

# EKD Sırasında Venöz Dönüş Bozulmasının Karaciğer Üzerine Etkileri

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KTÜ Tıp Fakültesi  
Anesteziyoloji ve Reanimasyon AD



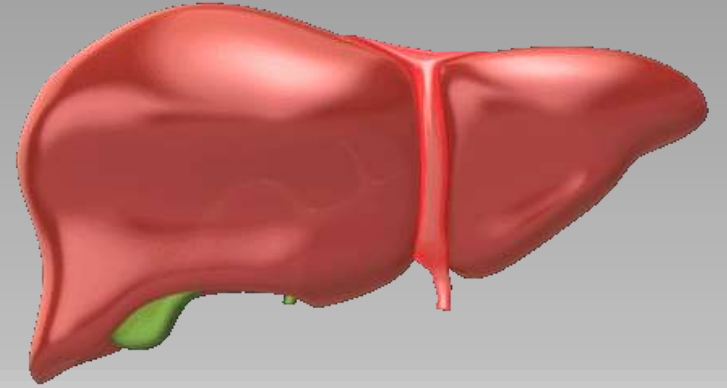


## Sunum planı

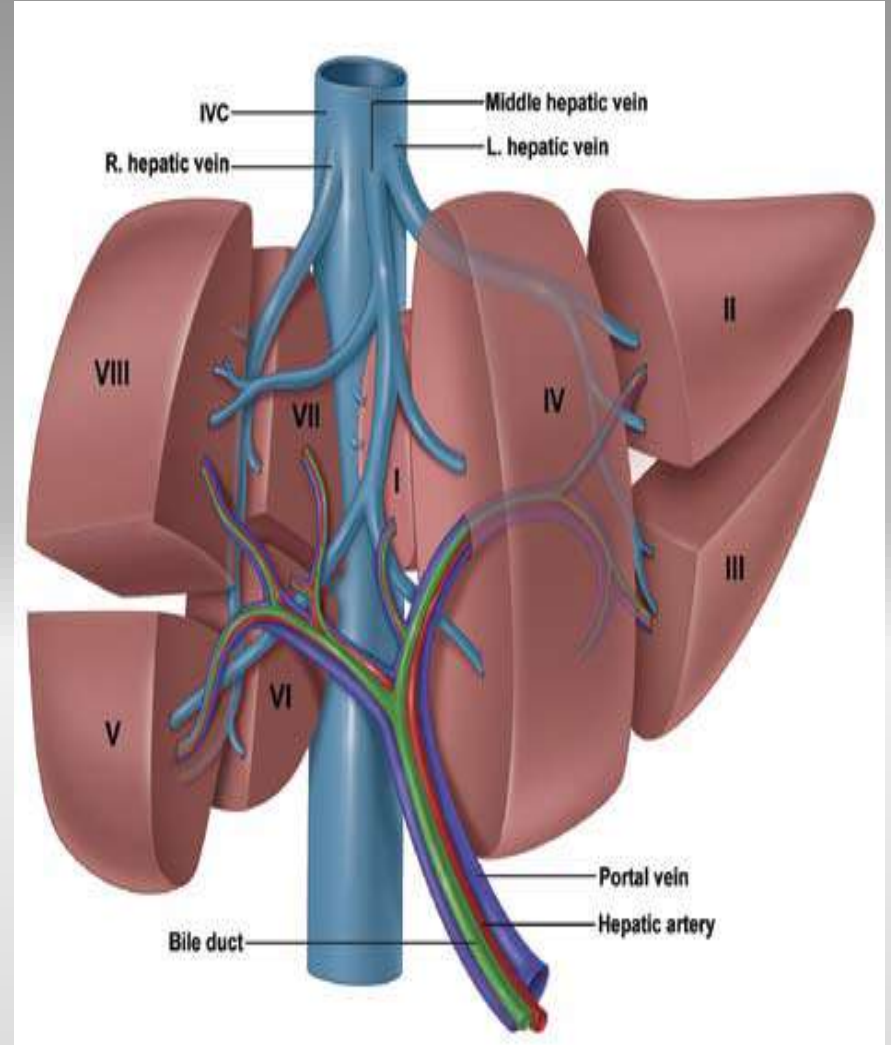
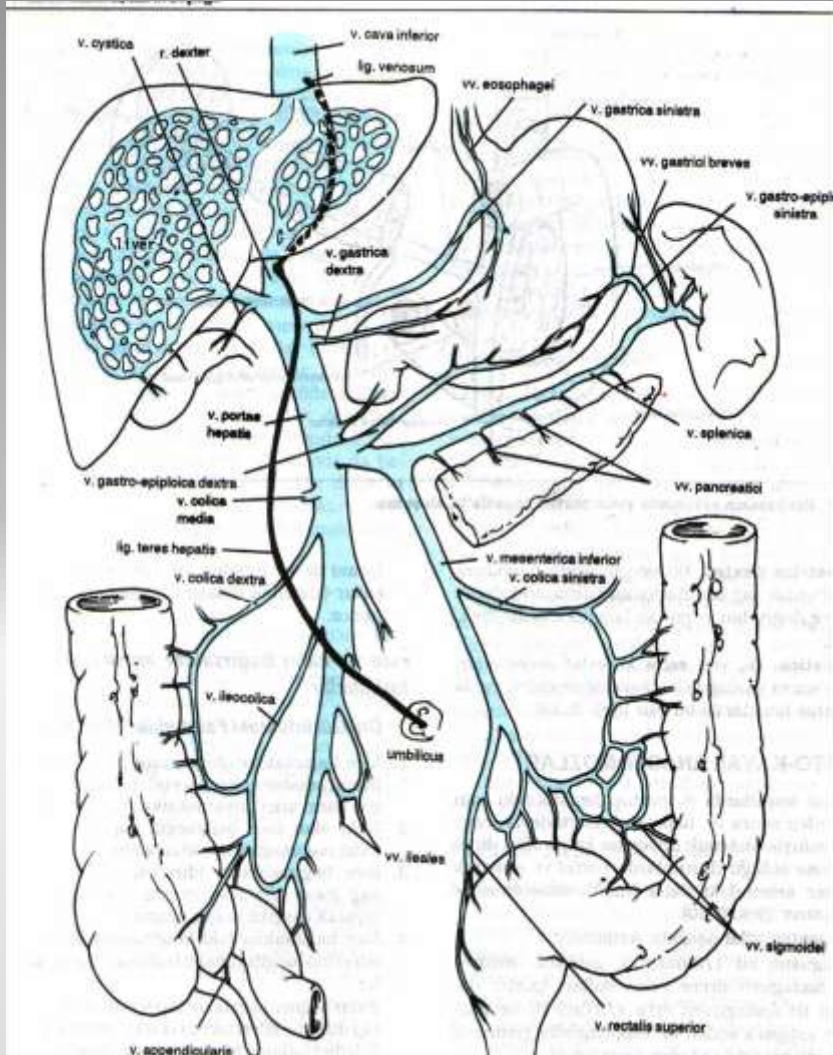
- Karaciğer anatomisi, fizyolojisi
- Ekstrakorporeal dolaşım
- Venöz dönüş yetersizliğinin nedenleri
- Yetersizliğin karaciğer üzerine etkileri
- Literatür ?

# Karaciğer

- En büyük organ
- İşlevleri fazla
- Dayanıklı
- Alternatifli perfüzyon
- Alternatifi yok



# Karaciğerin dolaşımı



# Karaciğerin Görevleri



**Yağ, protein ve şeker metabolizması**

**Vitamin ve mineral depolanması**

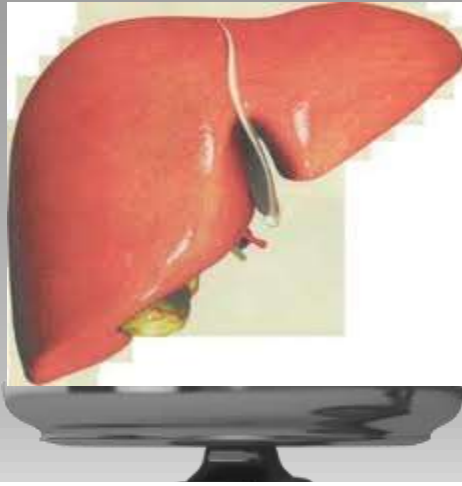
**Sindirim sistemine ait görevler**

**Hematopoetik görevler**

**Metabolizasyon**

**Detoksifikasyon**

# Karaciğer-Kalp İlişkisi



## Heart diseases affecting the liver and liver diseases affecting the heart

Jochanan E. Naschitz, MD, Gleb Slobodin, MD, Roger J. Lewis, BA, MA, Elimelech Zuckerman, MD, and Daniel Yeshurun, MD *Haifa, Israel*

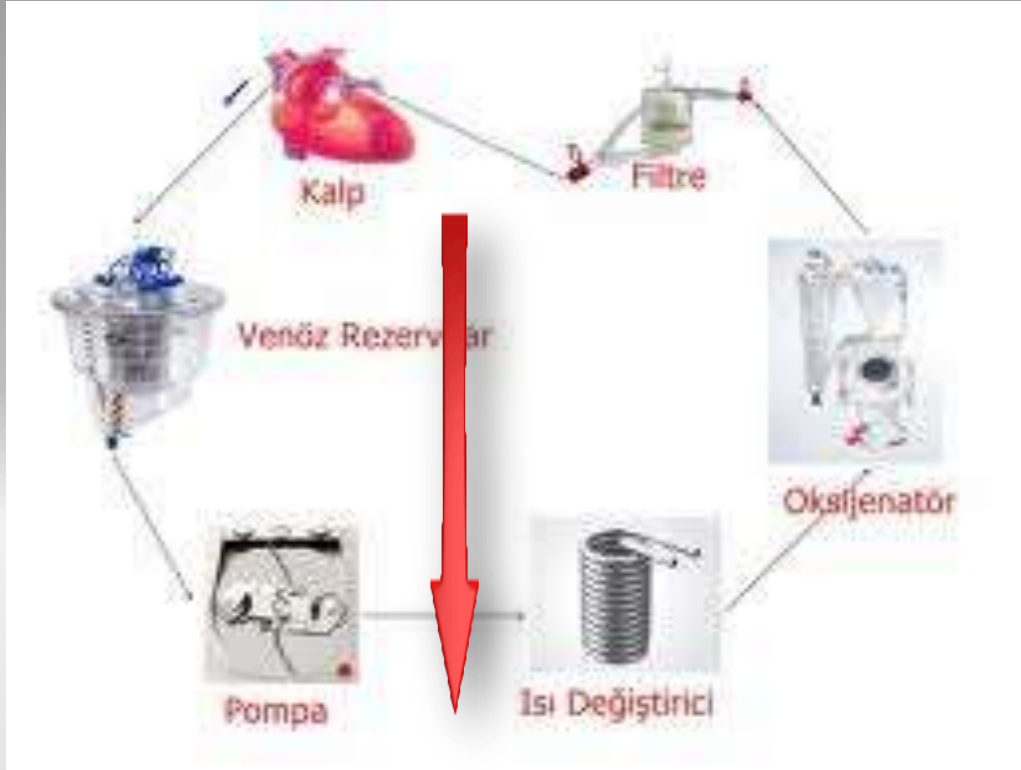
Am Heart J 2000;140:111-20.

# Ektrakorporeal dolařım





# Venöz dönüş yetersizliği



**Yer çekimi**

**preload**

**Output**



**Perfüzyon bozukluęu**



# Venöz dönüş yetersizliđi

## A- Hastaya ait özellikler



Vücut yüzey alanı ve kan volümü

Kardiyovasküler sisteme ait yapısal deđişiklikler

Kalbin dolum derecesi

Venöz dilatasyon durumu

# Venöz dönüş yetersizliđi

B- Cerrahi ekipman ve prosedür



Kateterizasyon yeri

Kanülün tipi

Pompaya ait devre

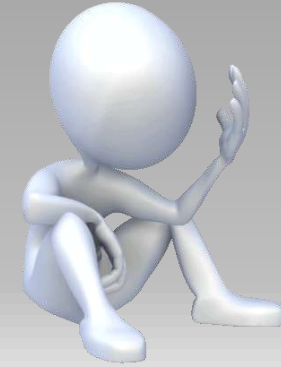
Cerrahi strateji

Mekanik sistemler

Kardiyak  
cerrahi

Kc fonks  
bozukluęu

% 15-65

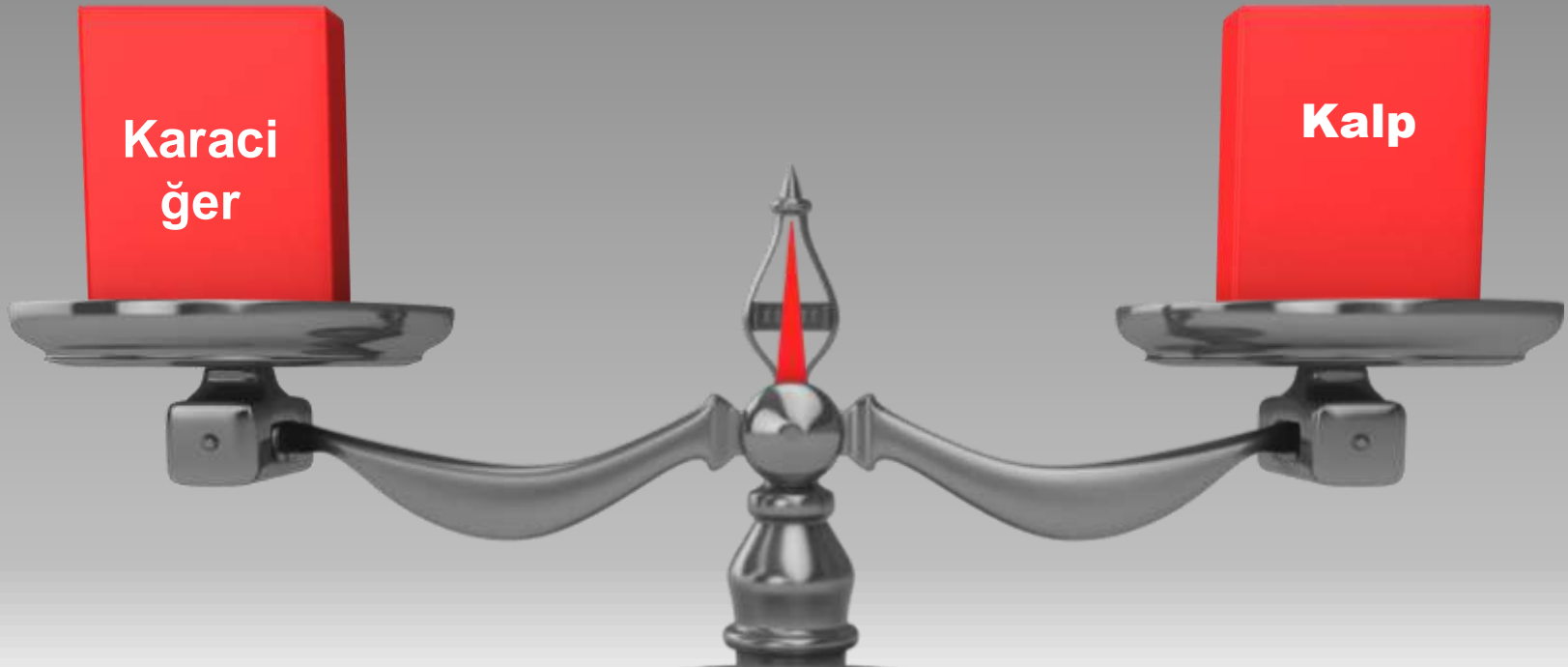


- ALT  
- ALP  
- LDH

- AST  
- GGT  
- Bilirubin



# Karaciğer-Kalp İlişkisi

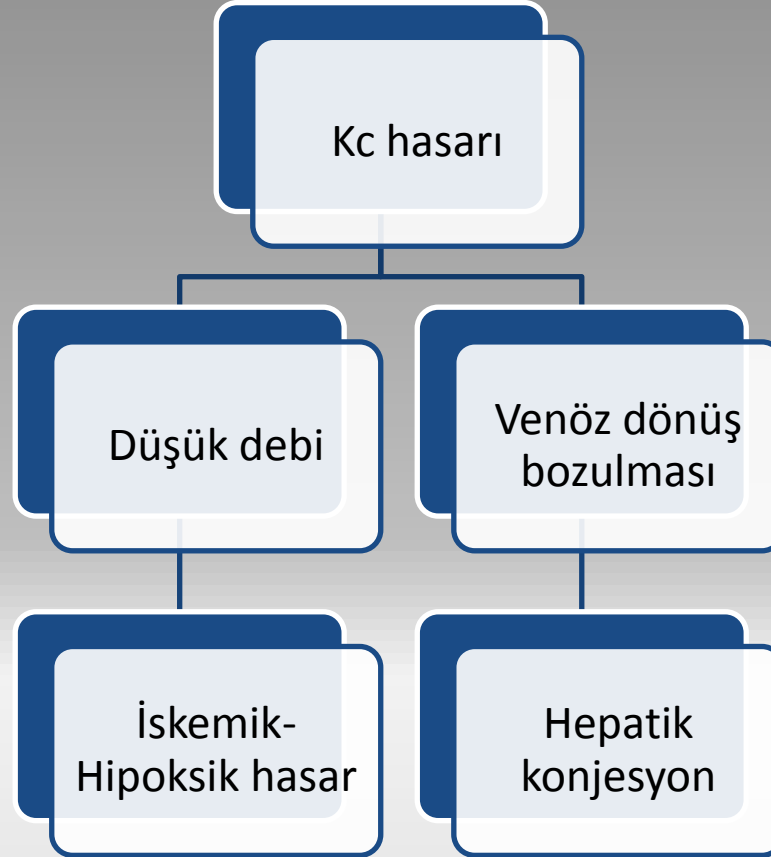


## **Cardiac Hepatopathy: Clinical, Hemodynamic, and Histologic Characteristics and Correlations**

Robert P. Myers,<sup>1</sup> Raimondo Cerini,<sup>2</sup> Raymond Sayegh,<sup>2</sup> Richard Moreau,<sup>2</sup> Claude Degott,<sup>3</sup> Didier Lebrec,<sup>2</sup> and Samuel S. Lee<sup>1</sup>

Cardiac hepatopathy, hepatic injury caused by cardiac dysfunction, is a common entity but has been characterized incompletely, particularly the relationship between hemodynamics and histology. We aimed to describe the clinical, biochemical, hemodynamic, and histologic characteristics of this disorder. Eighty-three patients from 2 tertiary referral centers were studied. Patients

# Kalple ilgili karaciğer hasarı



Venöz dönüşte bozulma

İnferior v. Cava

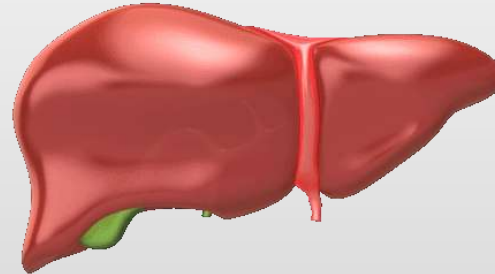
Superior v. Cava

Konjesyon

Superior vena kava sendromu

Konjestif kalp yetm benzeri

Hepatik konjesyon



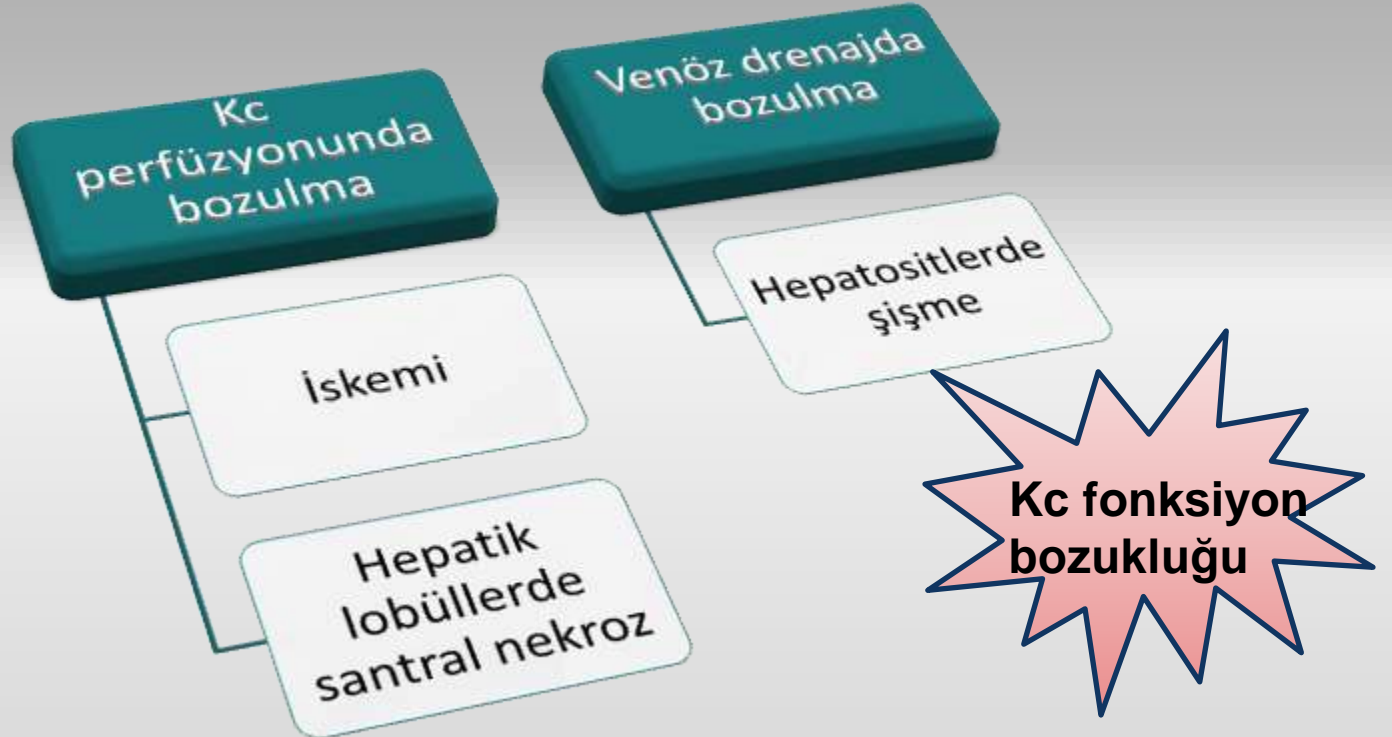
Hepatik konjesyon



Kompresyon



Damar duvarına bası





# Karaciğer fonksiyon bozukluğu

Karaciğer enzimlerinde artış

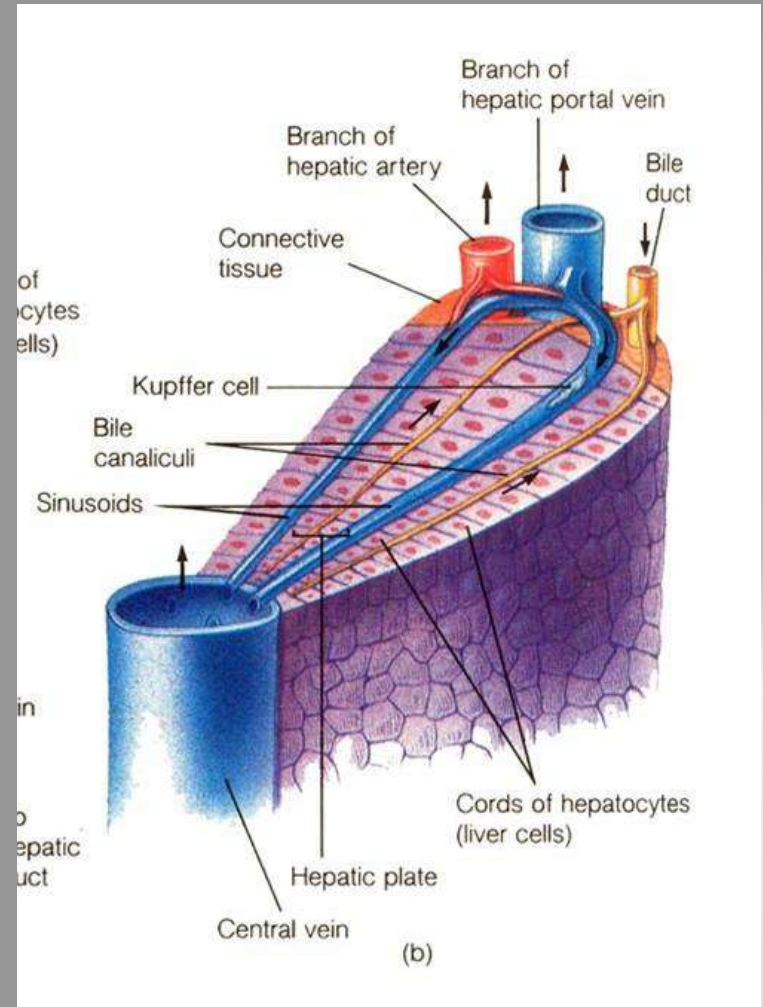
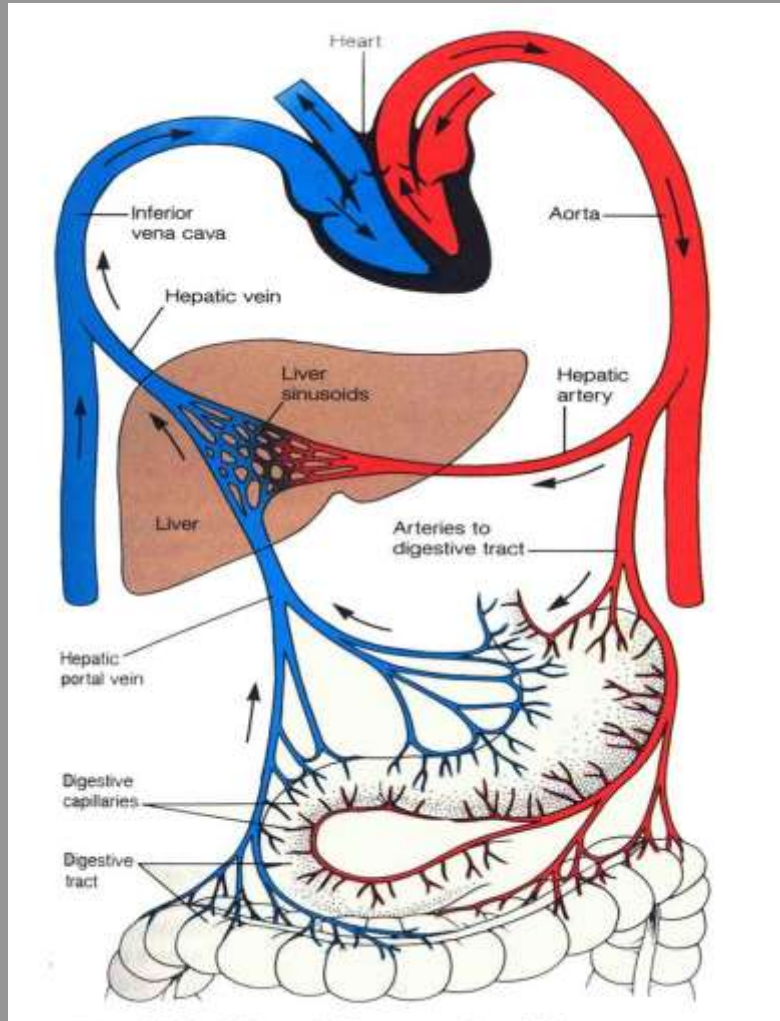
Sistemik etkiler

Laktat metabolizmasında

Laktat birikimi

**metabolik  
asidoz**

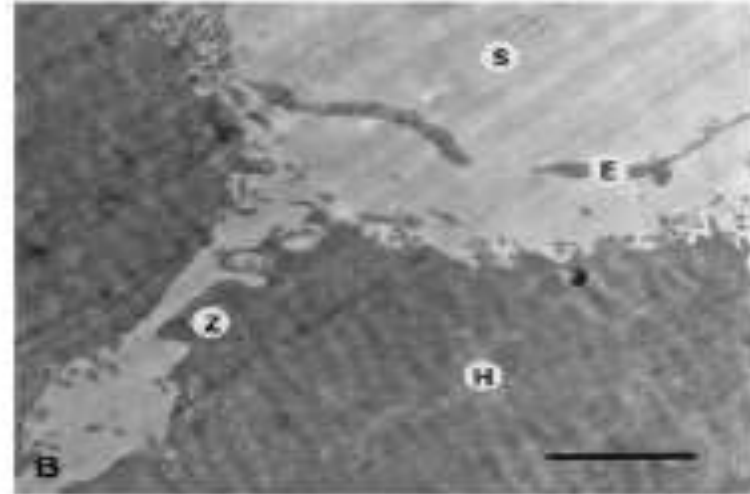
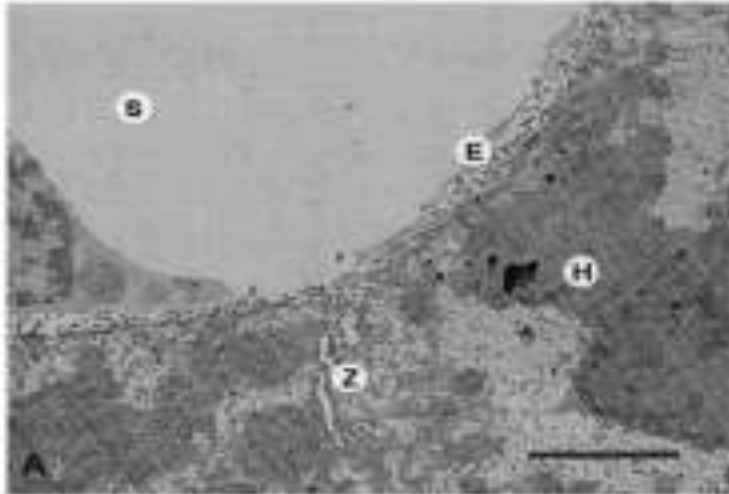
# Hepatik konjesyon



Perfüze rat karaciğeri

Outflowda  
obstrüksiyon

Hepatik sinüzoidlerde  
basınç artışı



**FIGURE 1.** Electron micrographs of perfused liver under normal (A) and high-pressure conditions (B). High pressure causes the zonula occludens (Z) to become distended and a fistula has formed between the hepatocytes (H). The endothelium (E) is swollen and disrupted, allowing direct contact between the bile canaliculus and the sinusoid (S). Scale bars = 2 $\mu$ m.

# Hepatik konjesyon

## **Type of Liver Dysfunction in Heart Failure and Its Relation to the Severity of Tricuspid Regurgitation**

George T. Lau, MBBS, Hiok C. Tan, MBChB, and Leonard Kritharides, PhD

**C**ongestive cardiac hepatopathy is characterized by the triad of clinical heart failure (especially right-sided cardiac failure), abnormal liver function tests (LFTs) and the exclusion of alternate causes of liver specific treatment of causative factors. This study aims to (1) identify the characteristic pattern of LFT abnormality in heart failure, and (2) identify associated cardiac factors to elucidate the processes medi-

- Hiperemi
- Santral hepatic loblarda konjesyon ve nekroz
- Kollajen birikimi, fibrozis

**Kolestatik kc hasari**

- ALP, GGT artışı

# Neden kolestatik?

- ALP, GGT biliyer epitel hücrelerinde lokalize
- Safra kanallarında hasar olunca yükselir
- Hepatik konjesyon:
  - Nonspesifik mekanik obstrüksiyon
  - Biliyer staz

**Kolestatik tipte Kc hasarı**

Green RM, Flamm S. Gastroenterology. 2002 Oct;123(4):1367-84.

# Karaciğer hasarı

Konjesyon mu

Düşük debi mi



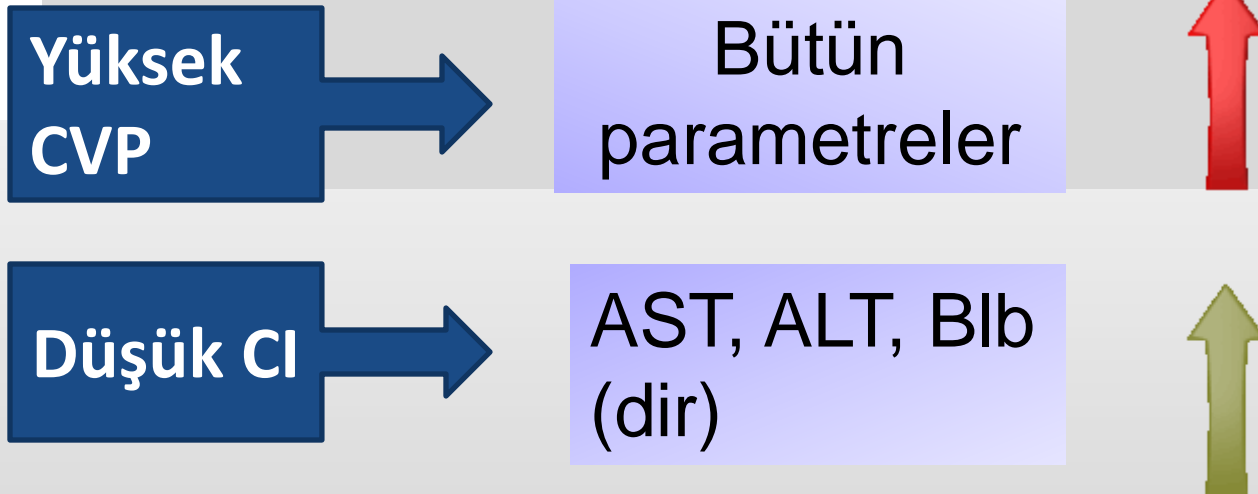


# Abnormal Liver Function in Relation to Hemodynamic Profile in Heart Failure Patients

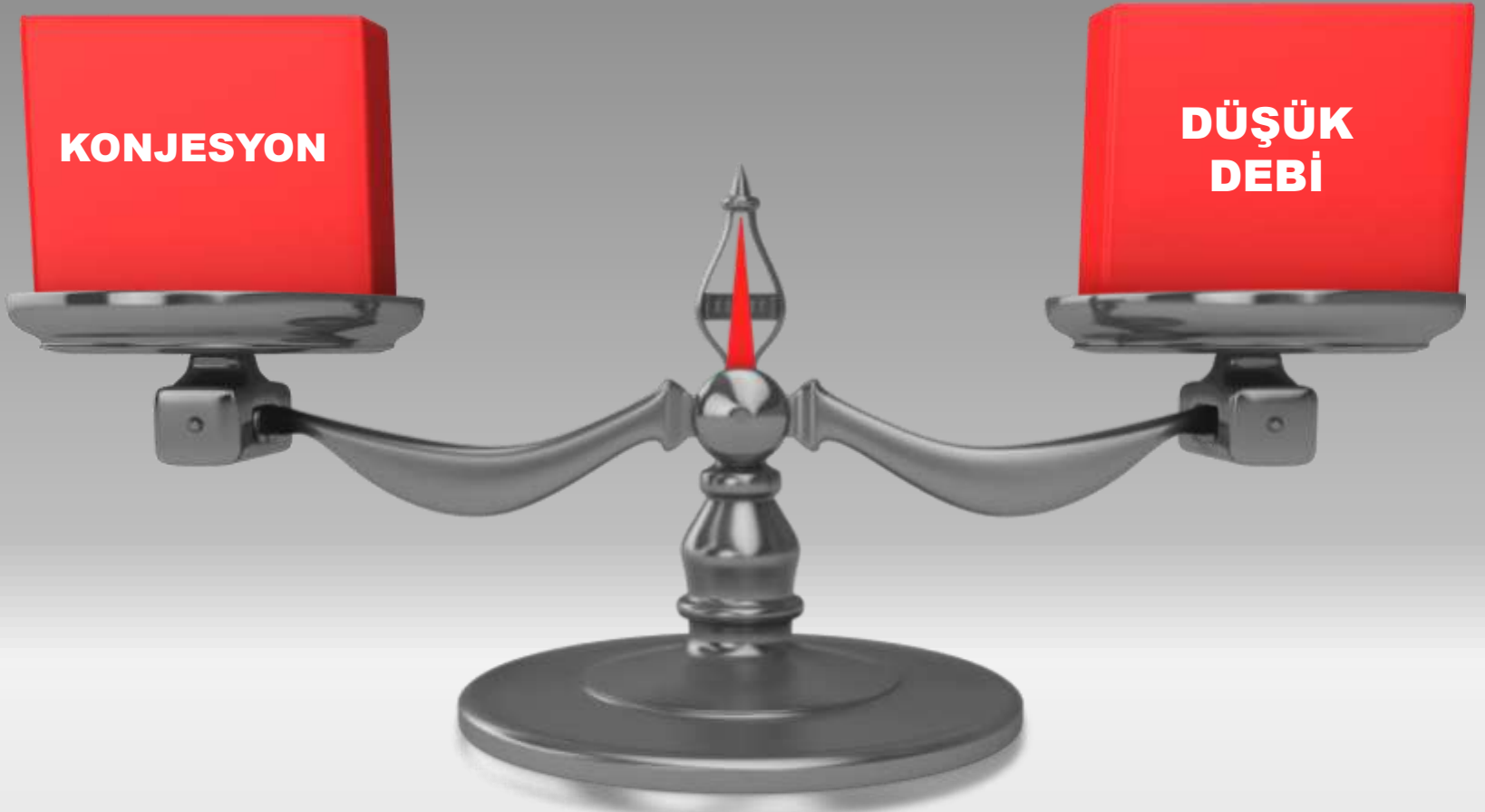
V.M. VAN DEURSEN,<sup>1</sup> K. DAMMAN, MD, PhD,<sup>1</sup> H.L. HILLEGE, MD, PhD,<sup>1,2</sup> A.P. VAN BEEK, MD, PhD,<sup>3</sup>  
D.J. VAN VELDHUISEN, MD, PhD,<sup>1</sup> AND A.A. VOORS, MD, PhD<sup>1</sup>

*Groningen, The Netherlands*

- Kalp yetmezlikli 323 hasta
- AST, ALT, ALP, GGT, LDH
- Bilirubin (dir, total)
- CVP, Card Index

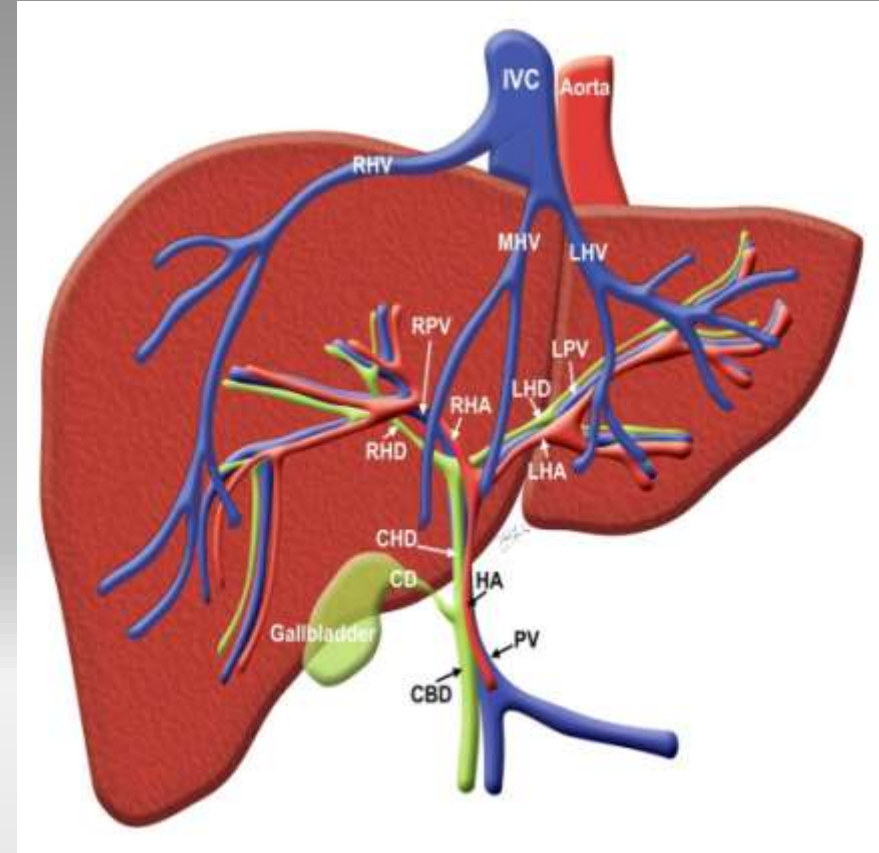
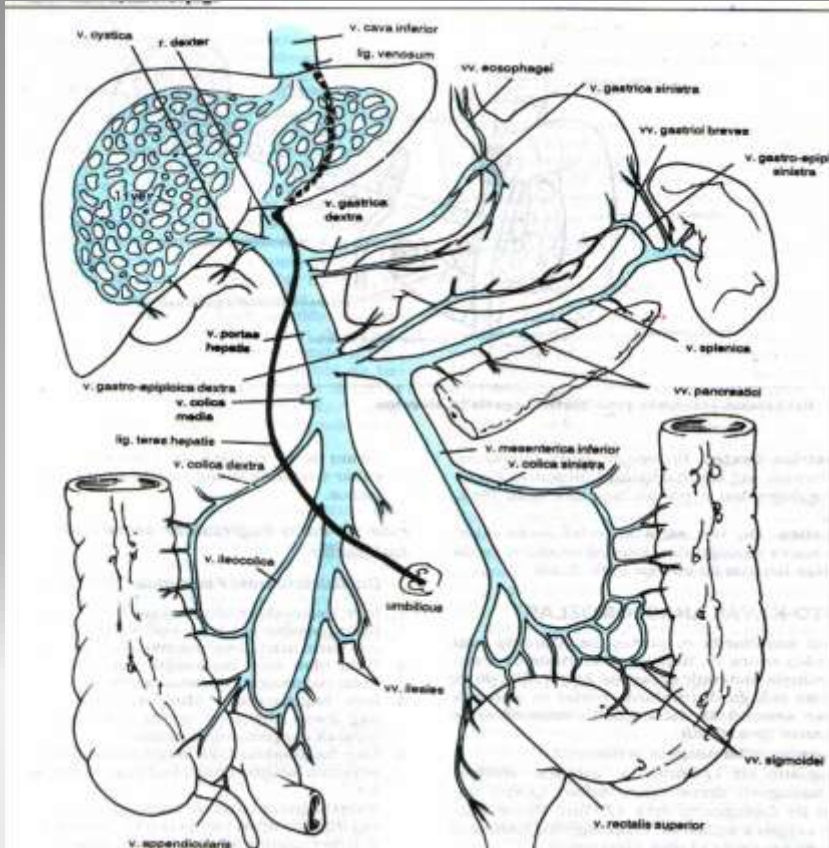






**DAHA FAZLA HASAR**

# Karaciğer kan akımı



**Portal sistem: %70**

**Hepatik arer: %30**

# Konjesyon; çift yönlü hasar!

- Şanslıyız 😊

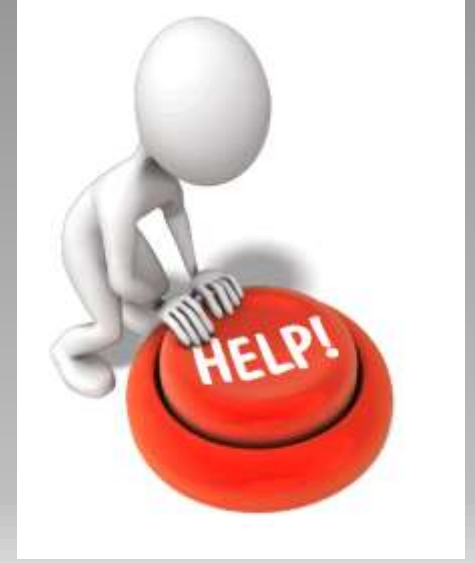


# Venöz dönüŖte bozulma

Acil !!!

İlave sıvı veya kan ürünü !!!

Dilüsyon ???



# Venöz dönüşte bozulma

Zamana karşı yarış

Çok sık değil (!)

Konjesyon



Zaman gerekli

Karaciğer hasarı



# Literatür ne diyor?

- ...na;
- ...
- ...serilen

# Venöz dönüšte bozulma



European Journal of Cardio-thoracic Surgery 31 (2007) 1044–1051

EUROPEAN JOURNAL OF  
CARDIO-THORACIC  
SURGERY

[www.elsevier.com/locate/ejcts](http://www.elsevier.com/locate/ejcts)

Review

Systemic venous drainage: can we help Newton?☆

Antonio F. Corno\*

*Alder Hey Royal Children Hospital, Eaton Road, Liverpool, L12 2AP, England, UK*

Received 29 November 2006; received in revised form 23 January 2007; accepted 31 January 2007; Available online 2 March 2007





# Venöz dönüŖte bozulma

- Cerrahi alan kontrolü
- Pompa ve ekipmanlarının kontrolü
- Hastanın kontrolü (hipovolemi)



# Venöz dönüşte bozulma

Kinetik venöz dönüş desteği  
-20 mmHg'lık negatif basınç

Vakum yardımlı venöz dönüş desteği

-80mmHg'lık basınç





teşekkürler