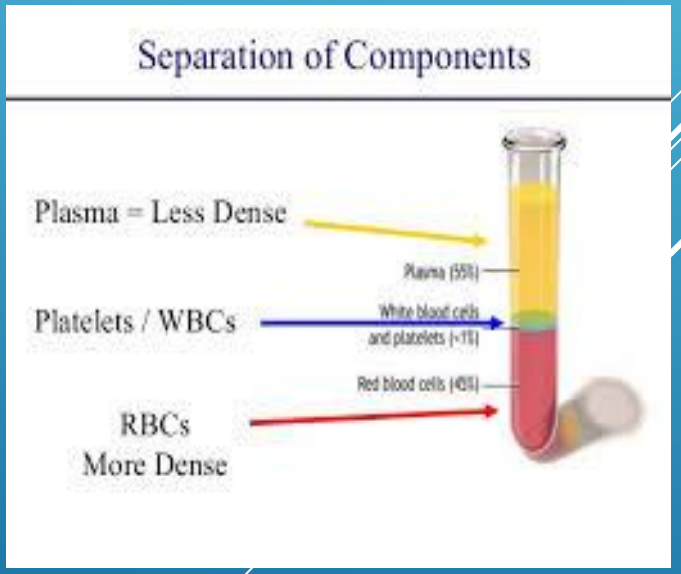
- Disclosure
- No financial or any conflict of interest

INTRODUCTIONS : BLOOD PLASMA

- Plasma constitutes 55% of total blood volume. Composed of 90% **water**, salts, lipids and hormones, it is especially rich in **proteins** (including its main **protein** albumin), immunoglobulins, **clotting factors** and **fibrinogen**.







- Outcomes of traumatic hemorrhagic shock and the epidemiology of preventable death from injury

  Brian J Eastridge 1, John B Holcomb 2, Stacy Shackelford 3 Transfusion –

  2019 Apr;59(S2):1423-1428. doi: 10.1111/trf.15161

Abstract

The majority of potentially preventable deaths after trauma are related to hemorrhage and occur early after injury, with the largest number of deaths occurring before hospital arrival. Approximately one-fourth of trauma deaths may be potentially preventable through early medical and surgical interventions. Interventions dedicated to bleeding control and hemostatic resuscitation have demonstrated merit in decreasing hemorrhagic injury mortality. Advancing these novel strategies to the casualty in the prehospital phase of care, particularly in tactical or austere environments, may prove beneficial for hemorrhage mitigation to temporize the window of survival to definitive care. Future studies of resuscitation and survival after traumatic injury must include analysis of prehospital deaths to fully understand the outcomes of early interventions.

ROLE OF PLASMA TRANSFUSION IN PHC

Clinical context for usage of plasma products:

- For haemorrhagic shock in trauma cases
- For resuscitation during pre hospital care

Is it considered superior compared to crystalloid resuscitation, especially in prehospital setting?

CONTROL OF MAJOR BLEEDING AFTER TRAUMA (COMBAT) TRIAL

- Pragmatic, randomized, placebo-controlled clinical trial based at a single institution in the USA, which was a level 1 trauma center
- Patients randomized to 250mL of AB plasma vs 250mL of frozen water + normal saline per standard care
- **Outcomes:**
- **Primary:** 28 day mortality after injury- Plasma -15%/Saline -10%
- No difference in mortality at 24h, ALI within 28 days.
- Prehospital administration of plasma reduced time to transfusion by 30 minutes but did not improve clinical outcomes
- During rapid ground rescue to an urban level 1 trauma centre, use of prehospital plasma was not associated with survival benefit.
- Beneficial in settings with longer transport times,

PREHOSPITAL AIR MEDICAL PLASMA (PAMPER) TRIAL [2]

Pragmatic, multi center, cluster-randomized, phase 3 trial of trauma patients at risk for haemorrhagic shock during air medical transport to a trauma center-564 Patients

Patients randomized to 2 units of thawed plasma (plasma group) vs standard care resuscitation (Standard care group)

Outcomes:

Primary: 3**0 day mortality (Primary Outcome)**

Plasma Group = **23.2%** /Standard Care Group = 33.0%

Conclusion: In injured patients at risk for hemorrhagic shock, the prehospital administration of thawed plasma was safe and resulted in lower 30-day mortality and a lower median prothrombin-time ration than standard-care resuscitation.

- **Different Outcomes in COMBAT and PAMPer:**
- Patients slightly older in PAMPer Trial vs COMBAT Trial (40's vs 30's)
- More Crystalloid used in PAMPer Trial vs COMBAT Trial (500 – 900cc vs 150 – 250cc)
- More Blunt Injury in PAMPer Trial vs COMBAT Trial (>80% vs ≈50%)
- Transport Times Longer in PAMPer Trial vs COMBAT Trial 39 – 52min vs 16 – 28min

ASSOCIATION OF PREHOSPITAL PLASMA TRANSFUSION WITH SURVIVAL IN TRAUMA PATIENTS WITH HEMORRHAGIC SHOCK WHEN TRANSPORT TIMES ARE LONGER THAN 20 MINUTES. A POST HOC ANALYSIS OF THE PAMPER AND COMBAT CLINICAL TRIALS

ANTHONY E. PUSATERI, PHD[1]; ERNEST E. MOORE, MD[2]; HUNTER B. MOORE, MD, PHD[2]; ET AL

DEC 2019, *JAMA SURG*

- Post hoc analysis was performed using harmonized data from 2 randomized clinical trials, Control of Major Bleeding After Trauma and Prehospital Air Medical Plasma, which included 626 patients with trauma and hemorrhagic shock.
- Patients who received prehospital plasma transfusion had significantly **reduced 28-day mortality** compared with standard care when prehospital **transport times** were **longer than 20 minutes.**
- Prehospital plasma administration is associated with **reduced mortality** in patients with trauma and significant hemorrhage **when transport times are prolonged**.

WHAT NEEDS TO BE CONSIDERED…

- Most of the studies did not take into account the logistics and cost aspect of using plasma transfusion in pre hospital setting
- Some of the studies are inconclusive, with difficulty to stratify the study with the little time and few tools available at the injury site
- Differences in early management and pre hospital care setting, especially in different countries/nation.

PRE-HOSPITAL BLOOD TRANSFUSION – AN ESA SURVEY OF EUROPEAN PRACTICE

KARL-CHRISTIAN THIES ET ALL

SCANDINAVIAN JOURNAL OF TRAUMA, RESUSCITATION AND EMERGENCY MEDICINE **VOLUME 28**, ARTICLE NUMBER: 79 (2020)

Abstract

Background

- The primary aim of this survey was to establish the degree of prehospital blood product use throughout Europe and discover main indications. The secondary aim was to evaluate opinions about PHBP and also the experience and the personal views of its users.
- Methods
- The subcommittee for Critical Emergency Medicine of the European Society of Anaesthesiology (ESA) held an online survey of European Helicopter Emergency Services (HEMS) and all French Services d'Aide Médicale Urgente (SAMU) regions. It contained 13 questions both open and multiple-choice about the frequency transfusions are carried out, the PHBP used and the perceived benefit. The survey was distributed to the corresponding HEMS leads in 14 European countries.
- Results
- **In total there were 172 valid responses: overall 48% of all respondents have prehospital access to packed red cells, 22% to fresh plasma and 14% use lyophilised plasma. Besides blood product administration, 94% of all services use tranexamic acid. Sixty five percent of all replies came from French and from German services (37 and 28% respectively). PHBP were mainly used for trauma related emergencies. France has the highest uptake of use of blood products at 89%, whereas the rate in Germany was far lower at 6%.**
- **Fifty five percent of the service leads felt that PHBP are beneficial, and even lifesaving in individual cases despite being needed infrequently.**

Conclusions

- We found remarkable dissimilarities in practice between the different European countries. Even if there is not an absolute consensus amongst providers on the benefit of PHBP, the majority feel they are beneficial. The difference in practice is possibly related to the perceived lack of evidence on prehospital blood transfusion. **We suggest to include the use of PHBP in trauma registries in order to consolidate the existing evidence.**

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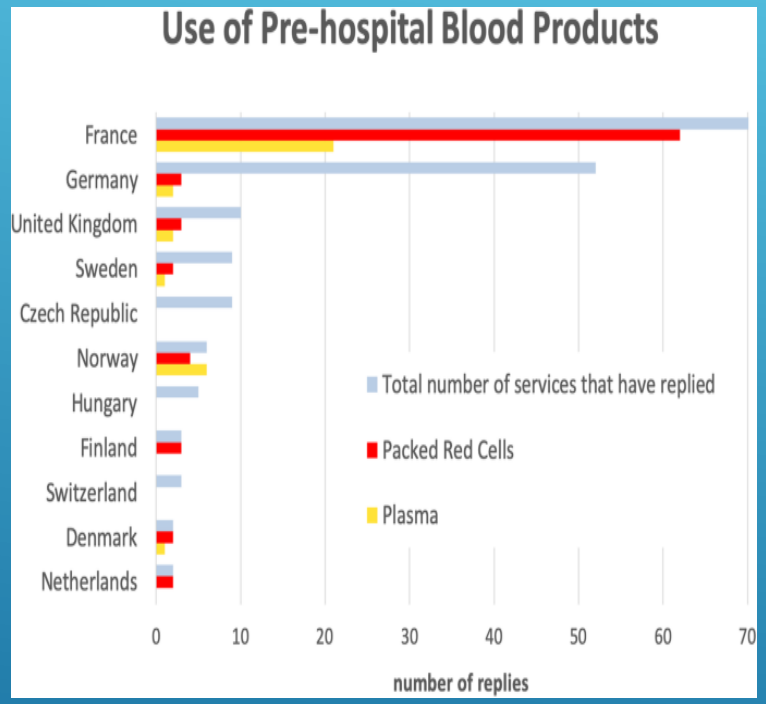
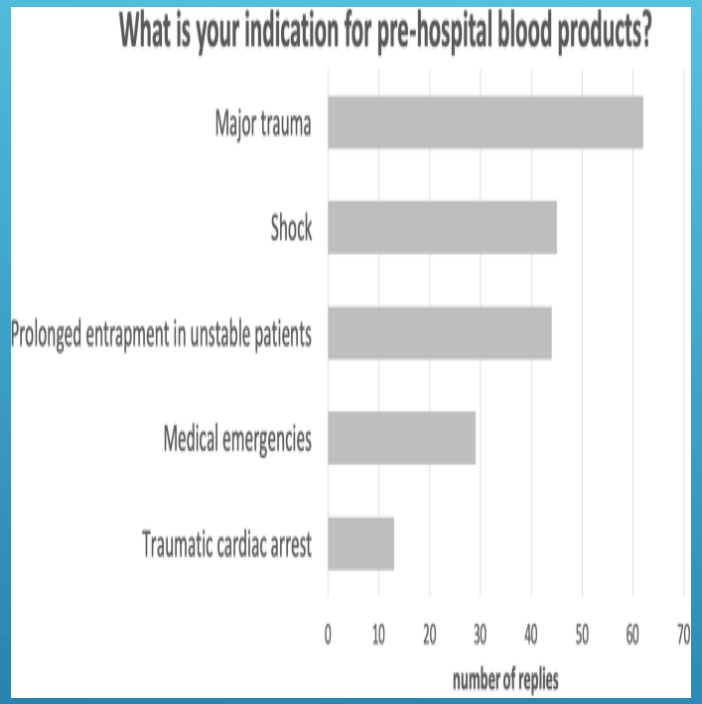
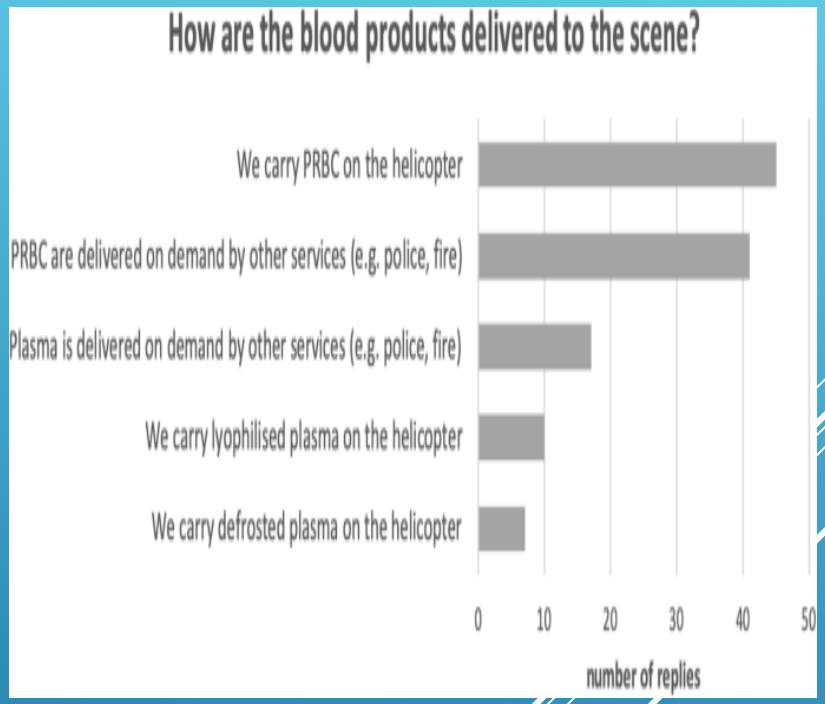






DOES THE RISK OUTWEIGH THE BENEFIT?

Transfusion risks

- Transfusion Related Acute Lung Injury (TRALI)
- Transfusion-associated Circulatory Overload (TACO)
- Allergic and/or anaphylactic reactions.

Less common risks include

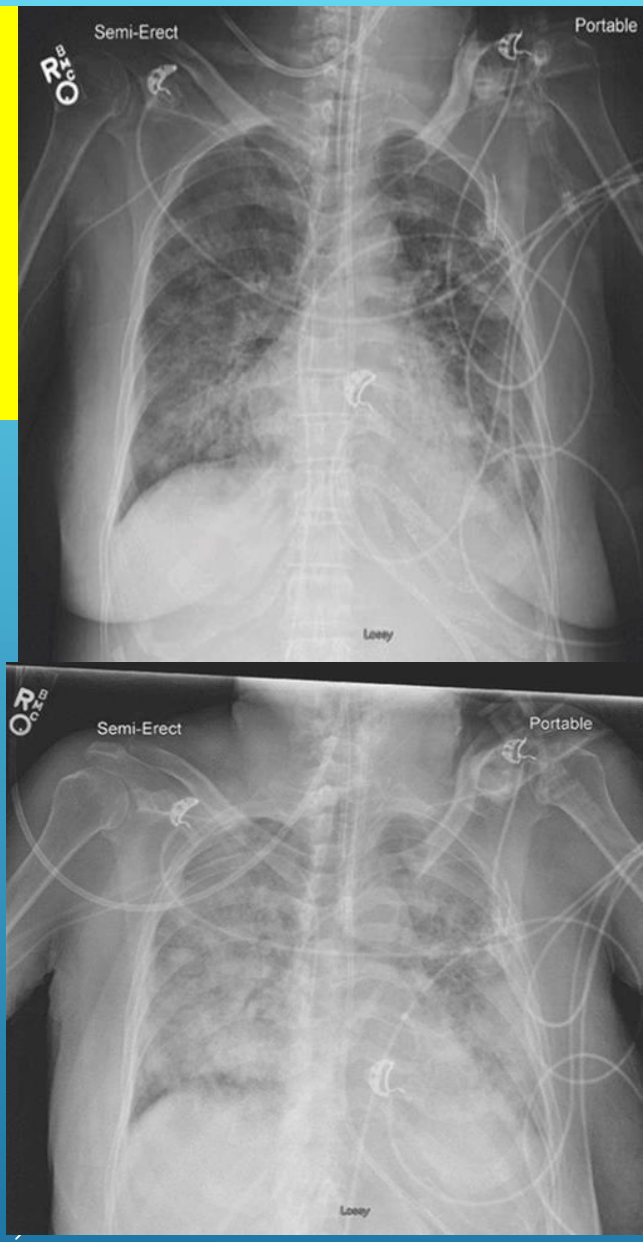
- Febrile nonhemolytic transfusion reactions
- Red blood cell alloimmunization
- Hemolytic transfusion reactions
- Transmission of infectious disease

UPDATE IN TRANSFUSION THERAPY FOR HEMATOLOGICAL MALIGNANCIES: TRANSFUSION SUPPORT—TACO AND TRALI| NOVEMBER 30, 2018

ACO and TRALI: biology, risk factors, and prevention strategies

Nareg Roubinian

Hematology Am Soc Hematol Educ Program (2018) 2018 (1): 585–594.
https://doi.org/10.1182/asheducation-2018.1.585



- **Abstract**
- **Transfusion-related acute lung injury (TRALI) and transfusion-associated circulatory overload (TACO) are the leading causes of transfusion-related morbidity and mortality. These adverse events are characterized by acute pulmonary edema within 6 hours of a blood transfusion and have historically been difficult to study due to under recognition and nonspecific diagnostic criteria.** However, in the past decade, in vivo models and clinical studies utilizing active surveillance have advanced our understanding of their epidemiology and pathogenesis. With the adoption of mitigation strategies and patient blood management, the incidence of TRALI and TACO has decreased. Continued research to prevent and treat these severe cardiopulmonary events is focused on both the blood component and the transfusion recipient.

LIMITATIONS OF USING PLASMA IN PREHOSPITAL CARE

- Logistics
- Infrastructure
- Costs

In most studies, risk-benefit assessment administration of plasma to potentially non-coagulopathic patients with short transportation times cannot be justified

ISSUES AND CHALLENGES

Blood product storage:

- **Ensuring proper temperatures for products both at the station and while in transport**
- **Tedious logging of temperatures and times, maintaining records**
- **Expense of regulated coolers, refrigerators, and thermoregulators**
- **Loss or waste of products due to misuse or lack of use prior to expiration**

CONCLUSION

1.Pre Hosptal Plasma transfusion is beneficiary, especially in patients with haemorhagic shock with prolong transport time to hospital

2.In damage control resuscitation, it reduce 28 days mortality in both studies

3.Challenges in PHC Plasma is logistic, infrastructure, cost ,quality control and adverse effect of transfusion of plasma.

4.More relevant research and the role of FDP need to be explored further

THANK YOU