

Should we use the Anti-fibrinolytics?

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ORIGINAL ARTICLE

Tranexamic acid reduces blood loss and financial cost in primary total hip and knee replacement surgery

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Balancing Act



Minimize Bleeding **Preventing Clots**

Blood Loss in TKA

- **Surgical technique**
- **Tourniquet**
- **Controlled hypotension**
- **Blood salvage**
- **Hemodilution**
- **Pharmacologic agents**
 - **Antifibrinolytics**

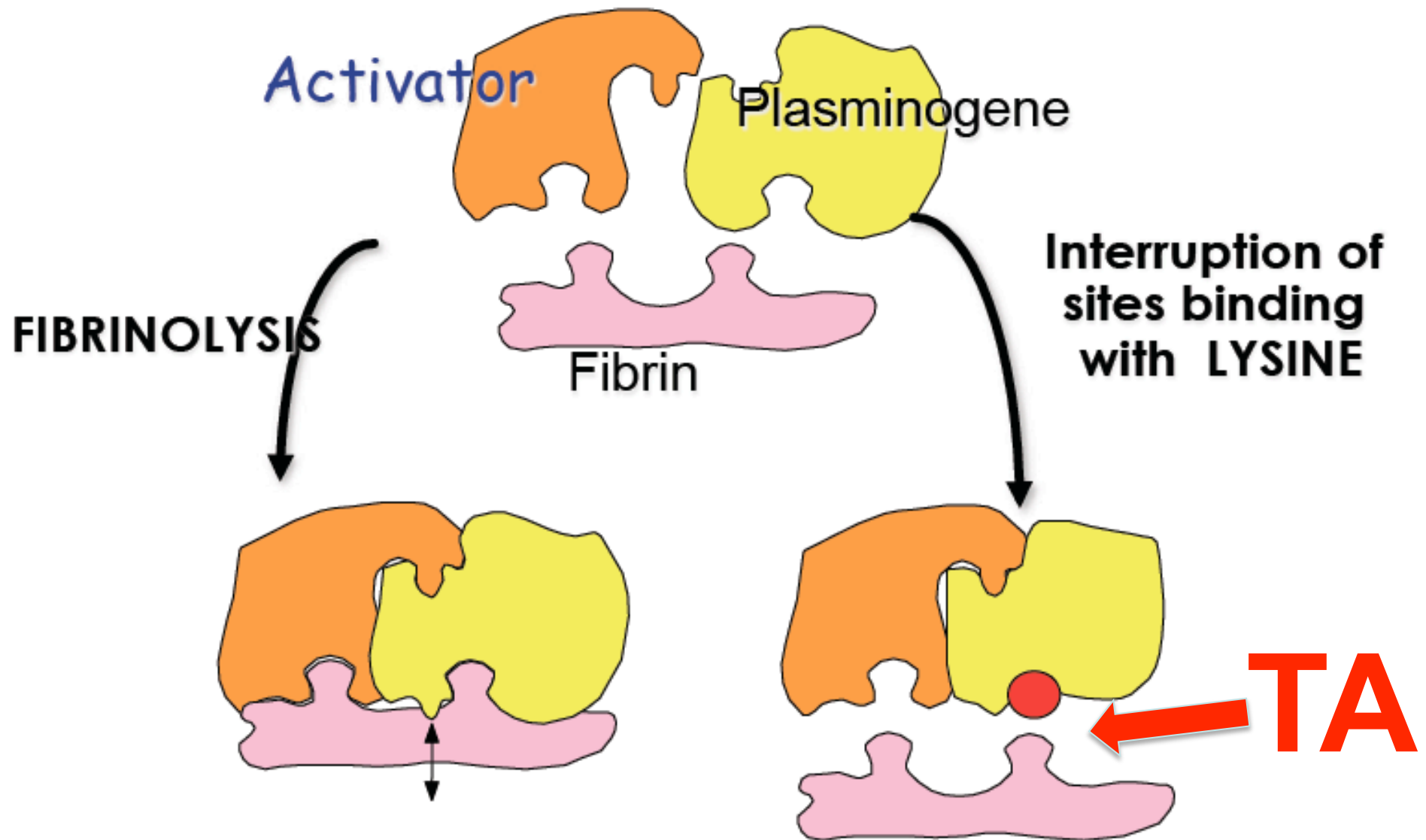


Antifibrinolytic Agents

- **Tranexamic acid (TA)**
 - **Cyklokapron**
- **ϵ -aminocaproic acid (EACA)**
 - **Amicar**
- **Aprotinin**



Antifibrinolytics : Mechanism of action



1. IV dose?
2. Topical?
3. Oral?
4. How efficient is it?
6. Complications of TX?
5. Cost?



IV Doses ?

1 g (i.e. 15 mg/kg) per injection



Standard protocol

1g before and 1g at wound closure

Also described :

1 dose before incision, one dose before closure

Before the incision (15 to 30 mn) , at wound closure, and every 6 hours for 24 hours there after.

Before the incision (15 to 30 mn) , at wound closure, and every 6 hours for 24 hours thereafter + 5 days oral

IV admistration?

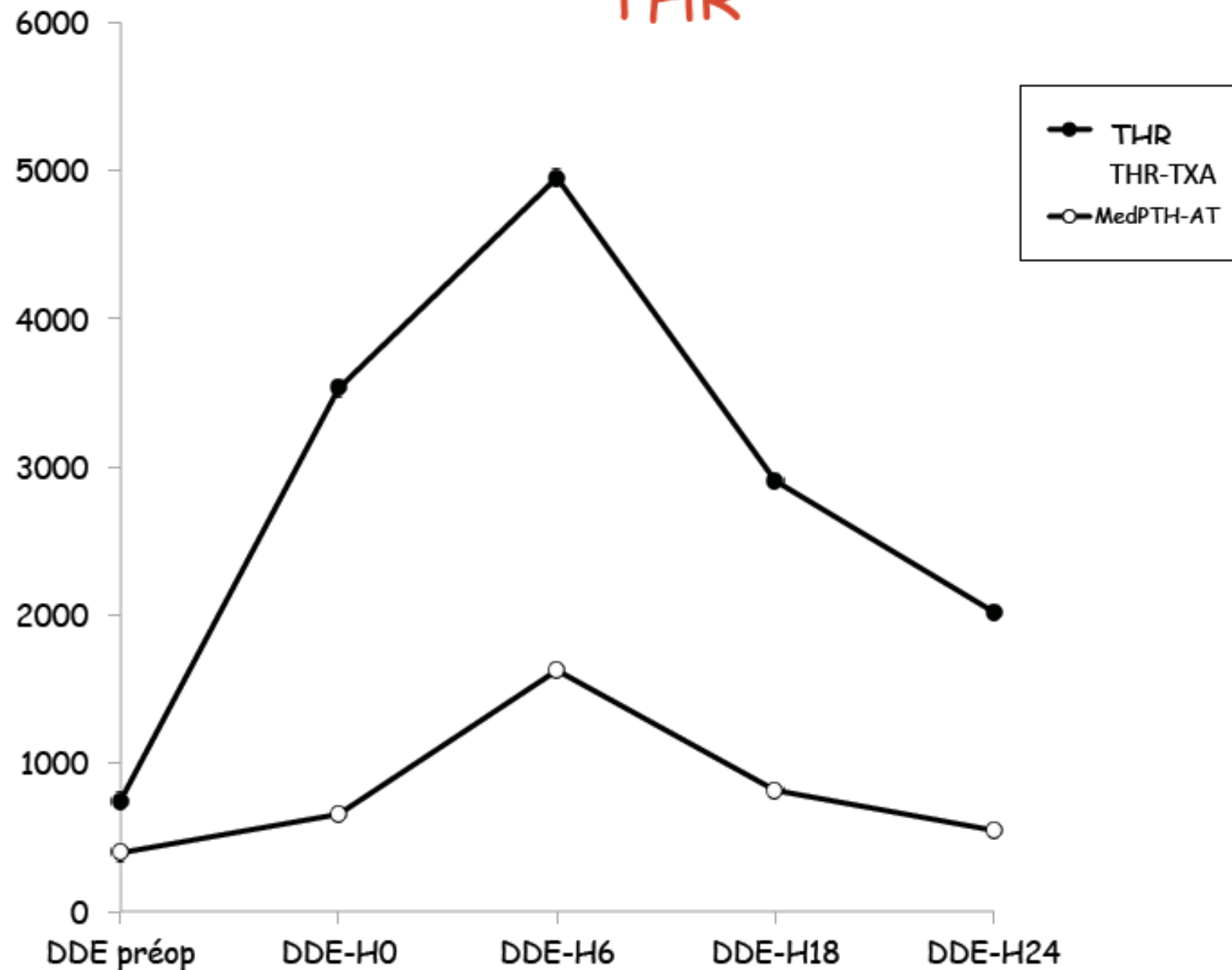
Double Dose seems to be the most efficient

Iwai T: Int Orthop. 2013 Mar;37(3):441-5. **Repeat-dose intravenous tranexamic acid further decreases blood loss in total knee arthroplasty**

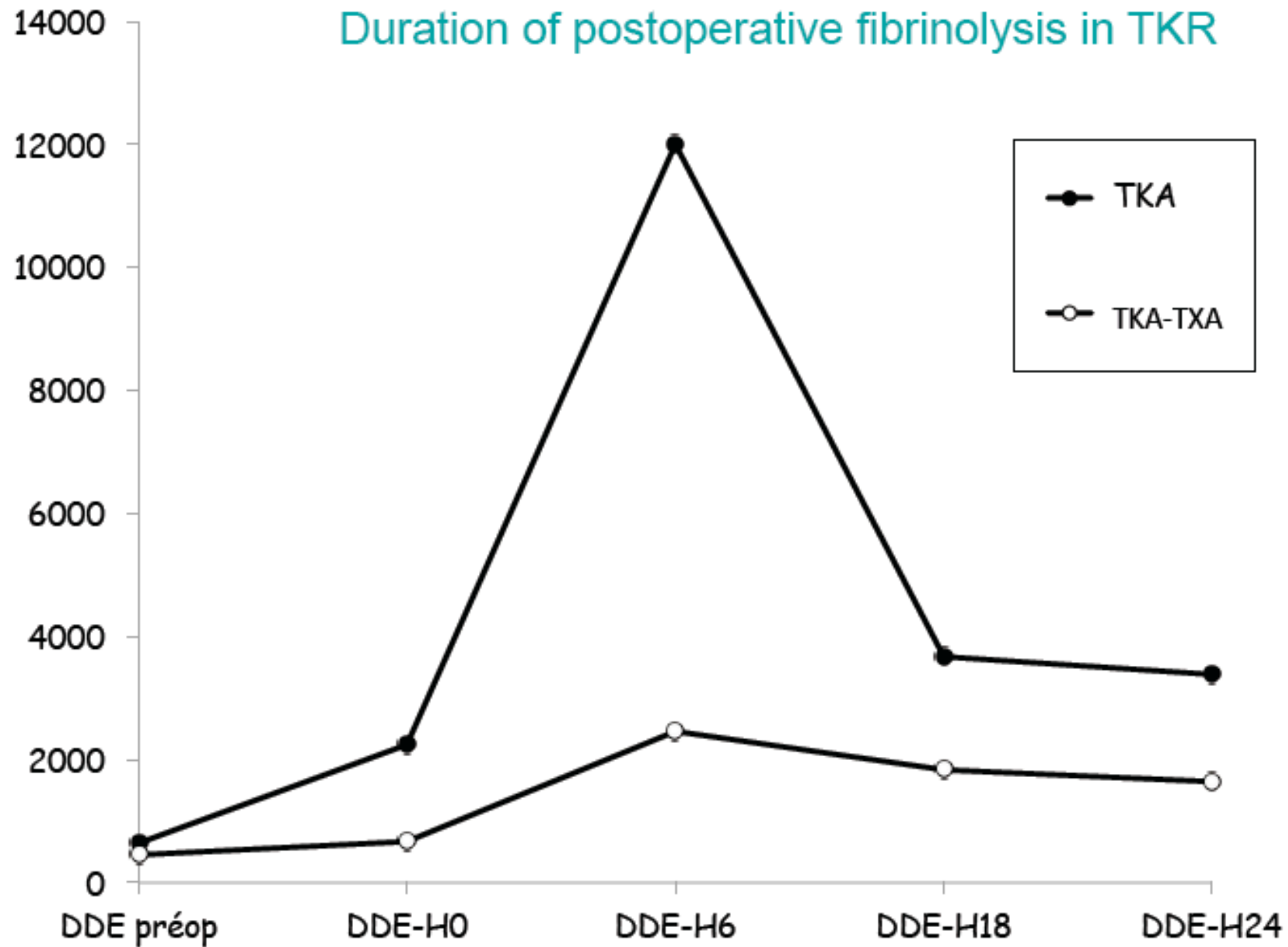
Hourlier H.: Single dose intravenous tranexamic acid as effective as continuous infusion in primary total knee arthroplasty: a randomised clinical trial. Arch Orthop Trauma Surg. 2015 Apr;135(4):465-71.

But 30 mg/ kg

Duration of postoperative fibrinolysis in THR



Duration of postoperative fibrinolysis in TKR



Topical ?

Topical is efficient

Optimal dose: has still to be defined

High Doses : 3 g

Alshryda S, Sukeik M, Sarda P, Blenkinsopp J, Haddad FS, Mason JM, A systematic review and meta-analysis of the topical administration of tranexamic acid in total hip and knee replacement. Bone Joint J. 2014

Potential for combined Use

Pre-op IV

Topical at the end of the surgery

The Efficacy of Combined Use of Intraarticular and Intravenous Tranexamic Acid on Reducing Blood Loss and Transfusion Rate in Total Knee: Lin SY, Chen CH, Fu YC, et al. Arthroplasty. J Arthroplasty 2015;30(5):776-80.

Oral ?

Limited data in the literature to support the use of TA oral alone

Charoencholvannich K Siriwattanasakul P. Tranexamic acid reduces blood loss and blood transfusion after TKA: a prospective randomized controlled trial. Clin Orthop Relat Res. 2011 Oct;469(10):2874-80

How efficient ?

- **Decreased blood loss by 505 mL**
– **$p < 0.0001$**
- **Transfusion decreased 1.5 units / pt**
– **$p < 0.0001$**



Yang et al. *JBJS*. 2012

Cochrane Review. 2011

Kagoma et al. *Thromb Res*. 2009

Cid et al. *Transfusion*. 2005

Ho et al. *Anaesthe Intensive Care*. 2003

Wei Z, Liu M1 The effectiveness and safety of tranexamic acid in total hip or knee arthroplasty: a meta-analysis of 2720 cases. *Transfus Med*. 2015 Jun;25(3):151-62. 12212.

How safe is TA ?

- **No difference in VTE**

– **OR = 0.75**

– **p = 0.48**

Yang et al. JBJS. 2012



Clin Orthop Relat Res (2014) 472:66–72
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SYMPOSIUM: 2013 KNEE SOCIETY PROCEEDINGS

Preliminary Results Suggest Tranexamic Acid is Safe and Effective in Arthroplasty Patients with Severe Comorbidities

Daniel R. Whiting MD, Blake P. Gillette MD,
Christopher Duncan MD, Hugh Smith MD, PhD,
Mark W. Pagnano MD, Rafael J. Sierra MD

Cost €

1A 500mg = 0,39€

1cp 500mg = 0,20€

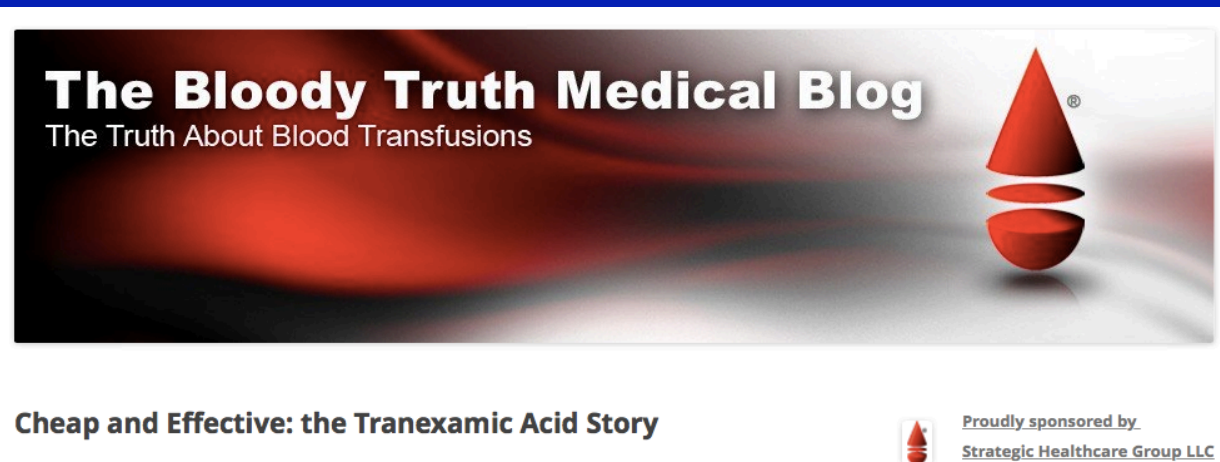


Cost

TA treatment : 6 g less than 10 EUROS

Cost decreased by 25 % (Erisson et al. OTSR 2012)

- **TA was associated with statistically lower total direct hospital costs (\$1000/case) *Mayo Clinic Study***



The Bloody Truth Medical Blog
The Truth About Blood Transfusions

Cheap and Effective: the Tranexamic Acid Story

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The banner features a red, stylized blood drop icon on the right side. The background is a blurred image of a blood transfusion set.

Conclusion

Is TA efficient and safe? YES

IV: 1 g before and 1 g at closure

Topical can be an efficient alternative

No oral alone

Combined IV and topical use promising

Cost-efficiency of TA is High