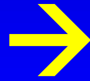
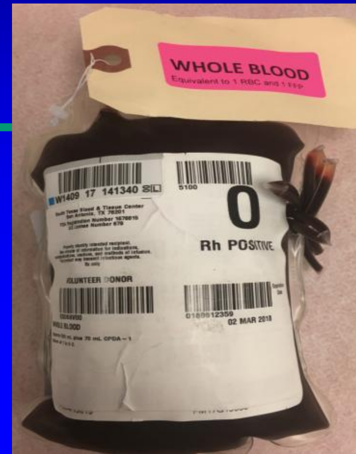
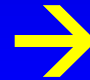
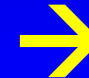
What Are the Evolving Blood Product "Solutions" for Managing Severe Hemorrhage, TBI, Burns, etc,?









Paul E. Pepe, MD, MPH, FAEMS, MCCM, FACEP MACP, FRCP, FFSEM

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Medical Director , Dallas County (TX) Public Safety and Emergency Medical Services

Global Coordinator, Metropolitan EMS Medical Directors Alliance, Earth, Solar System

DISCLOSURE for Continuing Medical Education Purposes

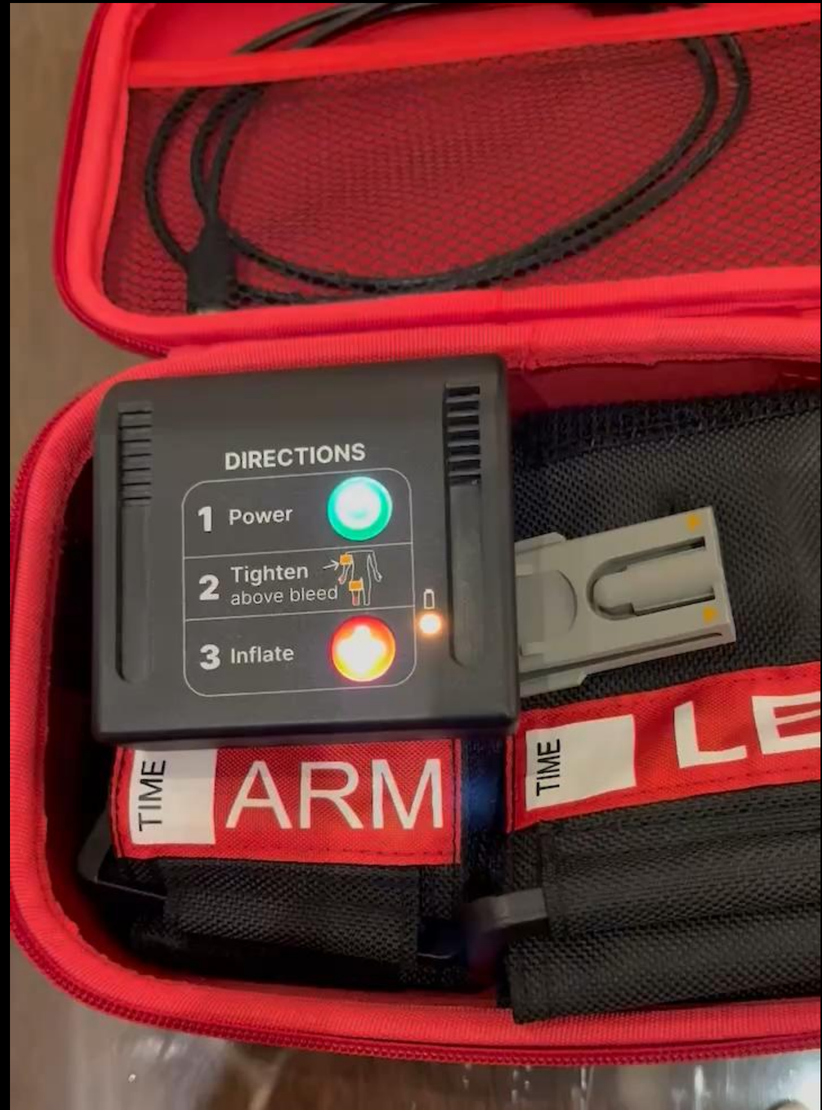
- **This activity has been planned and implemented in accordance with the accreditation requirements and policies of the *Accreditation Council for Continuing Medical Education* (ACCME) through the joint providership of White Coat Institute (d.b.a. *GetMyCME*) and the *Gathering of Eagles* alliance.**

- **The White Coat Institute is accredited by the ACCME to provide continuing medical education for physicians.**

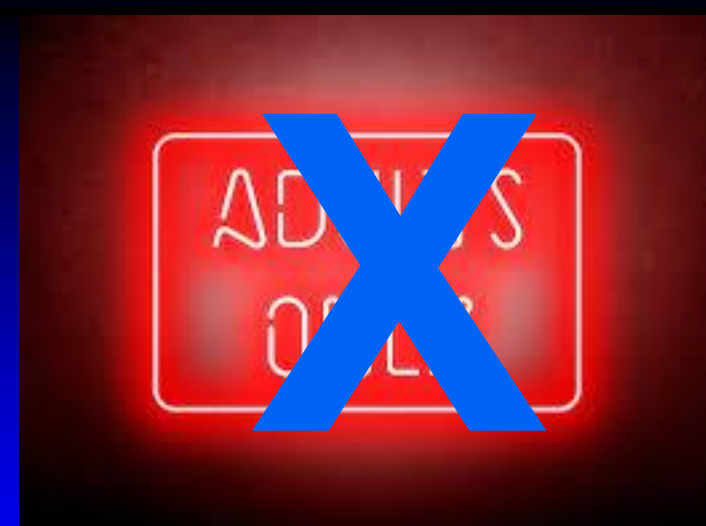
- **None of the planners for this educational activity have relevant financial relationship(s) to disclose with ineligible companies whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.**

So Where Did We Leave Off This Morning?

TO STOP BLEED
AutoTQ™ Tourniquet
theAutoTQ.com | A Golden Hour Medical, Inc. Innovation


DIRECTIONS
1 Power
2 Tighten above bleed
3 Inflate
TIME
ARM
TIME

Giving Blood in the Field…



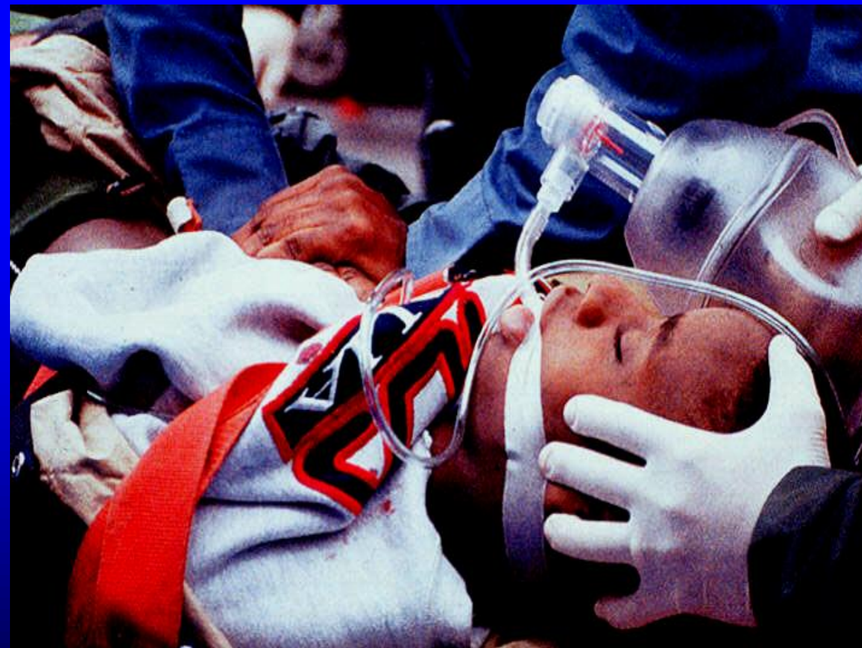
Hemorrhage after Tonsillectomy

Causes, types and management

Dr. Krishna Koirala

OBSTETRICAL HEMORRHAGE

- Antepartum hemorrhage
  - Abruptio placenta – No. 1 cause of death
  - Placenta previa
- Postpartum bleeding
  - Uterine atony – No. 3
  - Placenta accreta, increta, percreta
  - Uterine inversion
  - Laceration/Uterine Rupture – No. 2
  - Other



NBC NEWS INVESTIGATES

CALLS FOR RESCUE VEHICLES TO CARRY BLOOD

The Dallas Morning News

She was bleeding to death. A new treatment on Dallas ambulances helped save her life

Dr. Kate Krause, a Dallas emergency medicine physician, received transfusions on an ambulance as she
from postpartum hemorrhage.

By **Lauren Caruba**
Investigative reporter

Aug. 21, 2025 | Updated 6:00 a.m. CDT | 3 min. read

But ....

The Truth is Rarely Pure...

...and Never Simple

Oscar Wilde

"Dirty" Harry Callahan

Magnum Force (1973)

Whole Blood Program Requires:

- Close Cooperation with Blood Collectors
  (to produce Whole Blood vs. Components & to ID Low Titer Donors)
- Designated Trauma Ctr & Other Major Hospitals
  (that will exchange blood, take up expiring units, & create datasets)
- Community Donor Programs & Govt. Support
  ("Heros in Arms", Legislative Funding & Cost-Savings)
- Document Life- , Cost- and Supply-Saving,
  (mitigate massive transfusions, insurance costs and prosecutions)

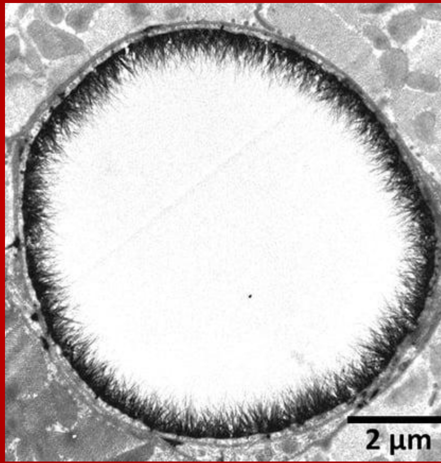
What's the Source?

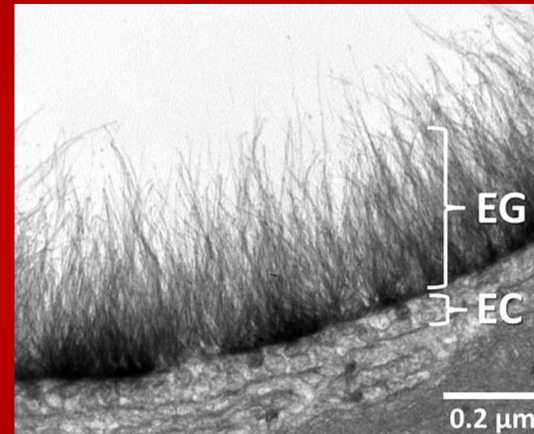
Still ….

Not Enough Whole Blood Supply for Every Ambulance --- and Never Will Be …

Instead – In Our Country …
… Medics Usually Need to Wait for an "Intercept" from a Supervisor Vehicle That Carries the Stored Whole Blood or an Air Medical Team…

My Answer Then --- And Now :
We Can --- and Need to ---
Protect the Glycocalyx ASAP. !

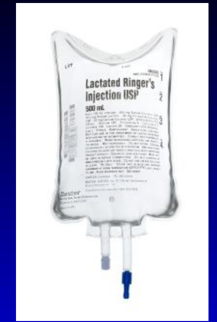




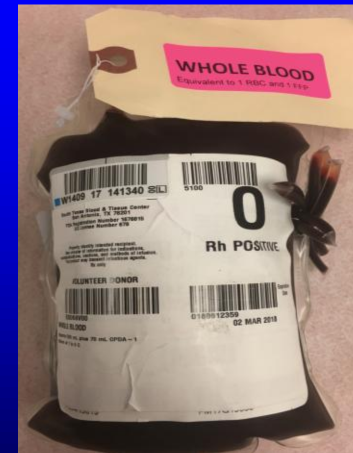
The Endothelial Glycocalyx (EG) Covering and "Caulking" the Endothelial Cells (EC)

(Which is Also Called the "Blood Brain Barrier" (BBB) in the Brain)

Evolving Thinking about the Endothelial Glycocalyx …

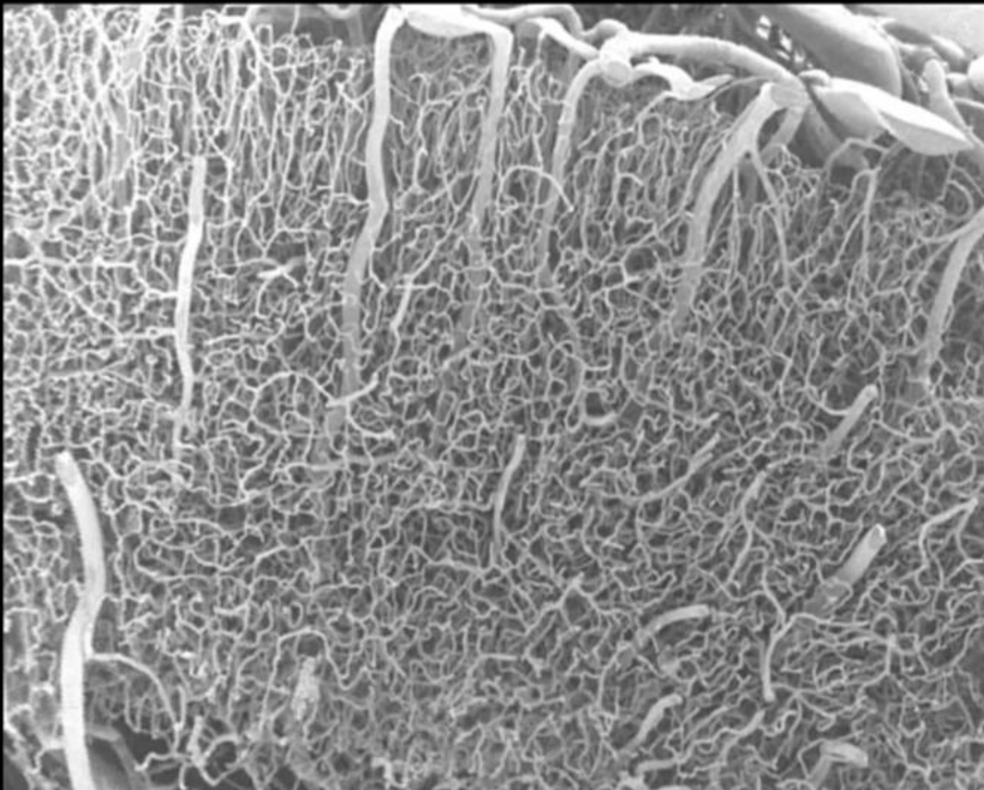


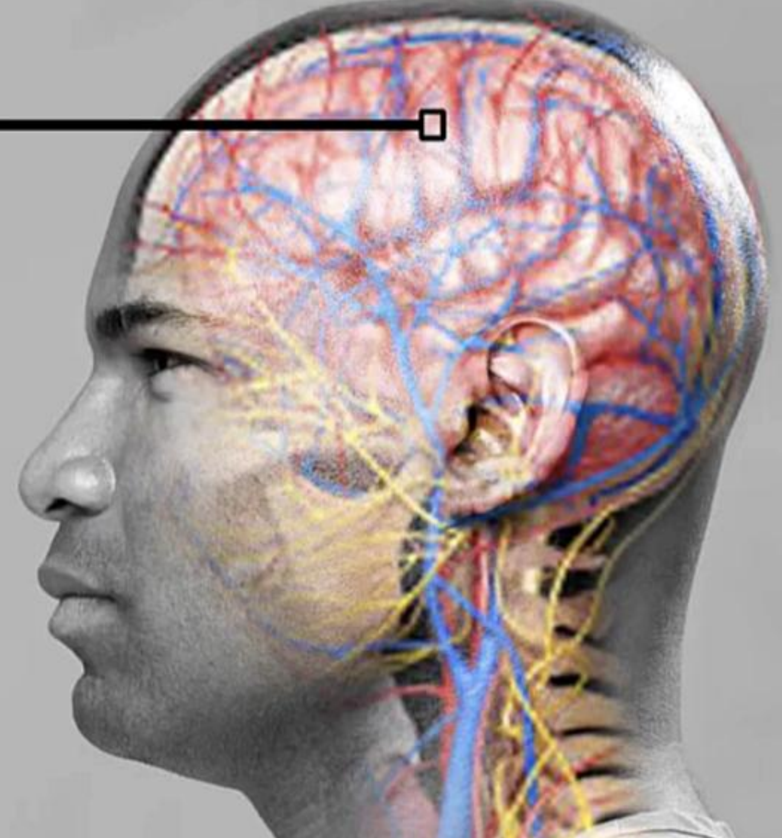
- Clear Fluids (e.g., Crystalloids) Disrupt It !
- Blood and Plasma Not Only Preserve It….
- They Seem to Heal It



So Why Would We Use Plasma for TBI?

What Is Brain Made Of ?



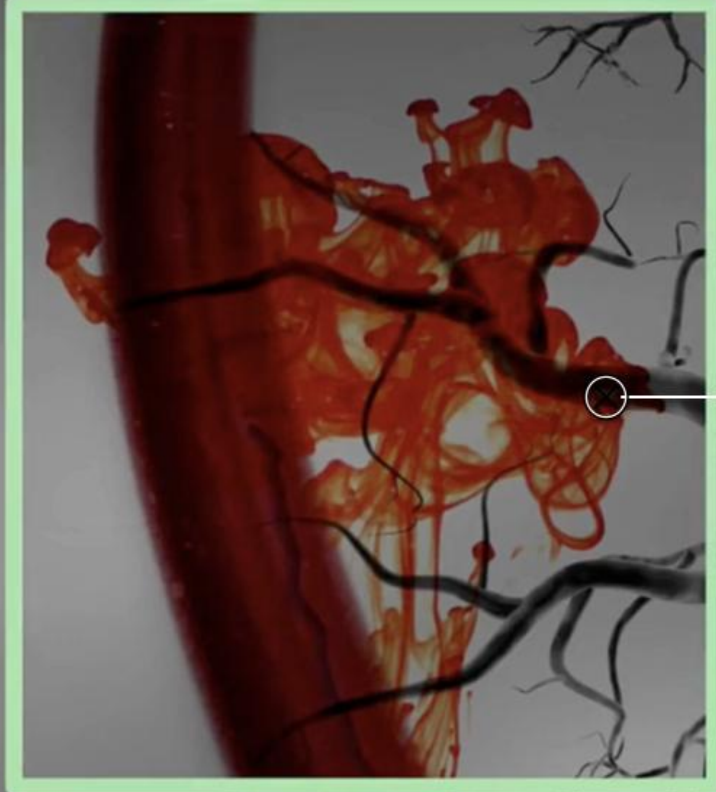


- **Brain Not Just "Grey Matter"**
- **Actually Looks More Like Blood Vessels**
- **No Cell is >10 *u*m from a Capillary**
- **Every Neuron Has Its Own Capillary**
- **= 600 km of Capillary Network**

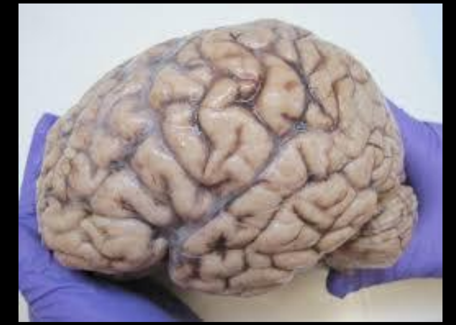
BUT –

DO IT EARLY ON !!!

Bottomline:



NEED TO STOP THE LEAK



So We Also Need to Protect the Glycocalyx Within the Cranium As Well !!

(aka -- the Blood Brain Barrier)

EMSWORLD PRINT ONLINE EXPO
EMS World November 2020; (49)11):14-17.

TXA IN TBI

Part 2: The earlier the intervention, the better the outcome

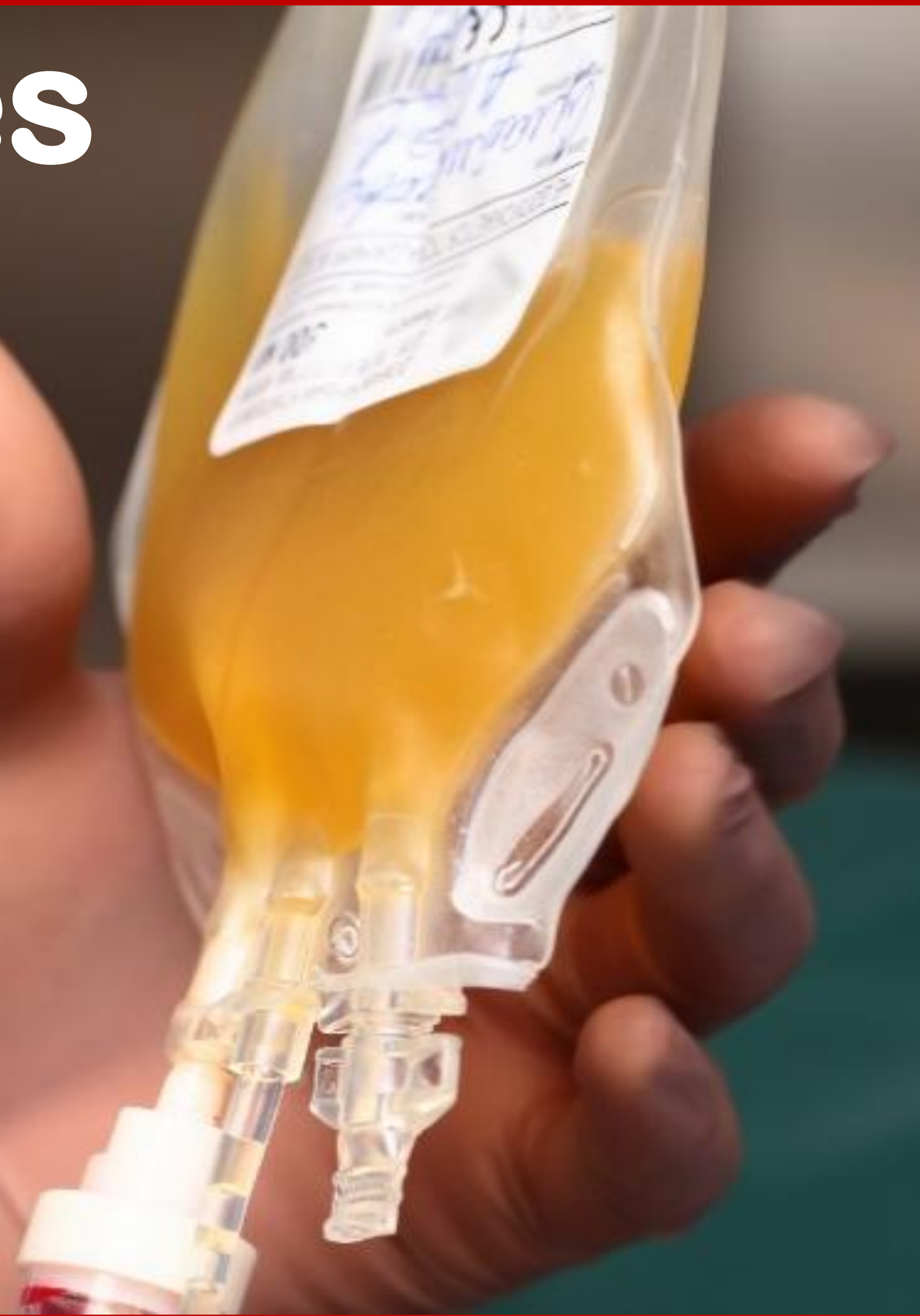
By Paul E. Pepe, MD, MPH, FAEMS, MCCM; Jonathan Jui, MD, MPH, FACEP, FAEMS; James P. Roach, DO, FACEP; and John B. Holcomb, MD, FACS

As discussed in last month's opening column about nonmechanical hemostasis in prehospital trauma care, the use of TXA had overall positive results when reported by the CRASH-2 investigators, who used it for presumed post-traumatic hemorrhage more than a decade ago.[1] Despite that apparent success and many other positive studies examined the use of TXA for those with mild to moderate head injury with the concern that if accompanying intracranial bleeding occurs, it can be life-threatening.[5]

The classic statement about patients with an epidural hematoma is that they are those who "first talked, then died." The relatively thin temporal bone is traversed by the middle meningeal artery (left or right), tion of TXA comes into play.

Like its predecessor trial in general trauma patients with bleeding, the number of patients enrolled in CRASH-3 was quite large, involving 175 hospitals in 29 countries. Published in November 2019, it was again a 1:1 trial of TXA for TBI vs. placebo. As in CRASH-2, the treatment protocol provided 1 gram over 10 minutes early on (within

And Same Applies for Plasma !



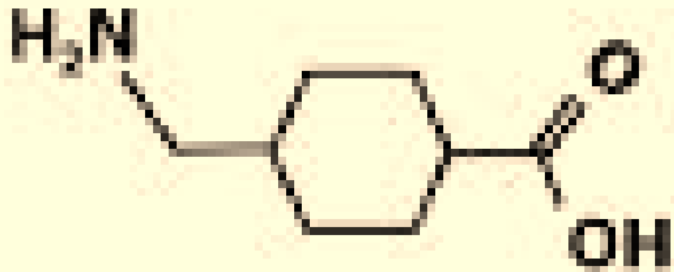
Head Injuries continued....

HEAD INJURIES WITH NEW ONSET GCS ≤ 12

- GCS of ≤ 12 must be assessed prior to any sedation medication administration
- PLASMA TRANSFUSION:
  - Refer to the "Blood Product Transfusion" protocol (pp. 130-131) for PLASMA administration procedure
  - Adult:
    - 1 unit IV/IO, deliver over 5-10 minutes utilizing the LifeFlow device.
      - **Exception:** If SBP < 120 mmHg, deliver as rapid infusion
    - May repeat 1x prn, if SBP is < 120 mmhg after the first unit is delivered
      - Max total dose 2 units
  - Pediatric:
    - 10mL/kg IV/IO, deliver over 5-10 minutes utilizing the LifeFlow device.
      - **Exception:** If age appropriate hypotension is present, deliver as rapid infusion
    - Max total dose 1 unit

As Implied --- Every ALS Unit *Can* Protect the Glycocalyx …

…. with TXA and Plasma



OTHER FORMULATIONS ?

Salsa Verde!

> Crit Care Med. 2010 Oct;38(10 Suppl):S620-9. doi: 10.1097/CCM.0b013e3181f243a9.

Rationale for routine and immediate administration of intravenous estrogen for all critically ill and injured patients

Jane G Wigginton [1], Paul E Pepe, Ahamed H Idris

Affiliations + expand

PMID: 21164406 DOI: 10.1097/CCM.0b013e3181f243a9

But Most Importantly …

Spray Dried Plasma

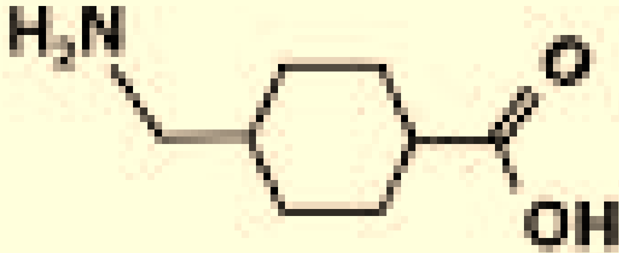
Estimated Early 2028’

Multi-Year Shelf Life & No Refrigeration, etc

Plan/Budget Now for Use on Every ALS Response Unit ?

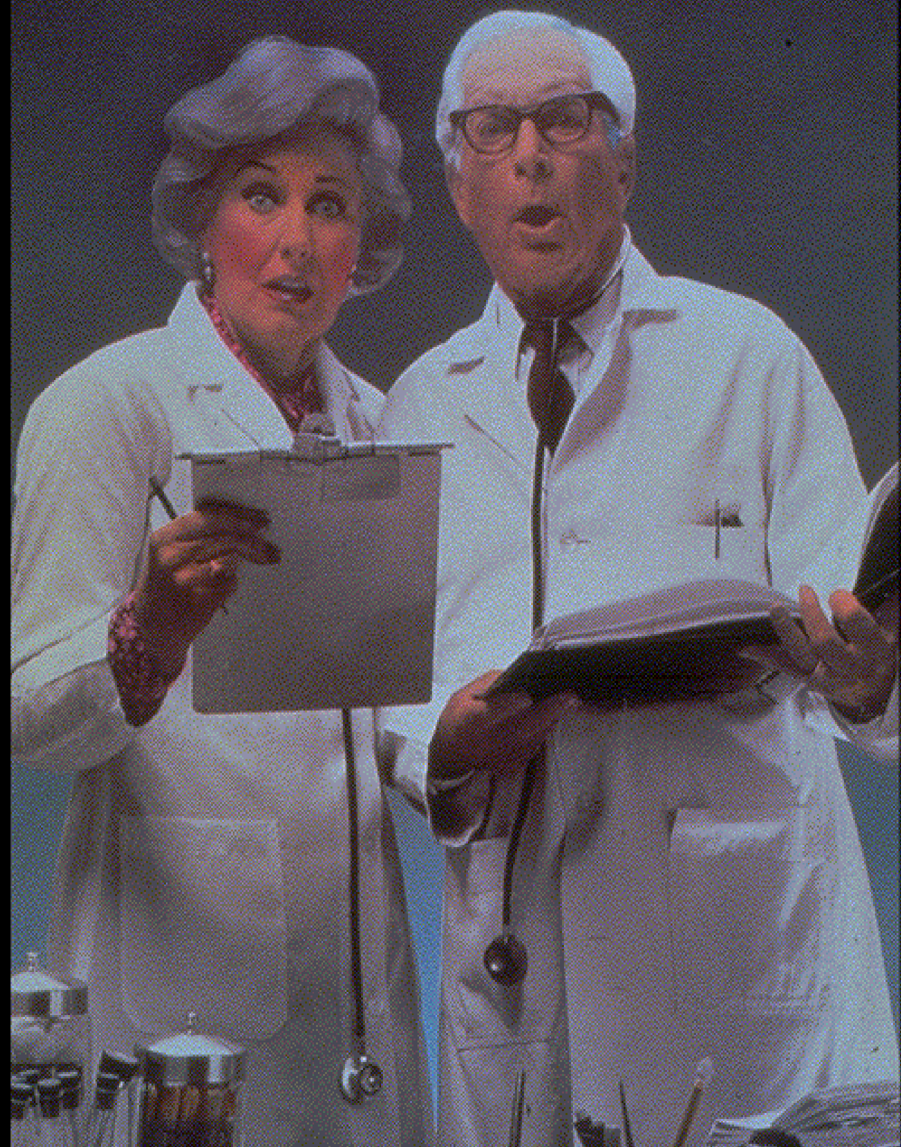
Eventually We Can Stock and Use On Any and Every First-in Advance Life Support Unit !

…And with NBA Trainers !



On the Road to the 22nd Century...

You mean you're still ALIVE!?



We’ll Make Life for Future Generations ….

I’m Paul Pepe …

… and I Approved this Message

Grazie Mille !

LARGE BREATH INFREQUENTLY !!