Krajská nemocnice Liberec, a.s.

nemocnice Liberec nemocnice Turnov

Agregometrie a polytrauma

Pavel Sedlák ČSIM, BRNO 2018

- Antiagregancia jsou součástí komplexní primární i sekundární prevence KV a CM příhod

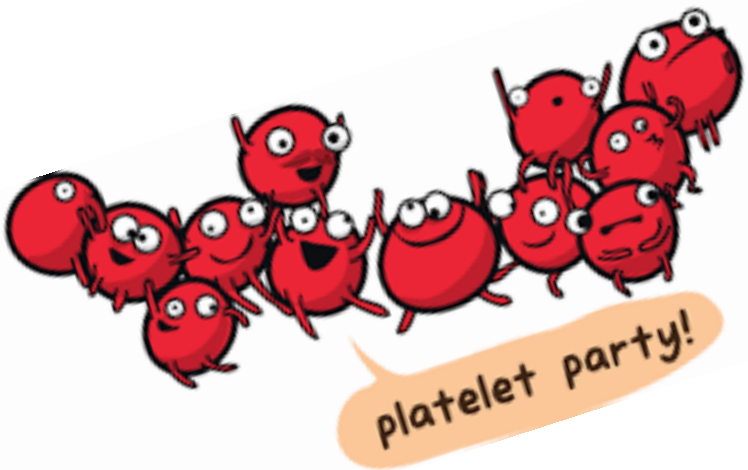
- Rostoucí spektrum léčiv
- Široké indikační spektrum
- Primárně pacienti s významnou komorbiditou (ICHS, CMP)

Můj pacient má těžké trauma a užívá antiagregancia co s tím ?

European Society of Anaesthesiology ESA

EJA European Journal of Anaesthesiology

Gudelines - ESA



Více podrobné než ESA

Revize 2014

I Angl. verze

www.bundesaerztekammer.de

- V současné době **nemáme** k dispozici data z velkých randomizovaných studií, která by určila, u kterých pacientů bychom měli antiagregační terapii ponechat a u kterých nikoliv.

- **Vysazování antiagregace** by mělo být zvažováno pouze **pokud rizika krvácení jednoznačně převyšují rizika vzniku aterotrombotické příhody**

- **Tedy výkony s velkou krvácivostí (TEP, op. Páteře) těžké krvácení, nebo krvácení v citlivé oblasti (NCH)**

Overview of retrospective studies on the effects of antiplatelet medication in patients with traumatic brain injury

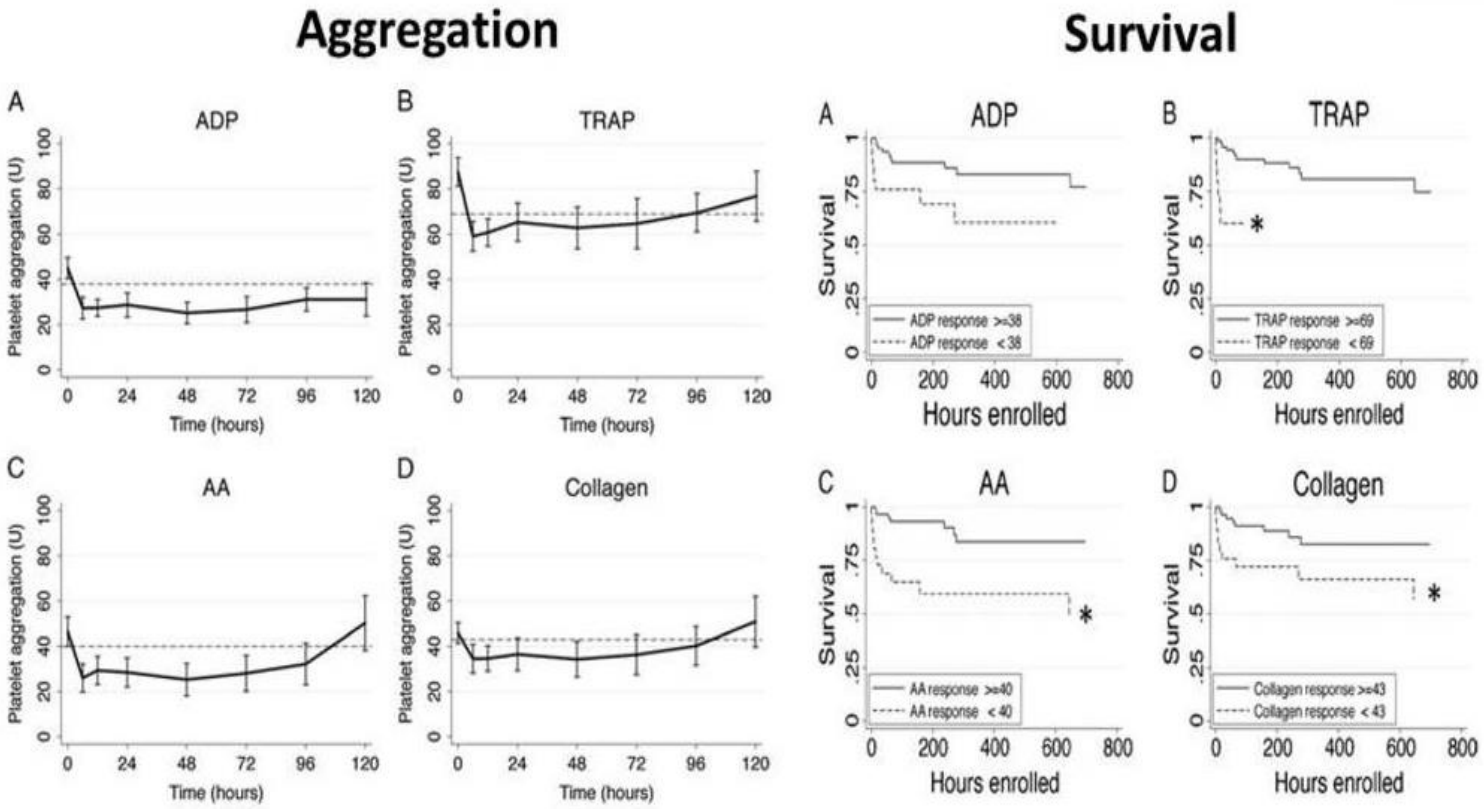
Beynon *et al*. *Critical Care* 2012, 16:228

Study	Inclusion criteria	Antiplatelet therapy	Number of subjects	Mortality rate	Major findings
Mina *et al.* 2002 [20]	Posttraumatic ICH	Aspirin	19	47% aspirin group; 8% control group	Mortality significantly increased with aspirin therapy. No difference in mortality rates between aspirin and warfarin treated patients
Spektor *et al.* 2003 [23]	Mild and moderate TBI, age >60 years	Aspirin (100 mg/day)	110	NR	Aspirin therapy had no effect on incidence of posttraumatic ICH after mild to moderate TBI
Ohm *et al.* 2005 [21]	Posttraumatic ICH	Aspirin, clopidogrel	90	23% antiplatelet group; 8% control group	Mortality threefold increased with antiplatelet therapy. GCS <12 and age >76 years risk factors for death in patients on antiplatelet therapy
Jones *et al.* 2006 [24]	All TBI, age >50 years	Clopidogrel	43	7% clopidogrel group	Clopidogrel-treated patients have higher rates of cranial surgery and episodes of rebleeds. More blood products were transfused in clopidogrel-treated patients
Wong *et al.* 2008 [25]	All TBI	Aspirin, clopidogrel	111	14% clopidogrel group; 3% aspirin group	Clopidogrel-treated patients were more likely to be discharged to long-term inpatient facilities
Major *et al.* 2009 [22]	All TBI	Aspirin, clopidogrel	287	1.4% aspirin group	Mortality rate 21% in patients on aspirin with posttraumatic ICH. Three of the four patients who died in the aspirin group deteriorated with a significant delay
Bonville *et al.* 2011 [26]	All TBI	Aspirin, clopidogrel	271	12.3% aspirin group; 9.3% clopidogrel group	Use of antiplatelet agents did not affect mortality or length of hospital stay

Characterization of platelet dysfunction after trauma

Kutcher, M. et al., Journal of Trauma and Acute Care Surgery 2012

n. 101 pt.



10x vyšší mortalita u pac. s těžkým traumatem se signifikantní dysfunkcí destiček

Možnosti vyšetření

- ***Optická agregometrie (LTA-Light Transmission Aggregometry)***
- Považována za zlatý standard, ale náročná na čas (reálně jen POC metody)
- Obecně u všech metod nutná normální hl. fibrinogenu
- Závislost na koncentraci trombocytů (PLT limit do 50tis.)
- Vhodné vyšetřit co nejdříve – před poklesem hl. trombocytů
- **Výsledky jsou mezi laboratořemi obtížně srovnatelné pro chybějící standardizaci metody**

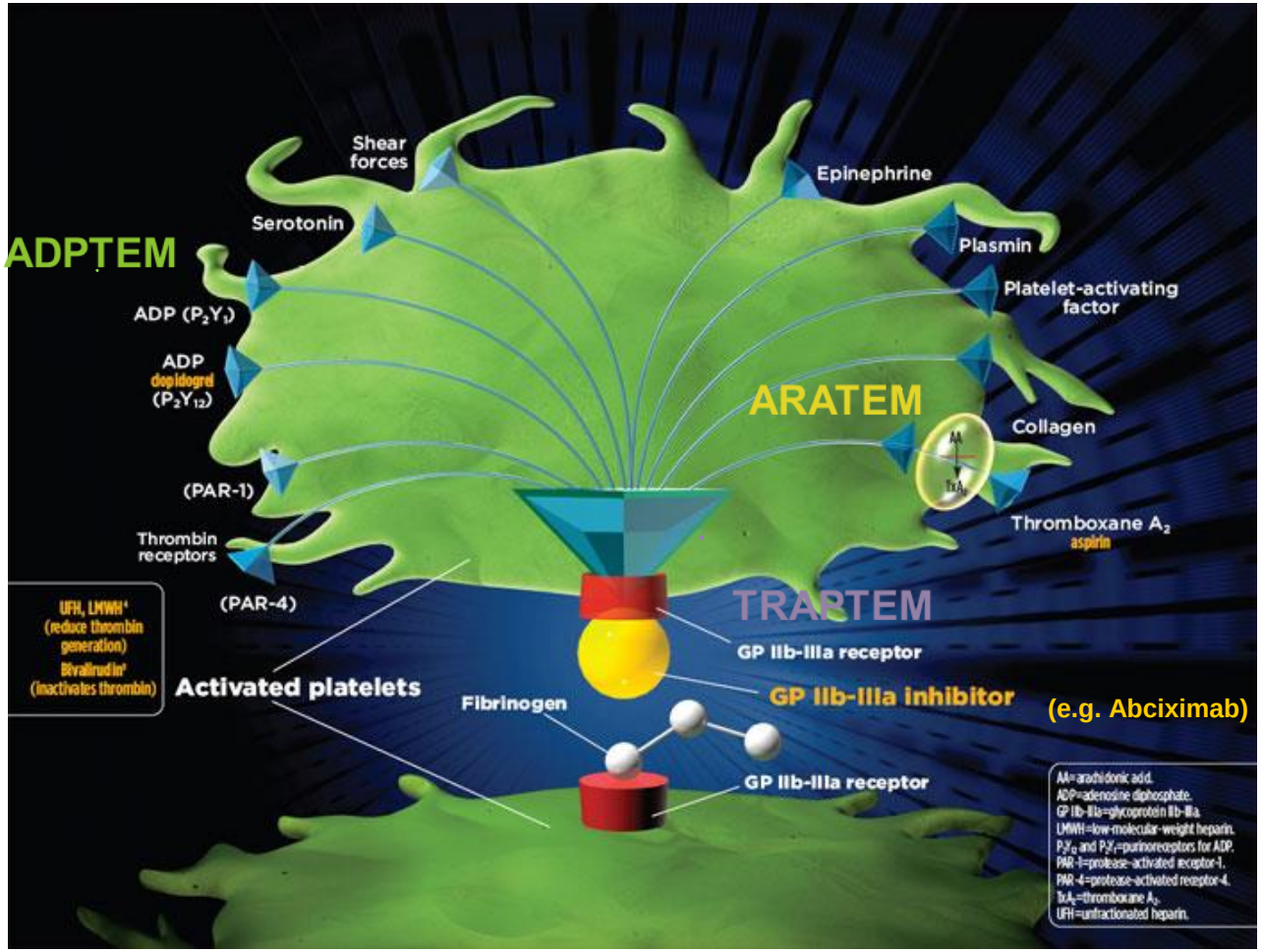
Možnosti vyšetření - POC metody

- ROTEM / s modulem PLATELET
- MULTIPLATE (ASA, ADP, GP IIb/IIIa)
- VERIFYNOW (ASA, ADP)
- *Test PFA-100 (Platelet Function Analyser-100)*

Agregometrie s modulem ROTEM® *platelet*


ROTEM® Measurement module
ROTEM® delta
Multi-TEM
Screenshot
Standard overlay
Patient overlay
Help
Quit
1
1: kocian, zdenek | 3: 350401005
EXTEM
ST: 15:08:19
RT: 00:56:30
CT: 71 s
[0038 -- 0079]
CFT: 708 s
[0034 -- 0159]
α: 28 °
[0063 -- 0083]
A5: 12 mm
A10: 19 mm
[0043 -- 0065]
2
1: kocian, zdenek | 3: 350401005
INTEM
ST: 15:09:29
RT: 00:55:20
CT: 301 s
[0100 -- 0240]
CFT: 632 s
[0030 -- 0110]
α: 32 °
[0070 -- 0083]
A5: 13 mm
A10: 20 mm
[0044 -- 0066]
3
1: kocian, zdenek | 3: 350401005
FIBTEM
ST: 15:11:55
RT: 00:52:54
CT: 71 s
CFT: ---
α: ---
A5: 4 mm
A10: 5 mm
[0007 -- 0023]
4
1: kocian, zdenek | 3: 350401005
APTEM
ST: 15:13:10
RT: 00:51:38
CT: 73 s
CFT: 855 s
α: 26 °
A5: 11 mm
A10: 17 mm
5
1: kocian, zdenek | 3: 350401005
TRAPTEM
ST: 15:30:38
RT: 00:06:00
A6: 6 Ω
[0014 -- 0036]
MS: 2 Ω/min
[0005 -- 0014]
AUC: 17 Ω*min
[0055 -- 0154]
6
1: kocian, zdenek | 3: 350401005
ADPTEM
ST: 15:25:05
RT: 00:06:00
A6: 4 Ω
[0012 -- 0029]
MS: 2 Ω/min
[0003 -- 0010]
AUC: 9 Ω*min
[0040 -- 0112]
2014-10-16T16:04:49
v2.4.1
User: admin
Temperature: 37.0°C
Dil
A
B

ROTEM® *platelet* testy



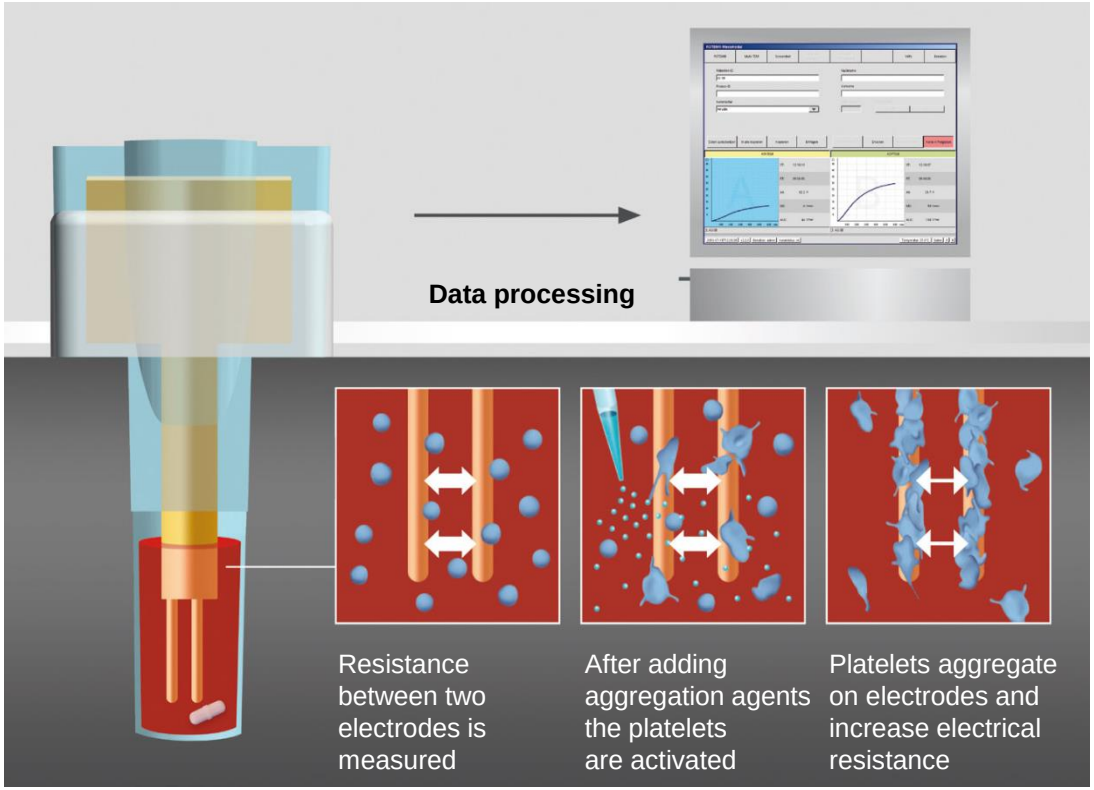
ARATEM

ADPTEM

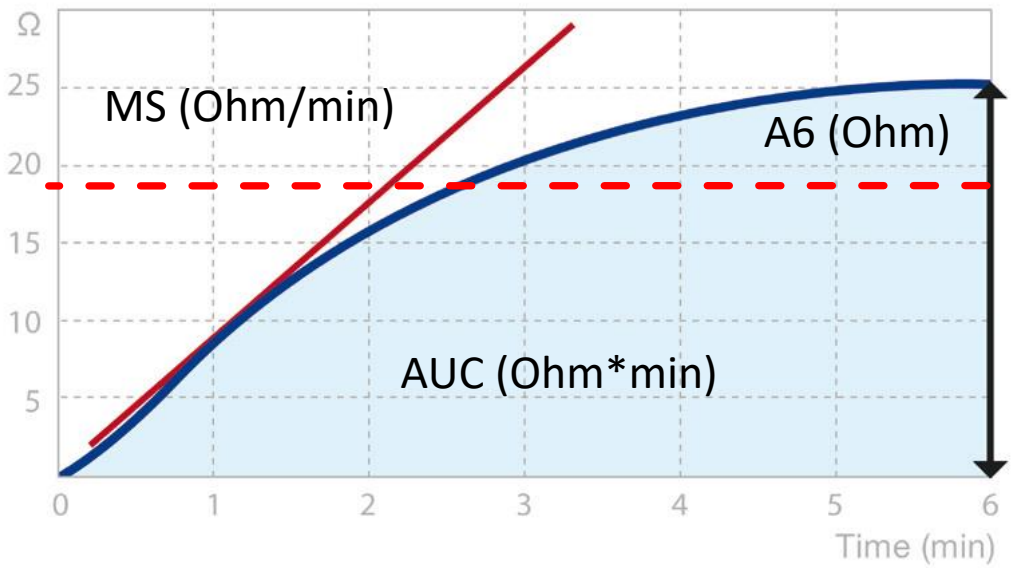
TRAPTEM

PLATELET

- Impedanční agregometrie
- Plná krev, antikoagulovaná



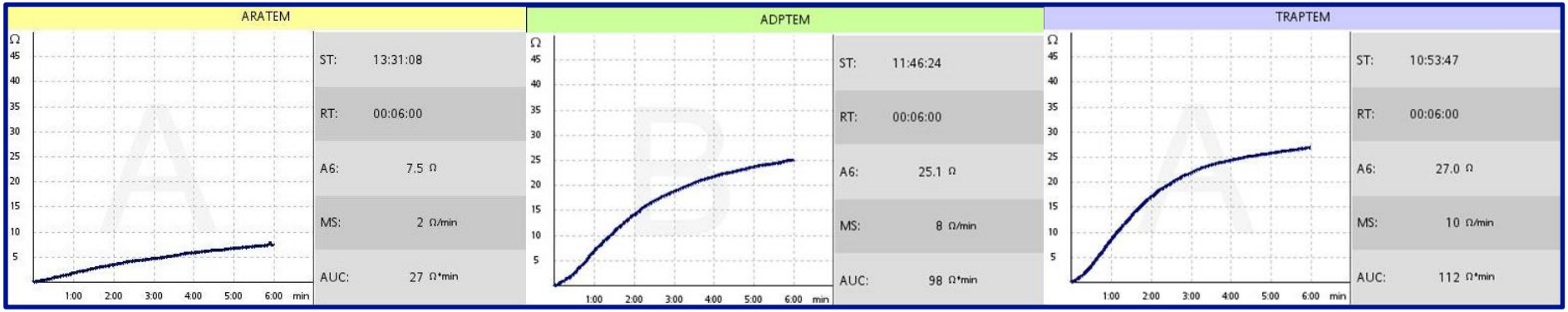
Křivky



- 3 Parametery:
- A6; AUC a MS
- A6 - celkový rozsah agregace
- MS - (maximal slope) rychlost agregace

AUC – celková agregační schopnost, hlavní parametr

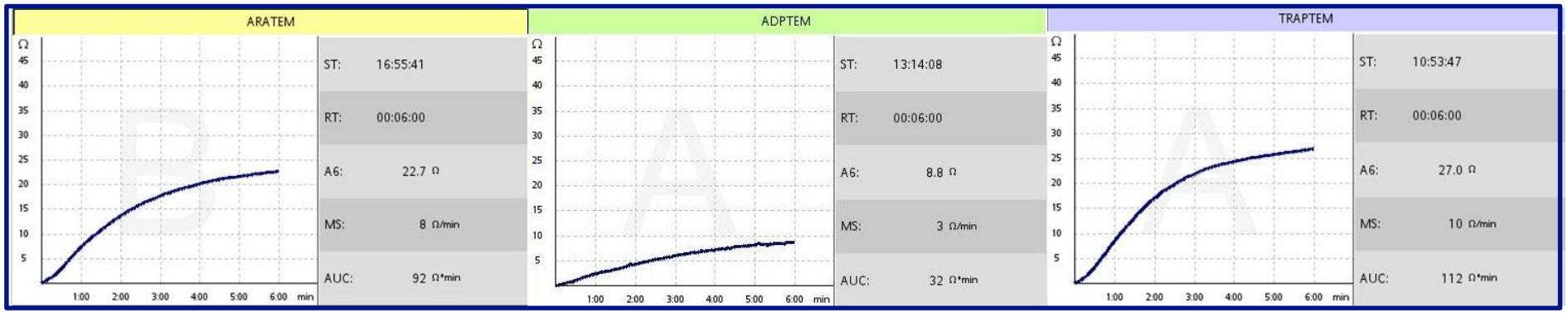
Case 1



ARATEM: low platelet aggregation.
ADPTEM and **TRAPTEM**: in normal range.

- e.g. detection of cyclooxygenase inhibitors (Aspirin®)

Case 2

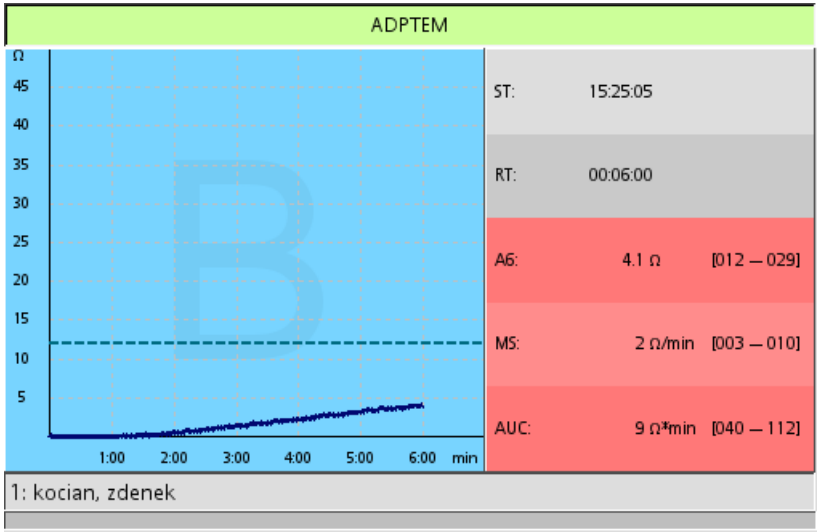


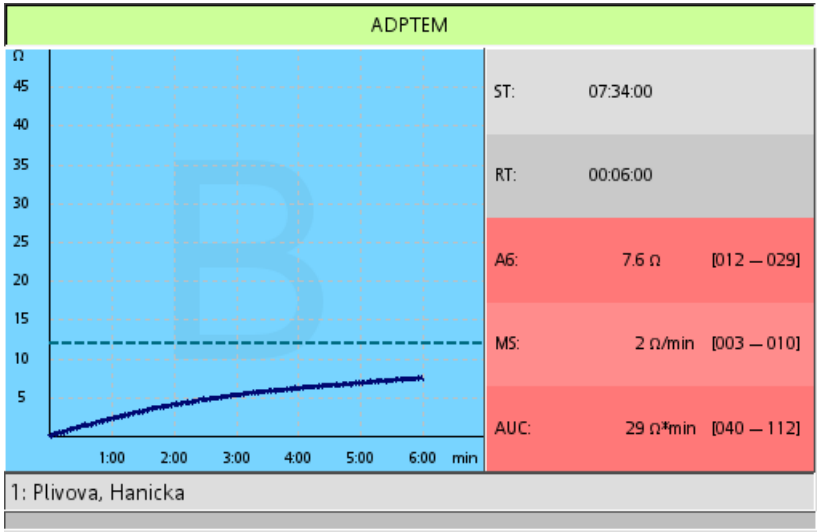
ADPTEM: low platelet aggregation.

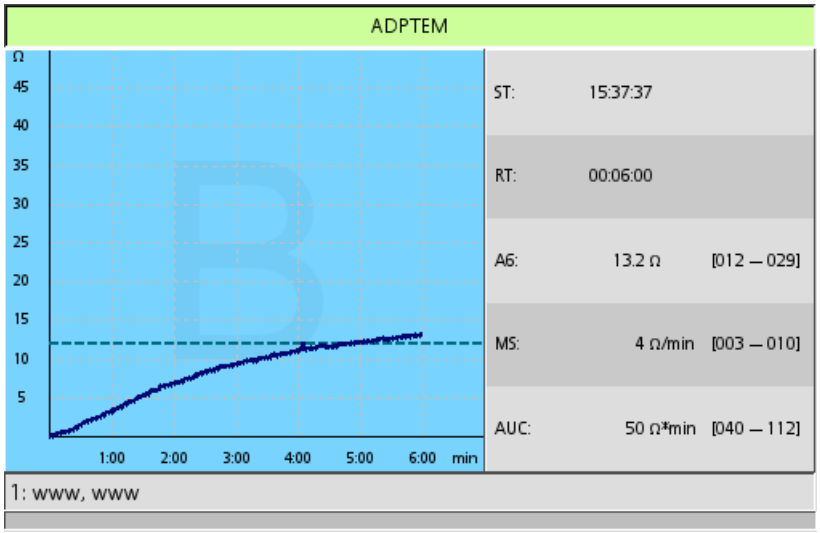
ARATEM and **TRAPTEM**: in normal range.

- ADP receptor blockage (Clopidogrel)

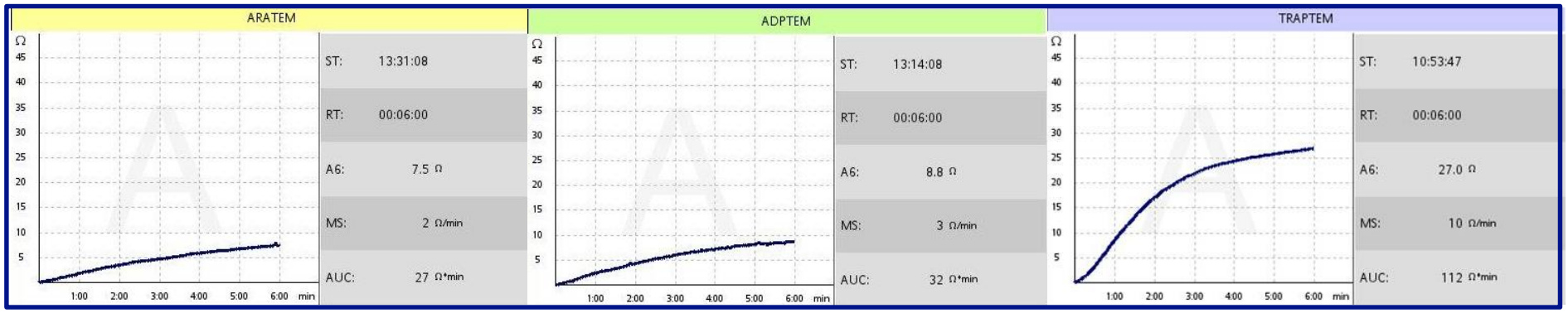
ADPTEM – blok ADP







Case 3

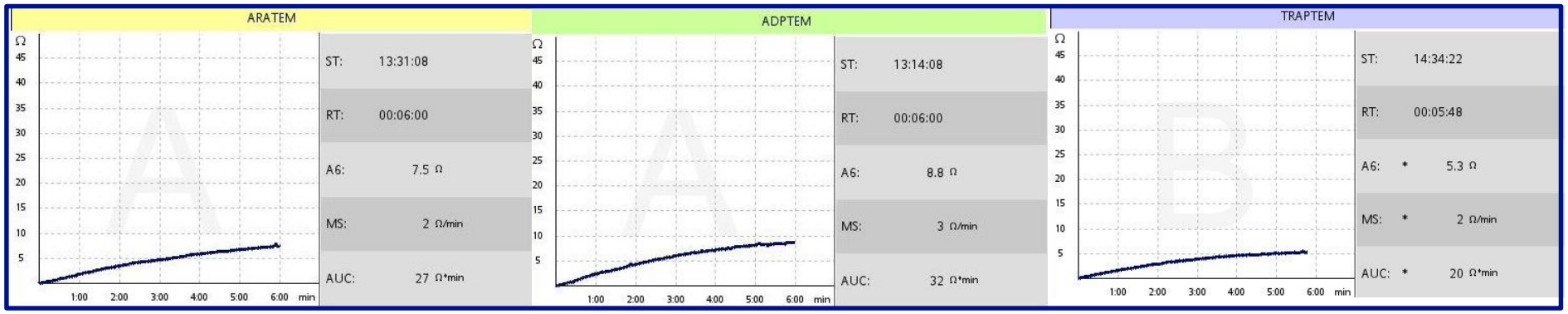


ARATEM and **ADPTEM**: low platelet aggregation.

TRAPTEM: in normal range.

- **dual therapy** Aspirin and Clopidogrel

Case 4



TRAPTEM, **ARATEM** and **ADPTEM**: <u>all</u> show low platelet aggregation.

- GPIIb/IIIa receptor antagonist (Abciximab - REOPRO)

- high sensitivity in others detection site due strong efect antagonist on GP IIb/IIIa recetor

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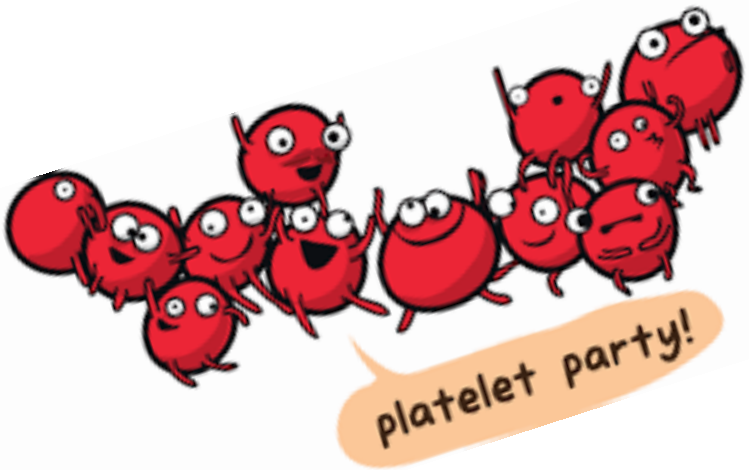
EJA European Journal of Anaesthesiology

Gudelines - ESA



- Reduced platelet activity is associated with early haematoma growth, more intraventricular haemorrhage and worse three-month outcome following ICH. **1C**

- We recommend discontinuing dual antiplatelet therapy before urgent intracranial neurosurgery or in major bleeding. **1B**

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- Where **aspirin** withdrawal is considered, we recommend a time interval of 5 days. **1C**

- **Clopidogrel** increases perioperative bleeding. In cases of increased bleeding risk, we recommend that it should be withdrawn for no more than 5 days. **1C**

- **Prasugrel** increases perioperative bleeding. In cases of increased bleeding risk, we recommend that it should be withdrawn for no more than 7 days. **1C**

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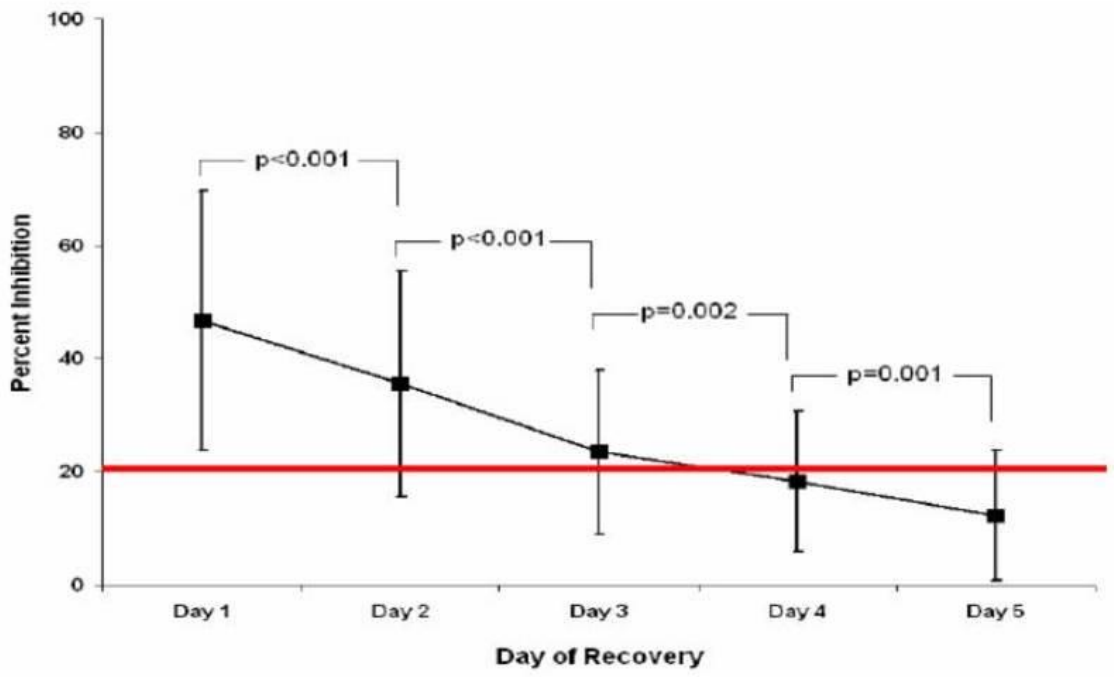
Decay of Clopidogrel in time, Price et al., Am. Journal of Cardiology 2006



- We suggest that platelet transfusion should be considered (two standard concentrates) in cases of intra- or postoperative bleeding clearly related to antiplatelet therapy. **2C**

- Platelet transfusion may be ineffective for treating bleeding clearly related to ticagrelor when given 12 h before. **2C**

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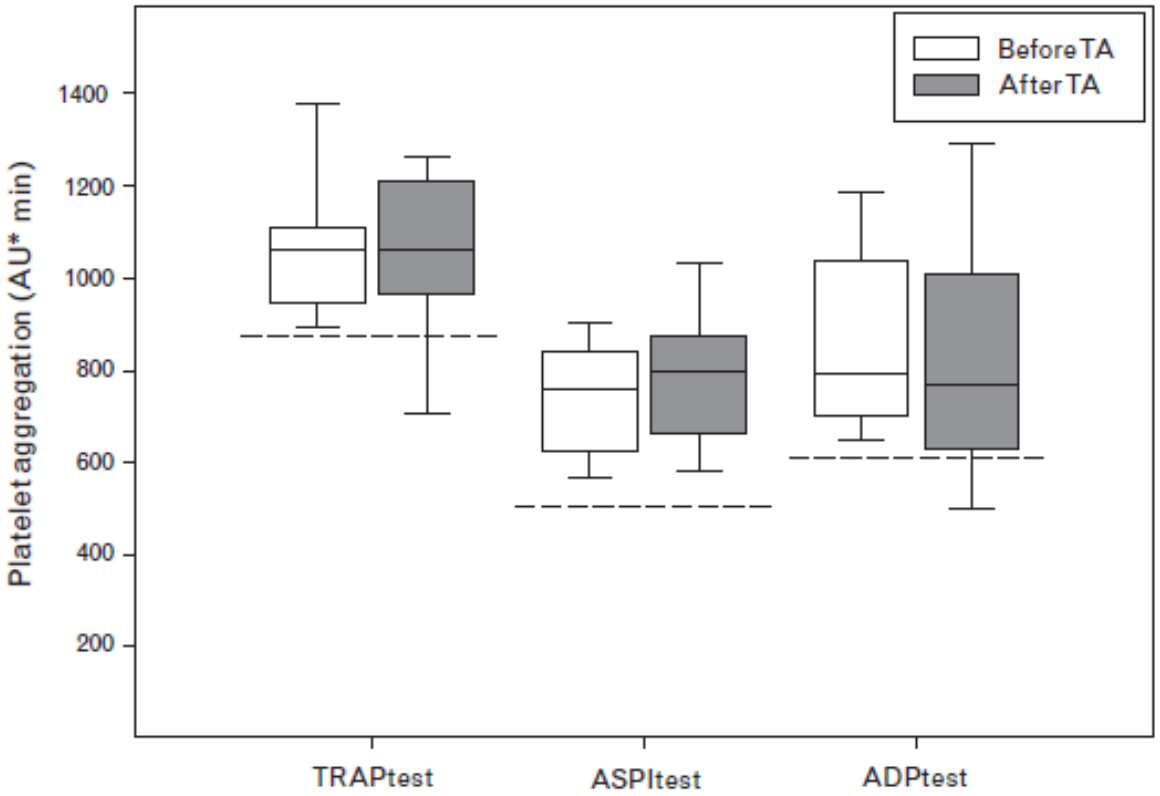
Terapeutický postup I.

- Vždy ověřit opravdovou funkčnost **PLATELET** (časté rezistence)
- Optimalizace koagulace + TXA
- Interakce fibrinogen/trombocyty - **ROTEM**
- Nepodávat Interagující léky (SSRI, statiny, betalaktamy, …)
- **U pacientů bez či s malou alterací oběhu zvážit Desmopresin**
- **U pacientů s oběhovou nestabilitou primárně 1-2TU trombocytů z aferezy** (POC kontrola po podání 1 TU)
- **Vždy dostatečná hladina Fibrinogenu !!!**

Tranexamic acid partially improves platelet function in patients treated with dual antiplatelet therapy

Christian F. Weber, Klaus Gorlinger, Christian Byhahn, Anton Moritz, Alexander A. Hanke, Kai Zacharowski and Dirk Meininger



ASA+Clopidogrel

Eur J Anaesthesiol 2011;28:57–62

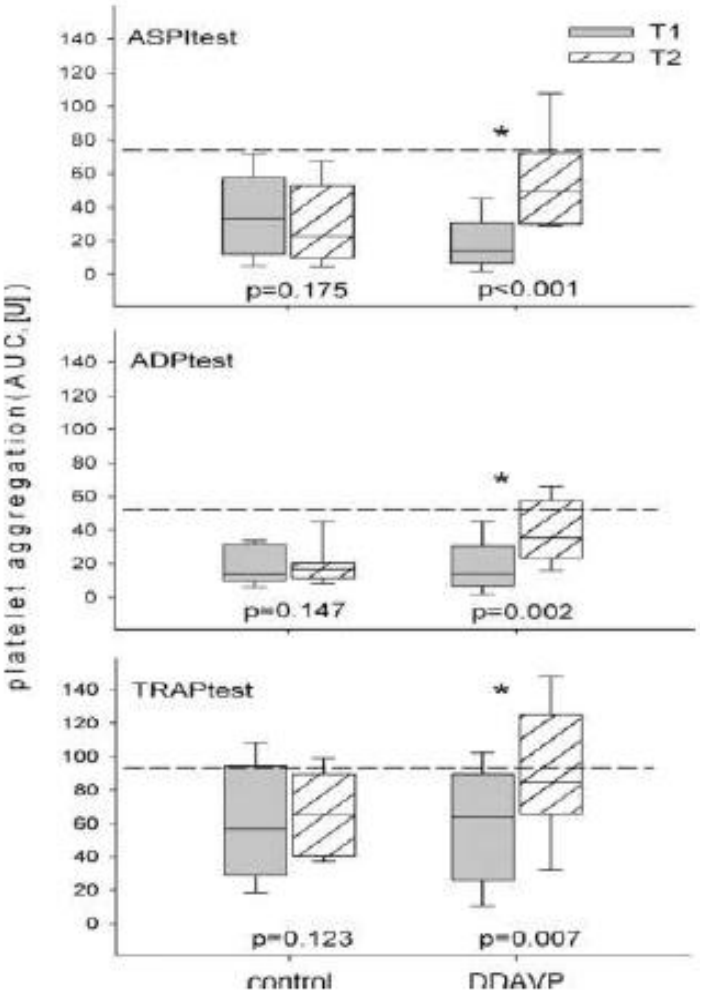
Terapeutický postup II.

- **Blokátory glykoproteinových receptorů IIb/IIIa**
- Integrilin – reverzibilní **(Eptifibatide) Min. 2-6h poločas eliminace**
- Reopro – ireverzibilní (**Abciximab) ! Min. 12h**
- **Při podání trombocytů dojde k redistribuci agens, nicméně klesá účinnost**
- Doporučeno vyčkat spont. eliminace, ev. CRRT, ev. Desmopresin
- **CAVE: při substituci silná redistribuce i u Ticagreloru do 12h od podání**
- Při podání trombonáplavu nezbytné vyčkat doby aktivace trombocytů min. 15-20min !

OFF label - Desmopresin

- Zlepšení adheze/agregace trombocytů pomocí vyplavení VW faktoru
- Desmopresin **(Octostim)** 0,3ug/kg i.v. v 5O ml FR 1/1 na 30-40 min (dle tolerance pac.)
- Možno zopakovat po 12h
- NÚ: tachykardizuje, vazodilatace, flush obličeje (opatrně u šokového stavu
- Možná přechodná oligo-anurie

Desmopresin efficacy in primary hemostasis



Weber C F et al. Anesth Analg 2010; 110:702-707

Děkuji a příjemný kongres