GÖĞÜS KALP DdamAR ANESTEZİ VE YOĞUN BAKIM DERNEĞİ
26. ULUSAL KONGRESİ

KANAMA PIHTILAŞMA SİSTEMİNİN YÖNETİMİ

Dr. Funda Gümüş Özcan
TC. SB. Başakşehir Çam ve Sakura Şehir Hastanesi
Anesteziyoloji ve Reanimasyon Kliniği

SUNUM AKIŞI

- Kanama riski yüksek olan hastalar
  - Antiplatelet kullananlar
  - Yüksek riskli cerrahiler
- Yönetim stratejileri
- Monitörizasyon
- Son söz

Kanama ve Transfüzyon Riski Skorlama Sistemleri

WİLL-BLEED
ACTA-PORT
TRUST
ACTİON
TRAC
CRUSADE

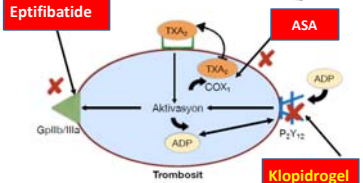
- LMWH – UFH – Fondaparinux
- Potent Antiplateletler < 5 gün
- Akut koroner sendrom
- Düşük VKİ
- Anemi
- Kritik preoperatif durum
- Acil - Kompleks Aort- Redo cerrahiler
- Yüksek Euroskor
- Böbrek yetmezliği

Antiplatelet kullananlar

Hastaya ve işleme göre 6 -12 ay İAPT

İV
Tirofiban
Eptifibatide

% 10-15 Acil CABG



oral
Klopidrogel
Prasugrel
Tikagrelor
Kangrelor

PRASUGREL	STOP	7-9	Yö: 7 saat
CLOPIDOGREL	STOP	5-7	Yö: 6 saat
TICAGRELOR	STOP	5-7	Yö: 7 saat

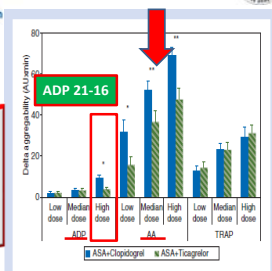
ESC 2017
Mahla et all. Circulation 2018
Hasta Kan Yönetiminde Ortak Görüş 2019

BJA
TRANSLATIONAL RESEARCH

Effects of *ex vivo* platelet supplementation on platelet aggregability in blood samples from patients treated with acetylsalicylic acid, clopidogrel, or ticagrelor

40 KAH; ASA / ASA+klopid. / ASA+ticag.,
Yükleme/idame doz, 2 saat sonra kan
örnekleri (Acil alınan hastalar

En yüksek doz PLT transf. rağmen;
Klopid. ve Tig. spesifik ADP < 31!!!
(ADP<31 ise kanama > 800ml/12 sa)

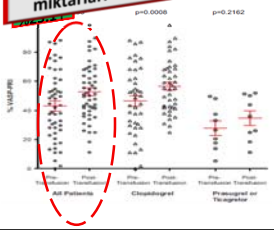


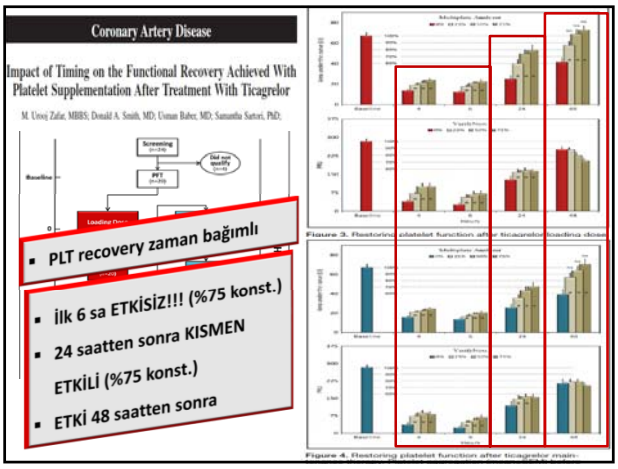
PLT Restorasyonu sağlamak ve Kanama riskini ↓ için
> 5 Ü aferez PLT rağmen etki yok!!!

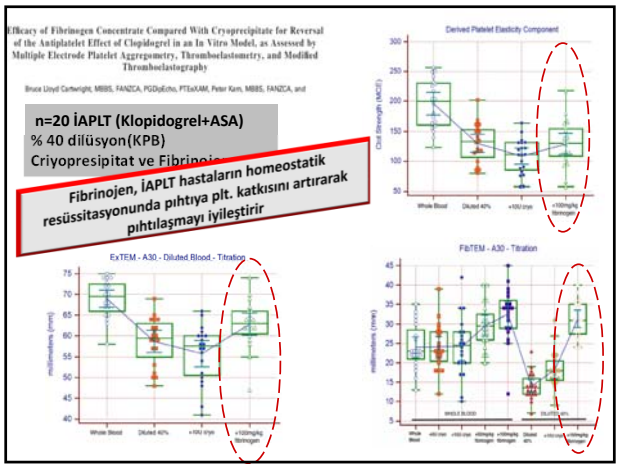
Pharmacology

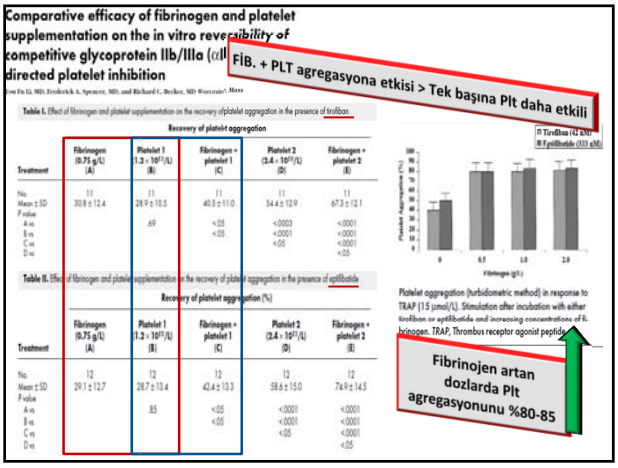
Efficacy of Ex Vivo Autologous and In Vivo Platelet Transfusion in the Reversal of $P2Y_{12}$ Inhibition by Clopidogrel, Prasugrel, and Ticagrelor
The APTITUDE Study

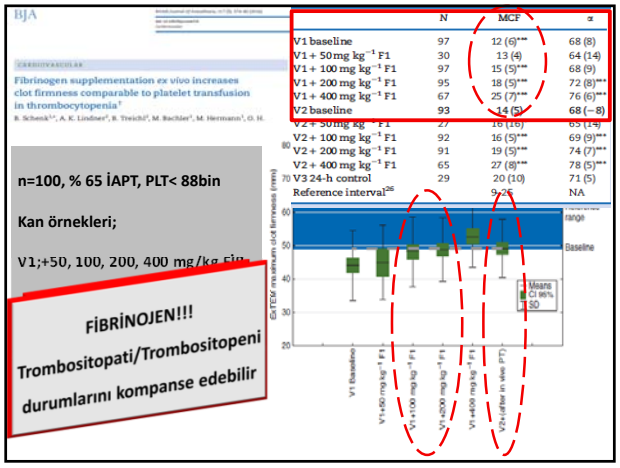
- PLT transf. ile PLT fonks. Yeterli değişiklik YOK
- Değişen parametreler ile kanama miktarları arasında korelasyon YOK



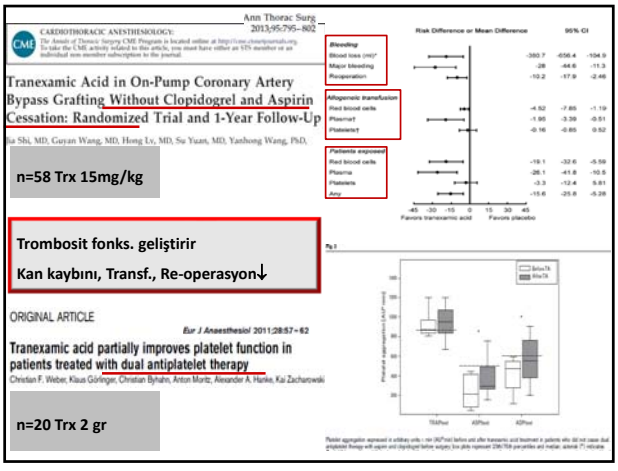


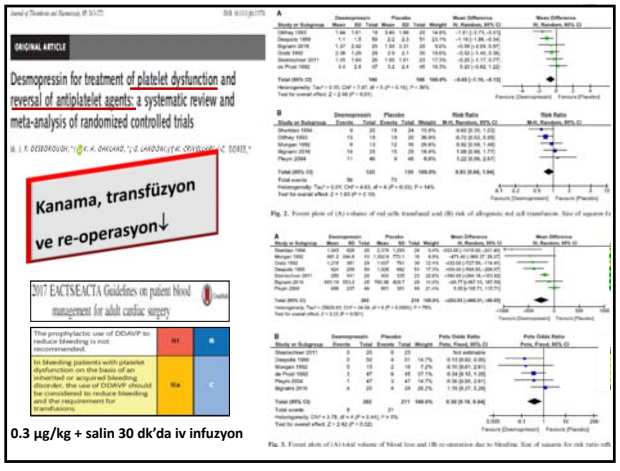






	N	MCF	α
V1 baseline	97	12 (6)***	68 (8)
V1+ 50 mg kg^{-1} F1	30	13 (4)	64 (14)
V1+ 100 mg kg^{-1} F1	97	15 (5)***	68 (9)
V1+ 200 mg kg^{-1} F1	95	18 (5)***	72 (8)***
V1+ 400 mg kg^{-1} F1	67	25 (7)***	76 (6)***
V2 baseline	93	14 (5)	68 (−8)
V2+ 50 mg kg^{-1} F1	27	16 (16)	65 (14)
V2+ 100 mg kg^{-1} F1	92	16 (5)***	69 (9)***
V2+ 200 mg kg^{-1} F1	91	19 (5)***	74 (7)***
V2+ 400 mg kg^{-1} F1	65	27 (8)***	78 (5)***
V3 24-h control	29	20 (10)	71 (5)
Reference interval[26]		9–25	NA





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faktörler

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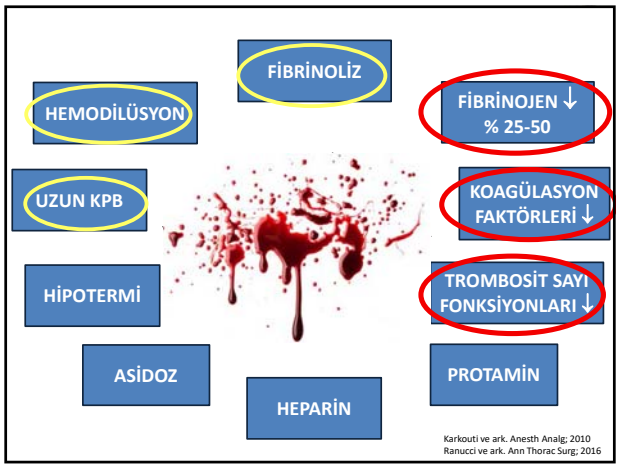
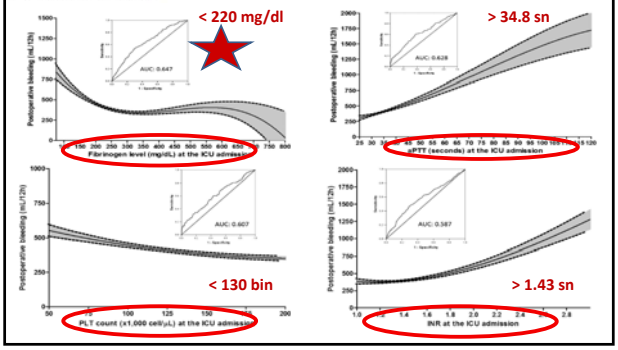


Karkouti ve ark. Anesth Analg; 2010
Ranucci ve ark. Ann Thorac Surg; 2016

Fibrinogen Levels After Cardiac Surgical Procedures: Association With Postoperative Bleeding, Trigger Values, and Target Values

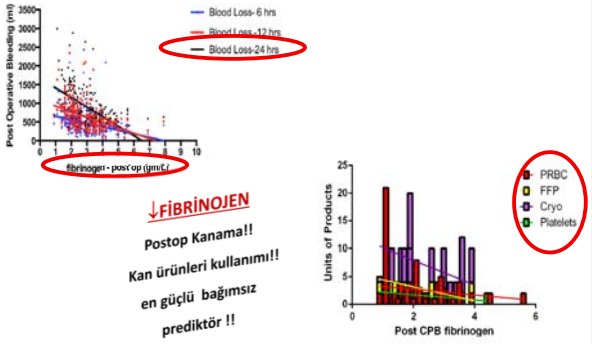
Marco Ranucci, MD, Valeria Pistuddi, Ekaterina Baryshnikova, PhD (Biol), Dionisio Colella, MD, and Paolo Bianchi, MD

n=2800, CABG-Kombine, n=131 kanama >1lt/12s
%26 re-eksplarasyon, cerrahi kaynak %23.5



The Influence of Circulating Levels of Fibrinogen and Perioperative Coagulation Parameters on Predicting Postoperative Blood Loss in Cardiac Surgery: A Prospective Observational Study

n=250, CABG-Kombine cerrahi
KPB>90 dk , Kan kaybı 879±479 ml/24 sa



↓FİBRİNOJEN
Postop Kanama!!
Kan ürünleri kullanımı!!
en güçlü bağımsız prediktör !!

Fibrinogen concentrate as first-line therapy in aortic surgery reduces transfusion requirements in patients with platelet counts over or under 100×10^9/L

Cristina Solomon[12], Niels R...

ORIGINAL ARTICLE

PLT N/↓
ilk planda uygulanan Fibrinojen desteği transfüzyonları ciddi şekilde ↓

Characteristic	Fibrinogen, platelet count ≥100×10⁹/L N=18	Placebo, platelet count ≥100×10⁹/L N=19	Fibrinogen, platelet count <100×10⁹/L N=11	Placebo, platelet count <100×10⁹/L N=13
Males, n (%)	12 (67%)	17 (89%)	7 (64%)	8 (62%)
Age, mean±SD, years	58.4±14.6	59.8±11.8	60.4±14.8	62.9±11.8
Weight, mean±SD, kg	83.8±17.2	92.5±20.8	94.5±17.6	79.4±17.3
Body mass index, mean±SD, kg/m²	27.8±4.3	28.0±4.8	29.3±5.0	25.5±4.2
Obesity (body mass index >30 kg/m²), n (%)	4 (22%)	6 (32%)	3 (27%)	2 (15%)
Smoking, n (%)	6 (33%)	3 (16%)	2 (18%)	5 (38%)
Operation type: TAAA, n (%)	5 (28%)	4 (21%)	3 (27%)	6 (46%)
Operation type: ascending with arch, n (%)	6 (33%)	5 (26%)	6 (55%)	5 (38%)
Operation type: ascending without arch, n (%)	7 (39%)	10 (53%)	2 (18%)	2 (15%)
Time on CPB, mean±SD, min	118.9±35.0	157.6±40.7	147.5±28.8	144.2±40.5
Dose of fibrinogen concentrate or placebo administered, mean±SD, g	7.1±2.4	7.7±2.4	9.1±1.9	7.7±2.1
Platelet count upon removal of the aortic clamp, mean (range), ×10⁹/L	143.1 (104-185)	134.4 (101-199)	78.2 (35-99)	80.9 (22-92)

Table III - Transfusion requirements.

Product administered in 24 hours (units)	Platelet count	Fibrinogen concentrate group	Placebo group	p value
Red blood cells	≥100×10⁹/L	0 (0, 2)	2 (2, 4)	0.01
	<100×10⁹/L	2 (0, 4)	2 (2, 5)	0.28
Fresh frozen plasma	≥100×10⁹/L	0 (0, 4)	6 (4, 10)	<0.001
	<100×10⁹/L	0 (0, 4)	8 (4, 8)	<0.001
Platelet concentrate	≥100×10⁹/L	0 (0, 2)	4 (2, 5)	<0.001
	<100×10⁹/L	2 (0, 3)	4 (2, 4)	0.03
Total allogeneic blood products	≥100×10⁹/L	0 (0, 7)	13 (8, 22)	<0.001
	<100×10⁹/L	3 (2, 9)	14 (8, 20)	0.008

Randomized, Double-Blinded, Placebo-Controlled Trial of Fibrinogen Concentrate Supplementation After Complex Cardiac Surgery

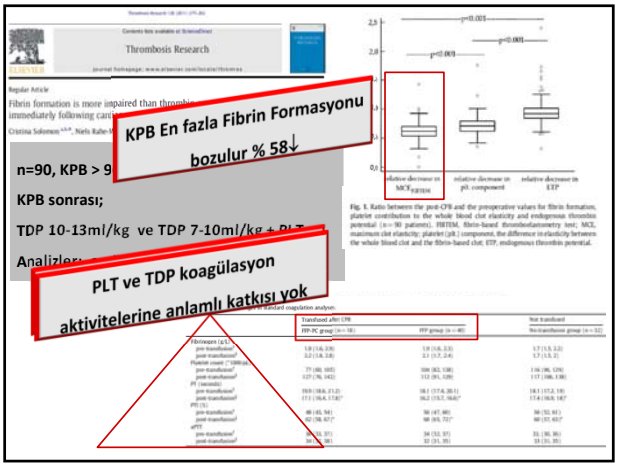
Fibrinojen↑ Kanama ↓

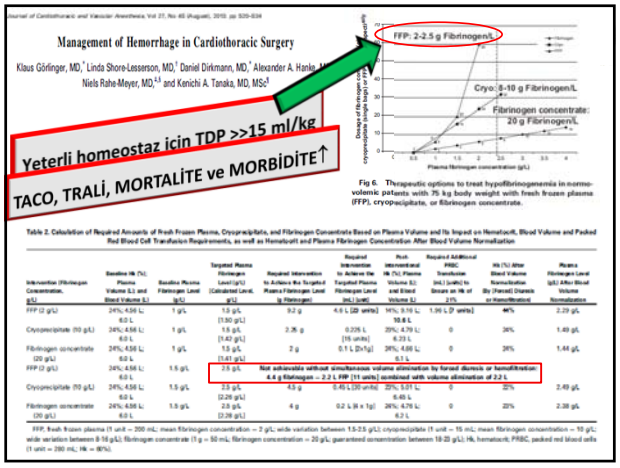
n=116, KPB> 90dk, acil, Scr>1.36
Protamin sonrası, Fib.ort. 4gr
Primer amaç; kanama/kan ürünü kullanımının ↓

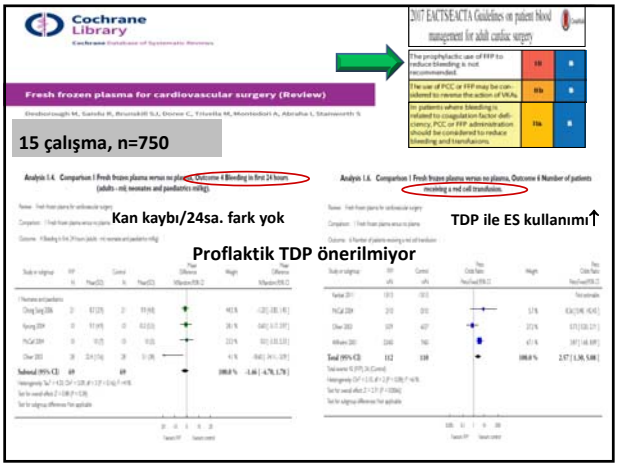
ES ↓, TDP/PLT Ø

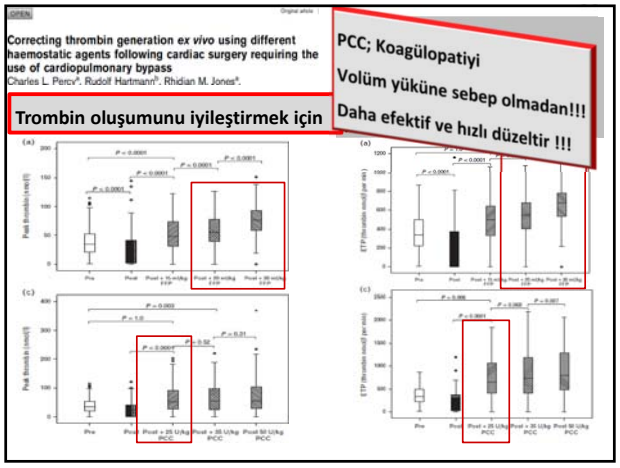
Table 2. Coagulation Data During the Procedure and at the Arrival in the ICU

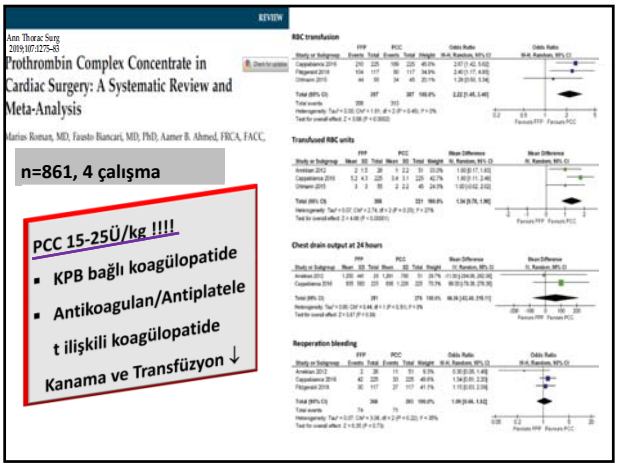
Parameter	Treatment Arm	Control Arm	Mean Difference (95% CI)	P Value
Clotting time EXTEM—seconds, median (IQR)				
20 minutes before removal of aortic cross clamp	84 (75 to 116)	89 (79 to 116)	−4.6 (−24 to 15)	0.262
After dosing	78 (63 to 111)	95 (78 to 113)	−16 (−36 to 3.7)	0.011
Maximum clot firmness EXTEM—mm, median (IQR)				
20 minutes before removal of aortic cross clamp	59 (55 to 64)	59 (54 to 62)	1.7 (−0.6 to 4	0.234
After dosing	64 (61 to 67)	60 (51 to 62)	7 (4.8 to 9.2)	0.001
Maximum clot firmness FIBTEM—mm, median (IQR)				
20 minutes before removal of aortic cross clamp	13 (9 to 18)	13 (10 to 15)	0.3 (0.2 to 1.7)	0.705
After dosing	23 (21 to 29)	13 (9 to 15)	10 (8.1 to 11.8)	0.001
Fibrinogen (mg/dL)—median (IQR)				
At the arrival in the ICU	367 (329 to 410)	242 (199 to 300)	120 (94 to 144)	0.001
Platelet count (cells, ×1000/μL)—median (IQR)				
At the arrival in the ICU	126 (108 to 159)	124 (96 to 150)	9.5 (−14 to 24)	0.321











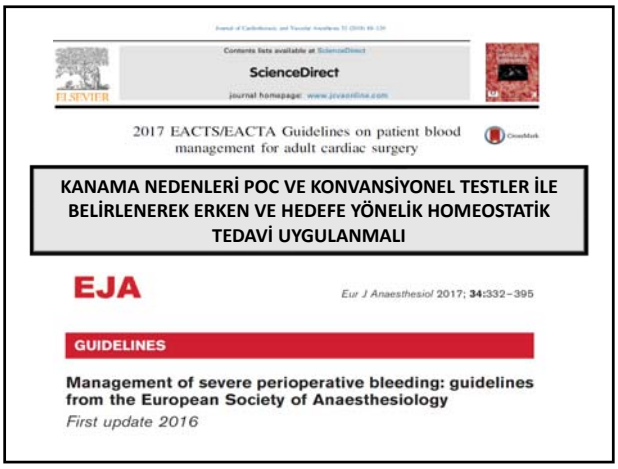
Homeostazı Yönetmek için ACT **GÜVENİLİR Mİ? YETERLİ Mİ?**

Pek çok faktörden etkilenir;

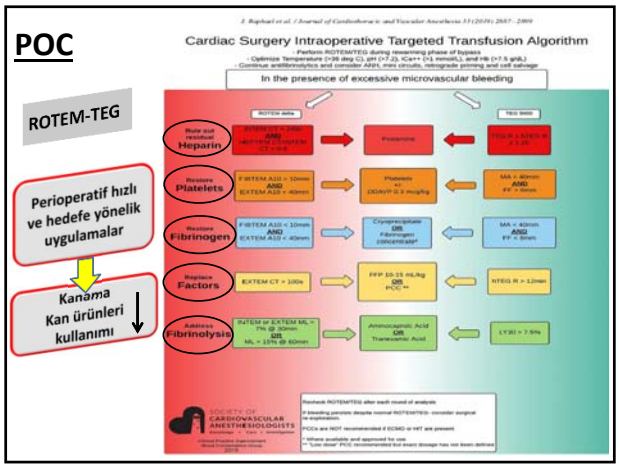
- ✓ Hemodilüsyo Faktörler ↓
- ✓ Uzayan KBP
- ✓ Hipotermi
- ✓ Trombsitopeni/Disfonksiyon
- ✓ Düşük fibrinojen seviyesi
- ✓ Direkt trombin inhibitörleri
- ✓ Platelet inhibitörleri
- ✓ Yüksek protamin dozu

ACT İLE HOMEOSTAZI YÖNETEMEYİZ

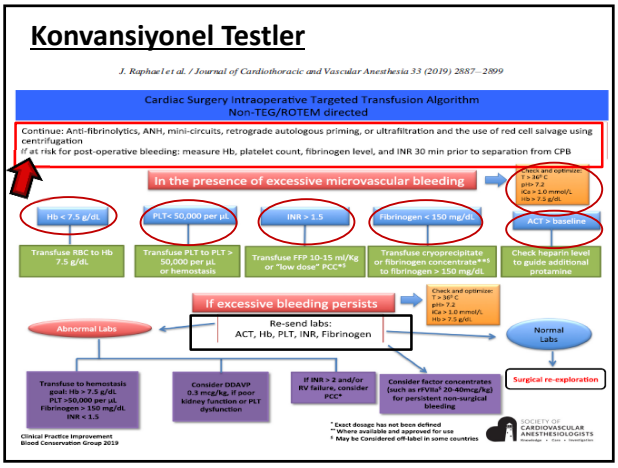
Finley ve ark. Anesthesia Analgesia;2013



POC



Konvansiyonel Testler



SON SÖZ

Kardiyovasküler cerrahide kanamalar; hastaya ait özellikler, operatif faktörlerler ve homeostatik sistemdeki değişimlere bağlı meydana gelir

Özellikle yüksek riskli hastalarda kanama yönetiminde, reaktif stratejiler yerine, bireyselleştirilmiş, hedefe yönelik tedaviler uygulanmalıdır

Bireyselleştirilmiş yönetim için homoestaz, POC ve konvansiyonel testler ile, vital bir organ gibi monitörize edilmelidir