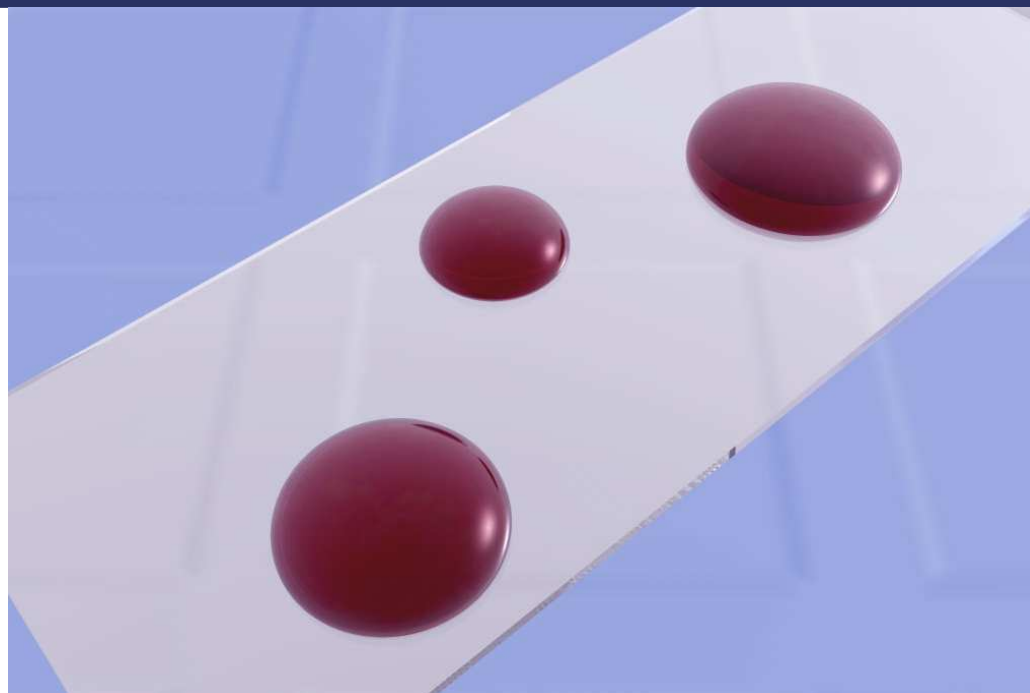


Antifibrinolytika v (kardio)anestézii.

prof. MUDr. Tomáš Vaněk, CSc.

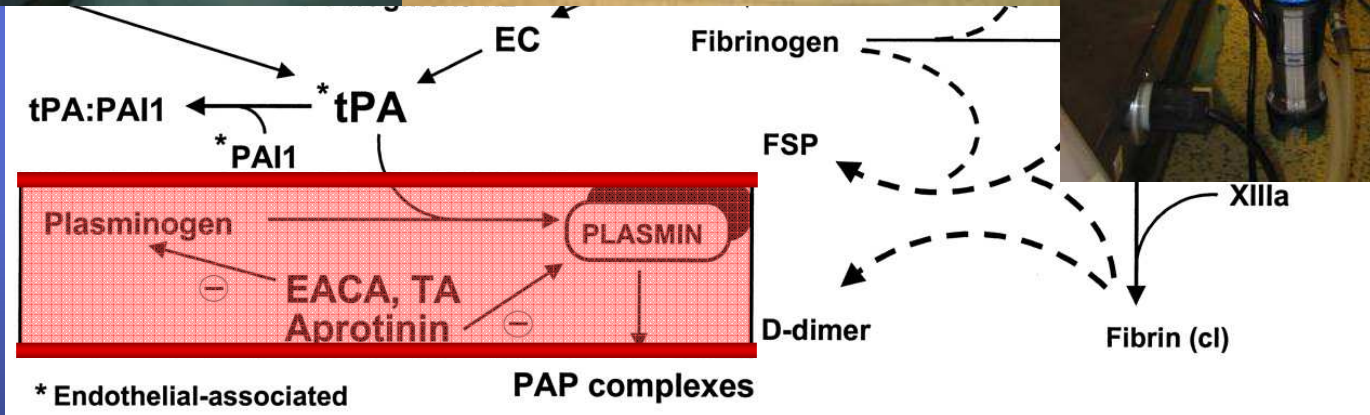
Kardiochirurgická klinika
3. LF UK a FNKV, Praha

XVI. Kongres ČSARIM
3.10.2009



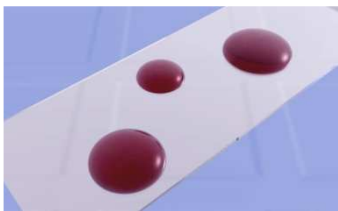


Fibrinolytická aktivita



THE ANNALS OF
THORACIC SURGERY

Despotis, G. J. et al.: Ann Thorac Surg 2001;72:1821S-1831S



Fibrinolytická aktivita

doi:10.1510/icvts.2007.161463

INTERACTIVE
CARDIOVASCULAR AND
THORACIC SURGERY

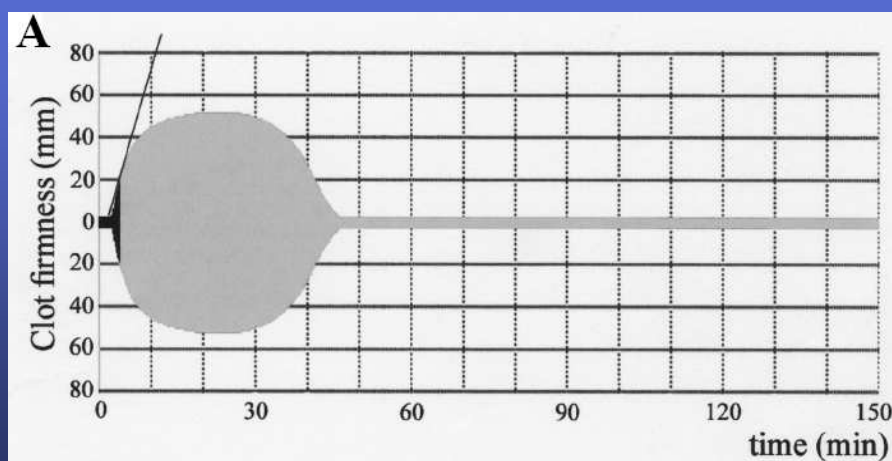
Interactive CardioVascular and Thoracic Surgery 6 (2007) 700-704

www.icvts.org

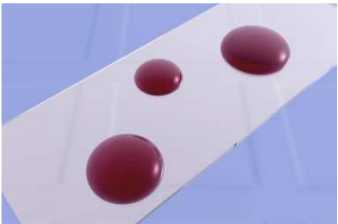
Work in progress report - Coronary Fibrinolysis in coronary artery surgery: detection by thromboelastography[☆]

Tomas Vanek^{a,*}, Martin Jares^a, Jana Snircova^a, Marek Maly^b

Interact Cardiovasc Surg 2007;6:700-704



52,2%



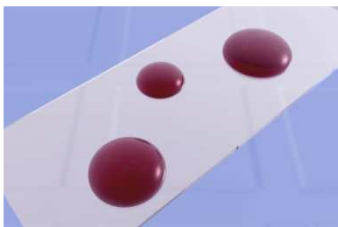
Fibrinolytická aktivita

A retrospective survey of fibrinolysis as an indicator of poor outcome after cardiopulmonary bypass and a possible early sign of systemic inflammation syndrome

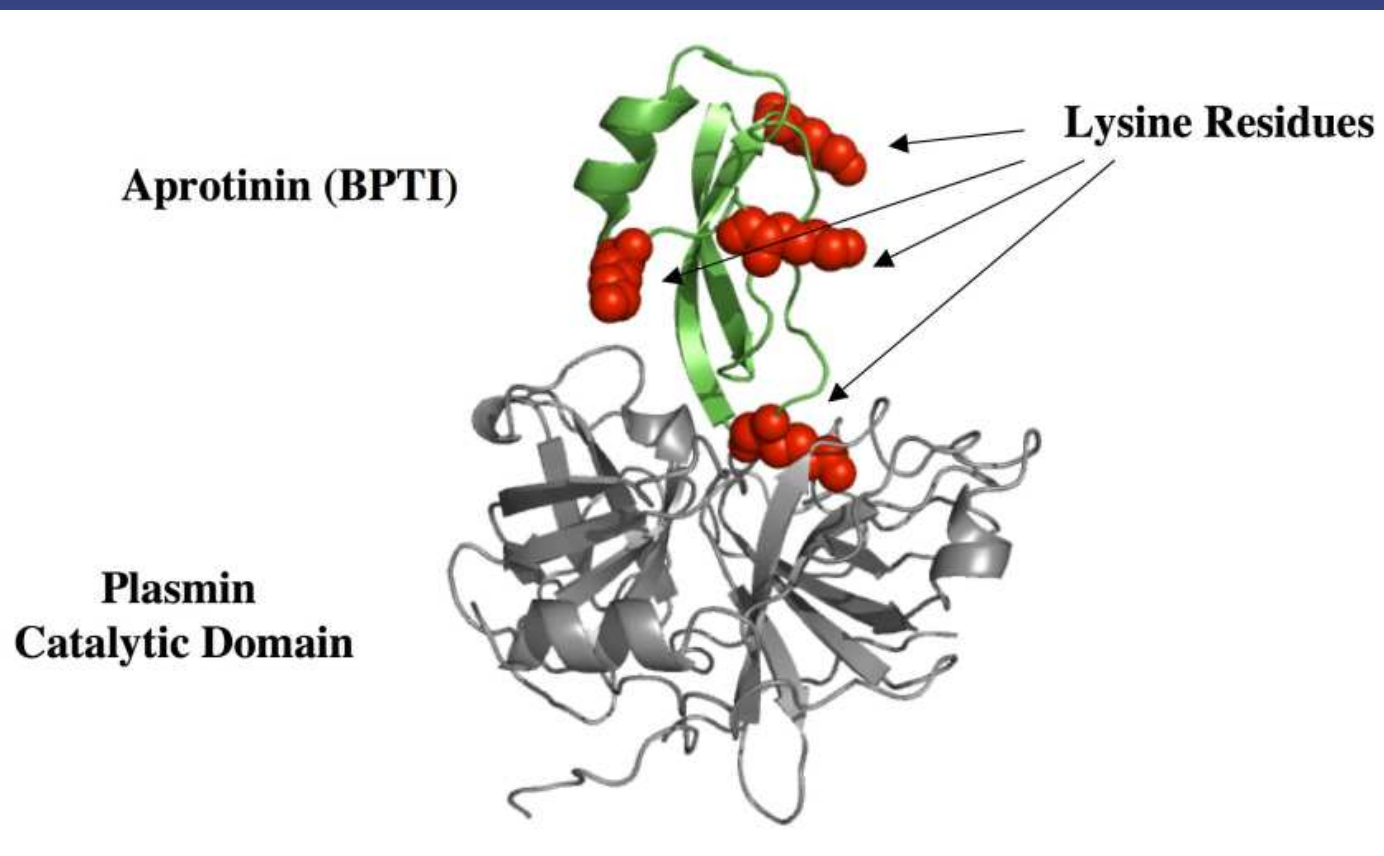
K. Cvachovec*, M. Horáček* and I. Vislocký†

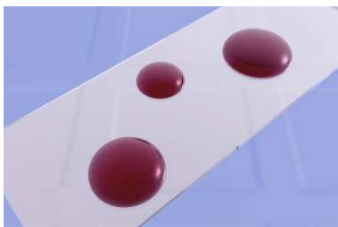
Eur J Anaesth 2000;17:173-176

Variables	Fibrinolysis after CPB*	Non-fibrinolysis after CPB*	<i>P</i>
Mortality	3/20 (15%)	0/123 (0%)	<i>P</i> = 0.0024
Volume of colloids administered (mL)*	1784 ± 707	1338 ± 791	<i>P</i> = 0.0328
Frequency of norepinephrine support (number/%)	8/20 (40.0%)	22/122 (18.0%)	<i>P</i> = 0.028
Duration of norepinephrine support (h) – where applicable*	80.4 ± 62.9	29.7 ± 21.3	<i>P</i> = 0.016

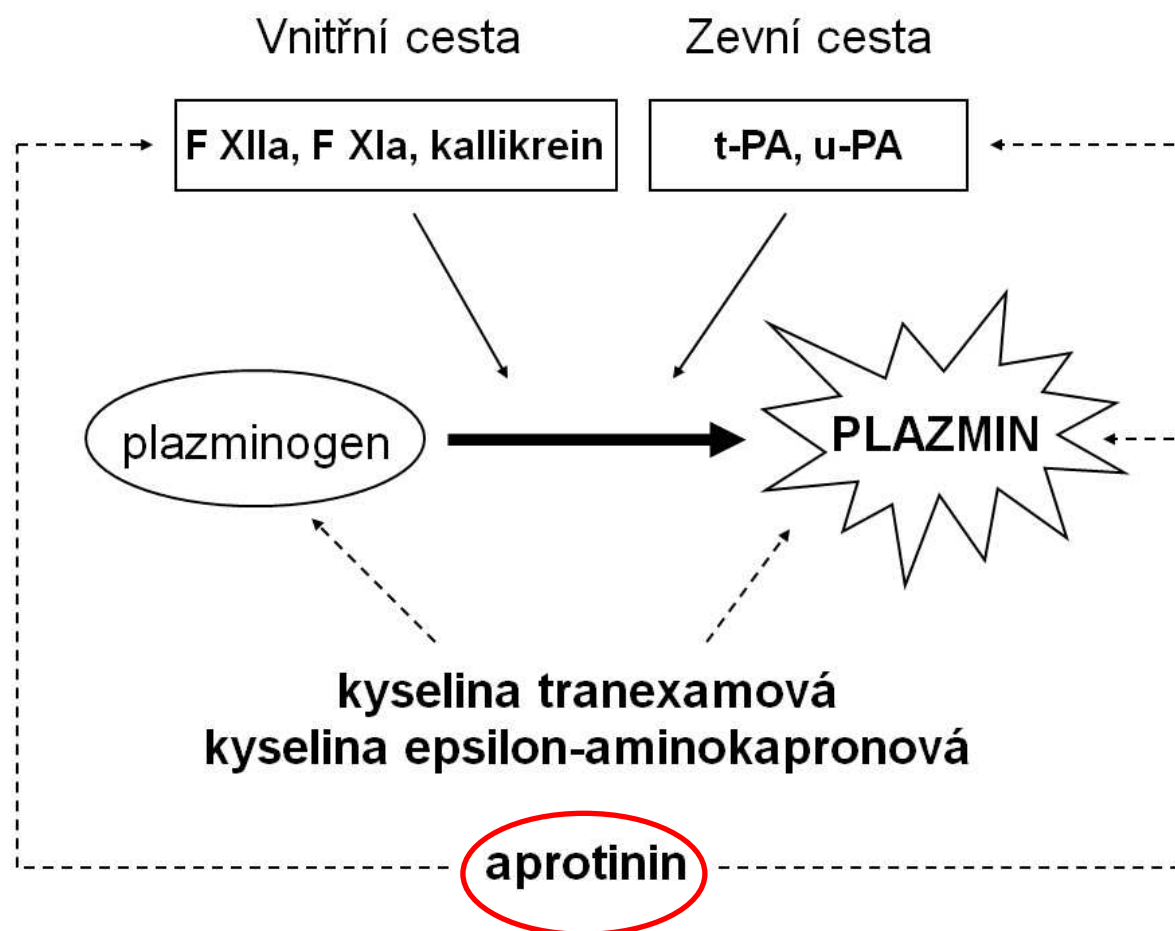


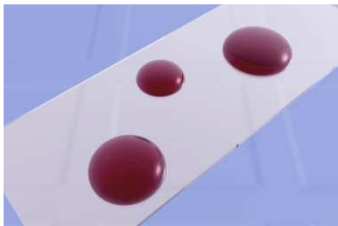
Aprotinin





Aprotinin





Aprotinin

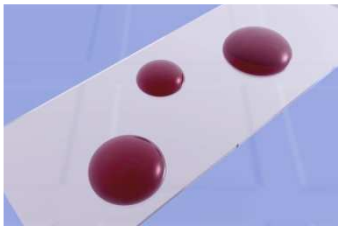
**Intensive
Care Medicine**
© Springer-Verlag 1987

Organ dysfunction after cardiopulmonary bypass. A systemic inflammatory reaction initiated by the extracorporeal circuit

S. Westaby

Department of Surgery, Hammersmith Hospital and Royal Postgraduate Medical School, London, UK

Intensive Care Med 1987;2:89-95



Aprotinin

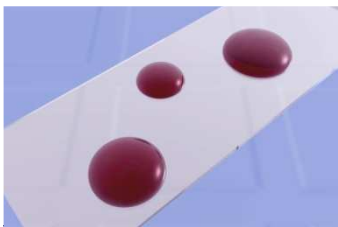
THE LANCET

EFFECT OF APROTININ ON NEED FOR BLOOD TRANSFUSION AFTER REPEAT OPEN-HEART SURGERY

D. Royston^{b, a}, K. M. Taylor^{b, a}, B. P. Bidstrup^{b, a} and R. N. Sapsford^{b, a}

Lancet 1987;8571:1289-1291





Aprotinin

Pharmacological strategies to decrease excessive blood loss in cardiac surgery: a meta-analysis of clinically relevant endpoints

Marcel Levi, Manon E Cromheecke, Evert de Jonge, Martin H Prins, Bas J M de Mol, Ernest Briët, Harry R Büller

Lancet 1999;9194:1940-1947

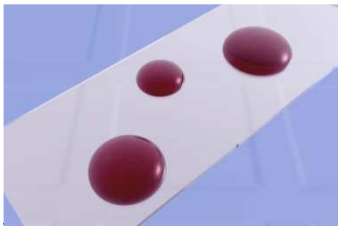
Effect of aprotinin on clinical outcomes in coronary artery bypass graft surgery: A systematic review and meta-analysis of randomized clinical trials

Artyom Sedrakyan, MD, PhD^{a,b,d}

Tom Treasure, MD, FRCS^{b,c}

John A. Eleftheriades, MD, FACS^a

J Thorac Cardiovasc Surg 2004;128:442-448



Aprotinin

ANALYSES OF CORONARY GRAFT PATENCY AFTER APROTININ USE: RESULTS FROM THE INTERNATIONAL MULTICENTER APROTININ GRAFT PATENCY EXPERIENCE (IMAGE) TRIAL

Edwin L. Alderman, MD^a

Jerrold H. Levy, MD^b

Jeffrey B. Rich, MD^c

Moshe Nili, MD^d

Bernardo Vidne, MD^d

Hartzell Schaff, MD^e

Gideon Uretzky, MD^f

Gosta Pettersson, MD^g

Jens J. Thiiis, MD^g

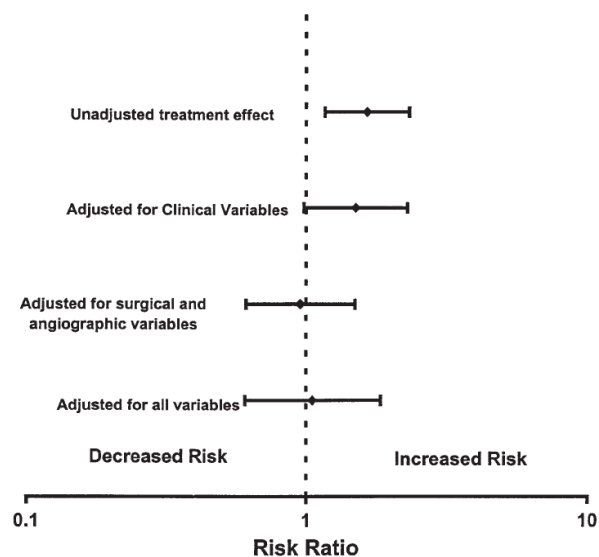
Charles B. Hantler, MD^h

Bernard Chaitman, MDⁱ

Andrea Nadel, PhD^j

On behalf of the IMAGE Investigators*

J Thorac Cardiovasc Surg 1998;116:716-730



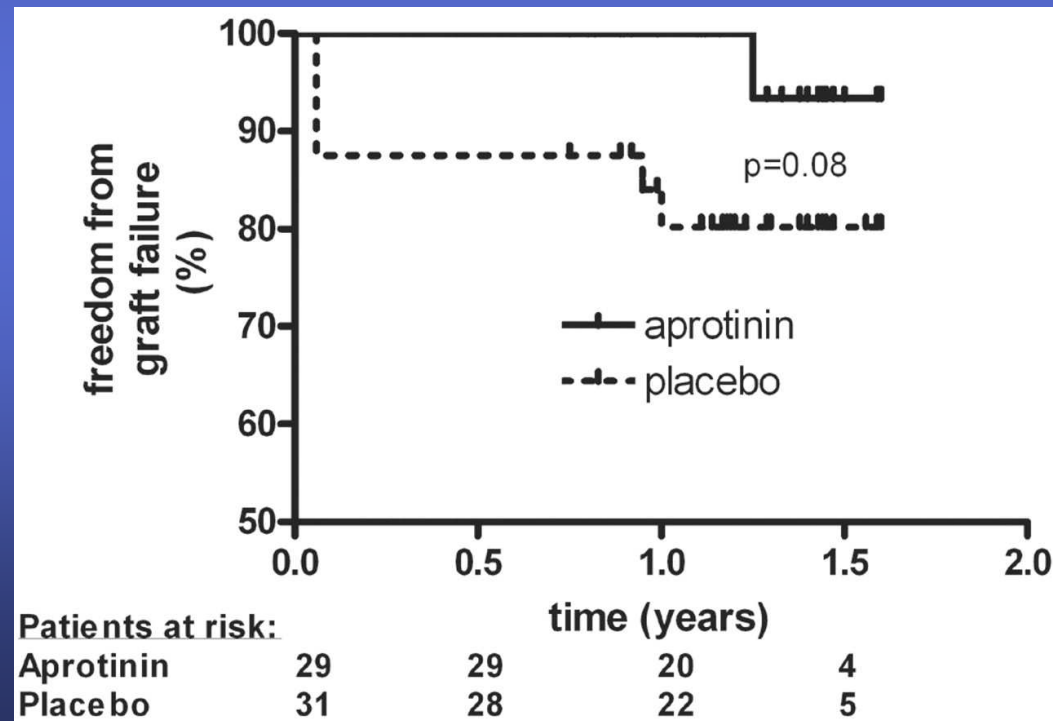
Průchodnost bypassů, aprotinin (plná čára) versus placebo (přerušovaná čára)

Aprotinin Shows Both Hemostatic and Antithrombotic Effects During Off-Pump Coronary Artery Bypass Grafting

Robert S. Poston, MD, Charles White, MD, Junyan Gu, MD, PhD, James Brown, MD, James Gammie, MD, Richard N. Pierson, MD, Andrew Lee, Ingrid Connerney, RN, DrPH, Thrity Avari, MS, Robert Christenson, PhD, Udaya Tandry, PhD, and Bartley P. Griffith, MD

Departments of Surgery, Radiology, Clinical Effectiveness, and Pathology, University of Maryland School of Medicine, Baltimore, Maryland; Chronolog Corp, Havertown, Pennsylvania; and Sinai Center for Thrombosis Research, Baltimore, Maryland

Ann Thorac Surg 2006;81:104-111



Troponin I



European Journal of Cardio-thoracic Surgery 28 (2005) 563-568

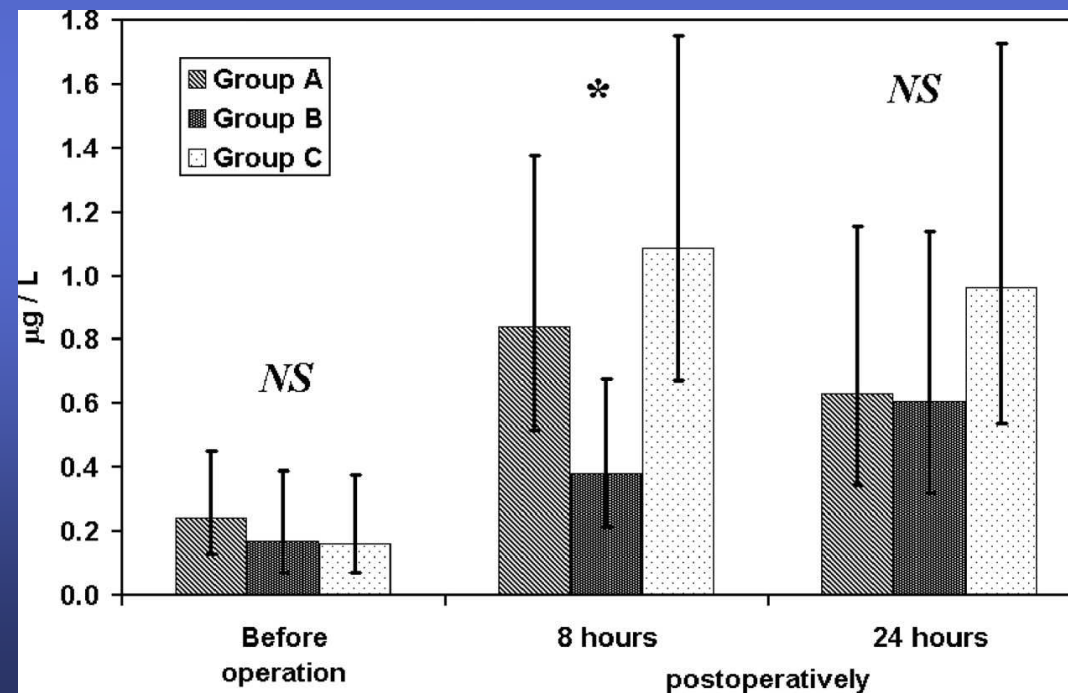
EUROPEAN JOURNAL OF
CARDIO-THORACIC
SURGERY

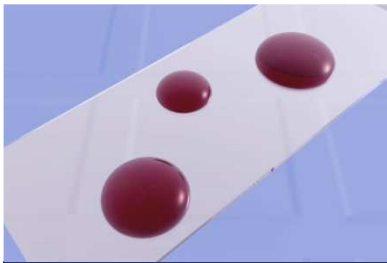
www.elsevier.com/locate/ejcts

Fibrinolytic inhibitors in off-pump coronary surgery: a prospective, randomized, double-blind TAP study (tranexamic acid, aprotinin, placebo)

Tomas Vanek^{a,*}, Martin Jares^a, Richard Fajt^a, Zbynek Straka^a, Karel Jirasek^a,
Miroslav Kolesar^a, Petr Brucek^a, Marek Maly^b

Eur J Cardio-thorac Surg 2005;28:563-568





Troponin I

Aprotinin reduces troponin I levels in OPCABG

To the Editor:

Tomas Vanek, MD, PhD

Martin Jares, MD

Zbynek Straka, MD, PhD

on behalf of MSM0021620817 study group

Ann Thorac Surg 2006;82:1950-1951

Aprotinin Reduces Cardiac Troponin I Release and Inhibits Apoptosis of Polymorphonuclear Cells During Off-Pump Coronary Artery Bypass Surgery

Christophe Bert, MD, PhD,* Frederik De Buck, MD,* Paul Sergeant, MD, PhD,† Jan Van Hemelrijck, MD, PhD,*

Ahmad Kasran, MD, PhD,‡ Victor Van Duppen,§ Jan Ceuppens, MD, PhD,‡ Bart Meyns, MD, PhD,†

Michel Delforge, MD, PhD,§ and Patrick Wouters, MD, PhD*

J Cardiothorac Vasc Anest 2008;22:16-22



Aprotinin

Anti-fibrinolytic use for minimising perioperative allogeneic blood transfusion

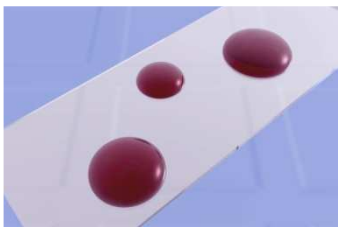
David A Henry¹, Paul A Carless², Annette J Moxey², Dianne O'Connell³, Barrie J Stokes²,
Brian McClelland⁴, Andreas Laupacis⁵, Dean A Fergusson⁶

¹Institute of Clinical Evaluative Sciences, Toronto, Canada. ²Discipline of Clinical Pharmacology, Faculty of Health, University of Newcastle, Newcastle, Australia. ³Cancer Epidemiology Research Unit, The Cancer Council NSW, Sydney, Australia. ⁴Scottish National Blood Transfusion Service, Edinburgh, UK. ⁵Department of Medicine, Li Ka Shing Knowledge Institute of St. Michael's Hospital, Toronto, Canada. ⁶Ottawa Health Research Institute, University of Ottawa Centre for Transfusion Research, Ottawa, Canada

Cochrane Database Syst Rev 2007:CD001886

Aprotinin does not appear to be associated with an increased risk of vascular occlusion and death...

...data do not exclude an increased risk of renal failure.



Aprotinin

A propensity score case-control comparison of aprotinin and tranexamic acid in high-transfusion-risk cardiac surgery

Keyvan Karkouti, W. Scott Beattie, Kathleen M. Dattilo, Stuart A. McCluskey, Mohammed Ghannam, Ahmed Hamdy, Duminda N. Wijeyesundera, Ludwik Fedorko, and Terrence M. Yau

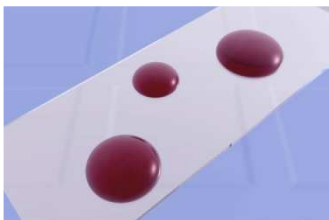
Transfusion 2006;46:327-338

The NEW ENGLAND JOURNAL of MEDICINE

The Risk Associated with Aprotinin in Cardiac Surgery

*Dennis T. Mangano, Ph.D., M.D., Iulia C. Tudor, Ph.D., and Cynthia Dietzel, M.D.,
for the Multicenter Study of Perioperative Ischemia Research Group
and the Ischemia Research and Education Foundation**

N Engl J Med 2006;354:353-365



Aprotinin



FDA Public Health Advisory Aprotinin Injection (marketed as Trasylo)

"The FDA will work with the authors of the publications and the manufacturer of Trasylo to carefully evaluate the risks and benefits associated with use of Trasylo in CABG".

<http://www.fda.gov/cder/drug/advisory/aprotinin.htm>



Aprotinin

The NEW ENGLAND JOURNAL *of* MEDICINE

ESTABLISHED IN 1812

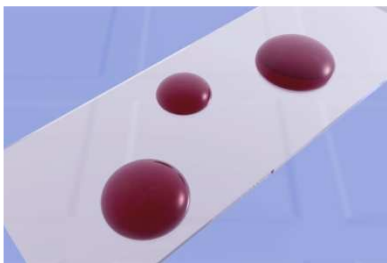
MAY 29, 2008

VOL. 358 NO. 22

A Comparison of Aprotinin and Lysine Analogues in High-Risk Cardiac Surgery

Dean A. Fergusson, M.H.A., Ph.D., Paul C. Hébert, M.D., M.H.Sc., C. David Mazer, M.D., Stephen Fries, M.D., Charles MacAdams, M.D., John M. Murkin, M.D., Kevin Teoh, M.D., M.Sc., Peter C. Duke, M.D., Ramiro Arellano, M.D., M.Sc., Morris A. Blajchman, M.D., Jean S. Bussières, M.D., Dany Côté, M.D., Jacek Karski, M.D., Raymond Martineau, M.D.,* James A. Robblee, M.D., M.B.A., Marc Rodger, M.D., M.Sc., George Wells, Ph.D., Jennifer Clinch, M.A., and Roanda Pretorius, M.Sc., for the BART Investigators†

NEJM 2008;358:2319-2331



Aprotinin

Aprotinin: 1 year on Wulf Dietrich

Departments of Anesthesiology and Transfusion
Medicine, Institute for Research in Cardiac Anesthesia
and Working Group of Perioperative Hemostasis,
University of Munich, Munich, Germany

Curr Opin Anaesthesiol 2009;22:121-127

Lessons Learned in Antifibrinolytic Therapy: The BART Trial

John M. Murkin, MD, FRCPC

Semin Cardiothorac Vasc Anesth 2009;13:127-131

Seminars in Cardiothoracic
and Vascular Anesthesia
Volume 13 Number 2
June 2009 127-131
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10.1177/1089253209338076
<http://scv.sagepub.com>



Aprotinin

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812

MAY 29, 2008

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2331 pacientů

aprotinin

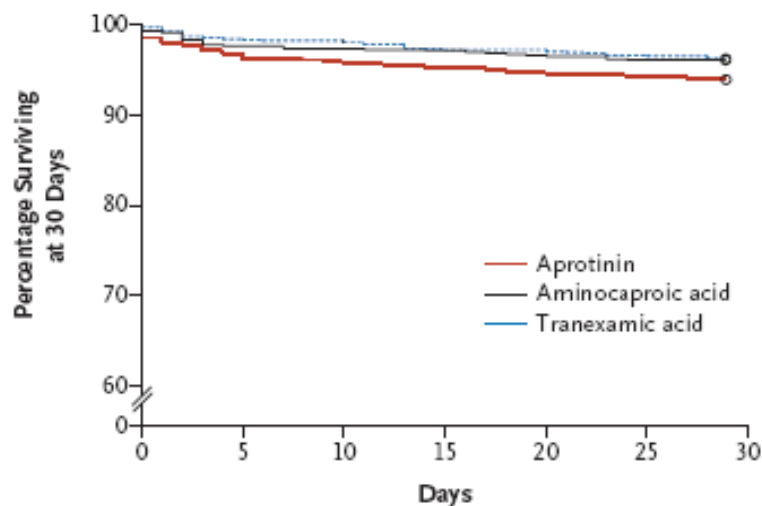
781

TA

770

EACA

780

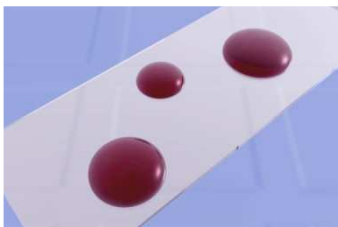


No. at Risk

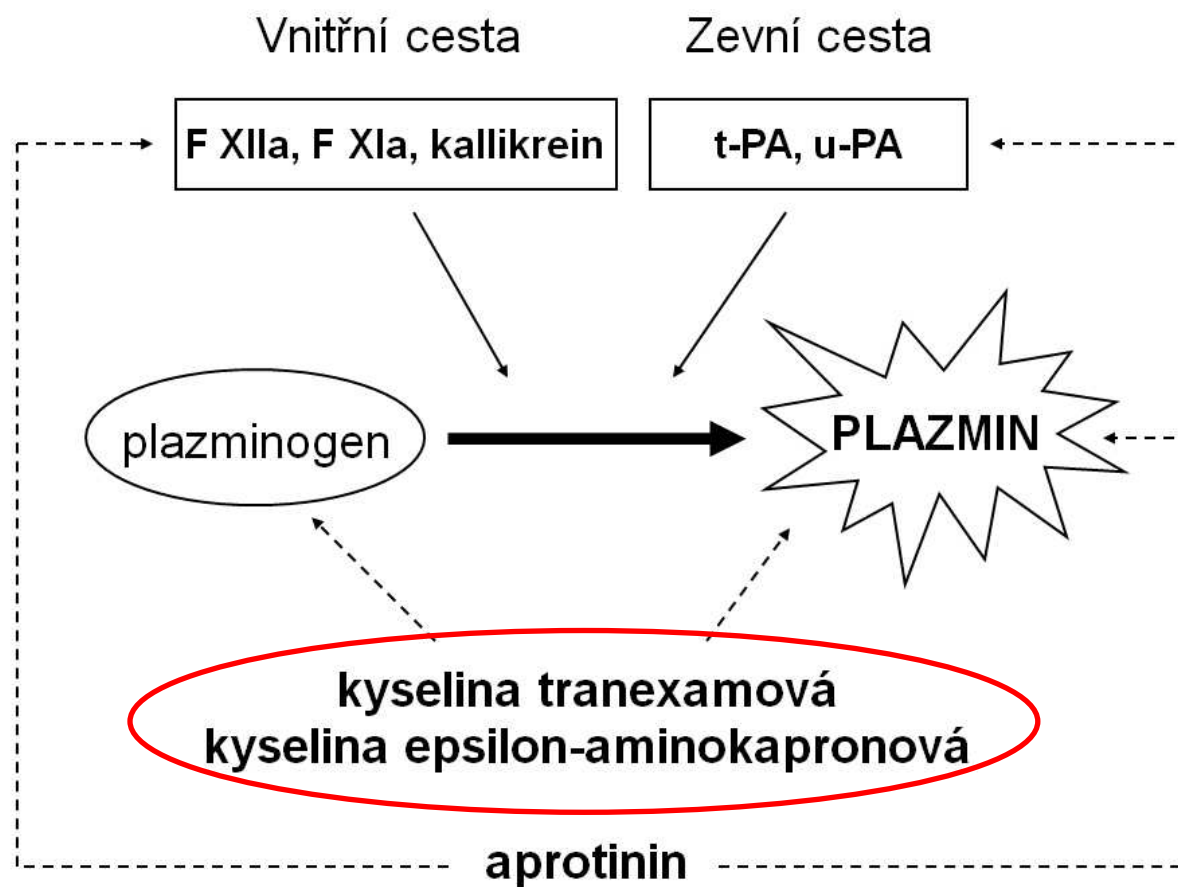
Aprotinin	779	753	747	742	737	734	732
Aminocaproic acid	780	761	759	757	753	749	749
Tranexamic acid	769	757	755	748	747	743	749

The cause of death remains at this point speculative...

APROTININ



Syntetická analoga lyzinu





Syntetická analoga lyzinu

Anti-fibrinolytic use for minimising perioperative allogeneic blood transfusion

David A Henry¹, Paul A Carless², Annette J Moxey², Dianne O'Connell³, Barrie J Stokes²,
Brian McClelland⁴, Andreas Laupacis⁵, Dean A Fergusson⁶

¹Institute of Clinical Evaluative Sciences, Toronto, Canada. ²Discipline of Clinical Pharmacology, Faculty of Health, University of Newcastle, Newcastle, Australia. ³Cancer Epidemiology Research Unit, The Cancer Council NSW, Sydney, Australia. ⁴Scottish National Blood Transfusion Service, Edinburgh, UK. ⁵Department of Medicine, Li Ka Shing Knowledge Institute of St. Michael's Hospital, Toronto, Canada. ⁶Ottawa Health Research Institute, University of Ottawa Centre for Transfusion Research, Ottawa, Canada

Cochrane Database Syst Rev 2007:CD001886

In most circumstances the lysine analogues are probably as effective as aprotinin...

...the evidence is stronger for tranexamic acid than for aminocaproic acid.



Užití antifibrinolytik ve spinální chirurgii

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The Use of Antifibrinolytic Agents in Spine Surgery A Meta-Analysis

By J. Brian Gill, MD, MBA, Yoona Chin, MA, Andrew Levin, BS, and Du Feng, PhD

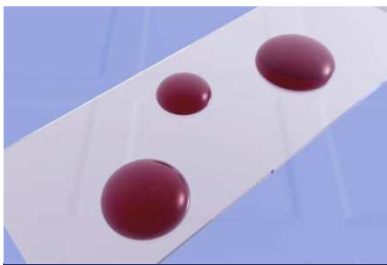
Investigation performed at Texas Tech University Health Sciences Center and Texas Tech University, Lubbock, Texas

J Bone Joint Surg Am 2008;90:399-407

aprotinin	7 studií	370 pacientů
TA	7 studií	286 pacientů
EACA	7 studií	308 pacientů

Aprotinin, tranexamic acid, and epsilon-aminocaproic acid are effective for reducing blood loss and transfusions...

...epsilon-aminocaproic acid had a greater effect on reducing blood transfusions.



Užití antifibrinolytik v chirurgii kyčle

Tranexamic Acid Reduces Blood Loss in Total Hip Replacement Surgery

Gustav Ekbäck, MD*, Kjell Axelsson, MD, PhD*, Lars Rytberg, MD†, Bror Edlund, MD, PhD‡, Jill Kjellberg, Chief CRNA*, Johan Weckström, MD†, Olle Carlsson, PhD§, and Ulf Schött, MD, PhD*

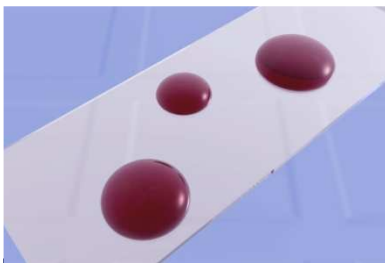
Anesth Analg 2000;91:1124-1130

Tranexamic acid reduces blood loss in cemented hip arthroplasty: A randomized, double-blind study of 39 patients with osteoarthritis

Raimo O. Niskanen ^a; Olli L. Korkala ^b

^a Department of Orthopedics, Päijät-Häme Central Hospital Lahti, Heinola, Finland ^b Department of Rheumatism Foundation Hospital, Heinola, Finland

Acta Orthop 2005;76:829-832

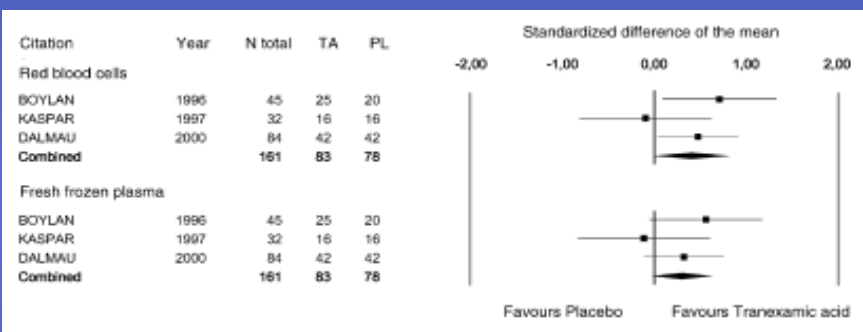


Užití antifibrinolytik při transplantacích jater

Efficacy and Safety of Antifibrinolytic Drugs in Liver Transplantation: A Systematic Review and Meta-Analysis

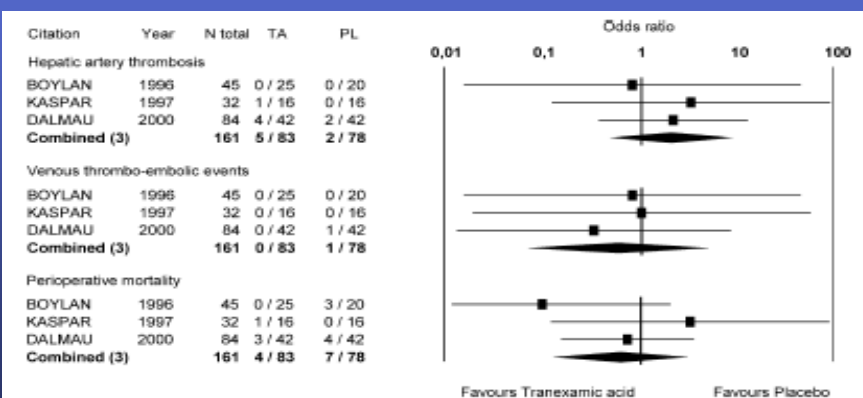
I. Q. Molenaar^a, N. Warnaar^a, H. Groen^b, E. M. TenVergert^b, M. J. H. Slooff^a and R. J. Porte^{a,*}

Am J Transplant 2007;7:185-194



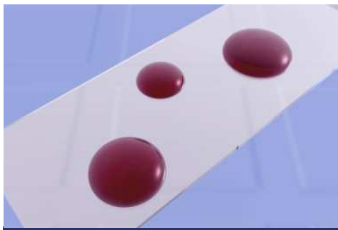
Vliv TA na počet krevních transfúzí

$P = 0.007$



Vliv TA na trombózu a. hepatica

$P = 0.33$



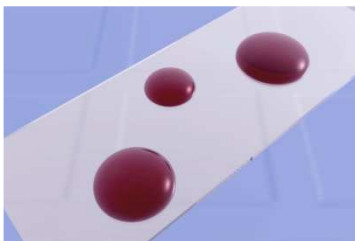
Užití antifibrinolytik v chirurgii jater

Bleeding in Liver Surgery: Prevention and Treatment

Edris M. Alkozai, BSc, Ton Lisman, PhD, Robert J. Porte, MD, PhD^{*}

Clin Liver Dis 2009;13:145-154





Děkuji za pozornost!

• Aprotinin

NO

• TA + EACA

YES

?

• Bezpečnost

YES

???