

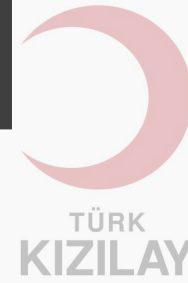
TROMBOSİT REFRAKTERLİĞİ



Fergün Yılmaz

Marmara Üniversitesi Tıp Fakültesi

Hematoloji Bilim Dalı



1. Uluslararası Kan Güvenliği ve Hemovijilans Kongresi, 2019

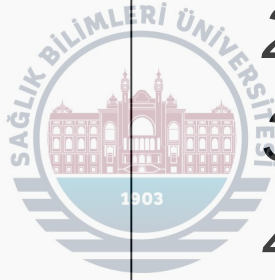
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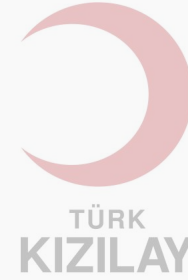
Sunum akışı – Trombosit Refrakterliği

1. Giriş
2. Tanımı
3. Klinik Önemi
4. Nedenleri
5. Refrakter hastaya yaklaşım



ULUSLARARASI
KAN
GÜVENLİĞİ
VE HEMOVİJİLAN

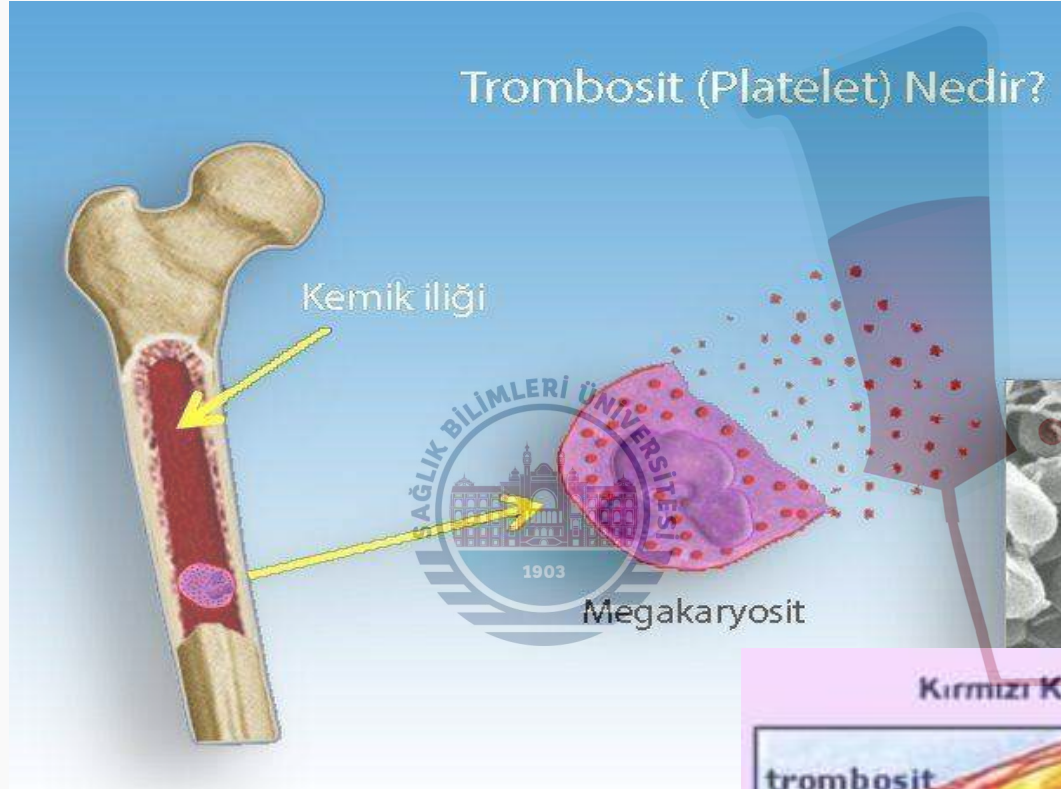
Kongresi



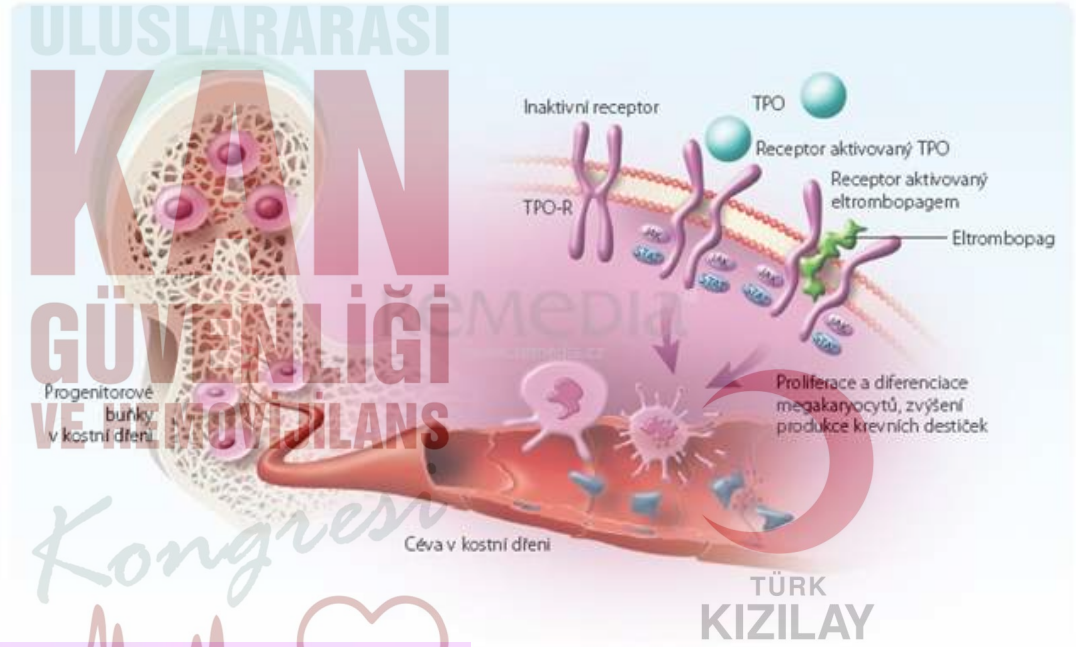
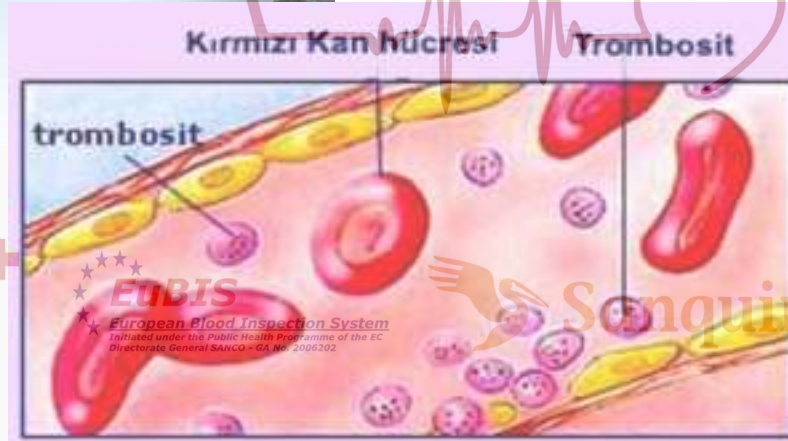
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TROMBOSİT VE PRİMER HEMOSTAZ....

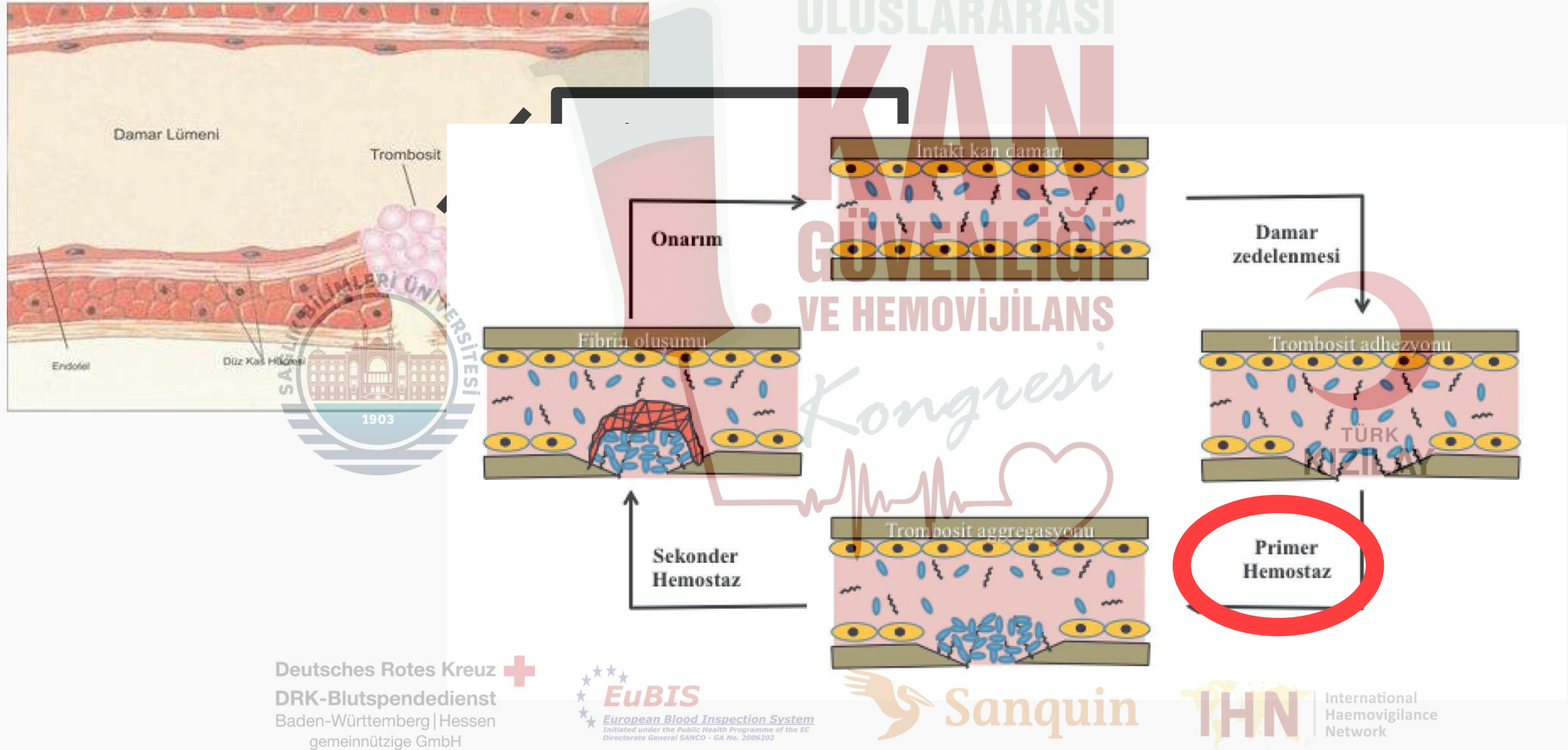


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TROMBOSİT VE PRİMER HEMOSTAZ....



TROMBOSİT VE PRİMER HEMOSTAZ....

- Primer hemostazın sağlanması ve devamı için
 - *Kalitatif*
 - *Kantitatif trombosit hastalıkları*



Trombosit süspansiyonları

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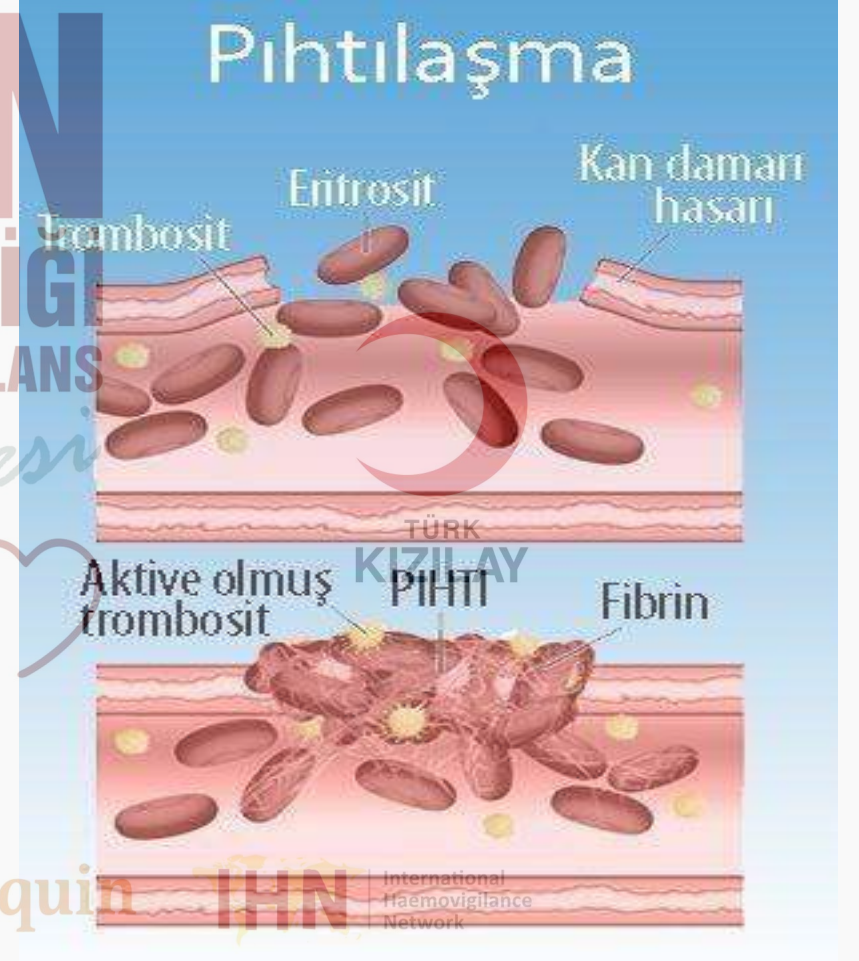
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Trombosit refrakterliđi



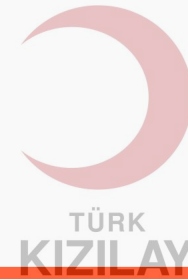
ANCAK

— %20-70 vakada

■ Beklenen yükselme izlenmiyor



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Trombosit refrakterliđi

Trombosit transfüzyonu sonrası beklenen artışın elde edilememesi

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Trombosit refrakterliği
Trombosit transfüzyonu sonra **beklenen artış** ememesi

??

■ Değişik tanımlar mevcut

- *düzeltilmiş trombosit artışı*
 - Hastanın vücut yüzey alanına
 - Verilen trombosit sayısı

Post-transfusion platelet increment (PPI) = $\frac{\text{Post-transfusion platelet count} - \text{Pre-transfusion platelet count}}{\text{platelets transfused (10}^{11}\text{)}}$

Corrected count increment (CCI) = $\frac{\text{PPI (l)} \times \text{body surface area (m}^2\text{)}}{\text{platelets transfused (10}^{11}\text{)}}$

Percentage platelet recovery (PPR) = $\frac{\text{PPI (l)} \times \text{total blood volume} \times 100\%}{\text{platelets transfused (10}^{11}\text{)}}$

Percentage platelet increment = $\text{PPR} / 0.67$ (0.67 accounts for splenic pooling)

En kolay yöntem

1. Saat : $>7.5 \times 10^9 / l$

1. Saat $> \%30$

2. 24. saat $> \%20$

CCI :

EN AZ 2 KEZ

ABO – UYUMLU TS

EN AZ 1 TS < 48 SAAT

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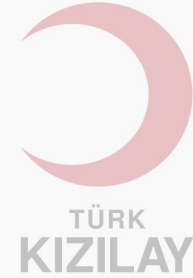
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Transfusion Medicine Reviews, 2006:20, 294–314.
British Journal of Haematology, 142, 348–360
New England Journal of Medicine, 1997:337, 1861–1869.
Journal of Clinical Oncology, 19, 1519–1538.

Tanım ????

Measure of transfusion outcome	Formula	Values suggestive of refractoriness
Absolute count increment (ACI)	$(\text{post-transfusion platelet count}) - (\text{pre-transfusion platelet count})$	At 60 min, ACI $< 5/\mu\text{l}$ per unit of whole blood derived platelets
Corrected count increment (CCI)	$(\text{ACI} \times \text{BSA}) / (\text{number of platelets transfused})$	At 10–60 min, CCI $< 7500/\mu\text{l}$ At 18–24 h, CCI $< 5000/\mu\text{l}$
Percent platelet recovery (PPR)	$(100\%) (\text{ACI} \times \text{TBV}) / (\text{number of platelets transfused})$	At 60 min, PPR $< 20\%$ At 16 h, PPR $< 10\%$



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The clinical impact of platelet refractoriness: correlation with bleeding and survival.

Kerkhoffs JL¹, Eikenboom JC, van de Watering LM, van Wordragen-Vlaswinkel RJ, Wijermans PW, Brand A.

	TR -	TR +
During follow-up		
Complications		
Fever	71	28
Infections	68	27
Mucosal damage	88	43
Severe mucosal damage (Grade III-IV)	18	5
Bleeding complications	22	5
Number of days with PLT counts $\geq 10 \times 10^9/L$		
0	35	16
1-3	58	39
≥ 4	24	4
RBC and PLT transfusions		
RBCs	5.8 ± 3.9	4.5 ± 3.7
PLT transfusions	4.3 ± 2.4	2.9 ± 1.8
Follow-up and survival		
Follow-up (months)	20.9 ± 12.5	22.9 ± 11.8
Lost to follow-up	2	1
Survival	56	33

117 HASTA

Trombosit refrakter vakalarda:

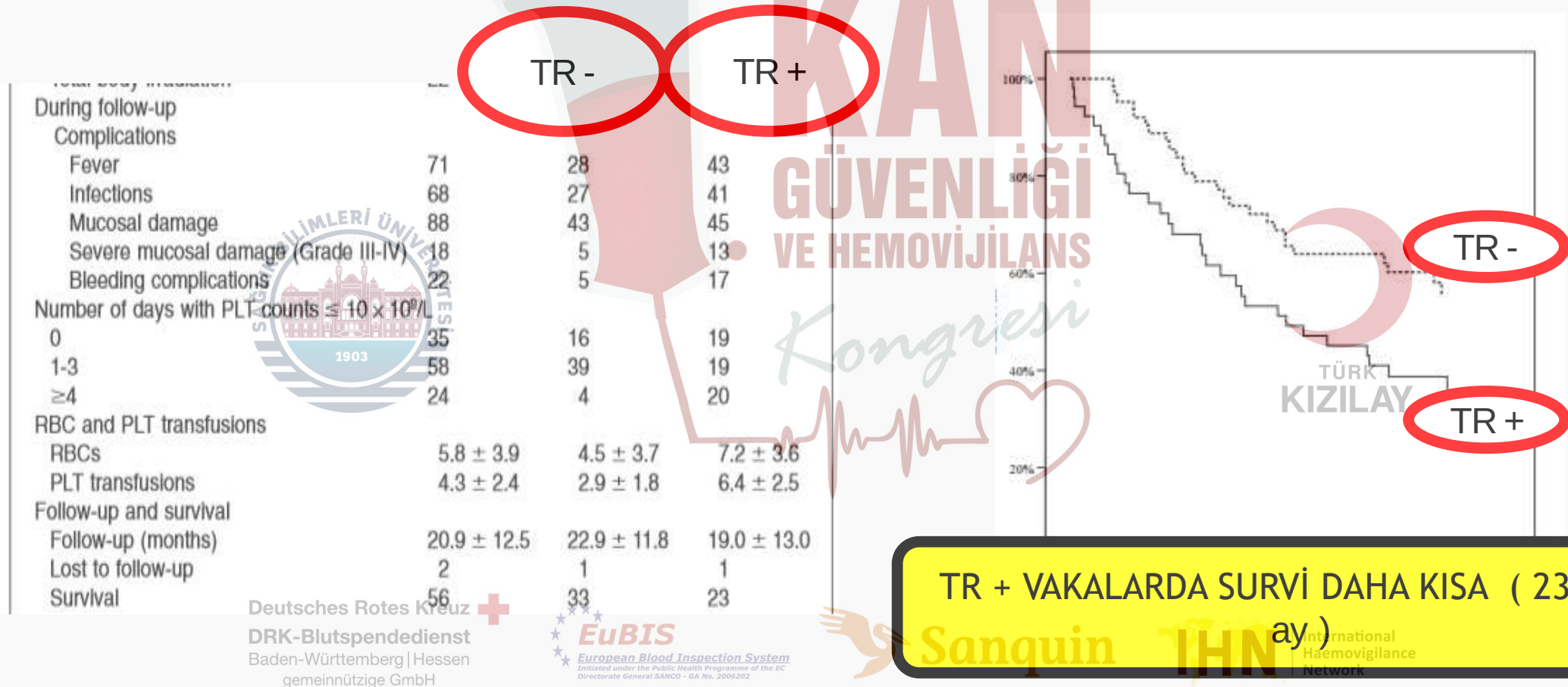
1. Daha sık kanama
2. Daha uzun trombositopenik dönem
3. Daha sık ES ve TS transfüzyonu

*TR: trombosit refrakterliği

The clinical impact of platelet refractoriness: correlation with bleeding and survival.

Kerkhoffs JL¹, Eikenboom JC, van de Watering LM, van Wordragen-Vlaswinkel RJ, Wijermans PW, Brand A.

117 HASTA



*TR: trombosit refrakterliği

Platelet transfusions: utilization and associated costs in a tertiary care hospital.

Meehan KR¹, Matias CO, Rathore SS, Sandler SG, Kallich J, LaBrecque J, Erder H, Schulman KA.

245 hasta

TABLE I. Patient Characteristics

	N (%)
Study Sample	245
Male	124 (50.6)
Mean age (SD)	49 (19.9)
Service ^a	
Bone Marrow Transplant	58 (23.4)
Allogenic-related	8 (3.2)
Allogenic-unrelated	6 (2.4)
Autologous bone marrow	1 (0.4)
Autologous peripheral blood stem cell	39 (15.7)
Autologous peripheral blood stem cell/bone marrow	4 (1.6)
Hematology/Oncology	78 (31.5)
Leukemia/lymphoma	33 (13.3)
Other oncology	24 (9.7)
Other hematology	21 (8.5)
Cardiothoracic Surgery	58 (23.4)
Other Surgery	30 (12.1)
Internal Medicine/Other Services	24 (9.6)
Platelet transfusions	
Patients receiving 1 platelet unit	77 (31.4)
Patients receiving 2-24 platelet units	145 (59.2)
Patients receiving 25+ platelet units	23 (9.4)
Total platelet units transfused	1,944

TABLE III. Refractory Status, Platelet Use, Hospitalization Costs, and Length of Stay

	TR +	TR -	P
Mean platelet use			
Total platelets	20.6	2.8	<0.0001
Single-donor platelets	16.1	1.9	<0.0001
Random-donor platelets	4.5	0.9	<0.003
Hospitalization costs			
Total costs (mean \$US)	103,956	37,818	<0.0001
Subcosts (mean \$US)			
Nursing	32,509	13,176	<0.0001
Laboratory	22,264	5,089	<0.0001
Pharmacy	18,609	4,794	<0.0001
Blood bank	2,039	646	<0.0001
Mean length of stay (days)	35.0	14.4	<0.0001

Biol Blood Marrow Transplant. 2018 Sep;24(9):1873-1880. doi: 10.1016/j.bbmt.2018.05.006. Epub 2018 May 10.

Platelet Transfusion Refractoriness in Single-Unit Cord Blood Transplantation for Adults: Risk Factors and Clinical Outcomes.

Tanoue S¹, Konuma T², Kato S¹, Oiwa-Monna M¹, Isobe M¹, Jimbo K¹, Takahashi S¹, Tojo A¹.

TR + vakalarda

- Gecikmiş trombosit ve nötrofil engraftmanları
- Artmış mortalite oranları mevcut

Crit Care Med. 2000 Dec;28(12):3843-6.

Blunted rise in platelet count in critically ill patients is associated with worse outcome.

Nijsten MW¹, ten Duis HJ, Zijlstra JG, Porte RJ, Zwaveling JH, Paling JC, The TH.

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TR + yoğun bakım hastaları

- Artmış mortalite ile ilişkili

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Sanguin

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Sonuç olarak TR

- Artmış mortalite
- Artmış hastane yatış süresi
- Artmış maliyet
- Artmış kan ve kan komponenti kullanımı ile ilişkili

bulunmuştur

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* TR trombosit refrakterliği

Trombosit refrakterliğinin nedenleri...



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Nedenler

Trombosit
alloimmunizasyonu

- HLA
- HPA
- ABO
- Diğer mekanizmalar

2/3

Non-
immun
nedenler

immun
nedenler

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Kongresi

TÜRK
KIZILAY

Relative importance of immune and non-immune causes of platelet refractoriness.

Doughty HA¹, Murphy MF, Metcalfe P, Rohatiner AZ, Lister TA, Waters AH.

Author information

1 Department of Haematology, St. Bartholomew's Hospital and Medical College, London, UK.

Abstract

In this prospective study of 266 (44%) platelet refractory patients, immune factors known to be associated with platelet refractoriness (fever, infection, antibiotic therapy, combination with immunosuppressive drugs) were present in 29/116 (25%) of unrefractory patients. The presence of no

combination of fever, infection and antibiotic therapy. This study provides evidence that immune mechanisms were not the predominant cause of platelet refractoriness in the patient population studied. It also suggests that measures for the prevention of HLA alloimmunisation, such as leucocyte depletion, may have a limited impact in reducing the incidence of refractoriness to platelet transfusions.

%44 vakada : trombosit refrakterliği

%88 vakada: non –immun nedenler : +

%67 vakada : sadece non- immun neden : +

%4 vakada : SADECE İMMUN NEDEN : +

Relative importance of immune and non-immune causes of platelet refractoriness.

Doughty HA¹, Murphy MF, Metcalfe P, Rohatiner AZ, Lister TA, Waters AH.

Clinical factor	Number of transfusions
Fever, infection, antibiotics	
Fever, infection, antibiotics in association with blood transfusion	
Fever, infection, antibiotics in association with DIC	
Fever, infection, antibiotics in association with bleeding	
Fever, infection, antibiotics in association with DIC and bleeding	
Fever, infection, antibiotics in association with DIC and blood transfusion	
Bleeding	

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>90 VAKADA: MULTİFAKTÖRİAL

- ATEŞ,
- İNFEKSİYON
- ANTİBİYOTİK KULLANIMI

KLİNİK OLARAK HİÇ BİR FAKTÖRÜN OLMAMASI
BAŞARILI BİR TRANSFÜZYON İLE İLİŞKİLİ

Non- immun nedenler

- Enfeksiyon / sepsis/ ateş
- İlaçlar

- *Antibiyotik (vankomisin)*
- *Anti fungal (amfo B)*
- *Heparin*

- DİK (dissemine intravasküler koagülasyon)
- Kanama
- GVHH (graft versus host hastalığı)
- Splenomegali
- Artan kilo

Sepsis :

Sepsis trombosit refrakterliği

- Trombosit ilişkili antikor varlığı

- %30 vakada gösterilmiş

- Sekestrasyon:

- Aktive endotelde
- Akciğer
- Karaciğer

- Azalmış yapım

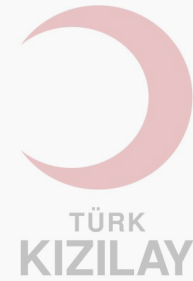
- Kİ baskılanması

- Artmış yıkım

- Dik
- Hemafagositoz
- Bakteriyel ürünler

Alloimmunizasyon

- İmmun nedenlerle azalmış yaşam süresi



Circulation Research, 1960: 8, 234-239
British Journal of Haematology, 142, 348-360
Ann Hematol. 1997 Apr; 74(4): 185-9.

Ateş

Tek başına bir neden mi ?



KARIŞTIRICI
FAKTÖRLER ???

Sepsis
Enfeksiyon
Antibiyotik kullanımı
DİK



Patient related

Increase platelet increment

Splenectomy

Age

Decrease platelet increment

Females with ≥ 2 pregnancies, or males

Palpable spleen

Amphotericin

SONUÇ:

ATEŞ+ENFEKSİYON EN SIK TROMBOSİT REFRAKTERLİĞİNİN NEDENİ

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Kanama

Clinical factor

Fever, infection, antibiotics
 Fever, infection, antibiotics in association with blood transfusion
 Fever, infection, antibiotics with DIC
 Fever, infection, antibiotics bleeding
 Fever, infection, antibiotics DIC and bleeding
 Fever, infection, antibiotics DIC and blood transfusion
Bleeding

Number of transfusions

Table I. Causes of platelet refractoriness

		Immune	Non-immune
Patient related	Increase platelet increment		
	Splenectomy	24.8	Infection
Decrease platelet increment	Age†	1	High fever
	Females with ≥ 2 pregnancies, or males	-8.9	Antibiotics (vancomycin)
Platelet related	Palpable spleen	-3.5	Anti-fungal medications (amphotericin B)
	Amphotericin	-2.7	Heparin
Bleeding	Fever	-1.7	Disseminated intravascular coagulation
	Infection	-1.6	Bleeding
Heparin	Heparin	-1.5	Granule versus-host disease
	Weight‡	-	Veno-occlusive disorder
Height§	Height§	-19	Splenomegaly
	Transfusion sequence number¶	-14	Increasing weight
ABO-compatible	ABO-compatible	-2	Pregnancies (multiple)
	Stored ≤48 hours	4.6	
Gamma irradiated	Gamma irradiated	1.9	
		-2.8	

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Vox Sang. 1994;66(3):200-5
 Transfusion. 2008;48(9):1959
 British Journal of Haematology, 2015, 171, 297-305.
 Blood. 2005 May 15;105(10):4106-14..

Splenomegali:

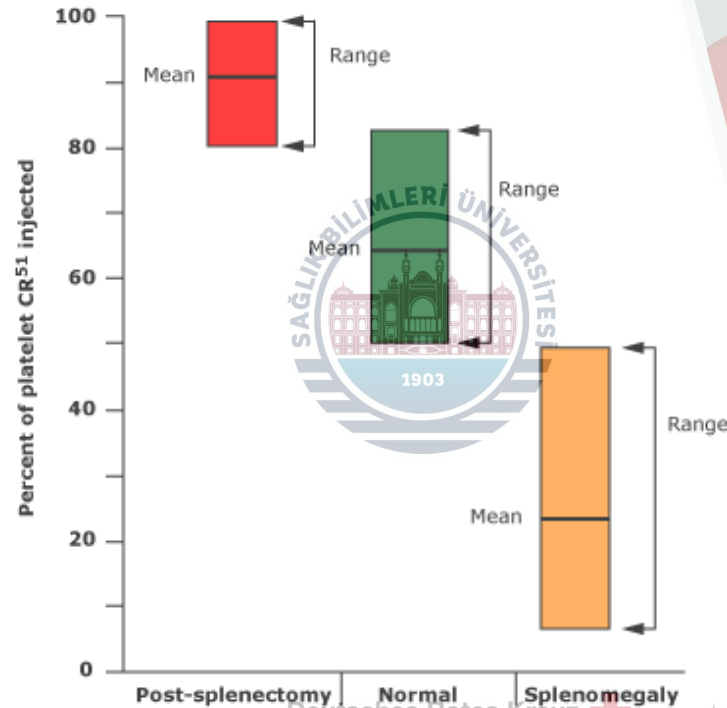
Normal kişilerde trombositlerin yaklaşık 1/3 'ü dalak tutulmakta ve periferik trombosit havuzu ile denge halinde bulunmaktadır

Splenomegali: sekestasyon %90' lara kadar yükselebilmektedir. Verilen trombositlerin çoğu dalakta sekestre olur ve trombosit sayısının yükselmesi gözlenmez



Trombosit refrakterliği
iki transfüzyon arasındaki sürede kısalma

Effect of spleen size on platelet pooling



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Splenomegali:

- Radyoaktif olarak işaretlenmiş trombositlerle yapılan çalışmalarda:

Dalak	Verilen trombositlerin periferdeki yüzdesi
Normal	%50-70
Splenomegali	<%30
Splenektomi	>%90

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variable
Patient related
Increase platelet increment
Splenectomy
Age
Decrease platelet increment
Females with ≥ 2 pregnancies, or males
Palpable spleen
Anti-phobicity
Bleeding
Fever
Infection
Heparin
Weight
Height
Transfusion sequence number
Platelet related
Increase platelet increment
ABO-compatible
Stored ≤ 48 hours
Decrease platelet increment
Gamma irradiated

Journal of Clinical Investigation, 1966 45, 645-657.
American Journal of Hematology, 23, 231-238.
Blood. 2005 May 15; 105(10): 4106-14..

Influence of antibiotics on posttransfusion platelet increment

M. Böck, K.-H. MUGGENTHALER, U. SCHMIDT, AND M.U. HEIM

Antibiotics	CCI (predicted mean $\pm$ SEM)		Significance	n*
Aminoglycosides	With	27.3 $\pm$ 3.1	NS	123
	Without†	25.2 $\pm$ 3.1		277
Amphotericin B‡	With	6.1 $\pm$ 6.6	0.001	28
	Without	27.3 $\pm$ 2.9		372
Cephalosporins	With	24.5 $\pm$ 3.0	NS	69

Factors affecting posttransfusion platelet increments, platelet refractoriness, and platelet transfusion intervals in thrombocytopenic patients

Sherrill J. Slichter, Kathryn Davis, Helen Enright, Hayden Braine, Terry Gernsheimer, Kuo-Jang Kao, Thomas Kickler, Edward Lee, Janice McFarland, Jeffrey McCullough, Glenn Rodey, Charles A. Schiffer, and Robert Woodson

Blood 2005 105:4106-4114; doi: <https://doi.org/10.1182/blood-2003-08-2724>

Br J Haematol. 2008 Jul;142(3):348-60. doi: 10.1111/j.1365-2141.2008.07189.x. Epub 2008 May 28.

Platelet transfusion refractoriness.

Hod E¹, Schwartz J.

Variable	
Patient related	
Increase platelet increment	
Lymphocyte count	
Females with platelet refractoriness	
Heparin	
Fever	
Platelet transfusion	
Weight	
Platelet related	
Decrease platelet increment	
Platelet dose	
F-AP	

Infectious disease agents	
Ampicillin	
Amoxicillin	
Cephalosporins	
Ciprofloxacin/levofloxacin	
Linezolid	
Metronidazole	
Nafcillin	
Penicillin	
Piperacillin/tazobactam	
Rifampin	
Sulfonamides	
Vancomycin	
Amphotericin	
Histamine-receptor antagonists	
Cimetidine	
Famotidine	
Ranitidine	
Analgesics	
Acetaminophen	
Diclofenac	
Fentanyl	
Ibuprofen	
Naproxen	
Salicylates	
Chemotherapeutics and immunosuppressants	
Bleomycin	
Cyclosporin	
Oxaliplatin	
Fludarabine	
Rituximab	
Antithrombotics	
Clopidogrel/ticlopidine	
GPIIb/IIIa antagonists	
Heparin	
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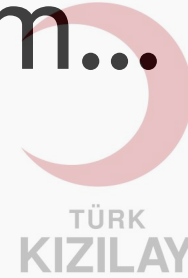
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Uptodate, Goldfinger D, Burner J
Transfusion 1996;36:952-954.
Antimicrob Agents Chemother. 2002 Aug; 46(8): 2723-2726.

Hematopoetik kök hücre nakli/ VOD

- Tek başına bir faktör mü ?
- Çoklu trombosit transfüzyonu
 - *Alloimmunizasyon* ???
- Multiple enfeksiyonlar ???
- İlaçlar ???
- VOD ek bir faktör mü ????
- GVHH ???

Refrakter hastaya yaklařım...



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Refrakterlik şüphesi olan hasta

Refrakterliğin gösterilmesi

$$\frac{CCI (/l) \times \text{body surface area (m}^2\text{)}}{\text{platelets transfused (10}^{11}\text{)}}$$

CCI < 5-10.000
(10 dk – 1 sa)
(18-24 sa)

Plt < 48-72 sa
aferez
ABO uyumlu

Negatif

pozitif

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CCI < 5-10.000
(10 dk - 1 sa)

Plt < 48-72 sa
aferez
ABO uyumlu

Negatif

TR OLASI DEĞİL



VERİLEN ÜRÜN ÖZELLİKLERİ !!!!

– Trombosit artışını etkileyen özellikler: :

- Verilen trombosit doz
- Trombosit saklama süresi
- Trombosit süspansiyonu kalite standartlarına uygun mu ?
- Trombosit süspansiyonu ABO uyumlu mu ?
- Ürüne uygulanmış işlemler
 - Işınlama

Trombosit artışı olmayan vakalarda gözden geçir

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Directorate General SANCO - GA No. 2006202

Sanquin

THN International
Thrombocyte Hematology Network

Journal of Clinical Investigation, 1966 45, 645-657
American Journal of Hematology, 23, 231-238.
Blood. 2005 May 15; 105(10): 4106-14.
British Journal of Haematology, 142, 348-360
Blood. 2012 Jun 7; 119(23): 5553-62.

CCI < 5-10.000
(10 dk - 1 sa)

Plt < 48-72 sa
aferez
ABO uyumlu

pozitif

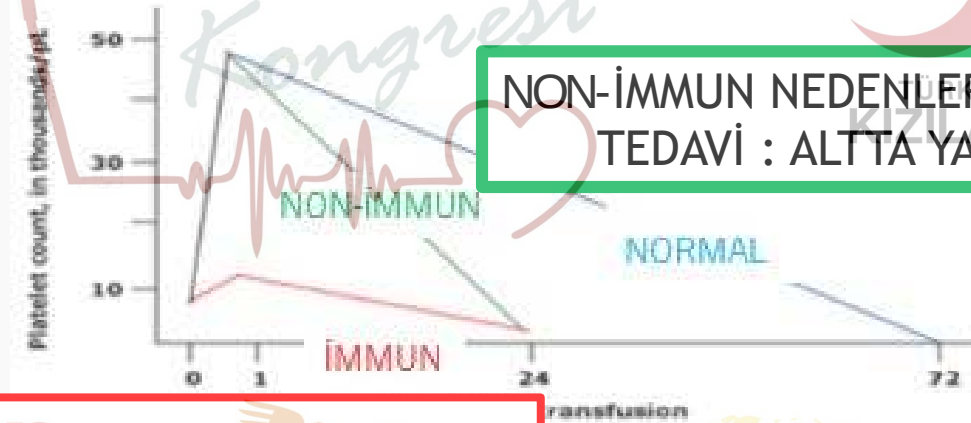
TR OLASI

Alloimmunizasyon ??

İMMUN X NON-İMMUN

- 1. saatte yükselme olur ancak 24. saatte hızlıca bazal seviyelere düşerse:
 - Öncelikle trombosit yaşam süresinin azaldığı düşünülmeli
 - Non-immun nedenler
 - DİK
 - Sepsis
- 1. saatte yükselme olmaması
 - Alloimmunizasyon ???

Sekestrasyon
Periferik kullanım



NON-İMMUN NEDENLER:
TEDAVİ : ALTTA YATAN NEDENİN TEDAVİSİ

İMMUN NEDENLER : **EuBIS**

TEDAVİ: UYGUN TROMBOSİTİN SAĞLANMASI

Refrakter Hastada Tedavi

NON-İMMUN NEDENLER:

TEDAVİ : ALTTA YATAN NEDENİN TEDAVİSİ

- Sepsis, DİK, enfeksiyon, ilaçlar....
- Havuzlanmış / aferez trombosit süspansiyonu
 - ABO uyumlu
 - <48-72 saat depolanmış TS

İMMUN NEDENLER :

TEDAVİ: UYGUN TROMBOSİTİN SAĞLANMASI

- Trombosit çapraz karşılaştırma
 - Hastanın plazması ile ABO uyumlu aferez trombosit süspansiyonu ile karşılaştırılır
- Genellikle 14 ayrı trombosit ile yapılır
 - <2 : çapraz reaksiyon : alloimmunizasyon dışı nedenler
 - ≥2 çapraz reaksiyon : alloimmunizasyon olasılığı yüksek
- Reaktivite yoksa: uyumlu donör???
- HLA/ HPA uygun trombosit süspansiyonu
- HLA/ HPA antijeni negatif trombosit süspansiyonu

Refrakter Hastada Tedavi

İMMUN NEDENLER

UYGUN TROMBOSİT SAĞLANMASI

TROMBOSİT SÜSPANSİYONU VERİLME
ENDİKASYONU GÖZDEN GEÇİRİLMELİ

DİĞER SEÇENEKLER ???

KANAMAYI ÖNLEME / KONTROL ALTINA
ALMAYA YÖNELİK TEDAVİLER



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 **THN**
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Haemovigilance
Network

UYGUN TROMBOSİT BULUNAMIYORSA

■ Diğer seçenekler:

- *Rhogam*
- *Splenektomi*
- *IVIG*
- *Rituksimab*
- *Plazmaferaz*

■ Kanamayı kontrol altına almaya yönelik

- *Antifibrinolitikler*
- *Yüksek doz trombosit transfüzyonu*
- *Hayati tehdit eden kanamalarda: aktive faktör VII*

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 **IHN**

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Network

Platelets. 2015;26(2):195-6

Platelets. 2015;26(2):190-4

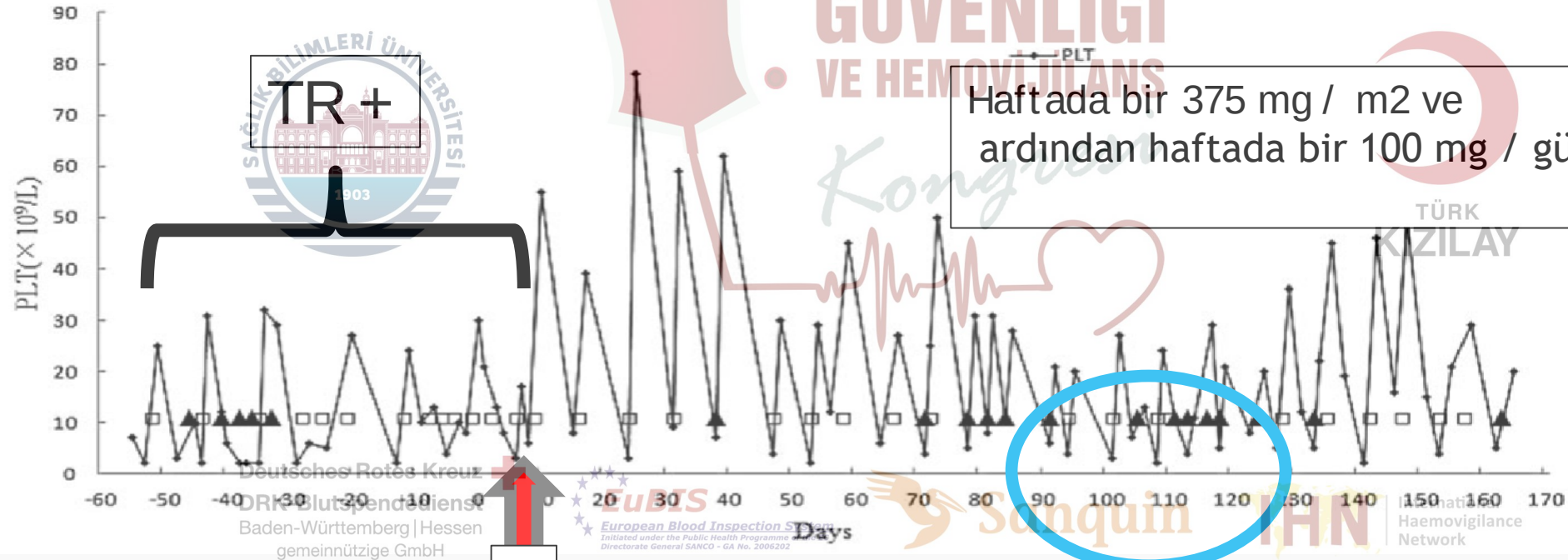
British Journal of Haematology, 2015, 171, 297–30

Rituksimab:

CASE REPORT

Successful use of rituximab in platelet transfusion refractoriness in a multi-transfused patient with myelodysplastic syndrome

Qing-Hong Yu, Yi-Ping Shen, Bao-Dong Ye, & Yu-Hong Zhou



R

PNÖMONİ

Platelets. 2015;26(2):195-6
Platelets. 2015;26(2):190-4
Int J Clin Exp Med. 2015;8(8):14080

Rituksimab

Int J Clin Exp Med. 2015 Aug 15;8(8):14080-4. eCollection 2015.

Efficiency of treatment

Liu W¹, Wu D¹, Hu T¹, Ye B¹.

Author information

1 Department of Hemato

Abstract

OBJECTIVE: The purpose

METHODS: We retrospective analysis 7 patients (5 aplastic anemia, 2 myelodysplastic syndrome) with immune PR who received at least 3 weekly infusions of rituximab (375 mg/m²).

RESULTS: All en
there were 2 patients

administration and the continuous beginning to appear at 3 weeks from the start of treatment.

CONCLUSION: Rituximab is a promising treatment in patients with immune PR and giving the opportunity and time for cure the disease.

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- 7 Vakada
- Haftada bir 375 mg / m² 3 –4 hafta
- 1.Haftada hızlı yanıt
- Hızlı yanıt kaybı
- >3.hafta daha yavaş ve devam eden yanıt
- Elde edilen yanıt : kanamada azalma ile ilişkili

Rituksimab TR olan vakalarda düşünülebilecek bir tedavi seçeneği

Am J Hematol. 1991 Sep;38(1):15-23.

Intravenous
response

Zeigler ZR¹,

- 19 hasta
- IVIg refrakter hastalarda trombosit yıkımına neden olan mekanizmalar üzerinde etki göstermektedir.

Blood. 1984 Oct;64(4):937-40.

High-d

Schiffer CA

- 13 hasta
- 400 mg / kg / gün – 5 gün
- IVIg, TR+ lösemi hastalarında yeterli yanıt elde etmemektedir.

Blood. 1990 Jan 1;75(1):313-6.

A randomized placebo-controlled trial of intravenous gamma globulin in alloimmunized thrombocytopenic patients

Kickler T¹, E

- 12 hasta
- 400 mg / kg / gün – 5 gün
- IVIg 1 saat yükselmesinde kısmı fayda sağlamasına rağmen 24saatte etkin değildir

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Directorate General for Health and Consumer Policy
0006202



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Aktif kanama ataklarında....

- Antifibrinolitik tedaviler
- Faktör VIIa preparatları

Med Oncol. 2010 Mar;27(1):16-9. doi: 10.1007/s12032-008-9163-y. Epub 2009 Jan 10.

Successful treatment of severe gastrointestinal bleeding after chemotherapy in acute myeloblastic leukemia with recombinant activated factor VII : report on one case and review of other uses in acute leukemias.

Pamuk GE¹, Taşçı M., Oztürk E., Demir M.

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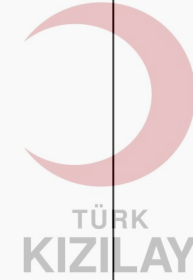
UYGUN TROMBOSİT BULUNAMIYORSA

■ Diğer seçenekler:

- Rhogam
- Splenektomi
- IVIG
- Rituksimab
- Plazmaferaz



ULUSLARARASI
KAN
GÜVENLİĞİ
VE HEMOVİJİLAN
Kongresi



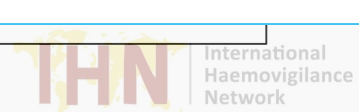
[Platelets](#). 2015;26(2):190-4. doi: 10.3109/09537104.2014.895922. Epub 2014 May 27.

Rituximab, plasma exchange and intravenous immunoglobulins as a new treatment strategy for severe HLA alloimmune platelet refractoriness.

[Cid J¹](#), [Magnano L](#), [Acosta M](#), [Alba C](#), [Esteve J](#), [Lozano M](#).

Deutsches Rotes Kreuz

DRK-Blutspendedienst
Baden-Württemberg | Hessen
gemeinnützige GmbH



[Platelets](#). 2015;26(2):195-6

[Platelets](#). 2015;26(2):190-4

British Journal of Haematology, 2015, 171, 297–30

ÖZET OLARAK ...

Refrakterlik şüphesi olan hasta

Refrakterliğin gösterilmesi

CCI < 5-10.000
(10 dk - 1 sa)
(18-24 sa)

Negatif

pozitif

TR OLASI DEĞİL

TR OLASI

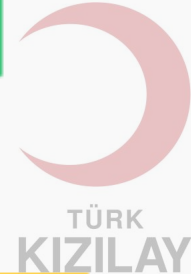
VERİLEN ÜRÜN ÖZELLİKLERİ

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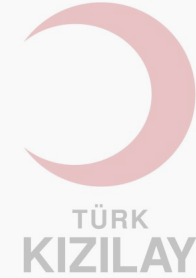
ULUSLARARASI

KAN

GÜVENLİĞİ

• VE HEMOVİJİLANANS

Kongresi



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Baden-Württemberg | Hessen
gemeinnützige GmbH



Tesekkür ederim...

