

ACİL TIPTA EKO

Doç. Dr. A. Sadık GİRİŞGİN
NEU Meram Tıp Fakültesi Acil Tıp AD.

Kardiak Ultrasonografi

- Hangi durumlarda?
- Cihaz ve problemler
- Yönler ve normal görüntüler
- Çeşitli patolojiler

Hangi durumda EKO yapılır?

Birincil endikasyonlar

- Toraks-karın travması (FAST)
- Kardiyak arrest

Nabızsız elektriksel aktivite

- Nedeni bilinmeyen hipotansiyon / dispne
PE? Hipovolemi? MI?
Efüzyon/tamponad?

Hangi durumda EKO yapılır? İkincil endikasyonlar

- Akut kardiyak iskemi
- Perikardiyosentez
- Eksternal pacer (yakalanma oldu mu?)
- Transvenöz pacer takılması

Önemli klinik sorular

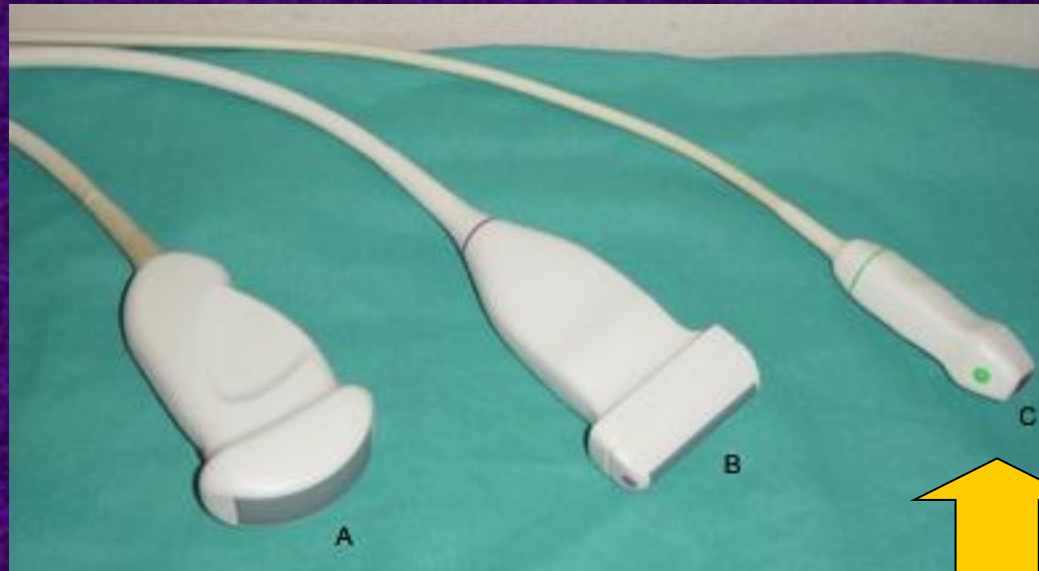
- Duvar hareketleri nasıl?
- Perikardiyal efüzyon var mı?

Duvar hareketleri

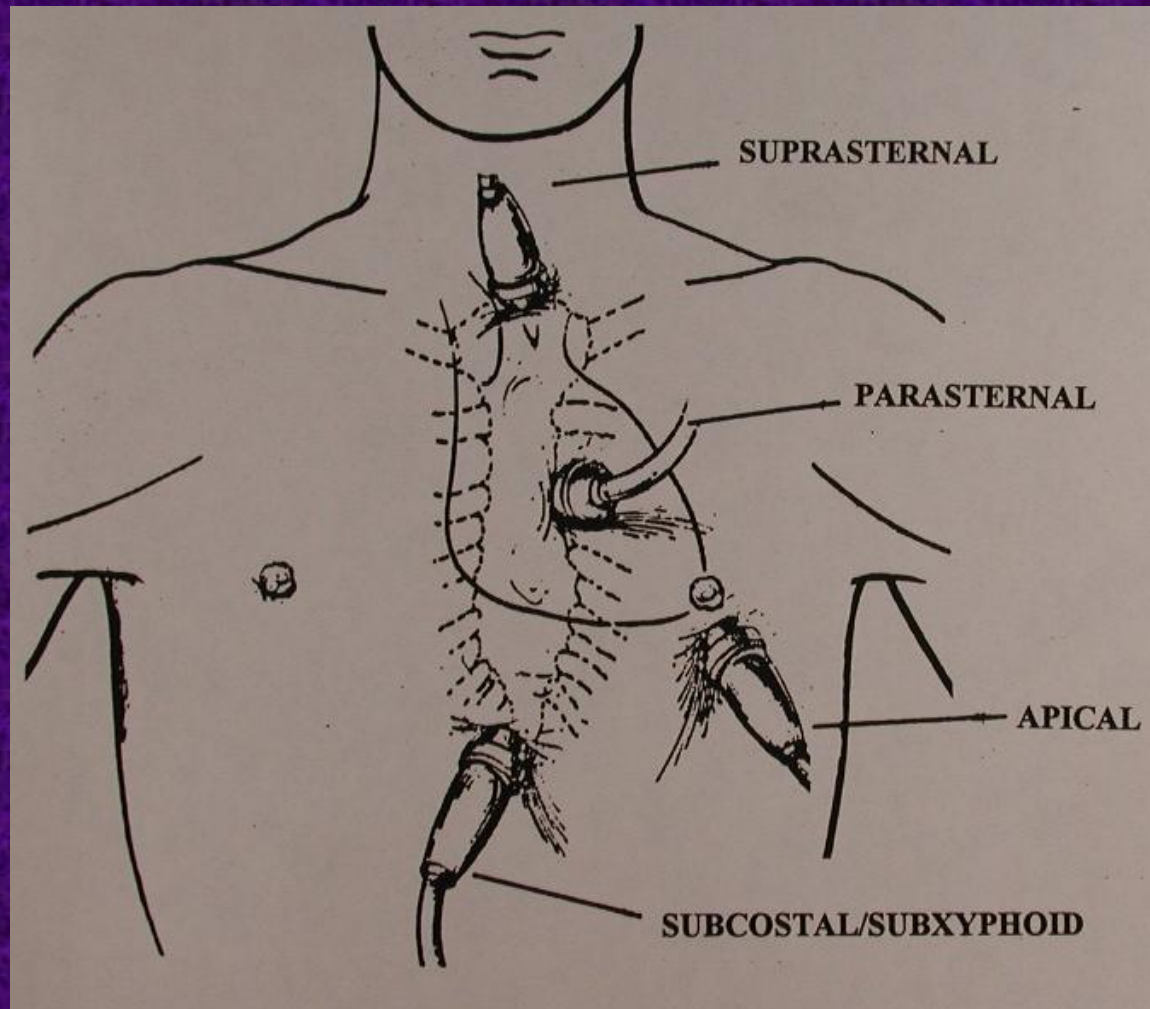
- Normal
- Hiperkinetik
- Akinetik
- Hipokinetik
- Diskinetik: kasılma olmuyor veya sistol esnasında dışarı hareket ediyor

Problar

- Eko probu- Sector probe (kotlar arasını görebilir)
- 2.5-3.5 MHz frekanslı

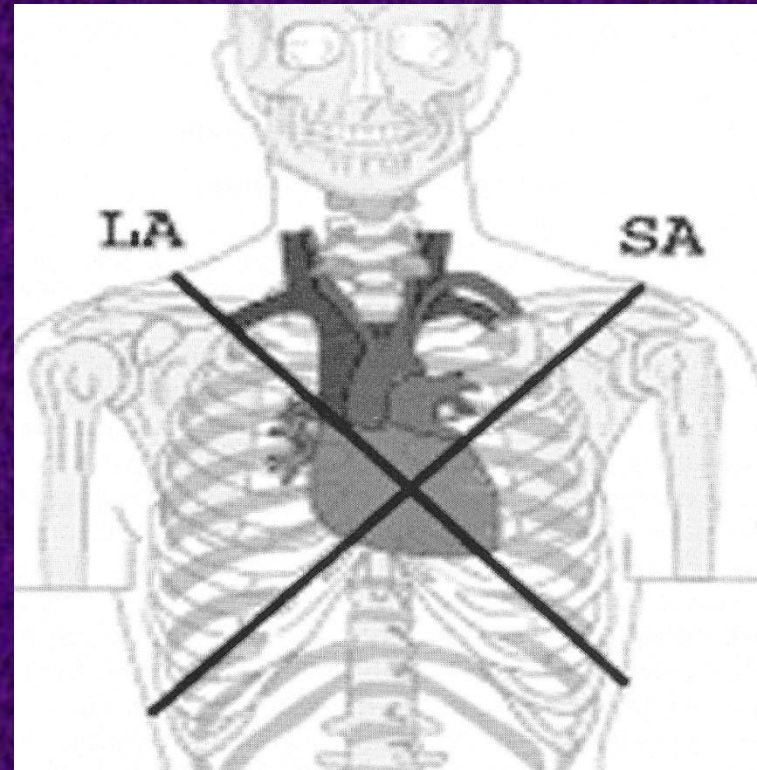


Prob pozisyonları:



Parasternal Yönler

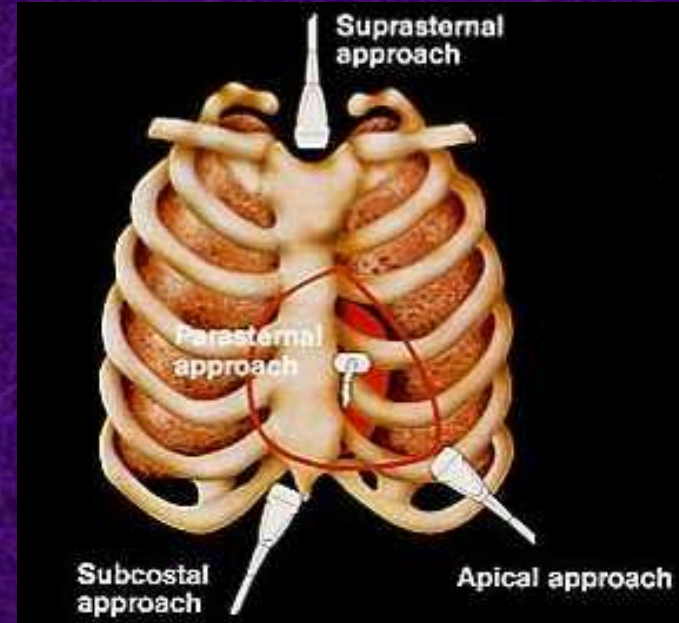
- Çok yararlı, özellikle sol ventrikül için
- Odacık boyutları
- Lokalize efüzyonlar
- Efüzyon
 - perikardiyal mı?
 - plevral mı?



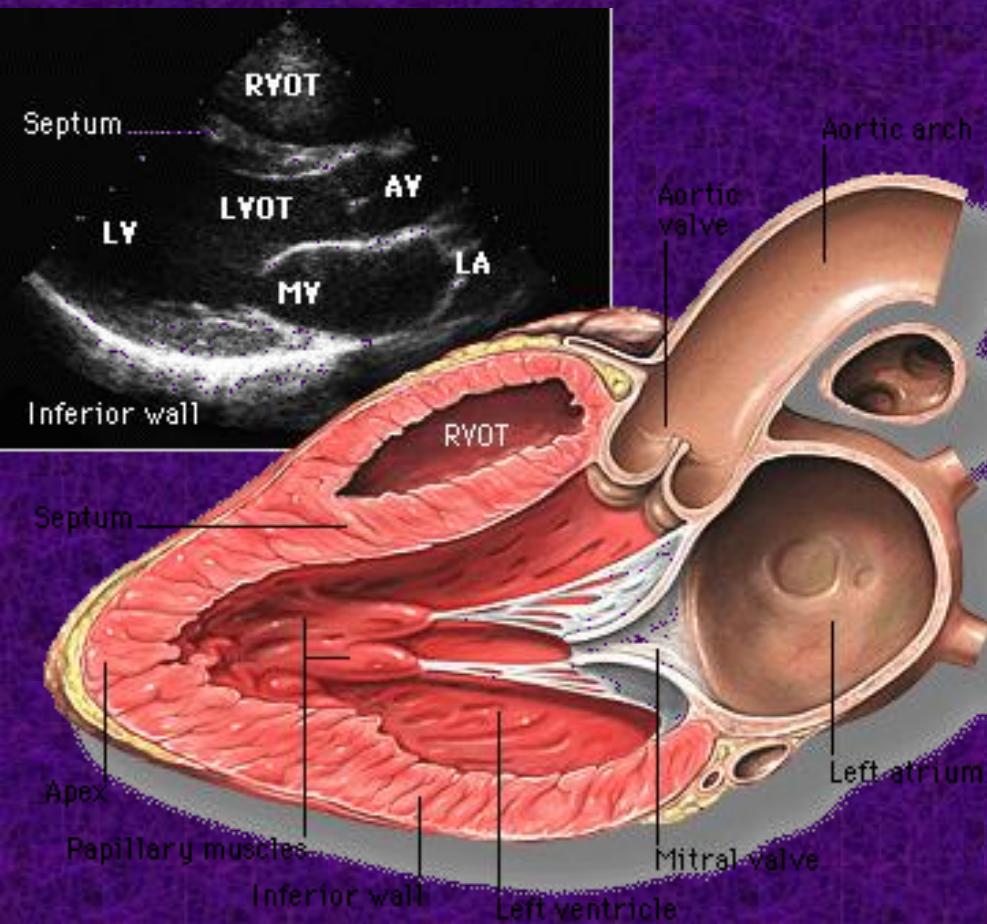
Parasternal

Uzun Aks

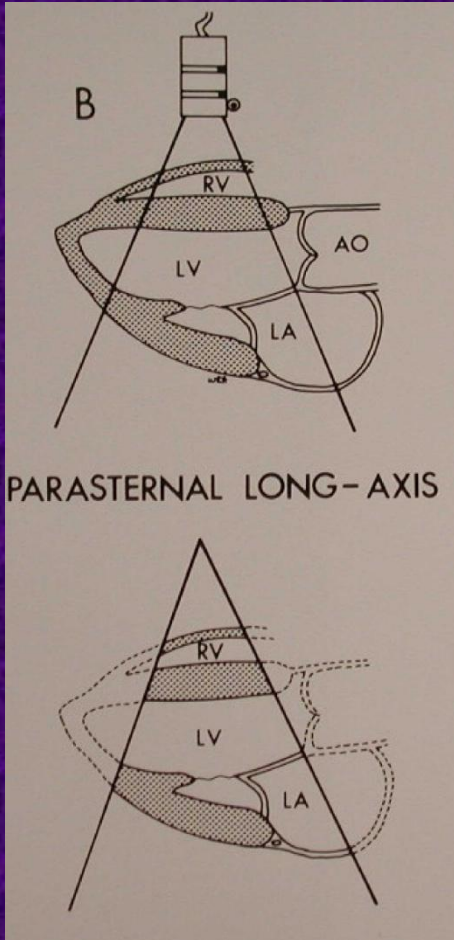
- Sternum yanında
- 3. veya 4. sol interkostal aralıkta
- Çıkıntı **sağ omuza** doğru
- Probu döndürün ki sol ventrikül uzun olsun



Parasternal - Uzun aks



Parasternal Uzun Aks



LV
Aort ve Mitral kapak
Aort kökü
LA

VI: 1.4
SE

2/2/E/F5
ILKE #17

ILKE ADULT

ED 6:33:31
GPIK 60
CCPF 55
SEEFM

LECF
66F-24



TIS:1.3

2/2/E/2/A
ILKE 3D #20

ILKE ADULT

GP16 52
CCPF 55
EEEFM

12CP
21F2

2.5MHZ

71

0

5

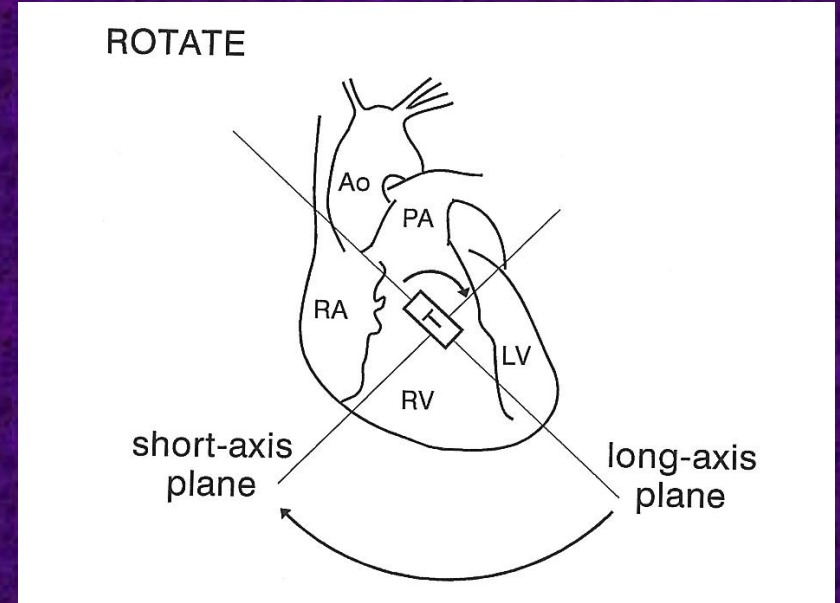
71



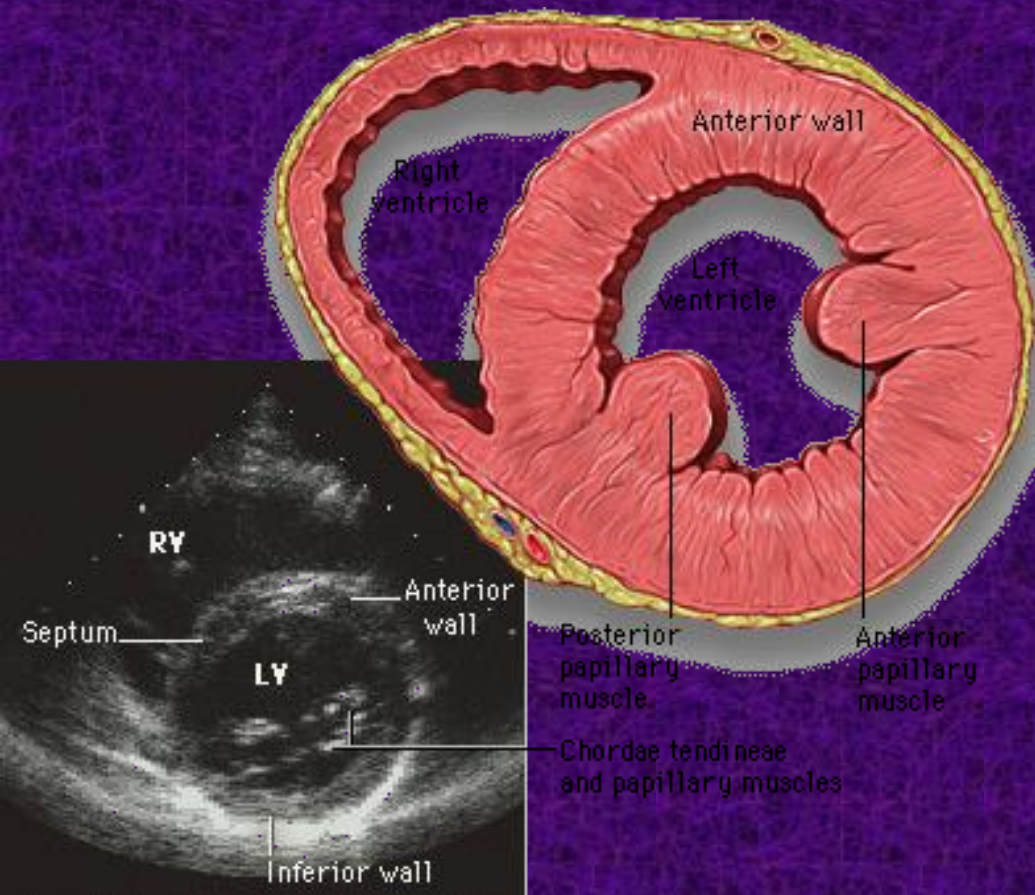
Parasternal

Kısa aks

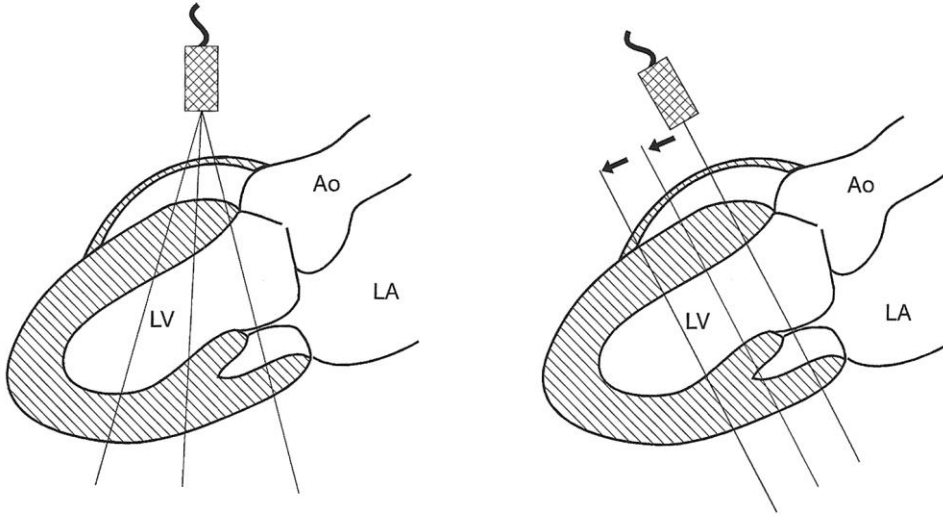
- Aynı yerde probun 90° döndürülmesi ile
- Prob çıkıntısı **sol omuza** bakar
- Apekten kalbin basisine kadar bakılır



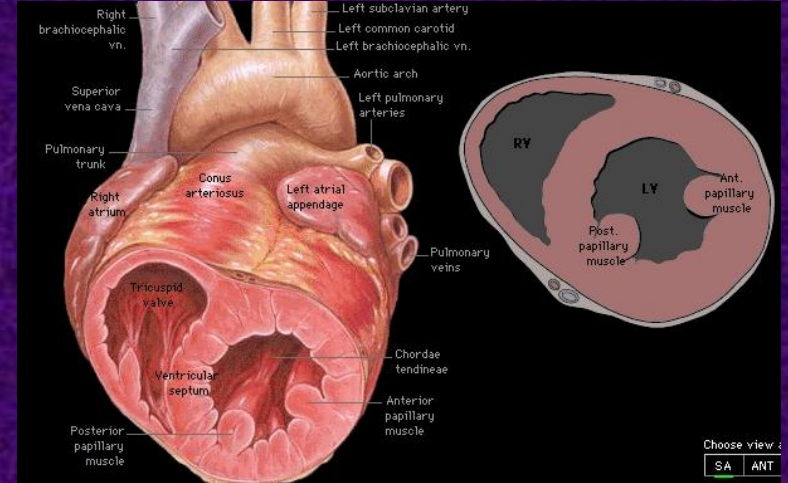
Parasternal - Kısa aks



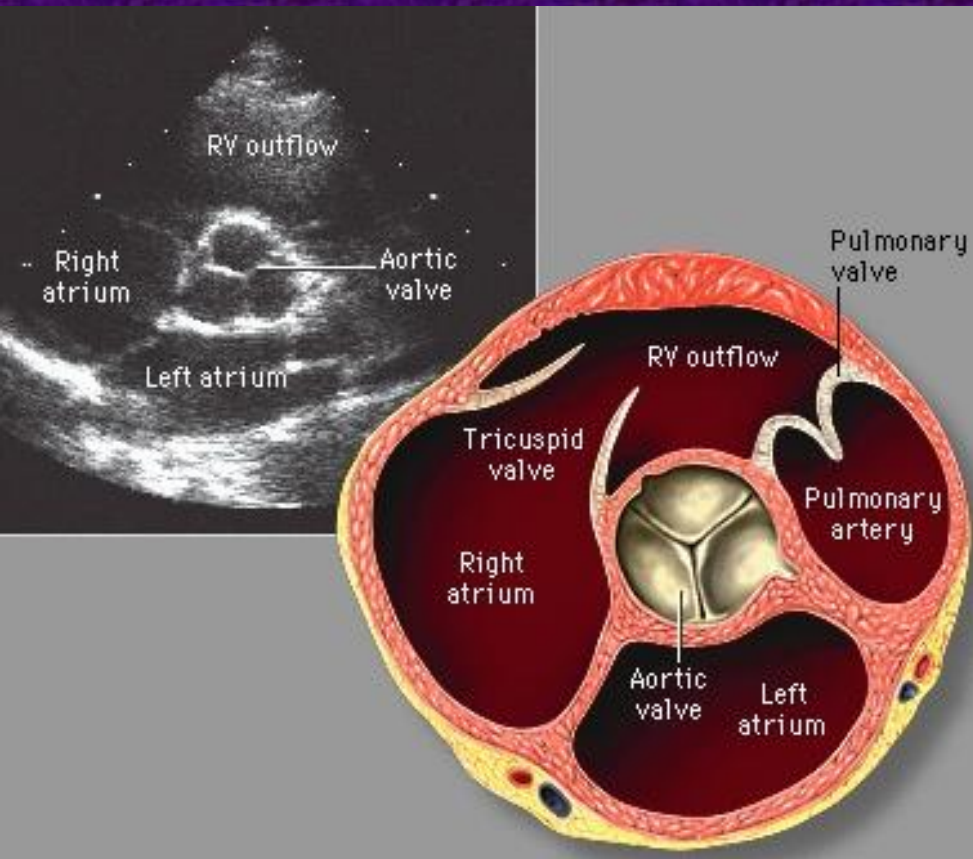
Parasternal - Kısa aks



Aortik valvin yapısı
LV fonksiyonları



Parasternal - Kısa aks

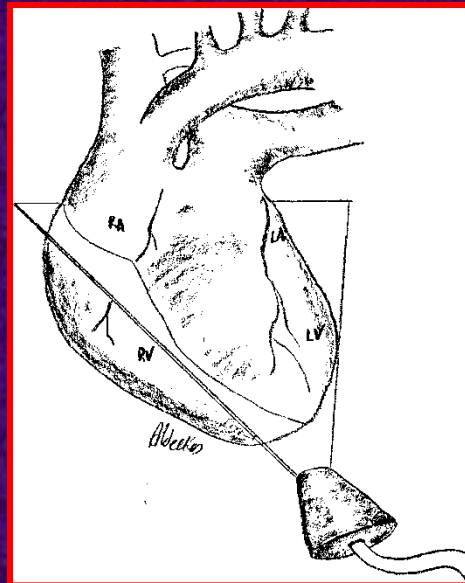
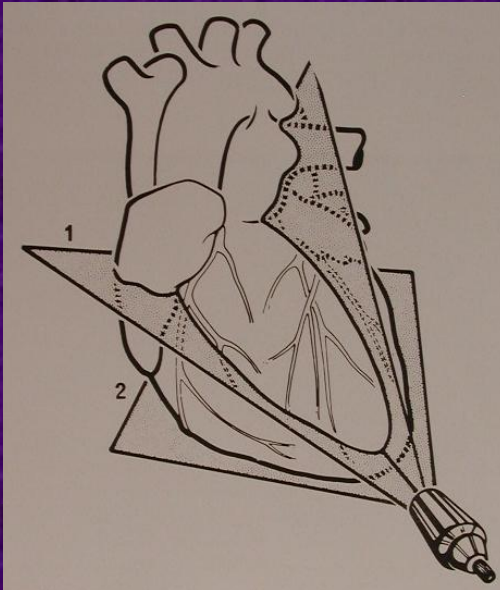


Aynı yerde probun 90° döndürülmesi ile Apeksten kalbin köküne kadar bakılır



Apikal Yön

- Görüntülemek daha zor
- Ventrikül boyutlarını ölçmek için uygun
- Septum / duvar hareketlerini değerlendirmek için uygun

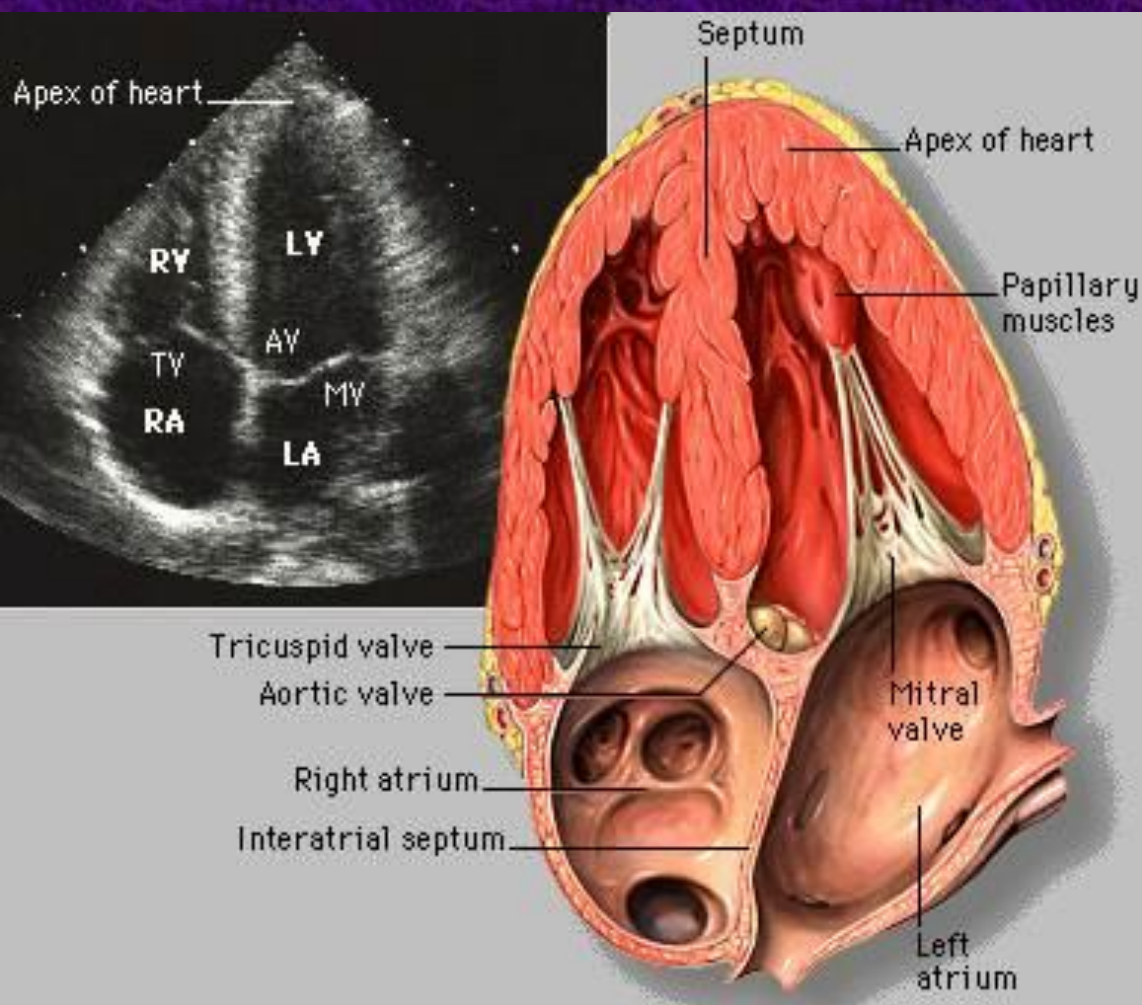


Apikal Yön - 4 odacık

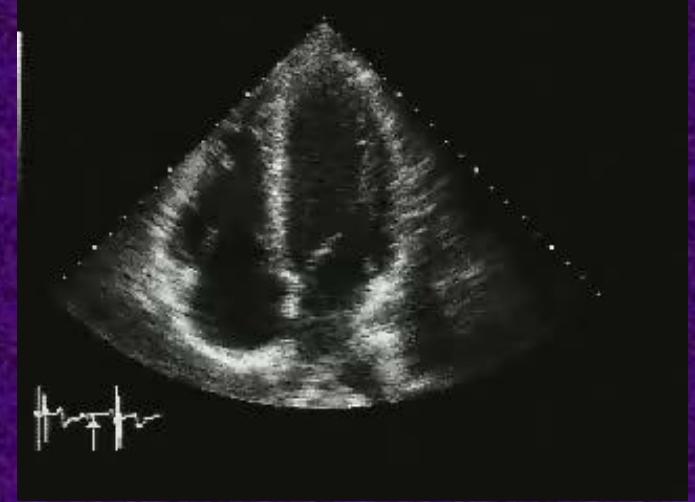
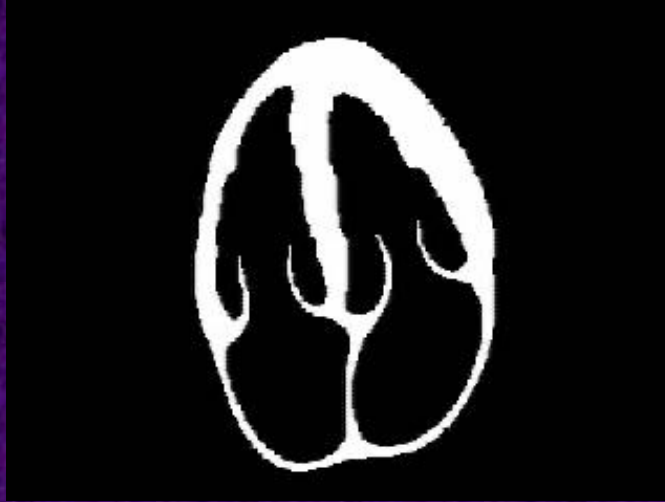
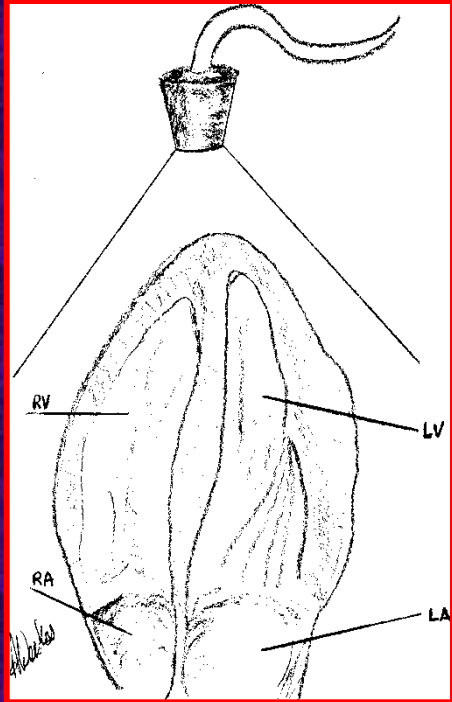
- Hasta sol lateral dekubit duruşunda
- Prob apekte
- Probun çıkıntısı
aşağıya doğru,
- Parasternal yön gibi
fakat apeksi
daha iyi gösterir



Apikal Yön - 4 odacık



Apikal Yön - 4 odacık



LV fonksiyonları
Atrium büyüklükleri
Kapak regürjitasyonu
Doppler

PI: 1.6
54

FRCC 0/0/E/F5
CLKE #1

CLKE ADULT

K826-53:51 JHT

ED 0:57:25

CP1K 60

CCPF 60

SSCFM

18CP

43124



ILKE 3D #5

ILKE ADULT

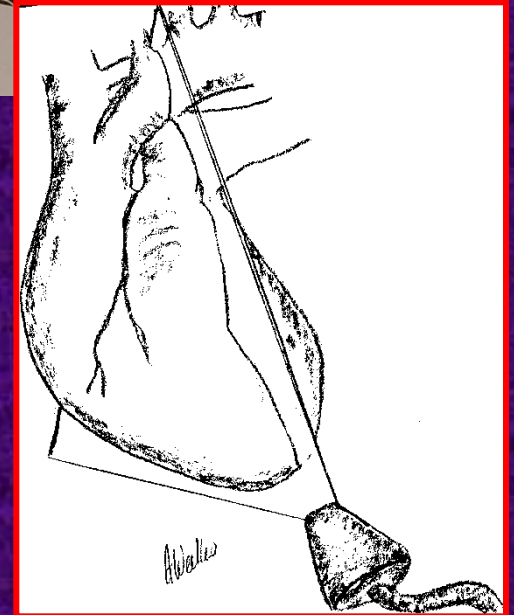
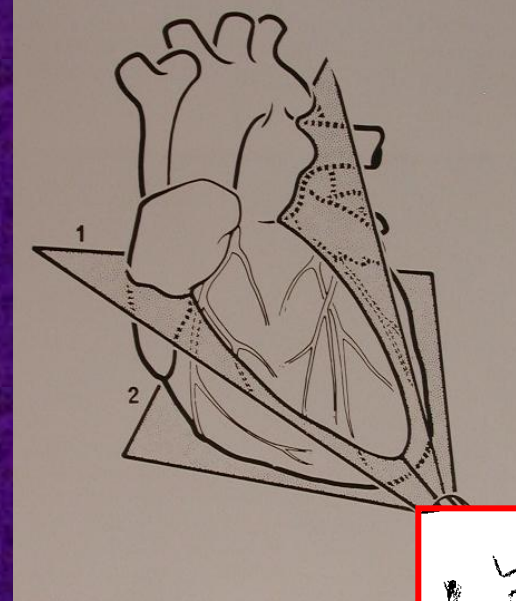
EP16 64
CCPF 55
EEEFM

17CF
381-24

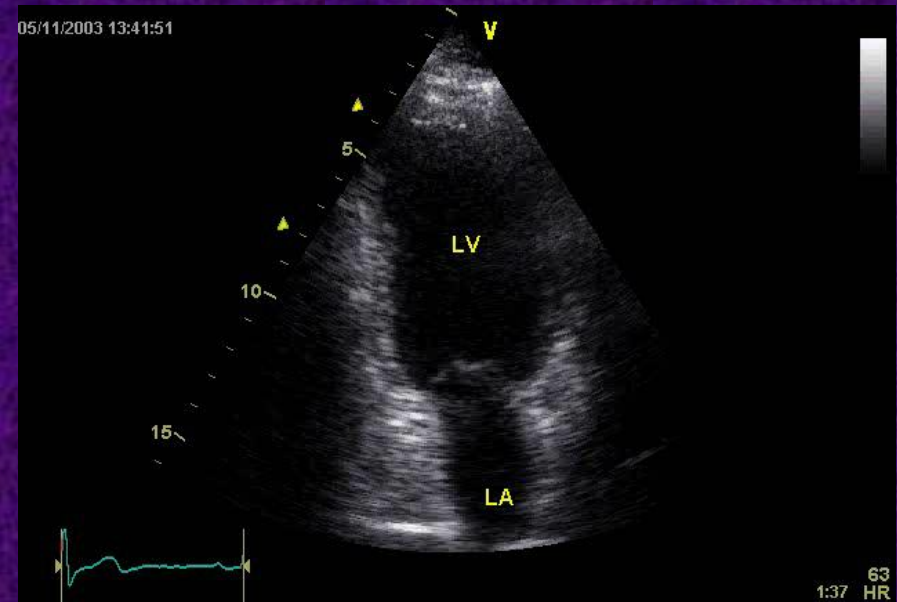
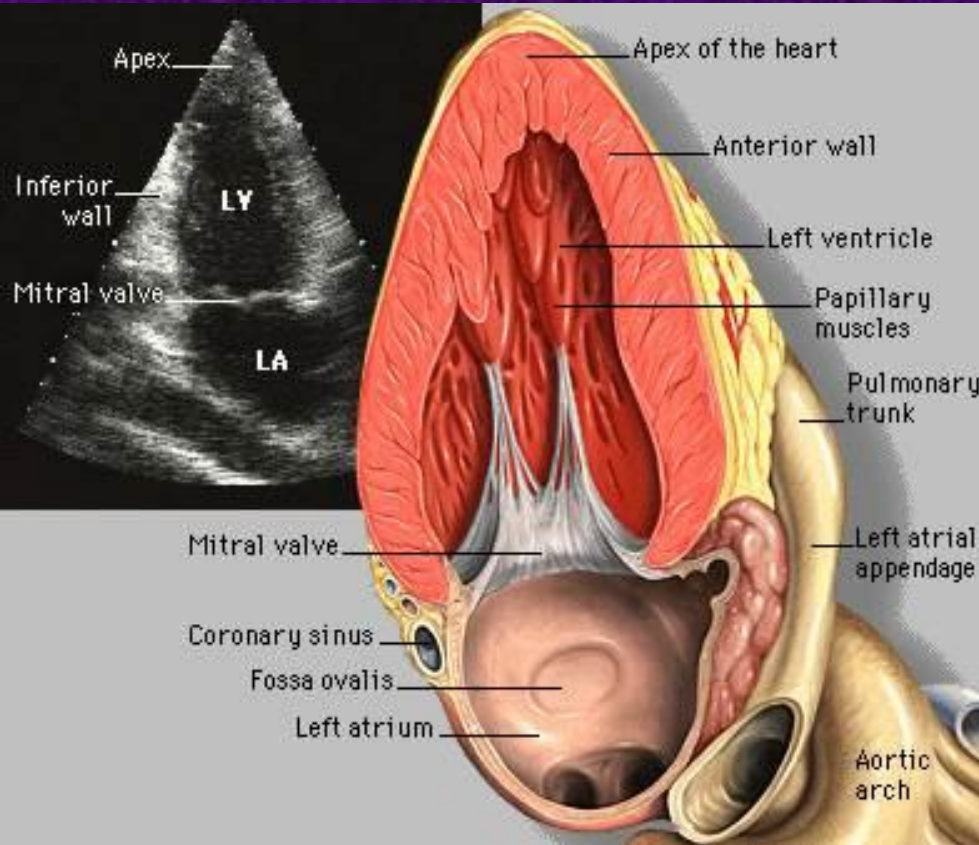


Apikal Yön - 2 odacık

- Prob 90° döndürülür
- Çıkıntı saat 3'e doğru
- Ant ve inf duvarlar ve mitral kapak için iyi



Apikal Yön - 2 odacık



LV fonksiyonları
Kapak regürjitasyonu

PI: 1.5
E4

[v]

FRCC 2/0/E/F3
CLKE H1
CLKE ADULT

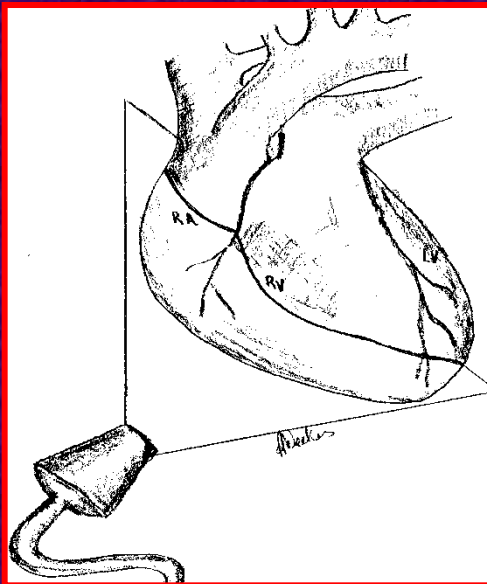
GP1K 60
CCPF 60
SSEFM

1SCP
45F2

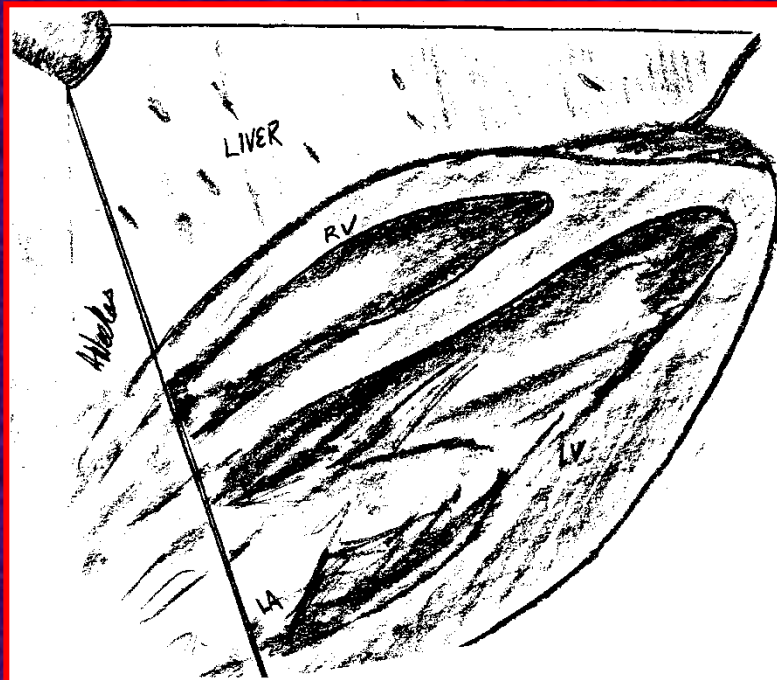


Subkostal (subksifoid)

- Genel değerlendirme penceresi
 - Circumferential perikardiyal effüzyon
 - Duvar hareketleri (genel olarak)
- Akustik pencere = karaciğer



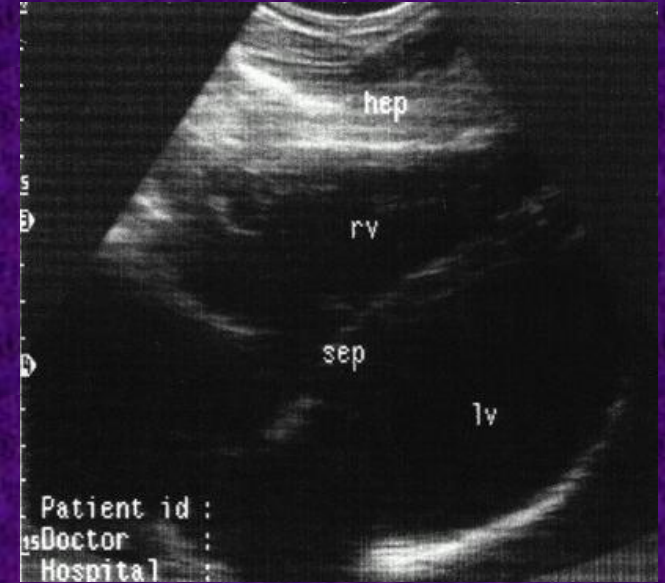
Subkostal Yön



Subkostal yön



LV fonksiyonları
Perikardiyal efüzyon
VCI değerlendirilmesi



Kardiyak USG

- Kardiyak
 - Kardiyak arrest
 - Hipotansiyon / NEA
 - Dispne
 - PE? Perikard tamponad? Papiller kas rüptürü?
 - Girişimsel:
 - Pacing sonucu, perikardiyosentez

Birincil endikasyon: Toraks-karın travması (FAST)



Birincil endikasyon: Kardiyak Arrest

Outcome in Cardiac Arrest Patients Found to Have Cardiac Standstill on the Bedside Emergency Department Echocardiogram

MICHAEL BLAIVAS, MD, JOHN CHRISTIAN FOX, MD
Kalp hareketleri olmayan hastaların tümü acilden morga gitmiştir.

Abstract. Patients presenting in cardiac arrest frequently have poor outcomes despite heroic resuscitative measures in the field. Many emergency medical systems have protocols in place to stop resuscitative measures in the field; however, further predictors need to be developed for cardiac arrest patients brought to the emergency department (ED). **Purpose:** To examine the predictive value of cardiac standstill visualized on bedside ED echocardiograms using the initial presentations of patients receiving cardiopulmonary resuscitation (CPR). **Methods:** The study took place in a large urban community hospital with an emergency medicine residency program and a high volume of cardiac arrest patients. As part of routine care, all patients arriving with CPR in prog-

included descriptive statistics, positive and negative predictive values, and likelihood ratios. **Results:** One hundred sixty-nine patients were enrolled in the study. One hundred thirty-six patients had cardiac standstill on the initial echocardiogram. Of these, 71 patients had an identifiable rhythm on monitor. No patient with sonographically identified cardiac standstill survived to leave the ED regardless of his or her initial electrical rhythm. Cardiac standstill on echocardiogram resulted in a positive predictive value of 100% for death in the ED, with a negative predictive value of 58%. **Conclusions:** Patients presenting with cardiac standstill on bedside echocardiogram do not survive to leave the ED regardless of their electrical rhythms. This finding was uniform regardless of

The Utility of Ultrasound to Determine Ventricular Capture in External Cardiac Pacing

JOEL S. HOLGER, MD, HAL J. MINNIGAN, MD, RICHARD P. LA
AND CHARLES C. GORNICK, MD

Determining electrical capture when using an external cardiac pacemaker is often difficult and confusing, especially when the resulting clinical signs of an effective blood pressure and pulse are inadequate or nondetectable. The objective of this study was to determine the efficacy of using 2-dimensional ultrasound (US) in determining the presence of ventricular capture of an external cardiac pacemaker in a swine model. Five anesthetized swine underwent external cardiac pacing (ECP) at variable levels of energy output while concurrent US images and electrocardiograph monitoring were recorded. Capture/no capture were made in

method of choice in (ACLS) algorithm for

When using external pacing in the emergency department (ED), effective ventricular contraction is present. The currents used by ex

Pacing

USING ULTRASOUND TO DETERMINE EXTERNAL PACER CAPTURE

Douglas Ettin, MD and Thomas Cook, MD

Palmetto Richland Memorial Hospital, University of South Carolina School of Medicine, Columbia, South Carolina
Reprint Address: Thomas Cook, MD, Department of Emergency Medicine, Palmetto Richland Memorial Hospital, 3 Medical Center
Suite 350, Columbia, SC 29203

☐ **Abstract**—Transcutaneous cardiac pacing is a temporary treatment of hemodynamically unstable bradycardias. However, the rhythmic skeletal muscle contractions that occur during external pacing can make it difficult to assess the hemodynamic status of the patient. We report a case of using bedside ultrasound to assess the effectiveness of transcutaneous pacer capture. © 1999 Elsevier Science Inc.

☐ **Keywords**—transthoracic pacing; transvenous pacing; ultrasonography; echocardiography; bradycardia

The patient eventually developed hypotension, bradycardia, and a decreased level of consciousness, prompting transfer to our facility. During transfer, she had a heart rate of 30 beats/min and no measurable blood pressure. The patient was treated en route with atropine and a fluid bolus without improvement of her symptoms. Her past medical history was significant for hypertension, supraventricular tachycardia. A coronary catheterization 2 years earlier was normal. Her medications include lisinopril and verapamil. She had no known drug allergies.

Hipotansif / Nabızsız Elektiksel Aktivitesi Olan Hastalar İçin

A NOVEL USE OF ULTRASOUND IN PULSELESS ELECTRICAL ACTIVITY: THE DIAGNOSIS OF AN ACUTE ABDOMINAL AORTIC ANEURYSM RUPTURE

Robert G. Hendrickson, MD, Anthony J. Dean, MD, and Thomas G. Costantino, MD

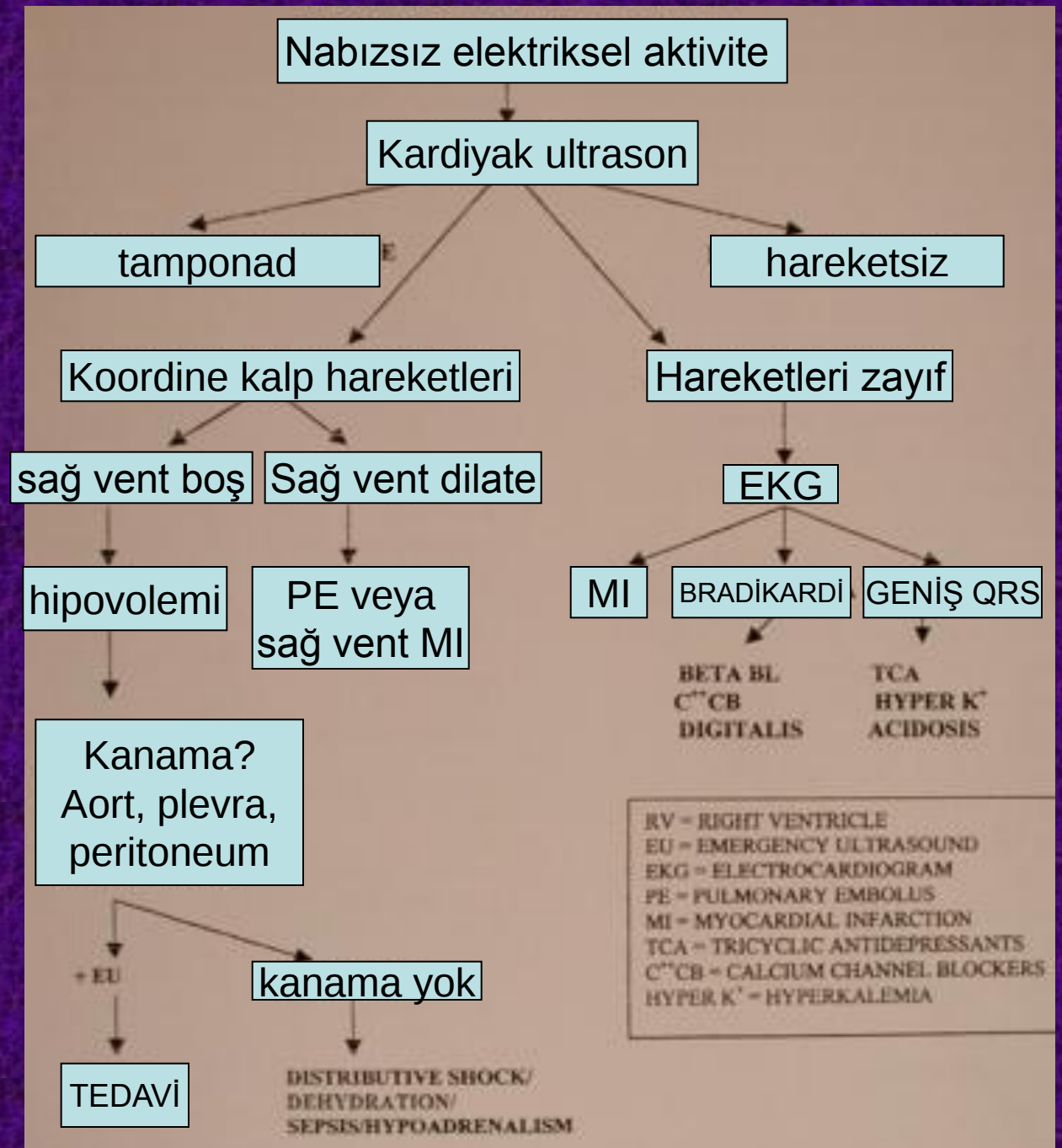
Department of Emergency Medicine, Medical College of Pennsylvania/Hahnemann University, Philadelphia, Pennsylvania
Reprint Address: Robert G. Hendrickson, MD, Department of Emergency Medicine, Medical College of Pennsylvania Hospital,
3300 Henry Avenue, Philadelphia, PA 19129

Abstract—We report a case of a patient who presented to the Emergency Department with pulseless electrical activity. A rapid diagnosis of ruptured abdominal aortic aneurysm was made by Emergency Medicine bedside ultrasonography. On arrival, the patient was without palpable pulses and bradycardic. Therapy with epinephrine, fluids, and atropine was initiated. A bedside ultrasound was immediately performed and revealed coordinated cardiac motion with empty ventricles. A rapid search for signs of blood loss in the abdomen revealed a large abdominal aortic aneurysm. Pulses were restored with fluid, blood, and epinephrine and surgical intervention was begun within 30 min of patient arrival. © 2001 Elsevier Science Inc.

CASE REPORT

A 68-year-old woman presented in the ED in cardiac arrest. Paramedics reported that the patient had complained of groin pain earlier in the day and was found unresponsive by her family, who activated the Emergency Medical System. On arrival, the paramedics found the patient unresponsive. The initial cardiac rhythm revealed a narrow complex rhythm at 80 beats/min. A faint carotid pulse was palpable. She was intubated in the field and several unsuccessful attempts at peripheral intravenous lines were made. On arrival to the ED, the patient was unresponsive, pulseless, intubated, and without

Nabızsız Elektriksel Aktivitesi Olan Hastalarda



Nedeni açık olmayan hipotansiyon

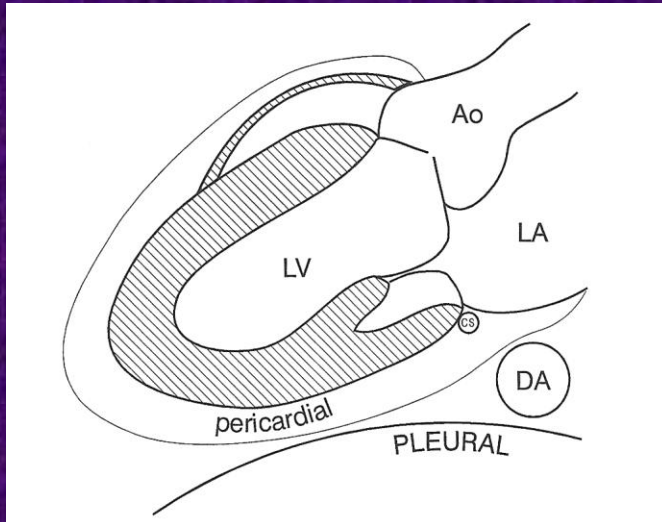
- Kardiojenik şok
 - Sol ventr. kontraktilitesi zayıf
- Hipovolemi
 - Hiperdinamik ventriküller
- Sağ vent. infarkt / masif PE
 - Belirgin sağ vent. dilitasyon / hipokinez
- Tamponad
 - RV diastolik kollaps

Hipovolemi

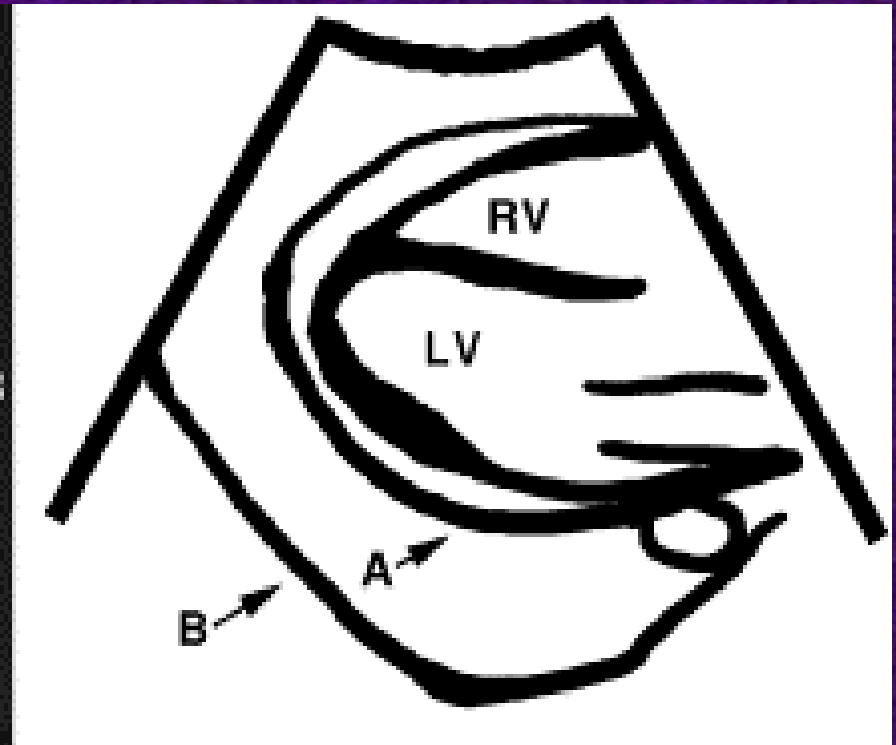
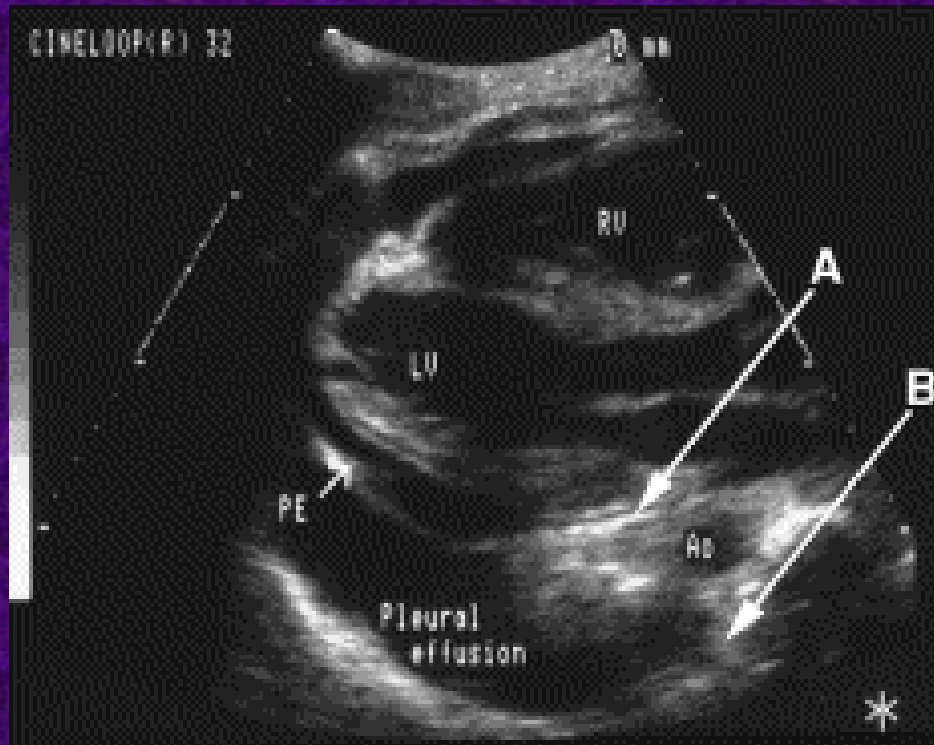
- Dolarken oda küçük
- Duvarlar hareketli
- VCI boş ve/veya inspirasyon ile kollaps

Perikardiyal Efüzyonun Büyüklüğü

- Normal 15- 50mlt
- Küçük: arkada, <0.5 cm
- Orta: ant. ve posterior, diastolde 0.5-2 cm
- Büyük: >2 cm



Perikardiyal Effüzyon



9:03:16 am

3V2c 44Hz

H3.5MHz 220mm

ECHO

General

Pwr= 0dB MI=1.2

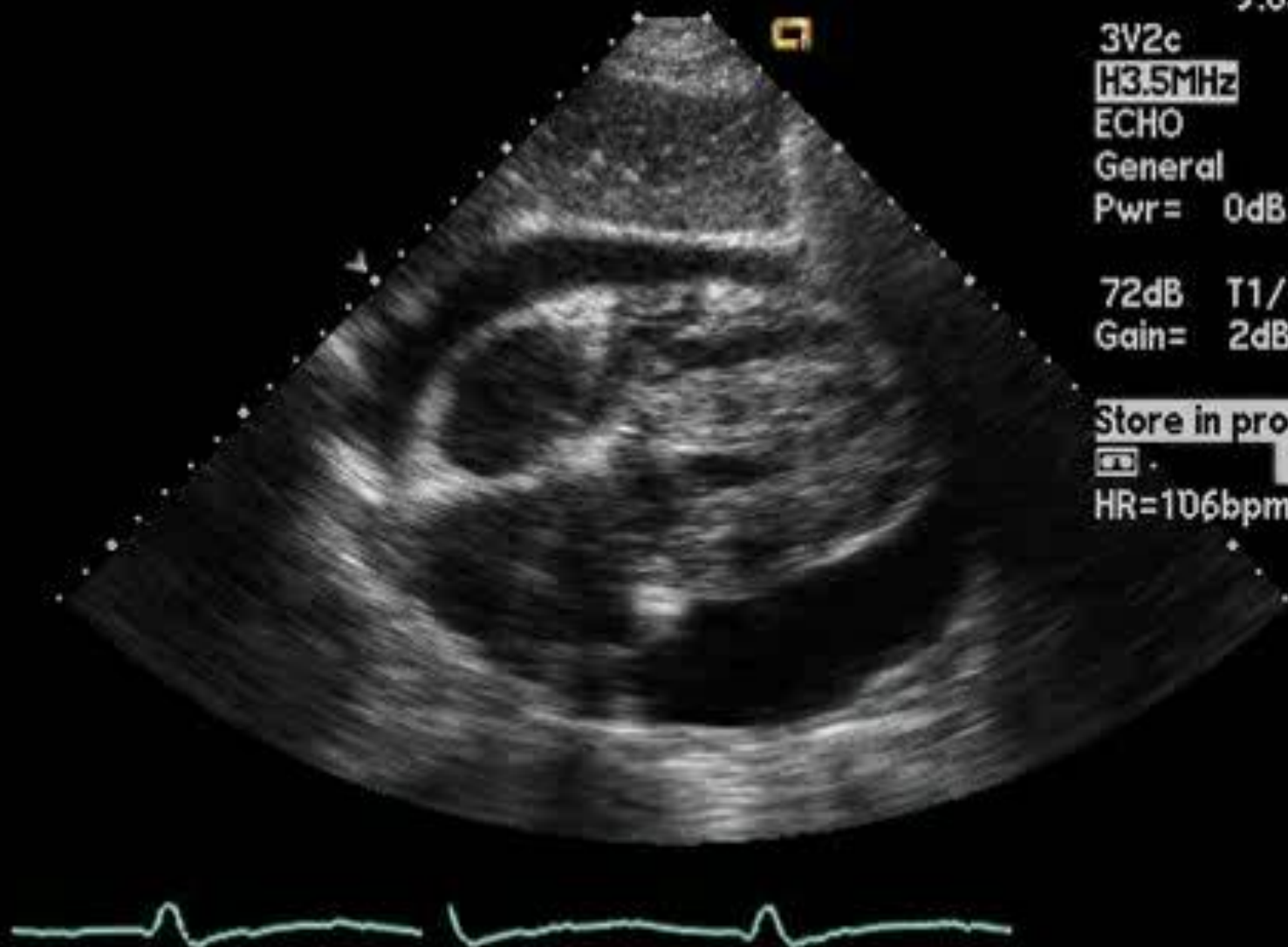
72dB T1/-4/0/2

Gain= 2dB $\Delta=1$

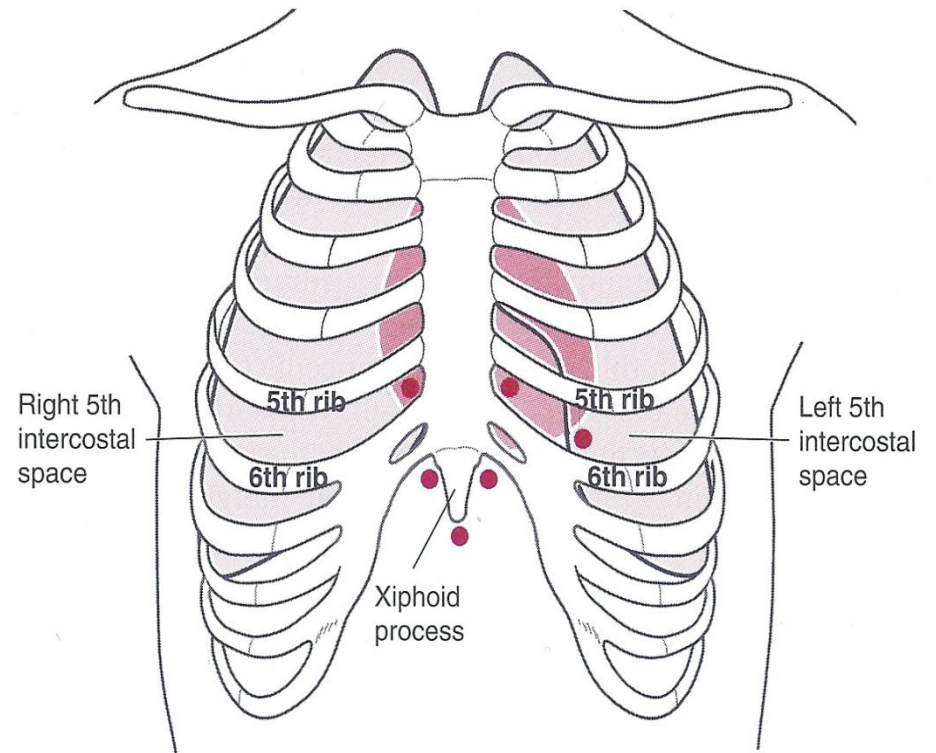
Store in progress

1:26:02

HR=106bpm



Perikardiyosentez



Ultrason ile Perikardiyosentez

- Subkostal
 - Geleneksel
 - Kör
 - Karaciğer/kalp yaralanmasına neden
- Ultrason ile perikardiyosentez
 - İğne sol parasternal... veya göğüs duvarına yakın en büyük sıvı birikimi

Yöntem



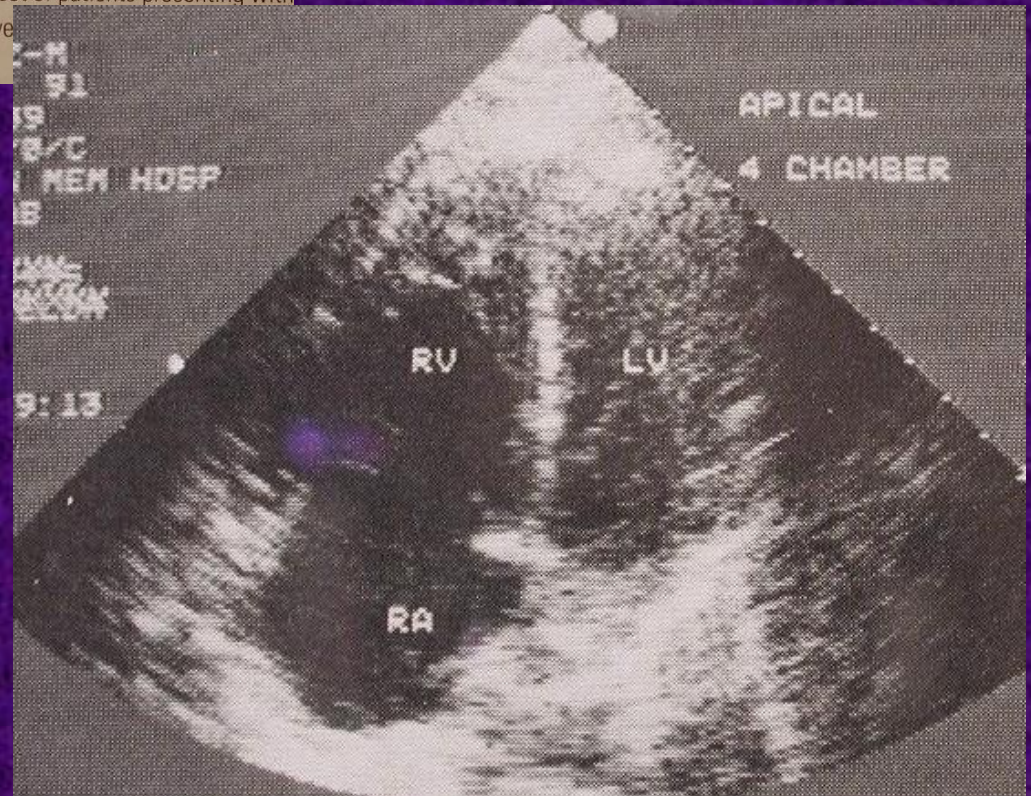
Diagnostic Use of Emergency Department Echocardiogram in Massive Pulmonary Emboli

Marian E Johnson, MD*
Richard Furlong, MD†
Kathleen Schrank, MD†

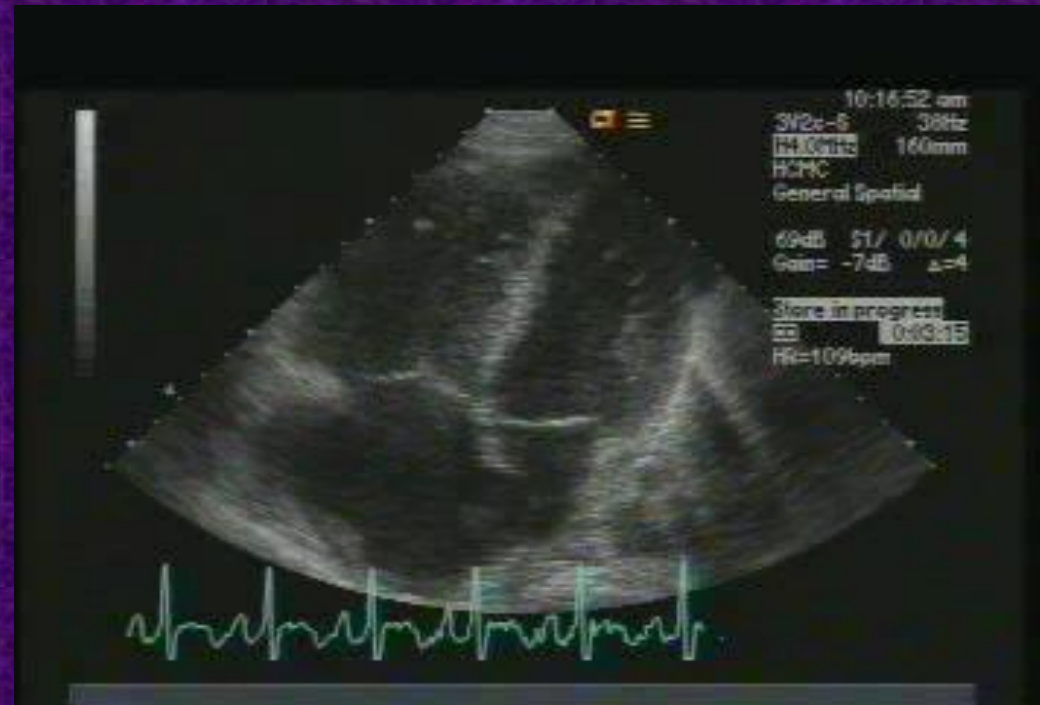
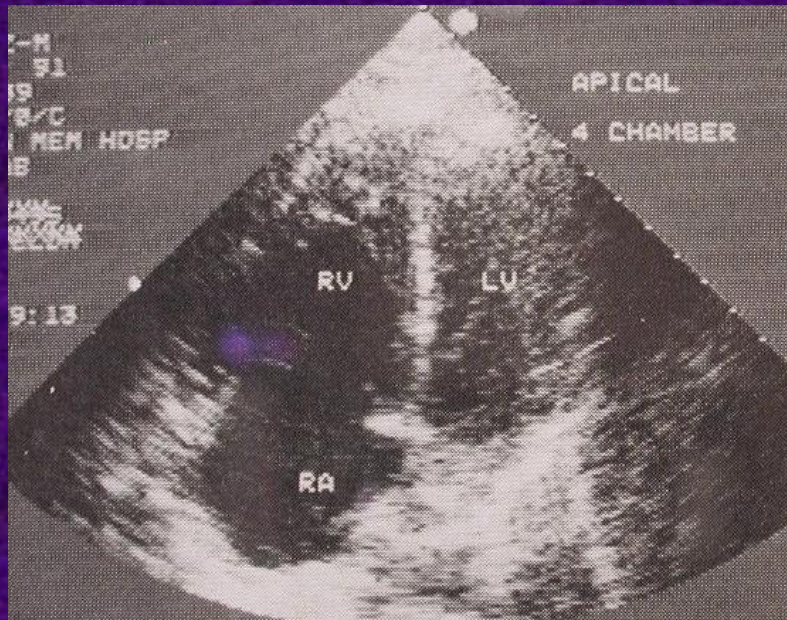
Massive pulmonary embolism represents a small percentage of patients presenting to the emergency department with clinical symptoms suggestive of embolic phenomenon. Definitive therapy with thrombolytics or embolectomy is usually delayed until angiographic verification of the clinical suspicion can be obtained. A case is described in which embolectomy was based on clinical diagnosis and confirmatory echocardiogram obtained in the ED. The rapid diagnostic role of echocardiographic data in a subset of patients presenting with clinical symptoms suggestive of massive pulmonary emboli warrants further evaluation.

Normalde RV/LV: 0.6/1
Apikal yön (4 oda) de mitral
kapağın bittiği yerde ölçüm
yapılır.
RV/LV>1 PE ciddi
Diğer sebepler...

Pulmoner emboli

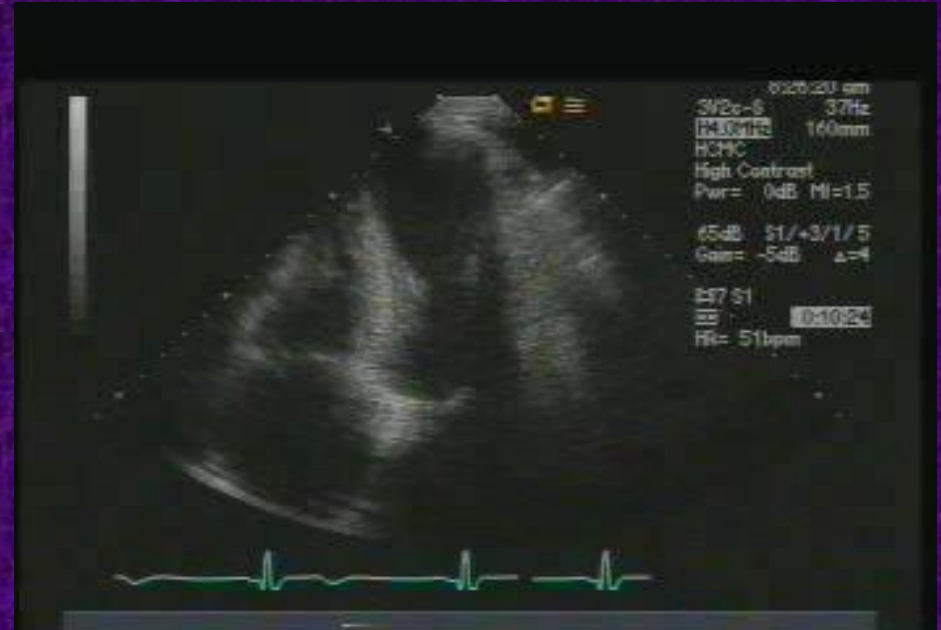


Pulmoner emboli



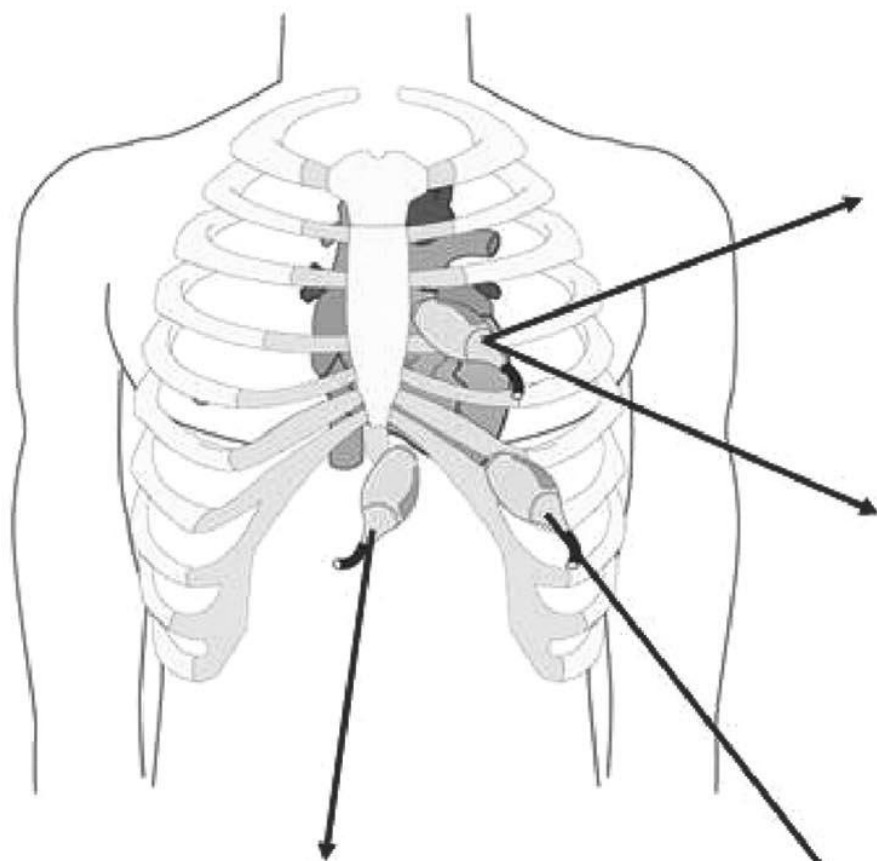
Kardiyojenik şok

- Dilate sol ventrikül
- Duvar hareketleri zayıf

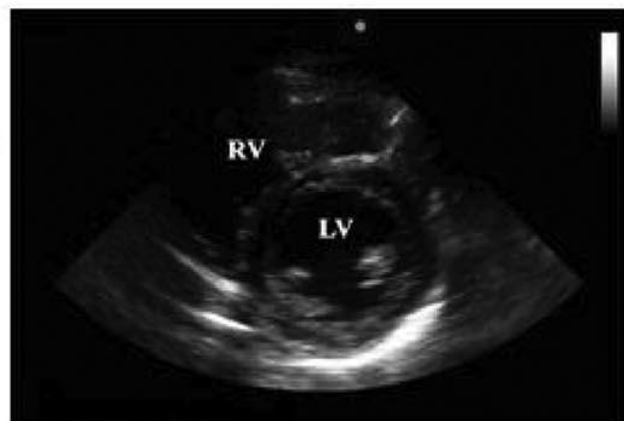


Teknik sorunlar

- Ciltaltı amfizem
- Pnömorekardiyum
- Mekanik ventilasyon
- Kısıtlayıcı etkenler:
 - Ağrı / hassasiyet
 - Spinal korumaların uygulanması
 - Diğer acil girişimler
- Dar interkostal aralıklar
- Şişmanlık
- Kaslı göğüs
- KOAH
- Kalsifiye kot kırkırdakları
- Abdominal distansiyon



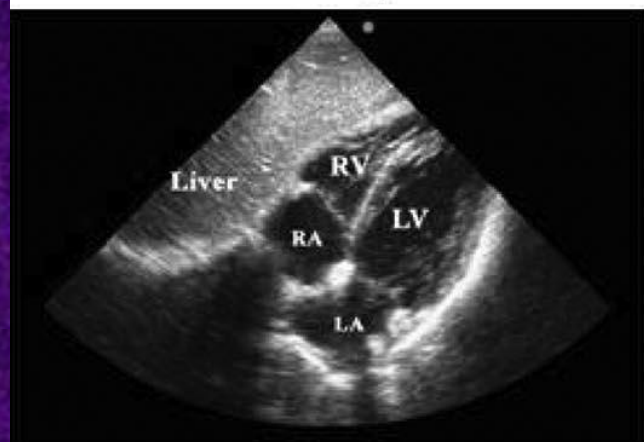
A



B



C



D

PI: 1.4
SE

2/2/8/F5
ILKE #17

ILKE ADULT

80 6:33:31
GPIK 60
CCPF 55
SEEFM

15CP
66F2



06 Nov 01

UNIVERSITY OF MICHIGAN HEALTH SYSTEM

10:14:00 am

3V2c 15Hz

H3.5MHz 140mm

ECHO

General

Pwr= 0dB

Mlcd=1.8 TIS=1.8

T1/-2/ 0/VV:1

1/2 CD:2.0MHz

CD Gain = 46

Store in progress

1:53:11

HR= 69bpm

.60

.60



CD Pan /

UCD Pos / Size

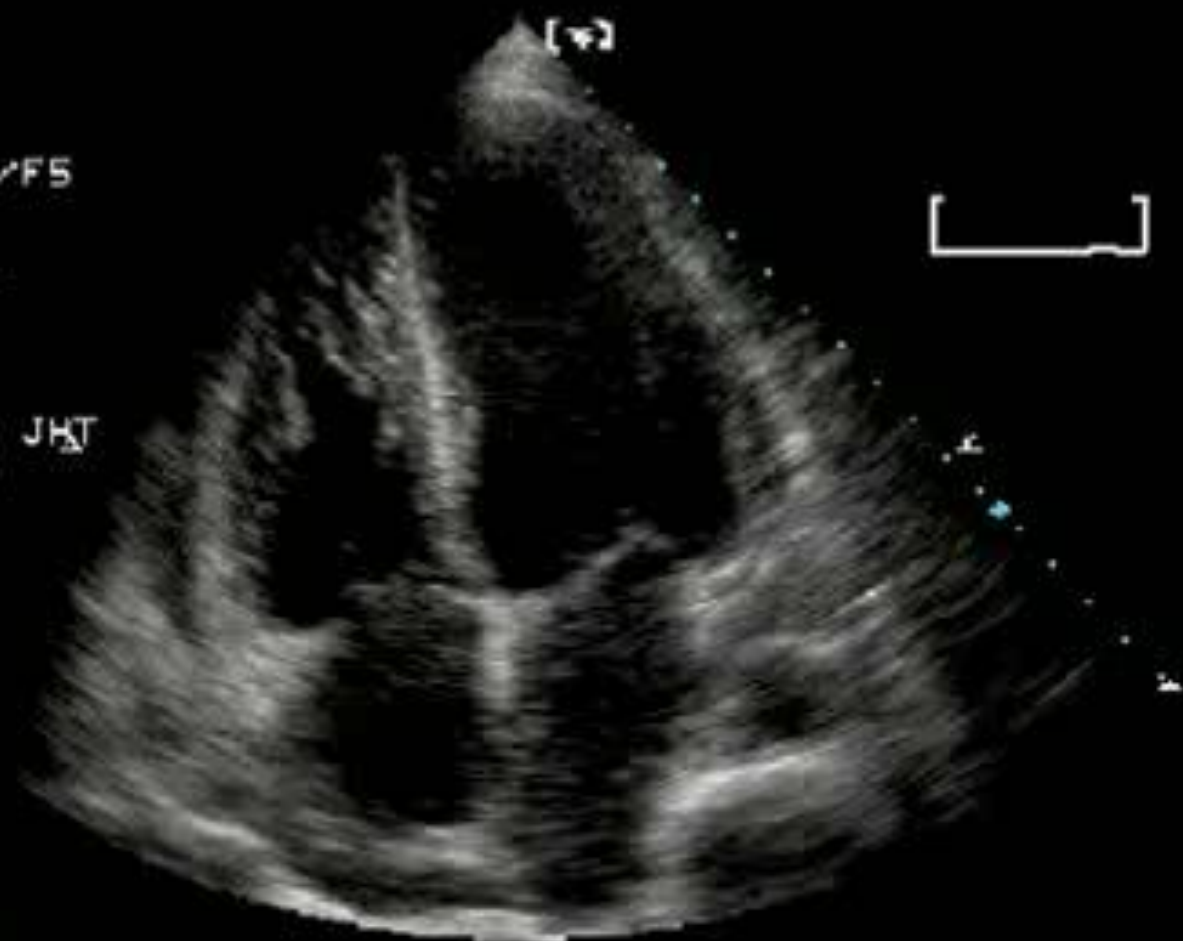
PI: 1.6
54

FRCC 0/0/E/F5
CLKE #1

CLKE ADULT

K826-53:51 JHT
00 0:57:25
GPIK 60
CCPF 60
5SEFM

18CP
43Hz



PI: 1.6
E4

[v]

FRCC 2/0/E/F3
CLKE #1

CLKE ADULT

GPIK 60
CCPF 60
SSEFM

USCP
4EF2

