# EKG ve EKO eşliğinde kalp damar yaralanmalarında hızlı kararlar

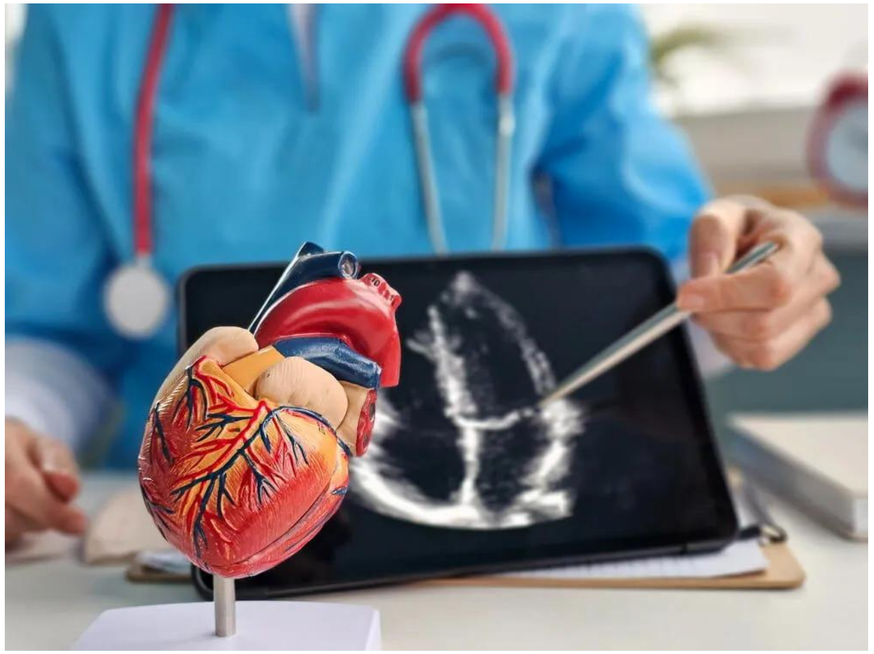
Dr. ALİ SAĞLIK

İSTANBUL VKV AMERİKAN HASTANESİ

ACİL SERVİS

# Sunum Planı

- Travmada neden erken kardiyak/damar değerlendirmesi?
- EKG’nin travmadaki gerçek rolü ve sınırları
- Yatak başı ekokardiyografinin güçlü ve zayıf yönleri
- Büyük damar (aort, supraaortik) yaralanmalarında EKO’nun yeri
- EKG–EKO–CTA karar algoritması
- Klinik mesajlar



# Travmada Kalp ve Büyük Damar: İlk 10 Dakika Yarışı

- Kardiyak/perikardiyal ve büyük damar yaralanmaları erken mortaliteyle ilişkilidir.
- Acil serviste zaman kısıtlıdır.
- Hızlı uygulanabilir testler: **EKG + yatak başı EKO.**



# Neden Bu Hastaları Geç Fark Edemeyiz?

- Görülme sıklığı düşük, mortalitesi yüksektir.
- Perikard tamponadı, serbest duvar laserasyonu, künt torasik aort yaralanması dakikalar içinde kötüleşebilir.
- Güncel kılavuzların ortak vurgusu: “Şüphe varsa erken yatakbaşı görüntüleme.”

Coccolini *et al. World Journal of Emergency Surgery* (2025) 20:78
https://doi.org/10.1186/s13017-025-00651-1

World Journal of Emergency Surgery

REVIEW Open Access

## Thoracic trauma WSES-AAST guidelines

Federico Coccolini[1*], Camilla Cremonini[1], Ernest E. Moore[2], Ian Civil[3], Zsolt Balogh[4], Ari Leppaniemi[5], Tal Horer[6], Viktor Reva[7], Chad Ball[8], Andrew W. Kirkpatrick[9], Andrea Colli[10], Laura Besola[10], Fank Plani[11], Bruno Viaggi[12], Giacomo Bellani[13], Marco Ceresoli[14], Enrico Cicuttin[15], Diego Mariani[16], Andreas Hecker[17], Stefania Cimbanassi[18], Ettore Melai[19], Francesco Forfori[19], Lorenzo Ghiadoni[20], Alessandro Cipriano[20], Boris Sakakushev[21], Krstina Doklestich[22], Edward Tan[23], Timothy Hardcastle[24], Mauro Podda[25], Arda Isik[26], Edoardo Picetti[27], Anastasia Pikoulis[45], Andrey Litvin[28], Joseph M. Galante[29], Nicola de Angelis[30], Stefano Cioffi[18], Giulia Montori[31], Fikri Abu-Zidan[32], Giuseppe Procida[31], Simone Frassini[33], Silvia Pini[19], Francesco Corradi[19], Belinda de Simone[34], Mircea Chirica[35], Carlos Ordonez[36], Dieter Weber[37], Vishal Shelat[38], Yoram Kluger[39], Aleix Martinez Perez[40], Pablo Ottolino[41], Igor Kryvoruchko[42], Walt L. Biffl[43], Fausto Catena[44], Massimo Sartelli[45], Emmanouil Pikoulis[46] and Raul Coimbra[47]

**Abstract**
Chest trauma is a common consequence of traumatic events. It may be blunt or penetrating. A low number of patients with blunt chest trauma require surgical intervention; in contrast, penetrating ones frequently require surgery and are associated with higher mortality. Chest trauma due to its anatomical location and to its potential effects on different systems must be multidisciplinary, and emergency and trauma systems should be organized and prepared to face all aspects. The present paper describes the recommendations provided by World Society of Emergency Surgery (WSES) and the American Association for the Surgery of Trauma (AAST), about comprehensive management of thoracic trauma.

# Sadece Kalp Değil: Aort ve Supraaortik Damarlar

- EKO kalp ve perikardı iyi gösterir.
- Aort arkusu ve supraaortik dallar TTE ile her zaman değerlendirilemez.
- Bu nedenle ‘kalp/perikard + büyük damar’ ekseninde düşünülmelidir.
- Gerekli hastada BTA / TEE geciktirilmemelidir.

Clinical Practice Guidelines
Eur J Vasc Endovasc Surg (2025) 69, 179—237
EJVES Open Access

CLINICAL PRACTICE GUIDELINE DOCUMENT

## Editor’s Choice – European Society for Vascular Surgery (ESVS) 2025 Clinical Practice Guidelines on the Management of Vascular Trauma☆

Carl Magnus Wahlgren [a,*], Christopher Aylwin [a], Ross A. Davenport [a], Lazar B. Davidovic [a], Joseph J. DuBose [a], Christine Gaarder [a], Catherine Heim [a], Vincent Jongkind [a], Joakim Jørgensen [a], Stavros K. Kakkos [a], David T. McGreevy [a], Maria Antonella Ruffino [a], Melina Vega de Ceniga [a], Pirkka Vikatmaa [a], Jean-Baptiste Ricco [a], Karim Brohi [a]

ESVS Guidelines Committee [b], George A. Antoniou, Jonathan R. Boyle, Raphaël Coscas, Nuno V. Dias, Barend M.E. Mees, Santi Trimarchi, Christopher P. Twine, Isabelle Van Herzeele, Anders Wanhainen

Document Reviewers [c], Paul Blair, Ian D.S. Civil, Michael Engelhardt, Erica L. Mitchell, Gabriele Piffaretti, Sabine Wipper

**Objective:** The European Society for Vascular Surgery (ESVS) has developed clinical practice guidelines for the care of patients with vascular trauma with the aim of assisting physicians in selecting the optimal management strategy.
**Methods:** The guidelines are based on scientific evidence completed with expert opinion. By summarising and evaluating the best available evidence, recommendations for the evaluation and treatment of patients have been formulated. The recommendations are graded according to the ESVS evidence grading system, where the strength (class) of each recommendation is graded from I to III, and the letters A to C mark the level of evidence.
**Results:** A total of 105 recommendations have been issued on the following topics: general principles for vascular trauma care and resuscitation including technical skill sets, bleeding control and restoration of perfusion, graft materials, and imaging; management of vascular trauma in the neck, thoracic aorta and thoracic outlet, abdomen, and upper and lower extremities; post-operative considerations after vascular trauma; and paediatric vascular trauma. In addition, unresolved vascular trauma issues and the patients’ perspectives are discussed.
**Conclusion:** The ESVS clinical practice guidelines provide the most comprehensive, up to date, evidence based advice to clinicians on the management of vascular trauma.

Article history: Received 22 November 2024, Accepted 9 December 2024, Available online 13 January 2025
© 2025 The Authors. Published by Elsevier B.V. on behalf of European Society for Vascular Surgery. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).

# “Bu Hastada Bir Şey Var” Dedirten Bulgular

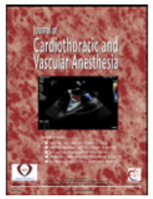
- Prekordiyal penetran yaralanma
- Yüksek enerjili künt toraks travması
- Açıklanamayan hipotansiyon / taşikardi
- Travma sonrası yeni aritmi veya EKG değişikliği
- Geniş mediasten / hızla dolan sol hemitoraks

Journal of Cardiothoracic and Vascular Anesthesia 36 (2022) 3265–3277

Contents lists available at ScienceDirect

Journal of Cardiothoracic and Vascular Anesthesia

journal homepage: www.jcvaonline.com



Review Article

## Echocardiography and Management for Cardiac Trauma

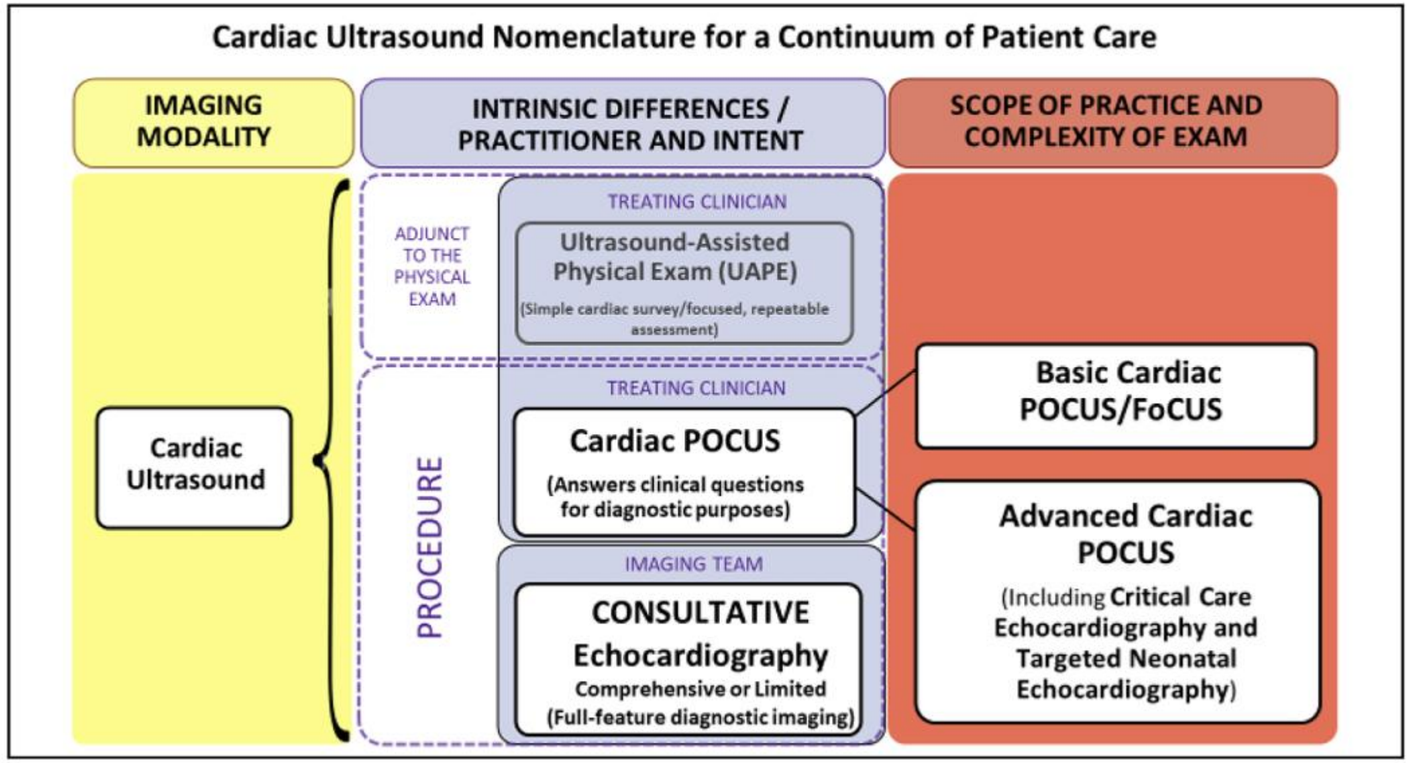
Rana K. Latif, MD[*,†,‡,1], Sean P. Clifford, MD[*], Shahab Ghafghazi, MD[§], Zachary Phipps, MD[*], James J. Chen, MD[*], Daisy Sangroula, MD[*], Areeba Z. Khan[*], Jawad Saleem[*], Ian Farah, MS[*], Jiapeng Huang, MD, PhD[*,‖], Jerrad R. Businger, MD[*]

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# EKG + EKO = Acilde En Hızlı Kestirme Yol

- İlk dakikalarda uygulanabilir: vital bulgular + 12 derivasyon EKG + odaklanmış kardiyak EKO.
- Üç bilgi birlikte yorumlanırsa: ameliyathane / BTA / izlem kararı hızlanır.
- EKO “hayatı tehdit eden lezyonu önce gösteren” araçtır.

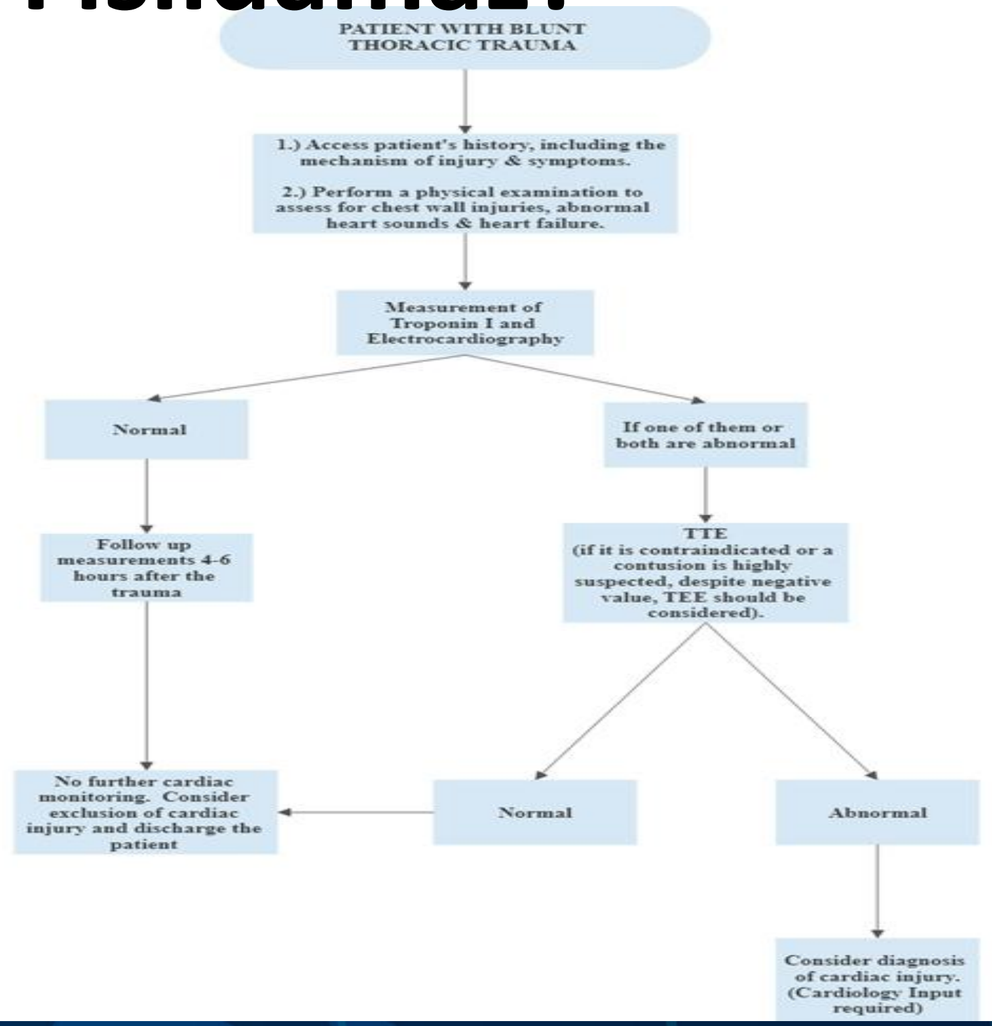

Journal of the American Society of Echocardiography
September 2024




Central Illustration

# EKG Bize Ne Fısıldar? Ne Fısıldamaz?

- Travmada sık: yeni aritmi (AF, SVT), sağ dal bloğu, intraventriküler iletim gecikmesi.
- ST–T dalga değişiklikleri travmatik miyokard kontüzyonunu düşündürebilir.
- Ventriküler ektopiler travma bağlamında izlem gerektirir. Normal EKG perikard tamponadını dışlamaz.




Kyriazidis *et al.*
*World Journal of Emergency Surgery* (2023) 18:36
https://doi.org/10.1186/s13017-023-00504-9

World Journal of Emergency Surgery

REVIEW Open Access

## Accuracy of diagnostic tests in cardiac injury after blunt chest trauma: a systematic review and meta-analysis

Ioannis Panagiotis Kyriazidis[1†], Dominik A. Jakob[1†], Juliana Alexandra Hernández Vargas[2], Oscar H. Franco[2], Elias Degiannis[1,3], Patrick Dorn[4], Sjaak Pouwels[5], Bijendra Patel[6], Ian Johnson[7], Christopher John Houdlen[8], Graham S. Whiteley[8], Marion Head[8], Anil Lala[8], Haroon Mumtaz[9], J. Agustin Soler[9], Katie Mellor[8], David Rawaf[10], Ahmed R. Ahmed[11], Suhaib J. S. Ahmad[1,8*†] and Aristomenis Exadaktylos[1†]

# EKG Bize Ne Fısıldar? Ne Fısıldamaz?

- 281 olguluk kesitsel seride EKG anormalliği **%30,9**
- normal EKG ise **%69**
- En sık değişiklikler **sinüs taşikardisi (~%6,8)** ve **sinüs bradikardisi (~%5,3)**
- erişkinlerde **ST-segment elevasyonu %9,2 ;%77,7'sinde Q dalgası**




**ELECTROCARDIOGRAPHY FINDINGS IN BLUNT CHEST TRAUMA AT TERTIARY CARE HOSPITAL PESHAWAR**

**Burhan Uddin[1], Maham Qazi[2], M Shehroz Aamir[3], Muhammad Abdullah[4], Farhan Manzoor[5]**

*Table II: Electrocardiography Finding (In Total sample)*

| Electrocardiography Findings in total sample | | |
|---|---|---|
| **Electrocardiography Findings** | **Total** | |
| | **No. of patients** | **Percentage (%)** |
| Normal sinus rhythm | 194 | 69.0% |
| Left Bundle Branch Block | 2 | 0.7% |
| Atrial Fibrillation | 6 | 2.1% |
| Ventricular Fibrillation | 1 | 0.4% |
| Ventricular Tachycardia | 1 | 0.4% |
| Sinus Bradycardia | 15 | 5.3% |
| ST Elevation with normal Q Wave | 14 | 5.0% |
| T wave inversion | 1 | 0.4% |
| premature ventricular contractions | 5 | 1.8% |
| Supraventricular tachycardia with premature ventricular contractions | 5 | 1.8% |
| Supraventricular tachycardia | 6 | 2.1% |
| Right Bundle Branch Block | 4 | 1.4% |
| Normal sinus rhythm with Premature ventricular contractions | 4 | 1.4% |
| Sinus tachycardia | 19 | 6.8% |
| ST Elevation with Q wave abnormality | 4 | 1.4% |
| **Total** | **281** | **100.0%** |

Case Report
J Trauma Inj 2025;38(3):294-298
https://doi.org/10.20408/jti.2025.0034
Check for updates

Journal of Trauma and Injury JTI
pISSN 2799-4317 • eISSN 2287-1683

# Silent ST elevation: unmasking blunt cardiac injury: a case report

Vasudha Dinesh, MD[1], Arun A. Mohanan, MD[2], Swetha Ramesh, MD[2], Amaravathi Uthayakumar, MD[2]

- **22 yaş erkek, yaya–araç çarpışması;** hemodinamik stabil, göğüs ağrısı yok.
- **EKG:** inferior derivasyonlarda **ST elevasyonu (II, III, aVF),** resiprok değişiklik yok
- **eFAST negatif; TTE normal** (RWMA/perikard efüzyonu yok).
- **Troponin-I 72.9 ng/L → düşüş trendi;** seri EKG'lerde **persistan fakat evrim göstermeyen** ST elevasyonu.
- **Yönetim:** yoğun bakımda **telemetri, seri EKG–troponin**, multidisipliner izlem; **cerrahi kardiyak girişim yok.**
- **Sonuç: stabil künt göğüs travması düşünüldü;** ortopedik girişim sonrası sorunsuz taburcu.

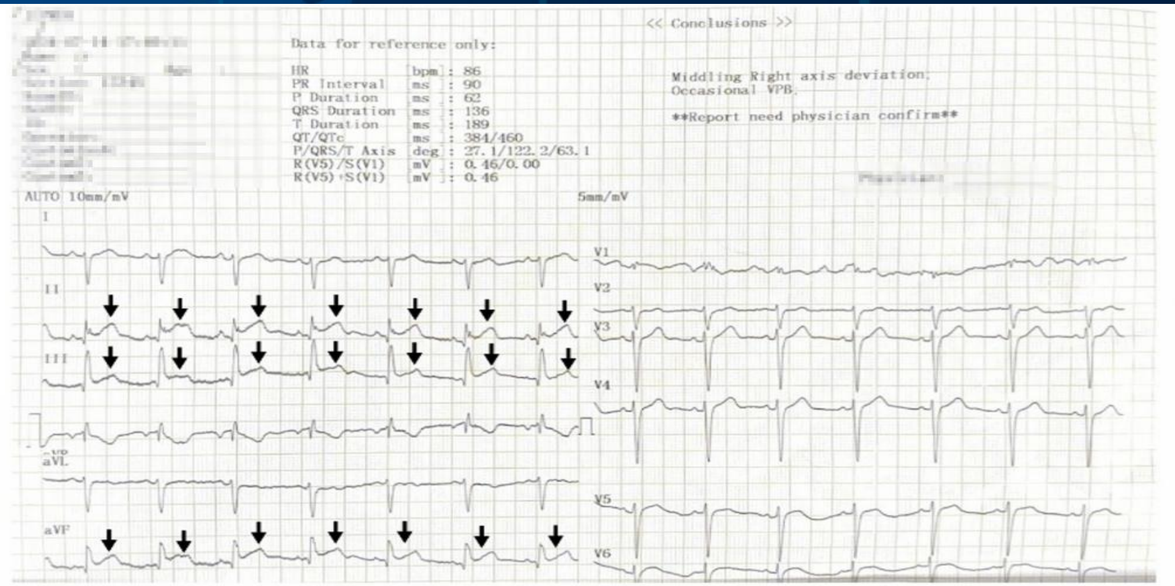



Fig. 1. Electrocardiography on presentation showing ST elevation in leads II, III, and aVF without reciprocal changes. HR, heart rate; bpm, beats per minute; VPB, ventricular premature beats.

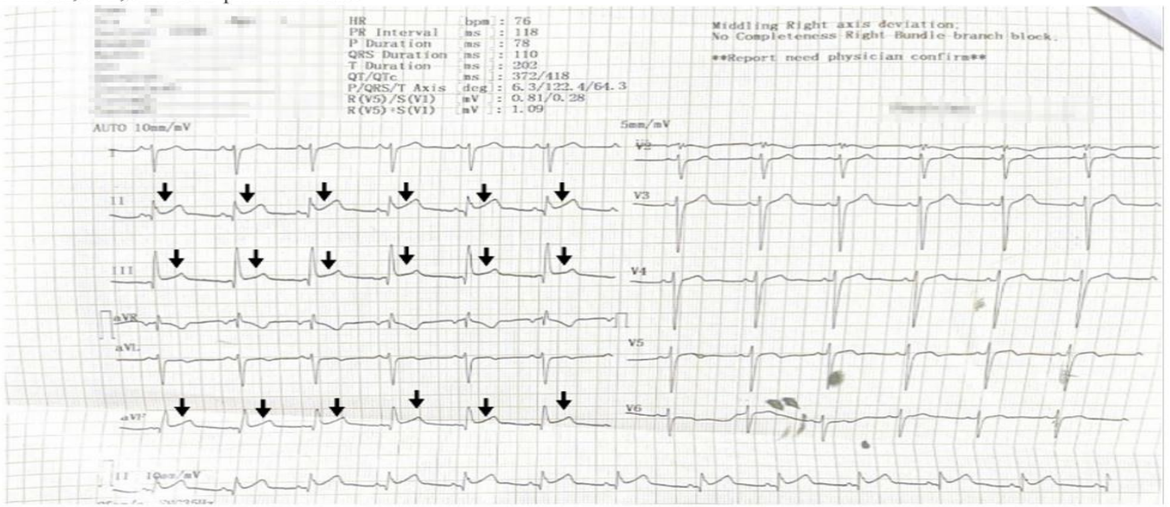



Fig. 2. Serial electrocardiography after 4 hours showing no significant change in the ST elevation pattern. HR, heart rate; bpm, beats per minute.

# “EKG Normalmiş” Tuzağına Düşmeyelim

- Penetran yaralanma + az perikard kanaması → EKG normal olabilir.
- Küçük sağ ventrikül laserasyonları EKG’ye yansımayabilir.
- Bu nedenle EKG tek başına dışlayıcı değildir.

Nair *et al. Journal of Cardiothoracic Surgery* (2023) 18:71
https://doi.org/10.1186/s13019-023-02146-z

Journal of Cardiothoracic Surgery

REVIEW Open Access

## Managing blunt cardiac injury

Lawrence Nair[1*], Brendan Winkle[2] and Eshan Senanayake[3]

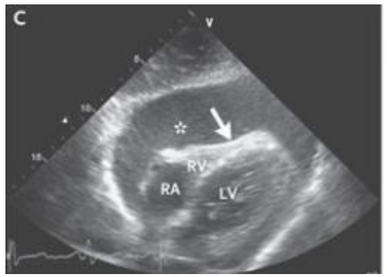
**Abstract**

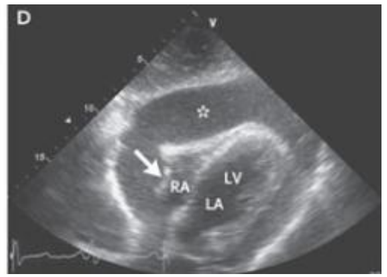
Blunt cardiac injury (BCI) encompasses a spectrum of pathologies ranging from clinically silent, transient arrhythmias to deadly cardiac wall rupture. Of diagnosed BCIs, cardiac contusion is most common. Suggestive symptoms may be unrelated to BCI, while some injuries may be clinically asymptomatic. Cardiac rupture is the most devastating complication of BCI. Most patients who sustain rupture of a heart chamber do not reach the emergency department alive. The incidence of BCI following blunt thoracic trauma remains variable and no gold standard exists to either diagnose cardiac injury or provide management. Diagnostic tests should be limited to identifying those patients who are at risk of developing cardiac complications as a result of cardiac in jury. Therapeutic interventions should be directed to treat the complications of cardiac injury. Prompt, appropriate and well-orchestrated surgical treatment is invaluable in the management of the unstable patients.

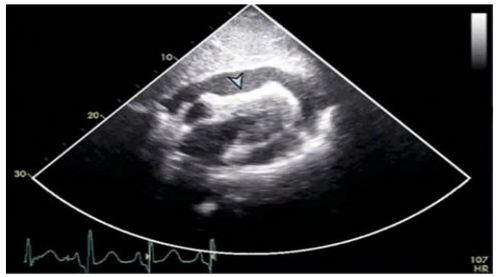
**Keywords** Blunt cardiac injury, Contusion, Rupture, Cardiorrhaphy

# Yatak Başında 6 Dakikalık EKO ile Neyi Kurtarırız?

- Subksifoid, parasternal ve gerektiğinde apikal pencerelerle perikard sıvısı/tamponad gösterilebilir.
- Global fonksiyon ve belirgin segmenter defektler hızlıca değerlendirilebilir.
- Güncel derlemeler erken EKO'nun cerrahiye gidişi hızlandırdığını vurgular.



## Pericardial Tamponade in Trauma: A Systematic Review of Diagnosis, Emergency Management, and Surgical Outcomes

Murhaf Assaf [1], Aya Abdalla [2], Amr Essam Shaltout [3], Shahzad Ahmad [4], Anwaar Ul Haq [5], Huba Ali Khan [6], Muhammad Faisal Saleem [7], Muhammad Nabeel Ahmad [7], Mohamed K. Abouelsadat [8], Manahil Awan [9], Nadia Malik [10]

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# EKO Her Şeyi Göstermez: Damarlar İçin Dürüst Olalım

- TTE torasik aortun tamamını ve supraaortik dalları çoğu zaman göstermez.
- EKO'nun normal olması aort/ subklavyen/ innominate yaralanmasını dışlamaz.
- Klinik şüphe varsa BTA veya TEE yapılmalıdır.

DOI: 10.7759/cureus.51032

## Point-of-Care Ultrasound for the Diagnosis of Frequent Cardiovascular Diseases: A Review

Ernesto Calderon Martinez [1], Edna Diarte [2], Diana Othon Martinez [3], Leonardo Rodriguez Reyes [4], Daniel A. Aguirre Cano [4], Carolina Cantu Navarro [5], Maria G. Ycaza Zurita [6], David Arriaga Escamilla [7], Jinal Choudhari [8], George Michel [9]

1. Digital Health, Universidad Nacional Autónoma de México, Ciudad de Mexico, MEX 2. Medicine, Universidad Autónoma de Sinaloa, Culiacán, MEX 3. Internal Medicine, University of Texas Rio Grande Valley, Edinburg, USA 4. Internal Medicine, Universidad de Monterrey, Monterrey, MEX 5. Internal Medicine, Universidad Anahuac, Monterrey, MEX 6. Internal Medicine, Columbia University, Bronx, USA 7. Internal Medicine, Universidad Justo Sierra, Mexico City, MEX 8. Research & Academic Affairs, Larkin Community Hospital, South Miami, USA 9. Internal Medicine, Larkin Community Hospital, South Miami, USA

**Corresponding author:** Ernesto Calderon Martinez, ernestocalderon.mtz@gmail.com

### Abstract

Point-of-care ultrasound (POCUS) has emerged as an indispensable diagnostic tool in cardiology, particularly within the emergency department. This narrative synthesis provides a comprehensive exploration of POCUS applications in cardiovascular diseases, elucidating its multifaceted roles and addressing challenges. The review delves into the technical attributes of POCUS, emphasizing its non-invasive nature, radiation-free qualities, and suitability for non-radiologists. It navigates through educational strategies, stressing the importance of structured programs for the seamless integration of POCUS into clinical practice. Highlighting its efficacy, the synthesis discusses POCUS applications in various scenarios such as dyspnea, chest pain, cardiac arrest, aortic dissection, pericardial effusion, and pulmonary embolism. Beyond acute care, the review explores the role of POCUS in outpatient and inpatient settings, focusing on chronic and acute heart failure, valvular heart diseases, and more. Acknowledging operator-dependent challenges and the need for continuous education, the review underscores the transformative potential of POCUS across diverse healthcare settings. This narrative synthesis accentuates POCUS as a valuable and versatile diagnostic tool in cardiology, offering efficiency, safety, and cost-effectiveness. Despite challenges, POCUS stands out as a transformative addition to clinical practices, poised to enhance patient outcomes and reshape the landscape of cardiovascular diagnostics.

# Künt Aort Yaralanmasında Doğru Sıralama: EKO mu, BTA mı?




- Hemodinamik olarak stabil künt toraks travmalı hastada: ilk tercih BTA'dır.
- İnstabil hastada: önce EKO ile tamponad/masif hemotoraks gibi hemen müdahale gerektiren durumlar dışlanır.
- EKO temizse ve klinik izin veriyorsa BTA'ya geçilir.

# Perikardda Kanı Gördüğün An Ne Yapacaksın?

- Penetran travmada perikard içi sıvı travma bağlamında anlamlıdır.
- BTA beklenmeden cerrahi ekip bilgilendirilmelidir.
- Perikardiyosentez geçici bir çözümdür; kesin tedavi cerrahidir.



# Nabzı Farklı, Hematomu Var: Damar Yaralanmasını Kaçırma

- Tek kolda nabız/tansiyon farkı
- Supraklaviküler veya üst toraksta genişleyen hematom
- Açıklanamayan şok/hemotoraks
- EKO normal olsa bile BTA gerektirir


JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY VOL. 80, NO. 24, 2022
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PUBLISHED BY ELSEVIER

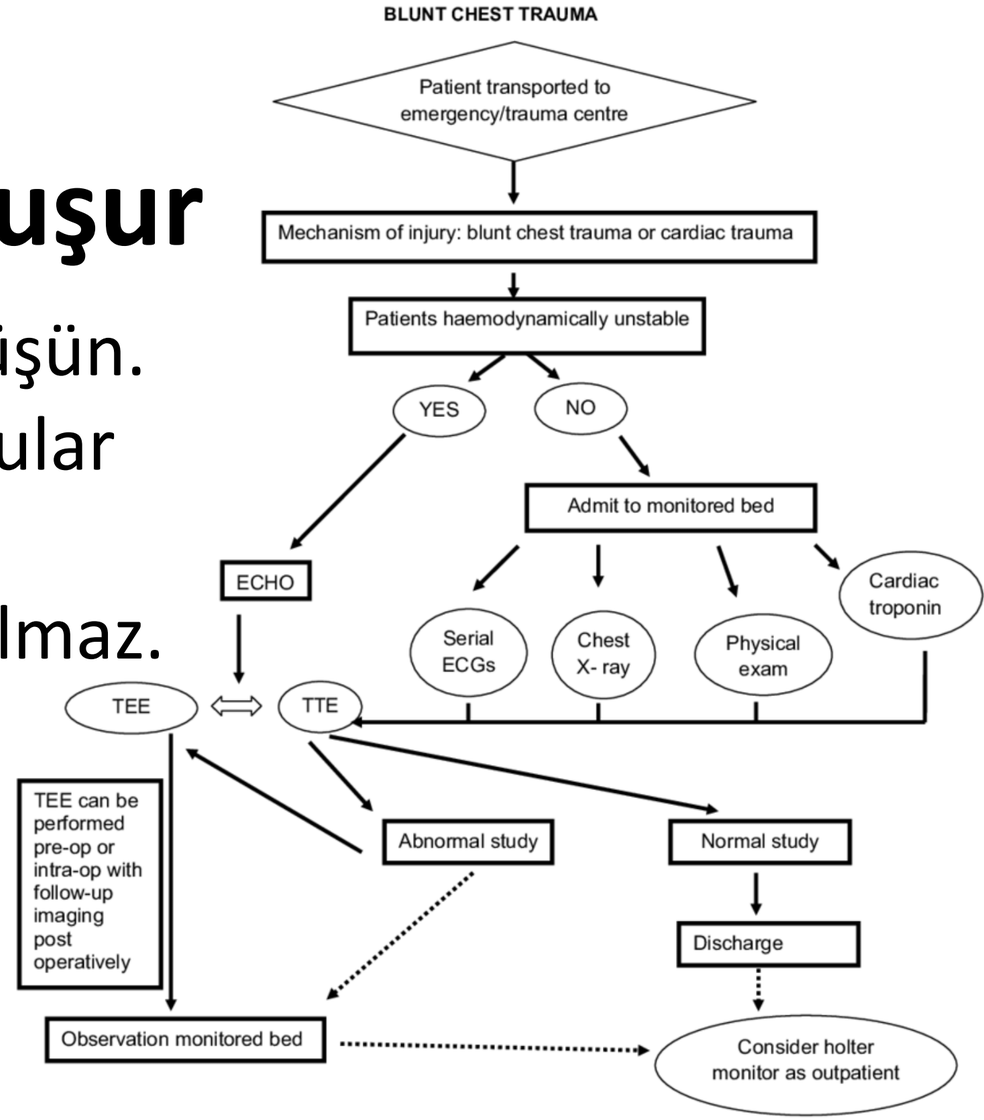
SOCIETAL STATEMENT

2022 Aortic Disease Guideline-at-a-Glance

John P. Erwin III, MD, FACC, on behalf of the ACC Solution Set Oversight Committee
Morgane Cibotti-Sun, MPH
MaryAnne Elma, MPH

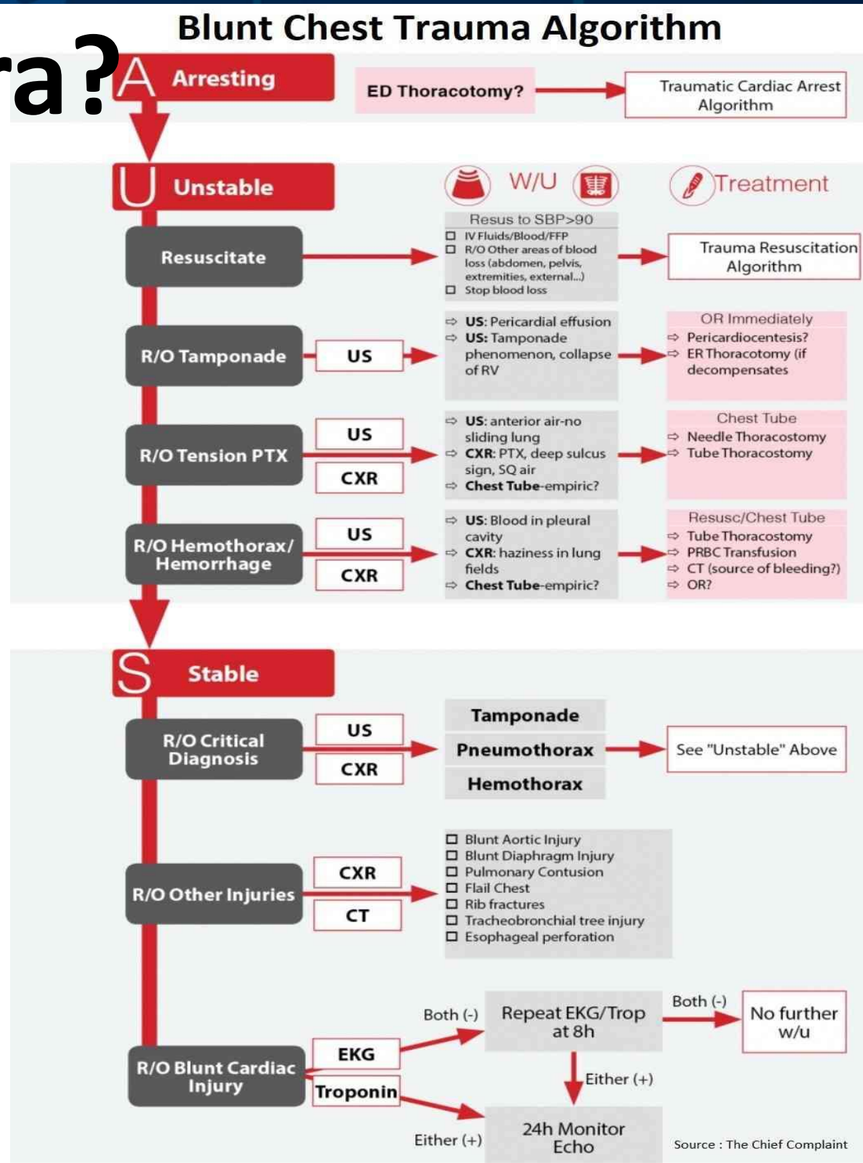
# Kalp Temiz, Hasta Kötü: İşte O Zaman Algoritma Konuşur

- EKG (–), EKO (–) ama mekanizma güçlü → BTA düşün.
- Geniş mediasten, tek taraflı nabız kaybı gibi bulgular BTA lehine bulgulardır.
- EKO'nun normal olması klinik şüpheyi geçersiz kılmaz.



# İlk EKO Temizdi… Peki 24 Saat Sonra? (Geç Tamponad)

- İlk EKO normal olabilir.
- 24–48 saat içinde perikard içine tekrar kanama ve tamponad gelişimi bildirilmektedir.
- Şüpheli hastalarda seri POCUS planlanmalıdır.



# EKG–EKO–BTA: Hangi Kombinasyon Ne Anlama Geliyor?

- EKG (+), EKO (+) → kardiyak/perikardiyal yaralanma yüksek → cerrahi.
- EKG (–), EKO (+) → tamponad/hemoperikard → önce bunu düzelt, BTA'yı ertele.
- EKG (+), EKO (–) → kontüzyon/aritmi olası → izlem; damar şüphesi varsa BTA.
- EKG (–), EKO (–) ama şüphe yüksek → BTA.

# Acilde EKO: Yeter ki Protokol Olsun

- Kısa ve yapılandırılmış eğitimlerle acil hekimleri perikard efüzyonunu güvenle saptayabilir.
- Kurumsal protokol: “Travma + açıklanamayan hipotansiyon → ilk 10 dakikada EKO.”
- Görüntü kaydı ve geribildirim tanısal doğruluğu artırır.

AEM Academic Emergency Medicine
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Media Review | Free Access

**POINT OF CARE ULTRASOUND FOR EMERGENCY MEDICINE AND RESUSCITATION. *Edited by* Paul Atkinson, Justin Bowra, Tim Harris, Bob Jarman, and David Lewis. New York: Oxford University Press, 2019; 264**

Daniel J. Kim MD

First published: 06 October 2019 | https://doi.org/10.1111/acem.13865 | Citations: 1

# En Çok Yapılan 4 Hata (Ve Nasıl Yapmayız)

- Normal EKG’ye fazla güvenmek
- Kötü pencereyi “normal” olarak raporlamak
- EKO bulgusunu klinikten bağımsız yorumlamak
- EKO ile büyük damar yaralanmasını dışlamaya çalışmak

# Klinik Mesajlar

- EKG gereklidir ancak tek başına dışlayıcı değildir.
- Yatak başı EKO hayatı tehdit eden lezyonu erken gösterir.
- Büyük damar yaralanmasını çoğu kez BTA tamamlar.
- Şüphe devam ediyorsa seri POCUS ve ileri görüntüleme geciktirilmemelidir.

# Teşekkürler

Online Bilimsel Program: