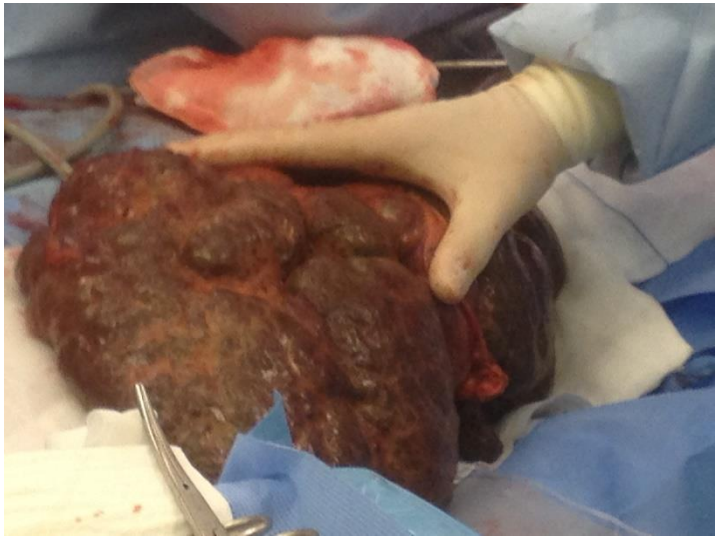
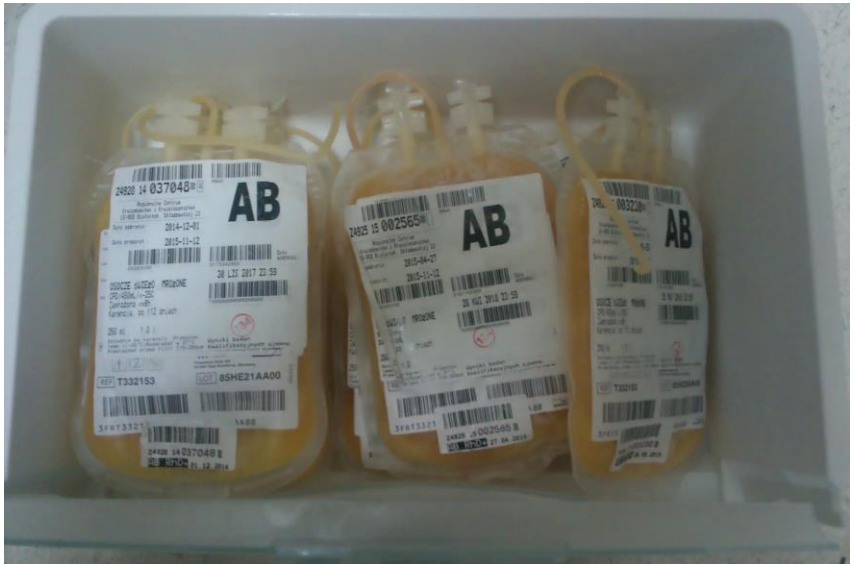




Krwotok – zagrożenie życia trudne do leczenia

lek. Barbara Nicińska

PLAN

1. Trochę fizjologii
2. Trochę kliniki
3. Wytyczne

Trochę fizjologii…

- $DO_2 = CO \times CaO_2$ (mL/min/m2)

- $CaO_2 =$
  $= (1.34 \times Hgb \times SaO_2) + (0.003 \times PaO_2)$

Trochę kliniki

Krwotok

- objawy
- diagnostyka
- rozpoznanie
- leczenie

EBM

WYTYCZNE

EJA

Eur J Anaesthesiol 2013; **30**:270–382

GUIDELINES

Management of severe perioperative bleeding

Guidelines from the European Society of Anaesthesiology

Sibylle A. Kozek-Langenecker, Arash Afshari, Pierre Albaladejo, Cesar Aldecoa Alvarez Santullano, Edoardo De Robertis, Daniela C. Filipescu, Dietmar Fries, Klaus Görlinger, Thorsten Haas, Georgina Imberger, Matthias Jacob, Marcus Lancé, Juan Llau, Sue Mallett, Jens Meier, Niels Rahe-Meyer, Charles Marc Samama, Andrew Smith, Cristina Solomon, Philippe Van der Linden, Anne Juul Wikkelsø, Patrick Wouters and Piet Wyffels

Donat R Spahn[1], Bertil Bouillon[2], Vladimir Cerny[3,*], Timothy J Coats[3], Jacques Duranteau[4], Enrique Fernández-Mondéjar[7], Daniela Filipescu[8], Beverley J Hunt[9], Radko Komadina[10], Giuseppe Nardi[11], Edmund Neugebauer[12], Yves Ozier[13], Louis Riddez[14], Arthur Schultz[15], Jean-Louis Vincent[16] and Rolf Rossaint[17*]

Diagnostyka

Evaluation of coagulation status

We recommend the use of a structured patient interview or questionnaire before surgery or invasive procedures, which considers clinical and family bleeding history and detailed information on the patient's medication. **1C**

We recommend the use of standardised questionnaires on bleeding and drug history as preferable to the routine use of conventional coagulation screening tests such as aPTT, PT and platelet count in elective surgery. **1C**

We recommend the application of transfusion algorithms incorporating predefined intervention triggers to guide haemostatic intervention during intraoperative bleeding. **1B**

We recommend the application of transfusion algorithms incorporating predefined intervention triggers based on point-of-care (POC) coagulation monitoring assays to guide haemostatic intervention during cardiovascular surgery. **1C**

Transfusion triggers

We recommend a target haemoglobin concentration of 7–9 g dl^{-1} during active bleeding. 1C

Monitoring tissue perfusion

We recommend repeated measurements of a combination of haematocrit/haemoglobin, serum lactate, and base deficit in order to monitor tissue perfusion, tissue oxygenation and the dynamics of blood loss during acute bleeding. These parameters can be extended by measurement of cardiac output, dynamic parameters of volume status (e.g. stroke volume variation, pulse pressure variation) and central venous oxygen saturation. 1C

Coagulation management

We recommend treatment with fibrinogen concentrate if significant bleeding is accompanied by at least suspected low fibrinogen concentrations or function. **1C**

We recommend that a plasma fibrinogen concentration $<1.5–2.0\,g\,l^{-1}$ or ROTEM/TEG signs of functional fibrinogen deficit should be triggers for fibrinogen substitution. **1C**

We suggest an initial fibrinogen concentrate dose of $25–50\,mg\,kg^{-1}$. **2C**

We suggest that the indication for cryoprecipitate is lack of available fibrinogen concentrate for the treatment of bleeding and hypofibrinogenaemia. **2C**

In cases of ongoing or diffuse bleeding and low clot strength despite adequate fibrinogen concentrations, it is likely that FXIII activity is critically reduced. In cases of significant FXIII deficiency (i.e. <60% activity), we suggest that FXIII concentrate ($30\,IU\,kg^{-1}$) can be administered. **2C**

We recommend that patients on oral anticoagulant therapy should be given prothrombin complex concentrate (PCC) and vitamin K before any other coagulation management steps for severe perioperative bleeding. **1B**

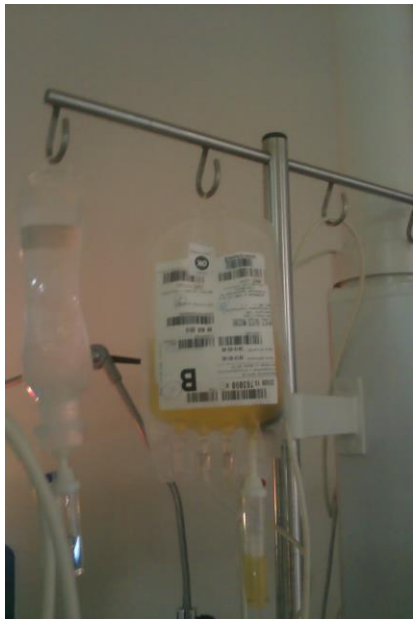
We suggest that PCC (20–30 IU kg^{-1}) can also be administered to patients not on oral anticoagulant therapy in the presence of an elevated bleeding tendency and prolonged clotting time. Prolonged INR/PT alone is not an indication for PCC, especially in critically ill patients. **2C**

We suggest that off-label administration of recombinant activated factor VII (rFVIIa) can be considered for bleeding which cannot be stopped by conventional, surgical or interventional radiological means and/or when comprehensive coagulation therapy fails. **2C**

Antifibrinolytics and tranexamic acid

We recommend the consideration of tranexamic acid (20–25 mg kg^{-1}). **1A**

We suggest the use of DDAVP under specific conditions (acquired von Willebrand syndrome). There is no convincing evidence that DDAVP minimises perioperative bleeding or perioperative allogeneic blood transfusion in patients without a congenital bleeding disorder. **2B**



Correction of confounding factors

We recommend maintaining perioperative normothermia because it reduces blood loss and transfusion requirements. **1B**

We suggest that rFVIIa may be used in treatment of patients with hypothermic coagulopathy. **2C**

While pH correction alone cannot immediately correct acidosis-induced coagulopathy, we recommend that pH correction should be pursued during treatment of acidotic coagulopathy. **1C**

We recommend that rFVIIa should only be considered alongside pH correction. **1C**

We suggest that calcium should be administered during massive transfusion if Ca^{2+} concentration is low, in order to preserve normocalcaemia ($\geq 0.9\ mmol\ l^{-1}$). **2B**

Dziękuję