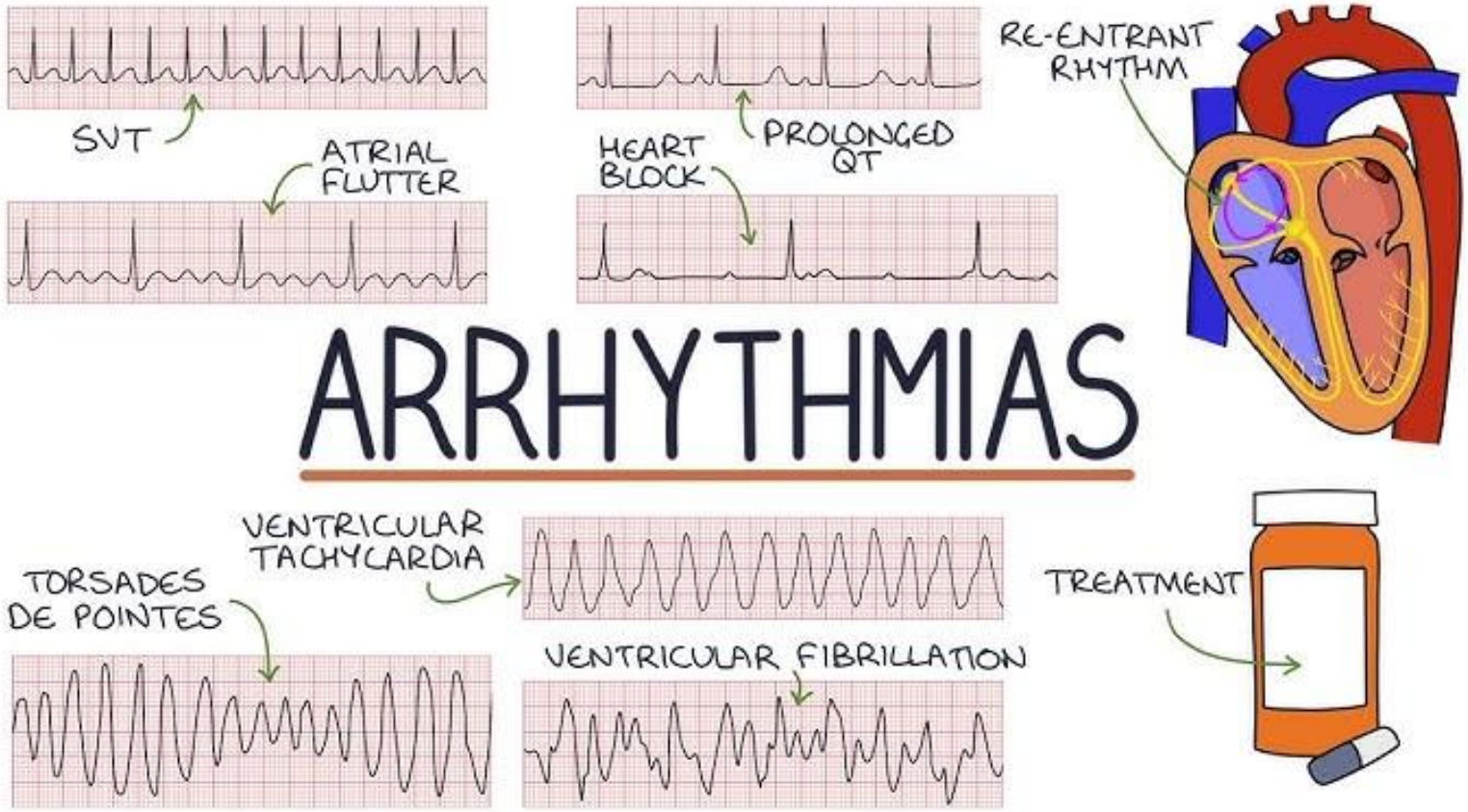
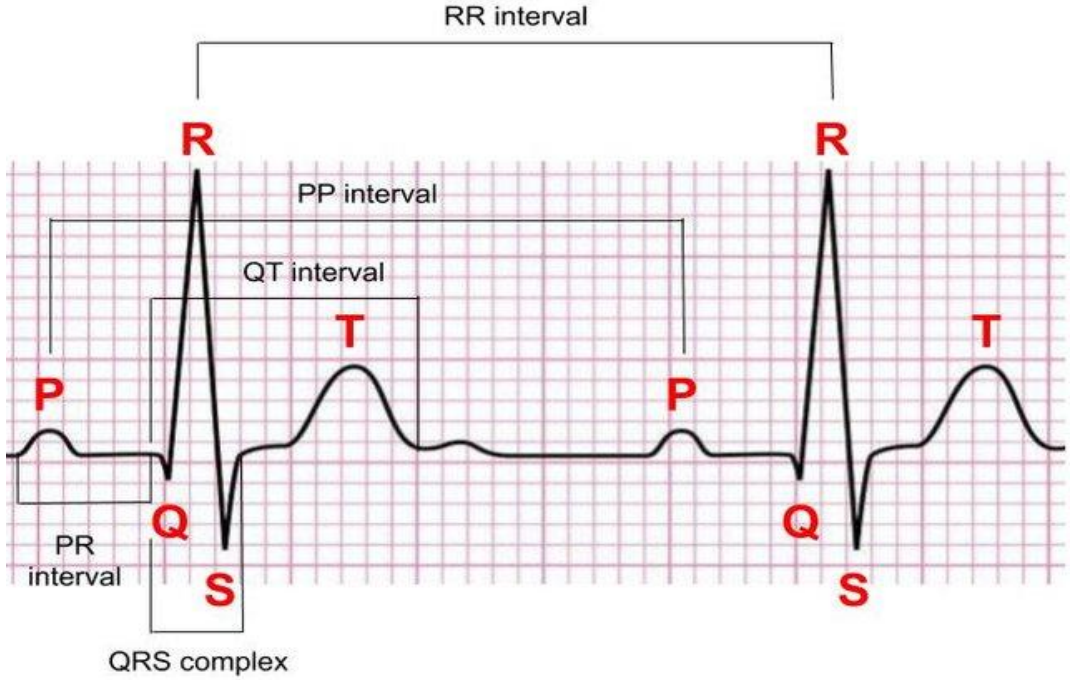
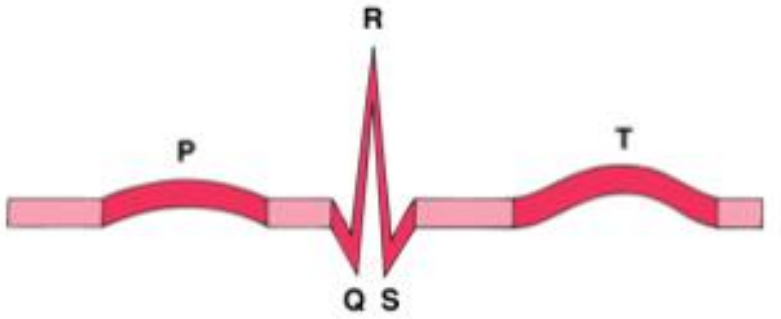


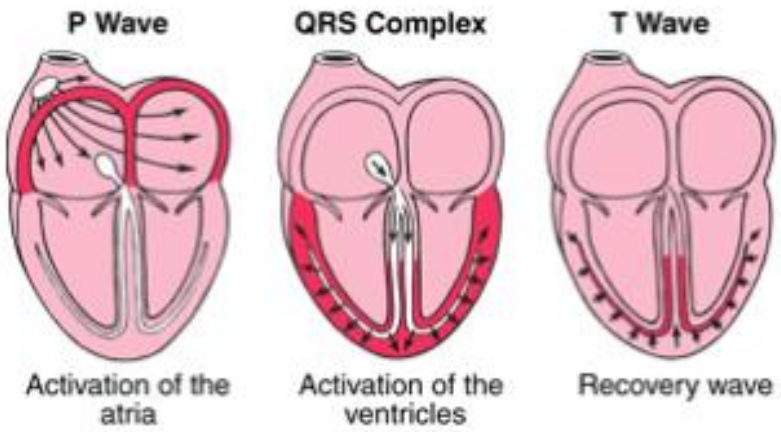
DİSRİTMİLER VE ELEKTRİKSEL TEDAVİLERİ

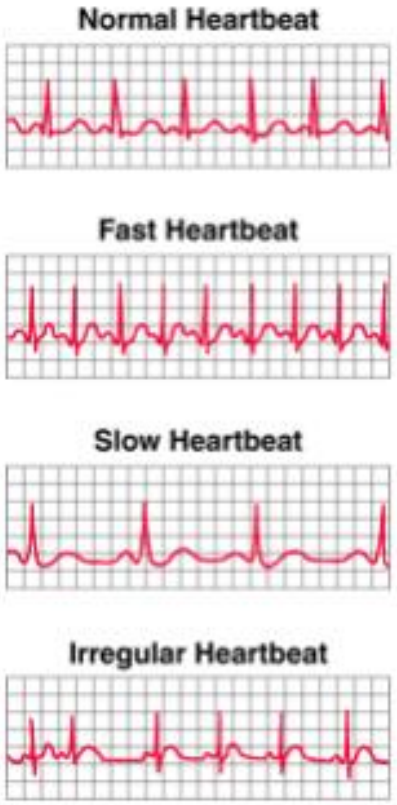
- **Tanım:**
  - Normal dışı,
    - Uyarı başlangıcı,
    - Uyarı iletimi.
  - Çok hızlı,
  - Çok yavaş.
- Normal?



- **Sinüs ritmi:**
- Her p dalgasını QRS izler,
- Düzenli R-R intervali,
- 60-100 vuru/dk,
- PR 0.12-0.20 sn (3-5 kk),
- QRS <0.12 sn(3 kk),
- D2 de pozitif, AVR de negatif P dalgas





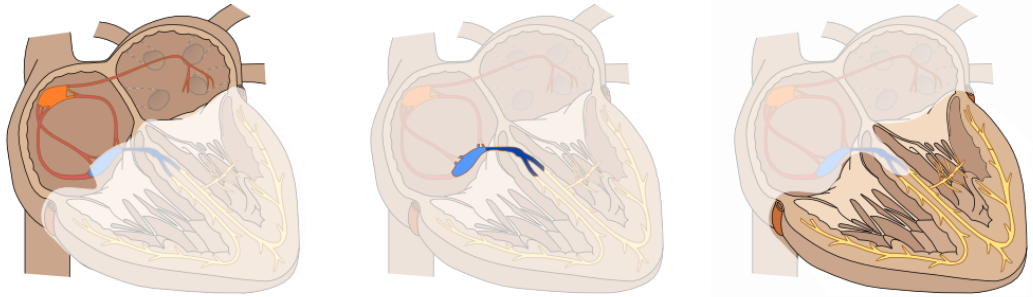


Supraventricular

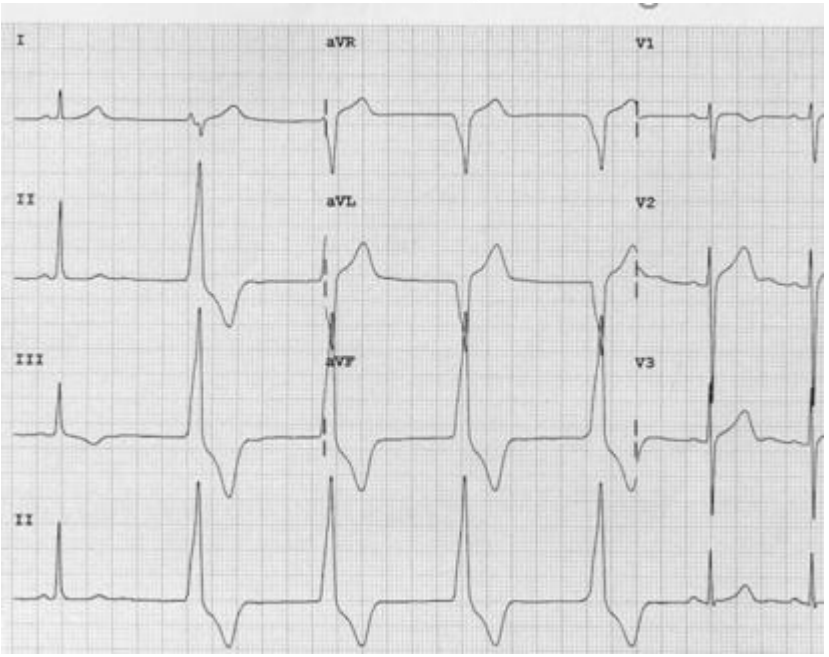
Atrial

Nodal

Ventricular



- Ritim nerden kaynaklı?
- P dalgası,
- P dalgası şekli,
- QRS boyutu,



- **Etiyoloji:**
  - Kardiyak hastalıklar (İKH, geçirilmiş cerrahi, kapak hastalıkları, vb)
  - Yüksek kan basıncı,
  - Konjenital hastalıklar,
  - Tiroid bozuklukları,
  - DM, OSAS, elektrolit inbalansı,
  - İLAÇLARRR,
  - Alkol, kafein, nikotin, illegal ilaçlar,
  - Metabolik durumlar,

- **Semptomlar:**

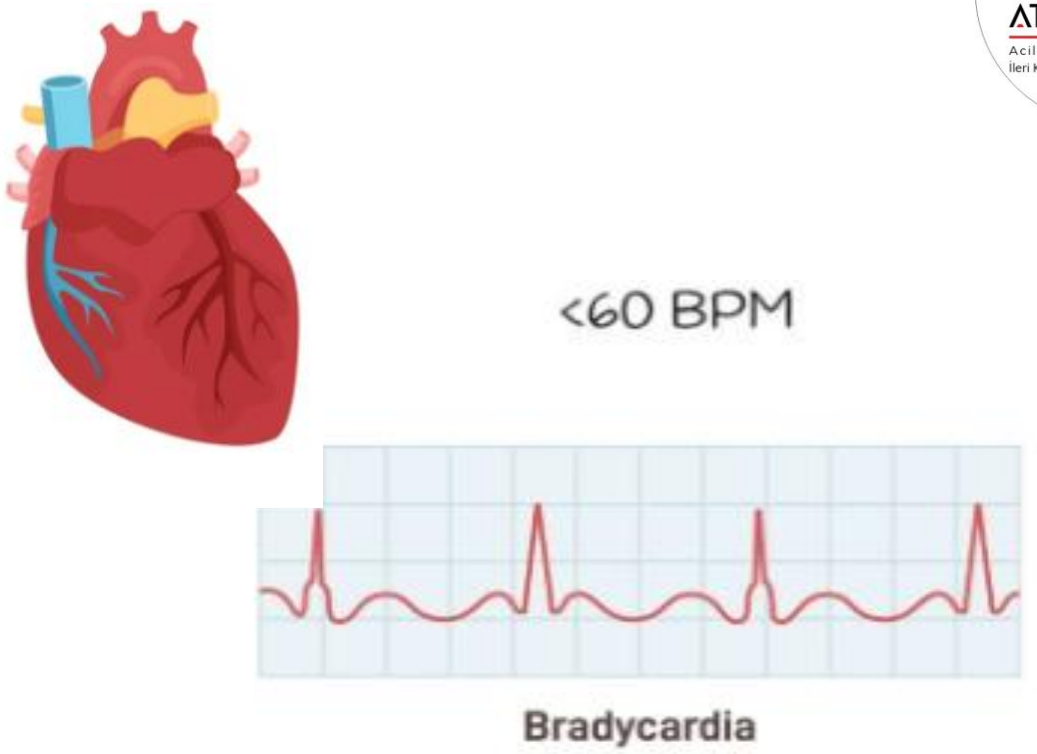
- **Bradikardi:**
- Halsizlik, yorgunluk,
- Baş dönmesi, denge bozukluğu,
- Bayılma, bayılayazma,
- Nefes darlığı,
- Göğüs ağrısı,
- Kardiyak arrest

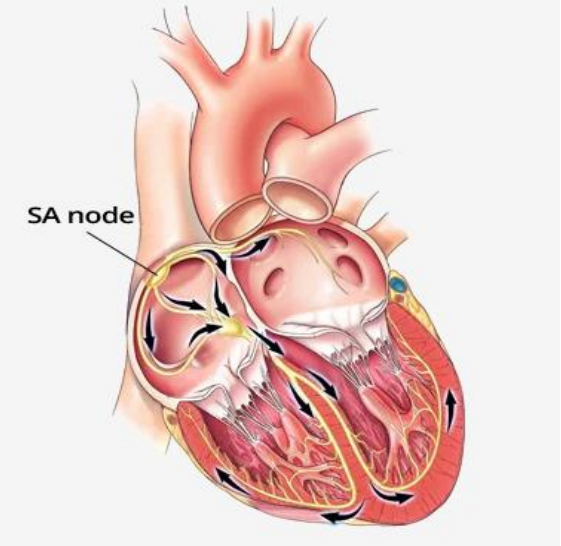
- **Taşikardi:**
- Baş dönmesi, denge bozukluğu,
- Bayılma, bayılayazma,
- Nefes darlığı,
- Göğüs ağrısı,
- Çarpıntı hissi,
- Kardiyak arrest

- **Ne yapmalı?**
- Başvuru şikayeti,
- Tıbbi özgeçmiş,
- İlaç kullanım öyküsü,
- Fizik muayene,
- 12 derivasyonlu EKG,
- Sürekli kardiyak ritim monitorizasyonu,

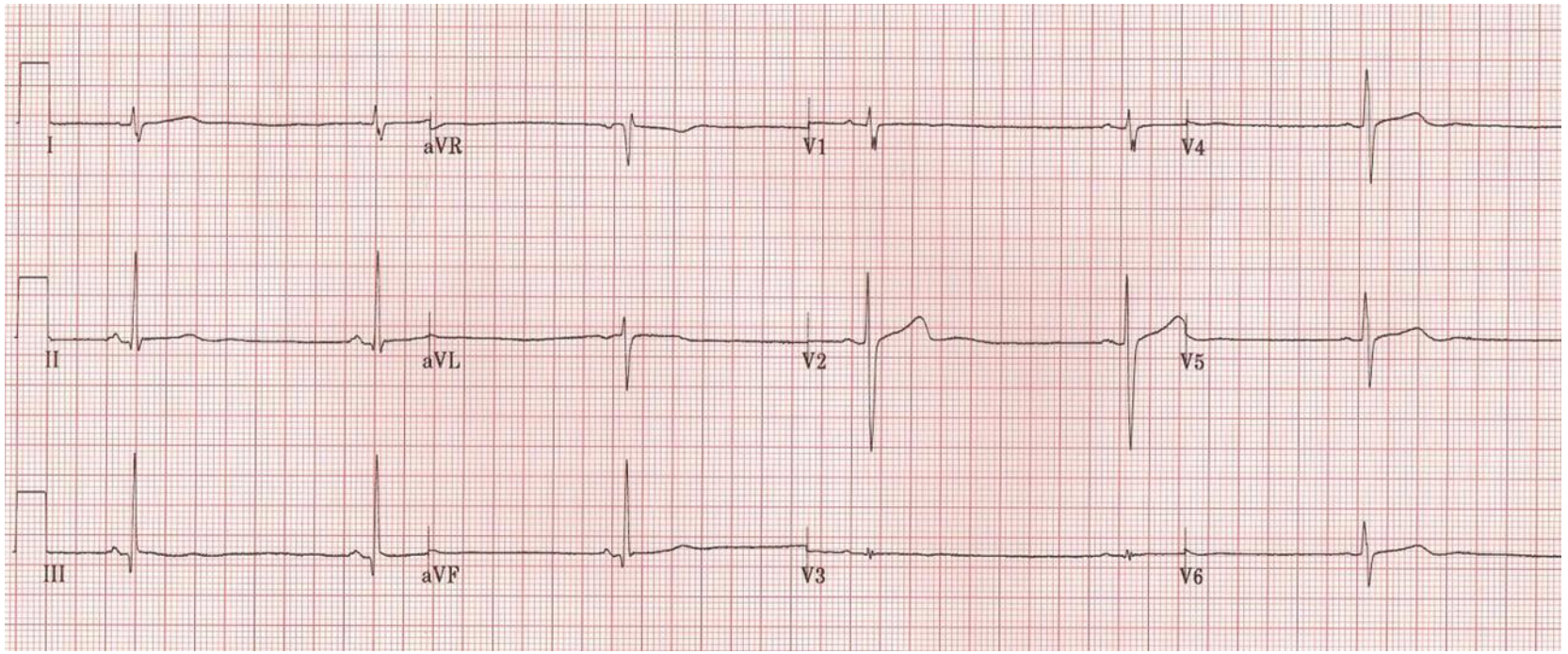
- **<u>Dikkatttt:</u>**
- **Hasta stabil mi???**
- Hipotansiyon (90 mmHg)
- Sistemik hipoperfüzyon
    - Bilinç değişikliği
    - İskemik göğüs ağrısı
    - Akut kalp yetersizliği
    - Senkop
    - Siyanoz

- **Bradidisritmiler (<60 bp/min)**
- Sinüs Bradikardisi
- Junctional ritim
- İdioventricular ritim
- Atrial fibrilasyon/flutter (yavaş ventriküler yanıtlı)
- II. Derece AV blok (özellikle tip 2)
- 3.derece AV blok

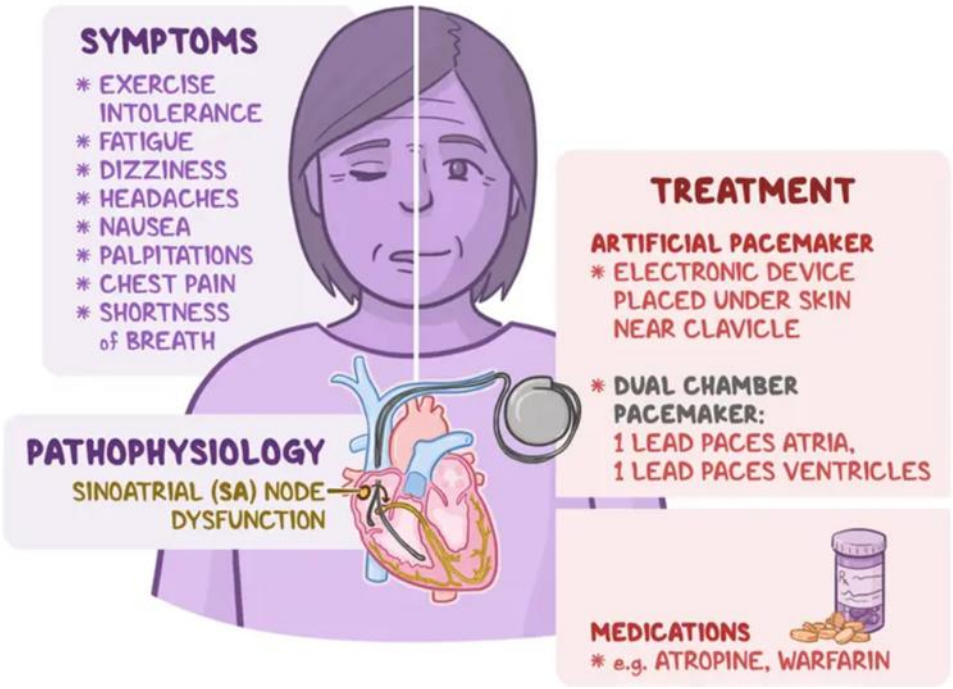




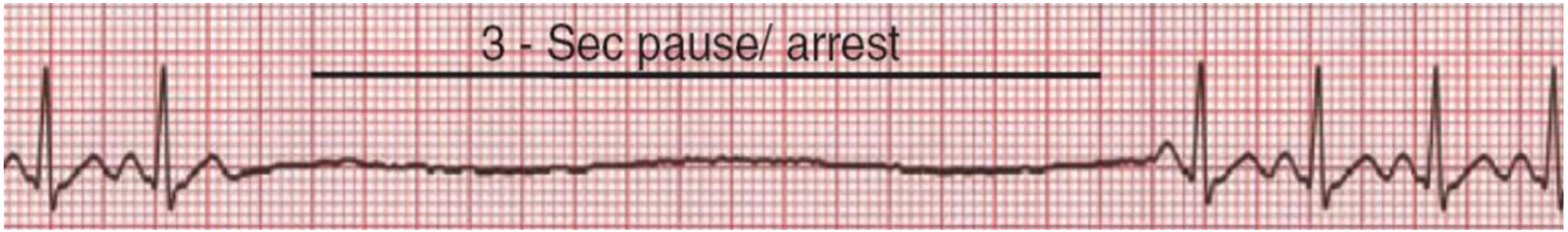
- **Sinüs bradikardisi:**
- <60 vuru/dk,
- Ritim düzenli,
- Her bir P dalgasını QRS izle
- PR 0.12-0.20,
- QRS <0.12,



- **Hasta sinüs sendromu:**
- Sinüs düğümü fonksiyon kaybı:
  - İdiyopatik dejeneratif fibroz (en yaygın),
  - İskemi,
  - Kardiyomiyopatiler,
  - İnfiltratif hastalık (ör. sarkoidoz, hemakromatoz)
  - Konjenital anomaliler,
  - İlaçlar (ör: Digoksin, ß- bloker, Ca kanal bl)
  - Otonomik fonksiyon bozukluğu
  - Hipotiroidi, elektrolit anormallikleri (ör. hiperkalemi),

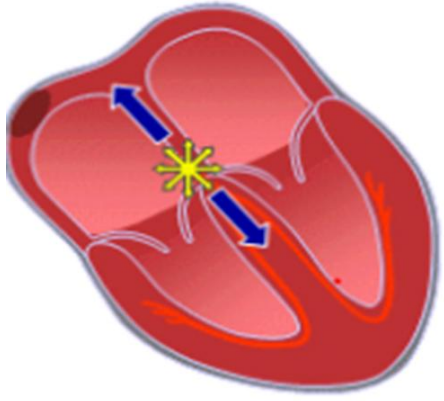


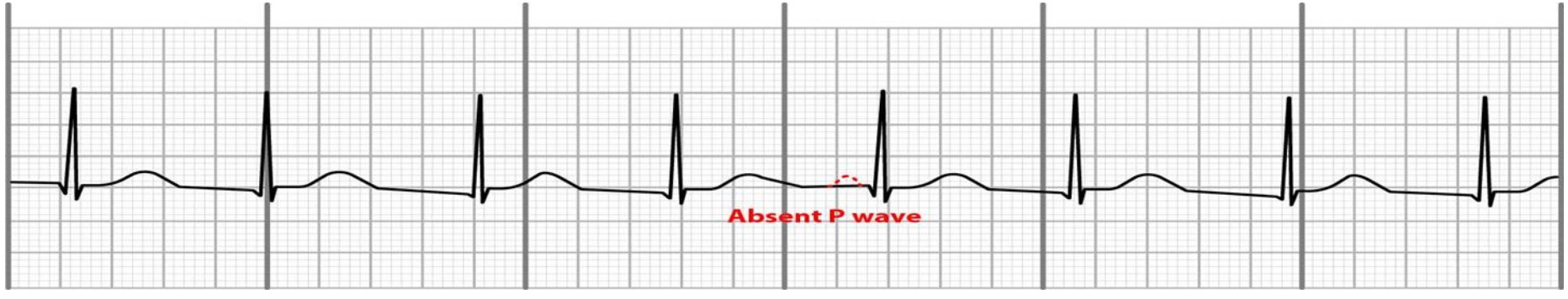
- EKG’de: sinüs bradikardisi, sinüs aritmisi, sinüs arresti >3 sn (15 bk),SA kaçış bloğu, bradikardi- taşikardi sendromu.

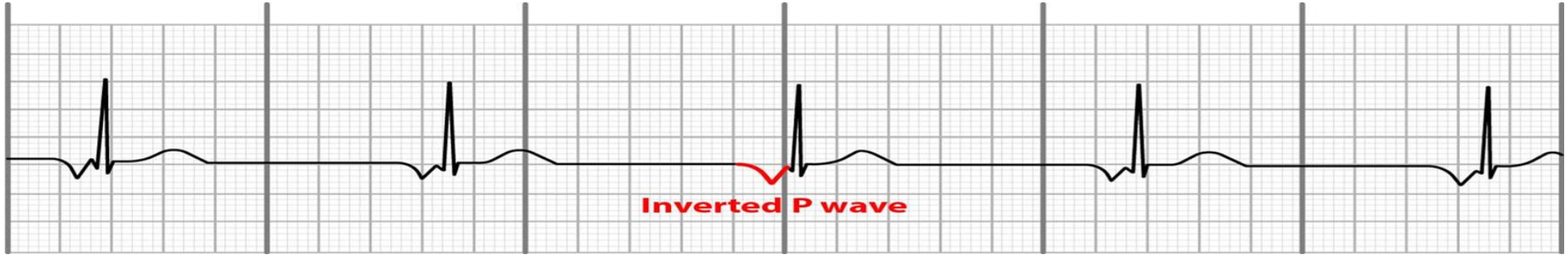


- Sıklıkla supraventriküler kökenli, paroksismal taşikardi ile değişkenlik gösteren bir bradikardi vardır.

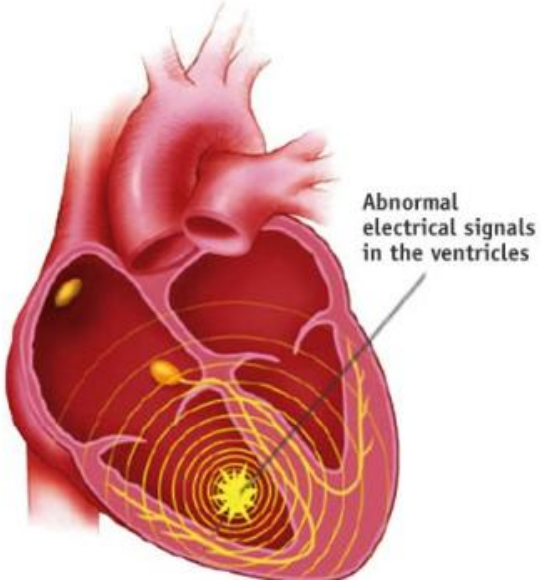
- **Junctional (nodal) ritim:**
- AV nod kaynaklı
- 40-60 vuru/dk,
- P yok, ters yada QRS’den sonra

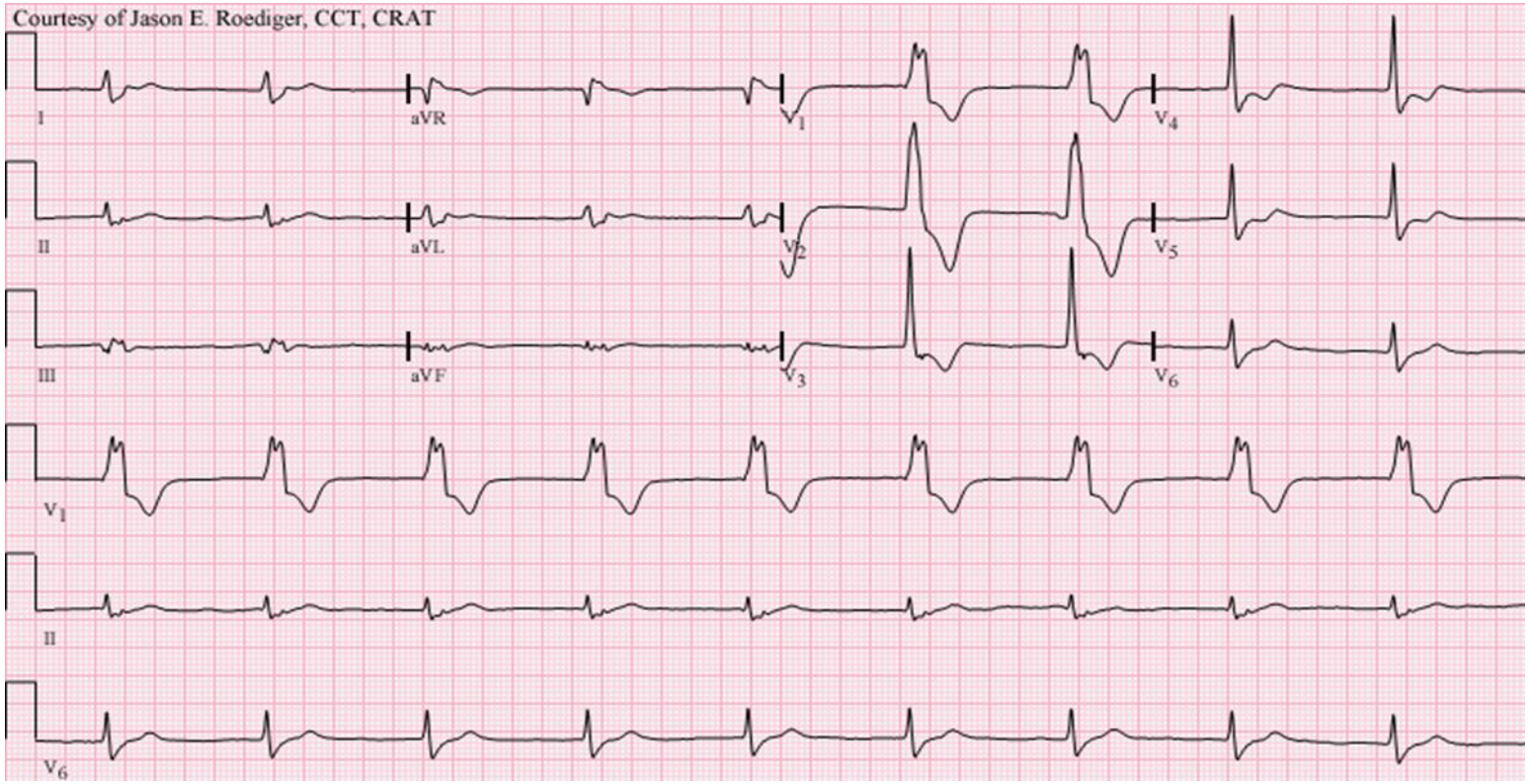




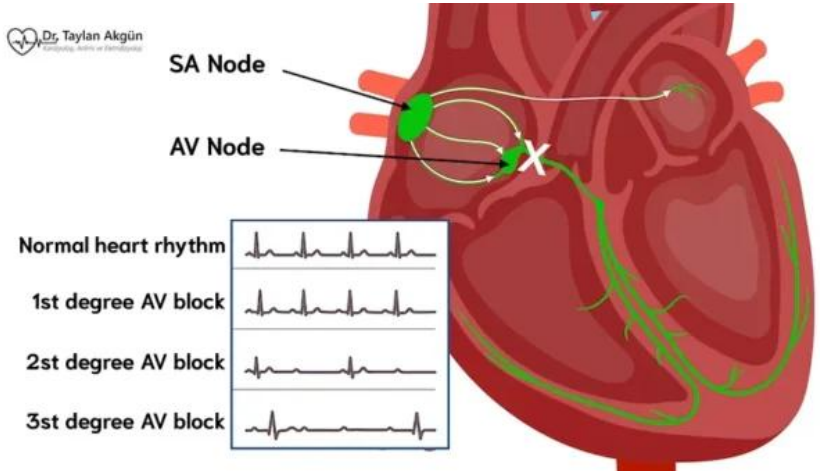


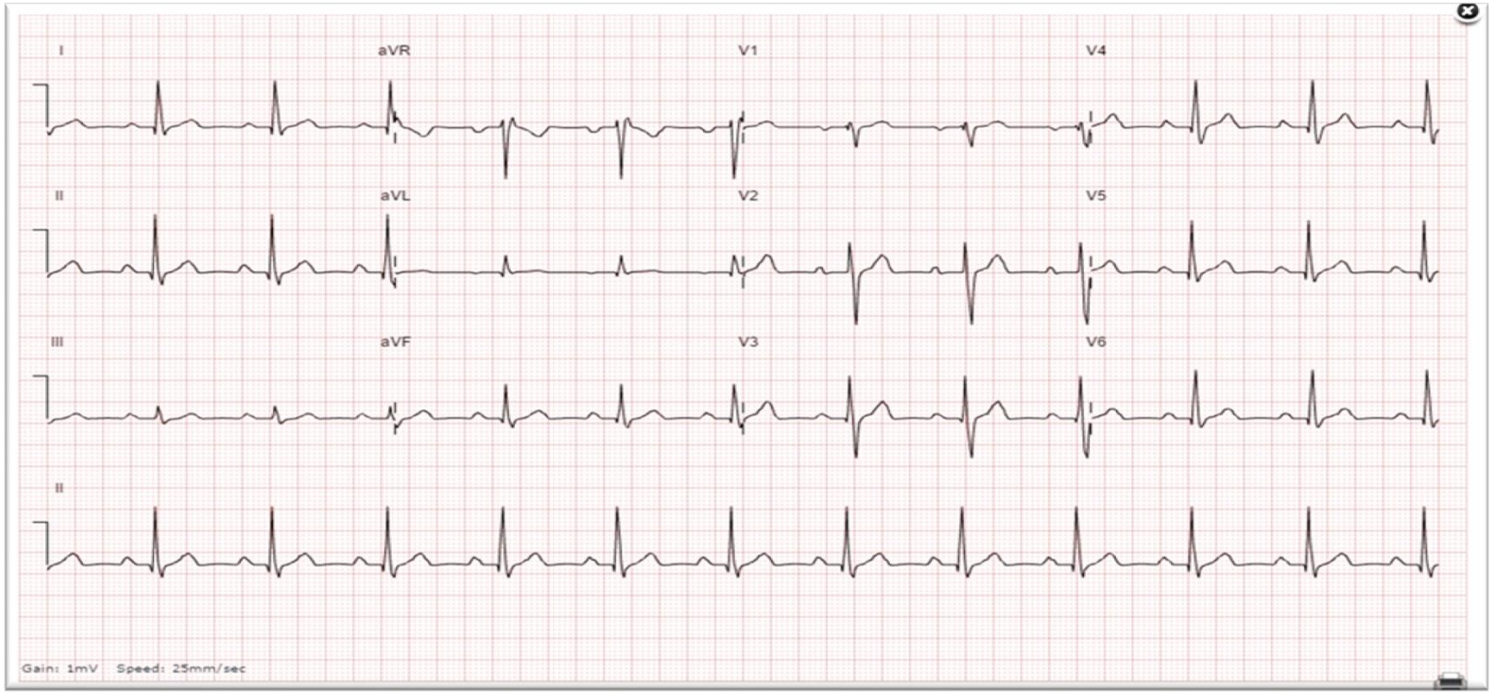
- **İdioventriküler ritim:**
- Ventrikül kaynaklı, düzenli ritim,
- 20-40 vuru/dk,
- 3 ya da daha fazla ventriküler kompleks, p dalgası görülmez,
- QRS >0.12,
- Hız>40 atım/dk akselere idioventriküler ritim,



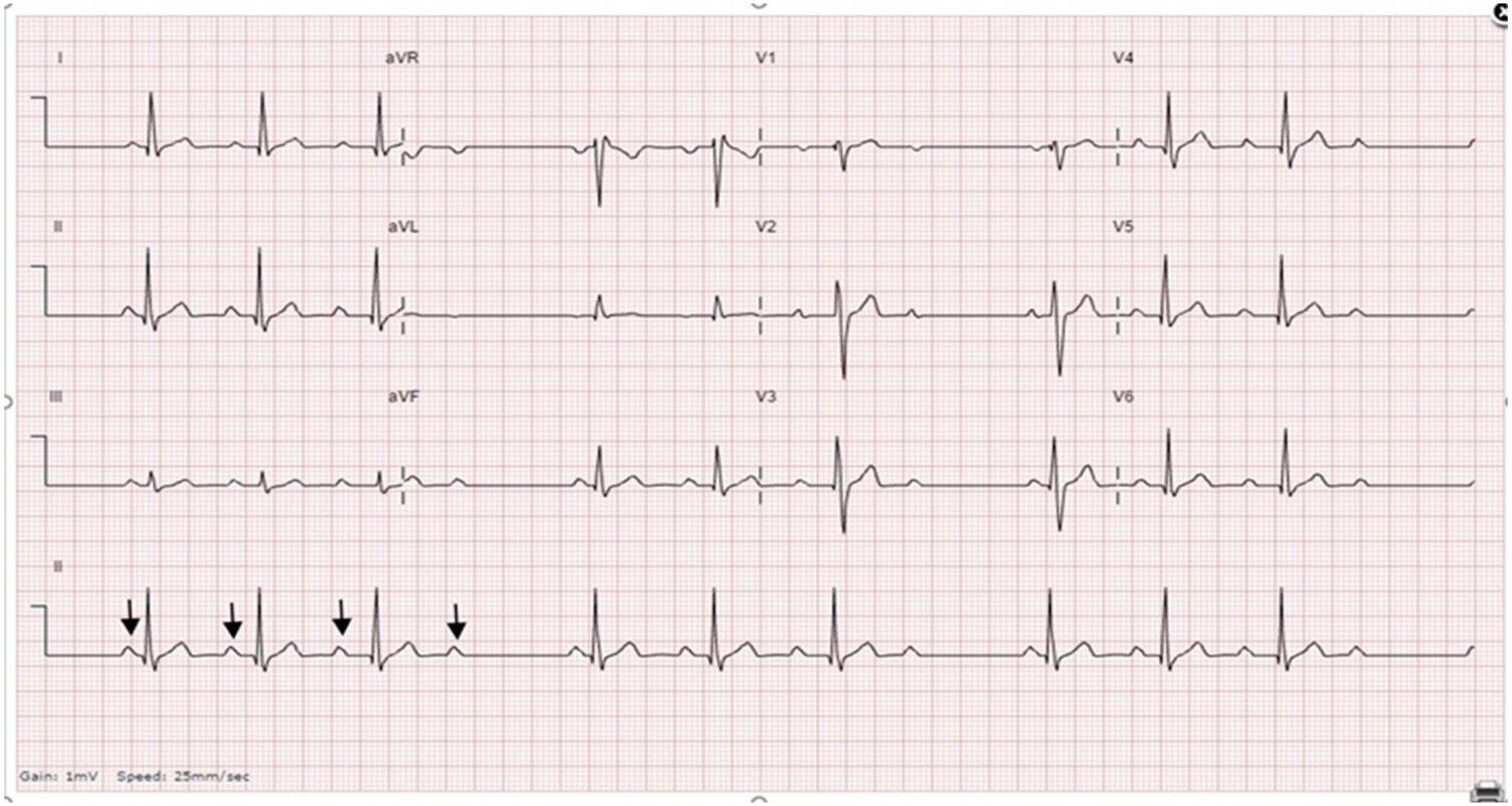


- **AV Bloklar:**
- **Birinci derece AV blok:**
- PR mesafesi 0,20 sn (5 kk) uzundur.
- Her P dalgasını bir QRS komleksi izler.
- QT mesafesi ve T dalgası normaldir .
- Acil tedavi gerektirmez

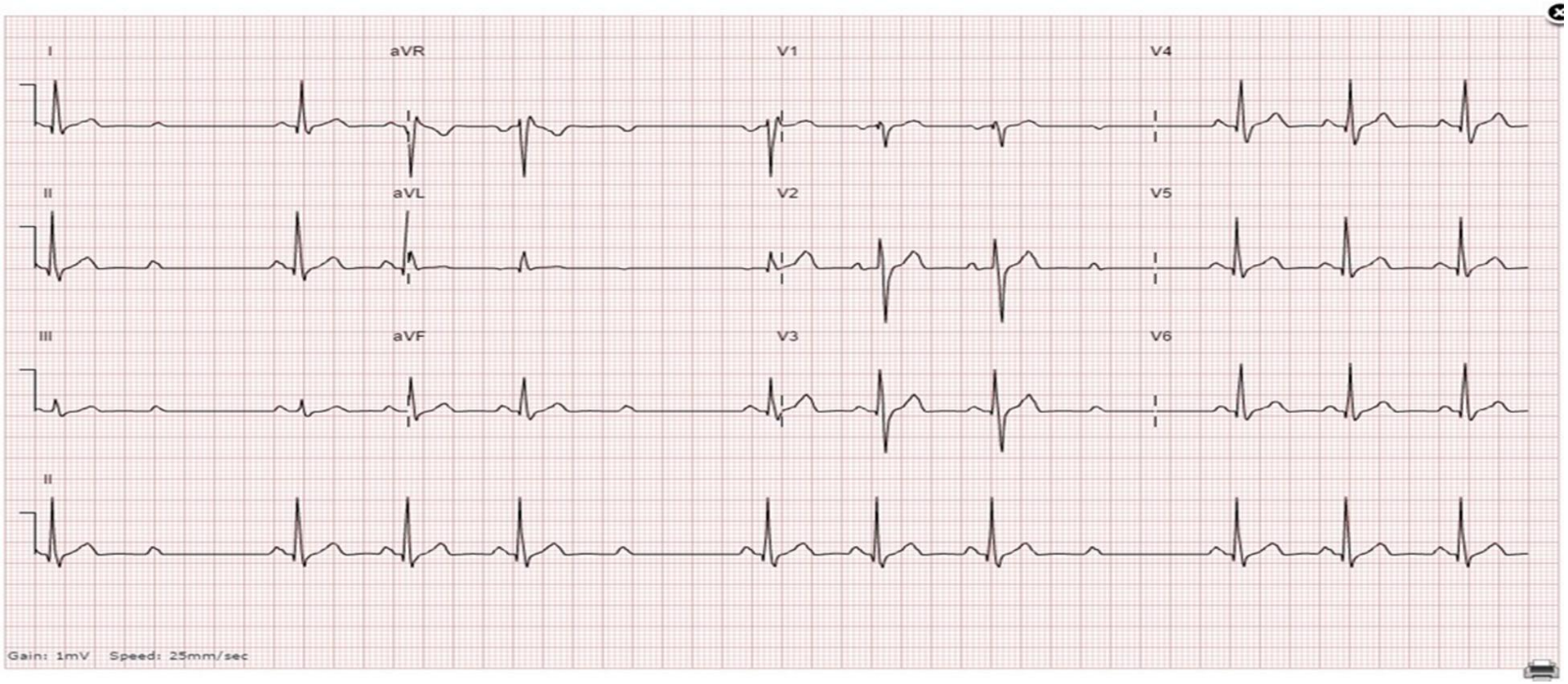




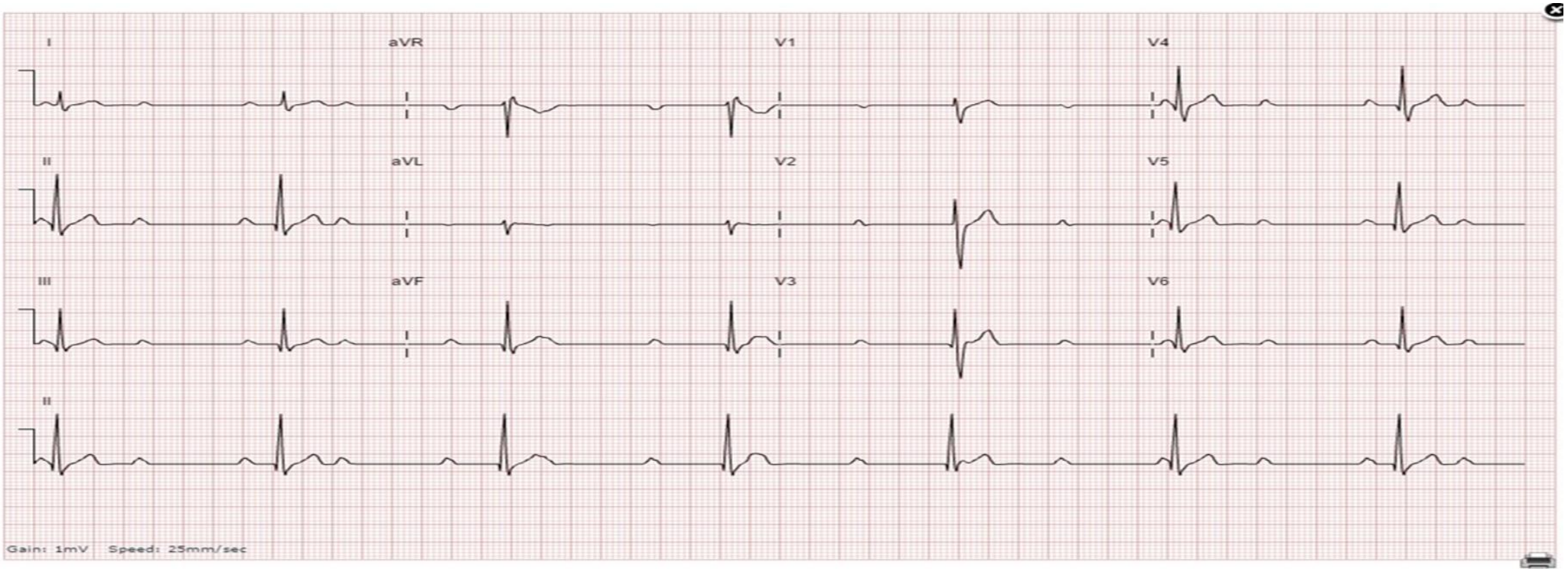
- **İkinci derece AV blok:**
- Mobitz Tip 1(Wenkebach)
- EKG’de PR mesafesi sabit değildir giderek uzar sonunda bir P dalgası ventrüküle iletilmez.



- **İkinci derece AV blok**
  Mobitz tip 2
- EKG de PR mesafesi sabittir ama devam eden iletide aralıklı olarak bir P dalgası ventrüküle iletilmez.
- QRS kompleksinin olmadığı yerden önceki ve sonraki PR aralıkları sabitse tip 2 AV bloktan bahsedilir



- **Üçüncü derece AV blok**
- Atriyumdan çıkan uyarılar ventrüküle geçmez.
- Atriyum ve ventrüküller birbirinden bağımsız çalışır
- PP mesafeleri kendi içinde eşit RR mesafeleri kendi içinde eşittir

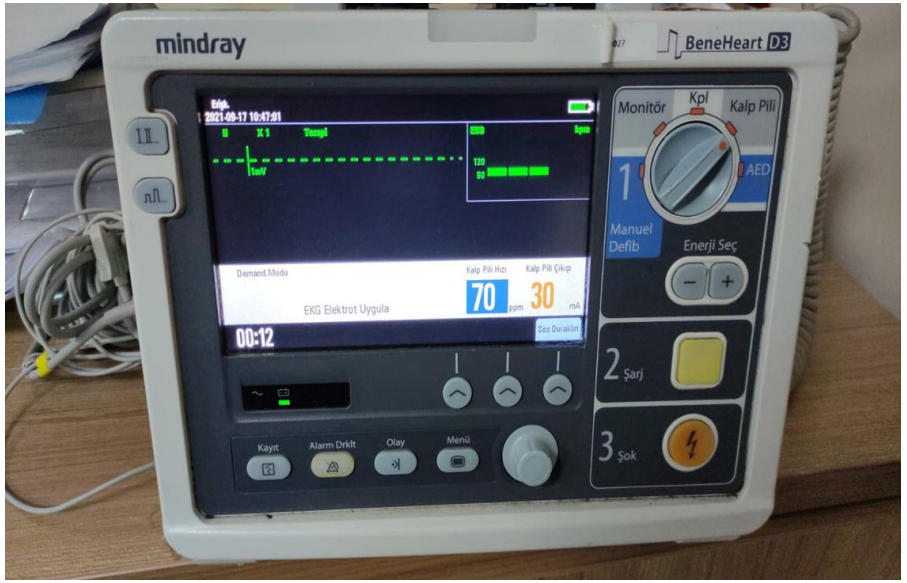


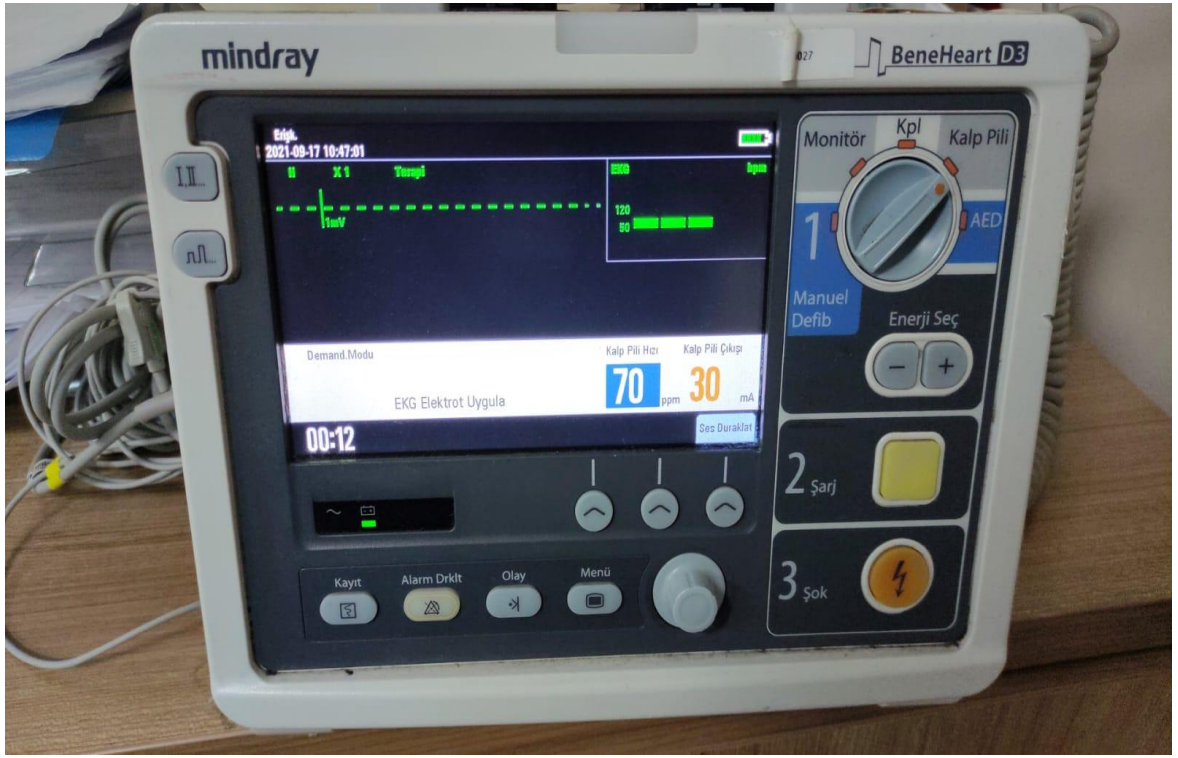
Stabil hasta

Bradidisritmi

- Atropin (0.5-1 mg) (max 3mg)
- Dopamin (2-20 mcg/kg/dk)
- Epinefrin (2-10 mcg/kg/dk)
- Glucagon (3-10 mg)

Unstabil hasta





1.Sternumun hemen sağ tarafında klavikulanın altına,

2. anterior veya midaksiller çizgide (V5-6) kalbin apeksine lateral olarak yerleştirilir.

Fixed (asenkron)- demand (senkron)? R on T?
Kalp hızı
Şok seviyesi

ATUDER
Acil Tıp Uzmanları Derneği

ATUDER-İKYD
Acil Tıp Uzmanları Derneği
İleri Kardiyak Yaşam Desteği Kursu

Adult Bradycardia Algorithm

Assess appropriateness for clinical condition.
Heart rate typically <50/min if bradyarrhythmia.

↓

Identify and treat underlying cause

- Maintain patent airway; assist breathing as necessary
- Oxygen (if hypoxemic)
- Cardiac monitor to identify rhythm; monitor blood pressure and oximetry
- IV access
- 12-Lead ECG if available; don't delay therapy
- Consider possible hypoxic and toxicologic causes

↓

Persistent bradyarrhythmia causing:

- Hypotension?
- Acutely altered mental status?
- Signs of shock?
- Ischemic chest discomfort?
- Acute heart failure?

No → **Monitor and observe**

Yes ↓

Atropine

If atropine ineffective:

- Transcutaneous pacing
  and/or
- **Dopamine** infusion
  or
- **Epinephrine** infusion

↓

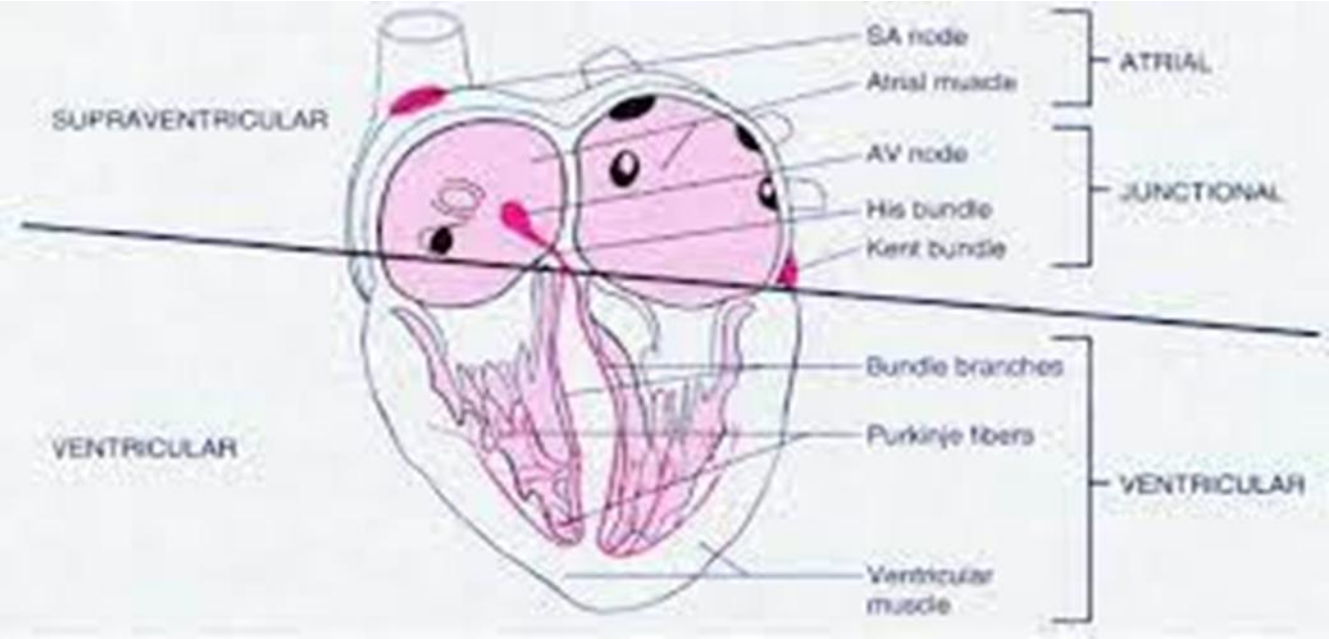
Consider:

- Expert consultation
- Transvenous pacing

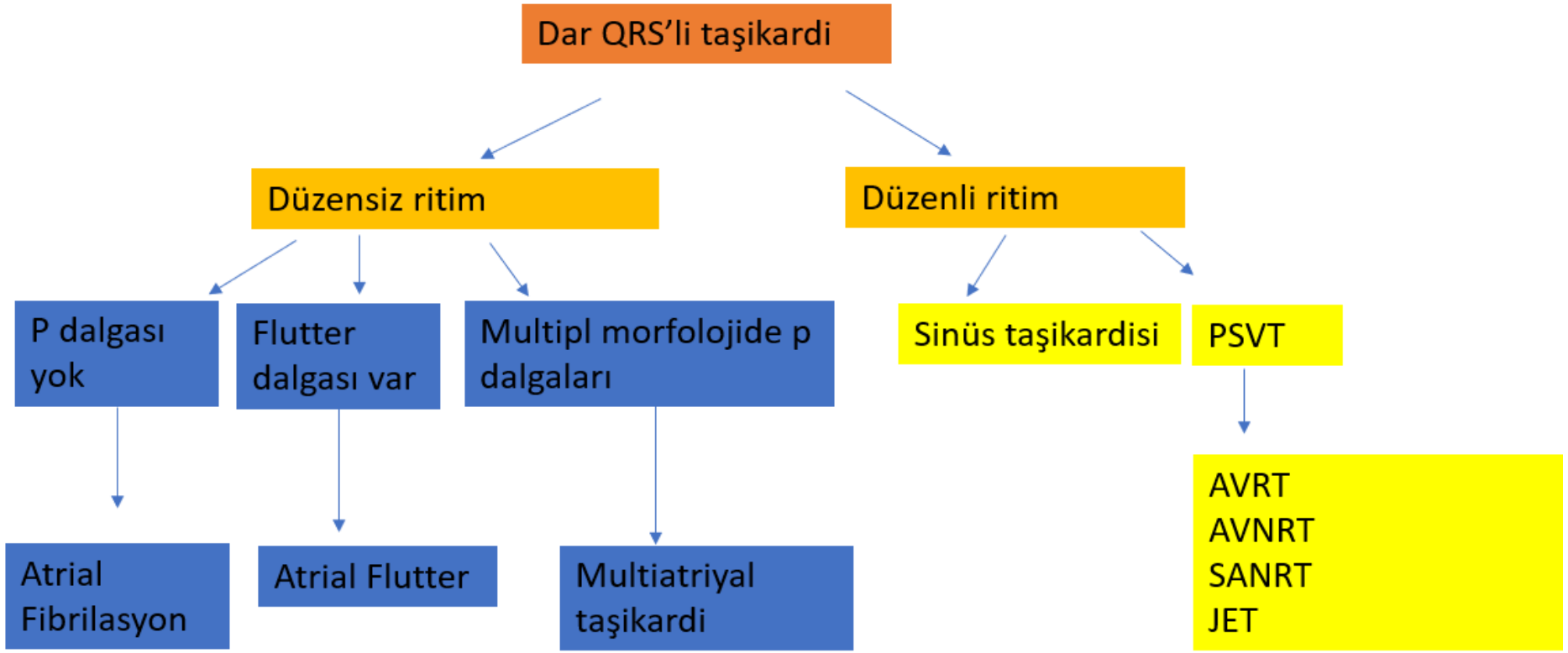
Doses/Details
Atropine IV dose: First dose: 1 mg bolus. Repeat every 3-5 minutes. Maximum: 3 mg. **Dopamine IV infusion:** Usual infusion rate is 5-20 mcg/kg per minute. Titrate to patient response; taper slowly. **Epinephrine IV infusion:** 2-10 mcg per minute infusion. Titrate to patient response. **Causes:** • Myocardial ischemia/ infarction • Drugs/toxicologic (eg, calcium-channel blockers, beta blockers, digoxin) • Hypoxia • Electrolyte abnormality (eg, hyperkalemia)

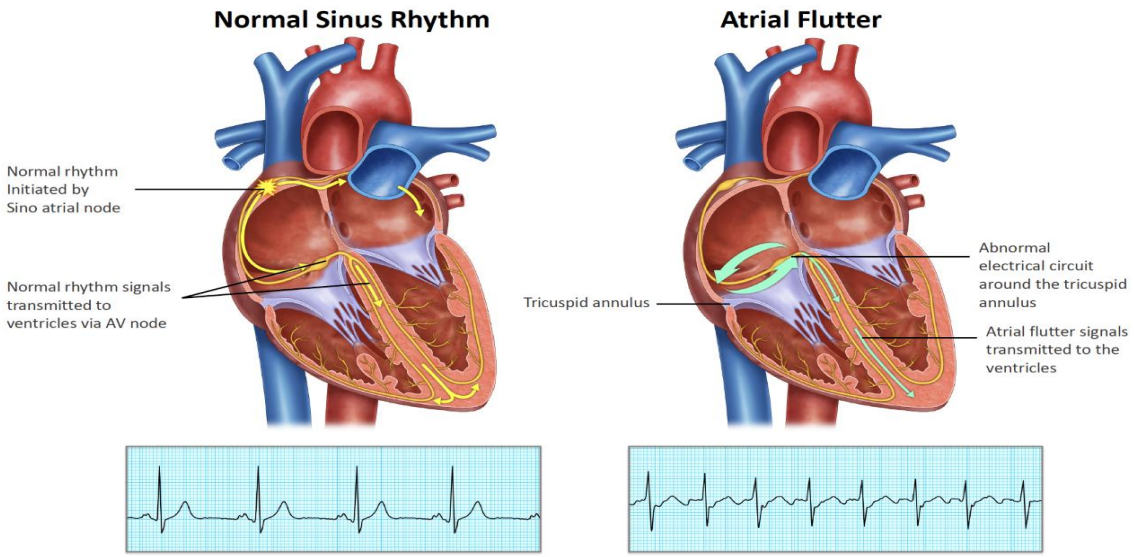
© 2020 American Heart Association

- **Taşidisritmiler(>100 bp/min):**

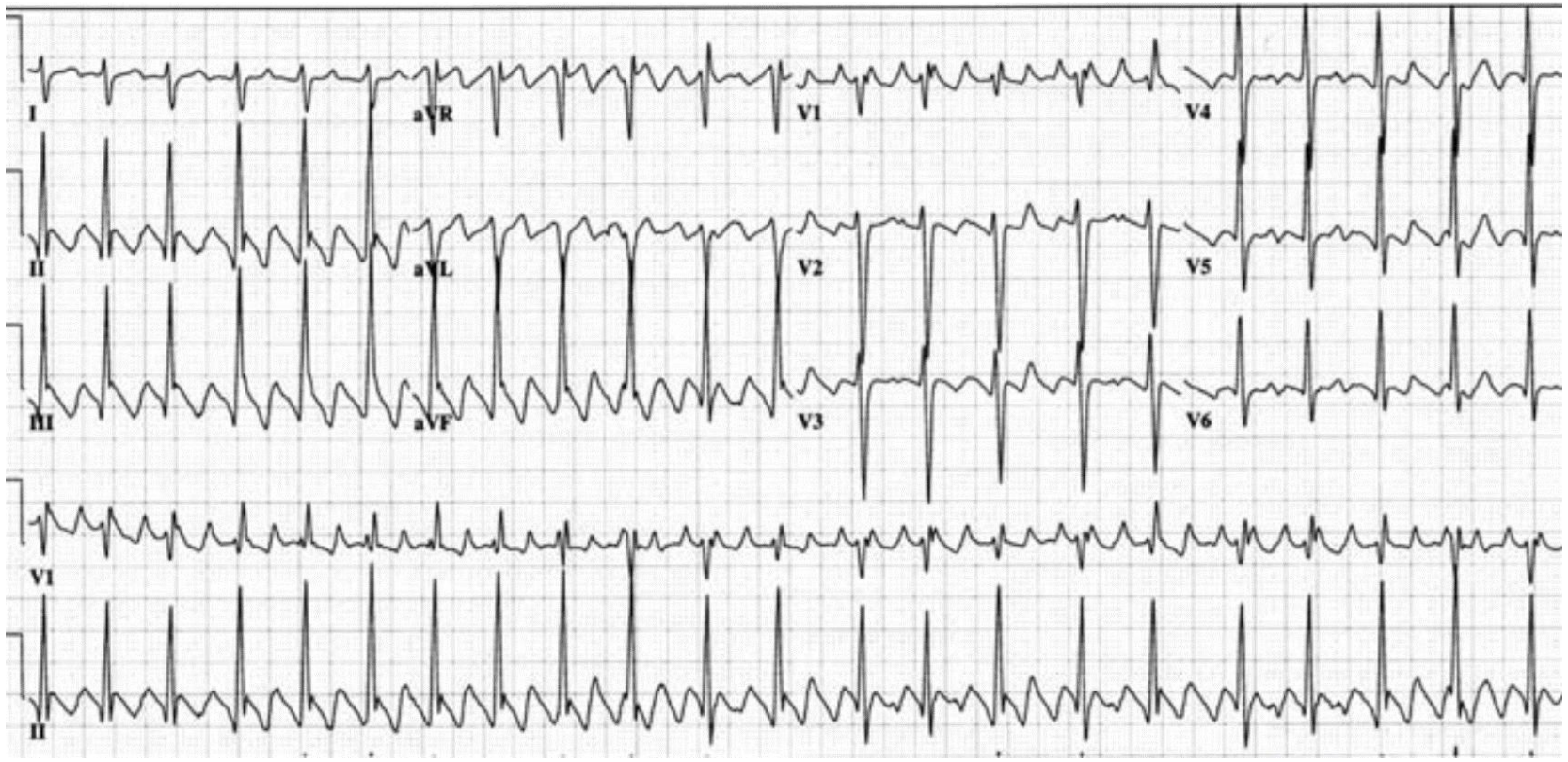


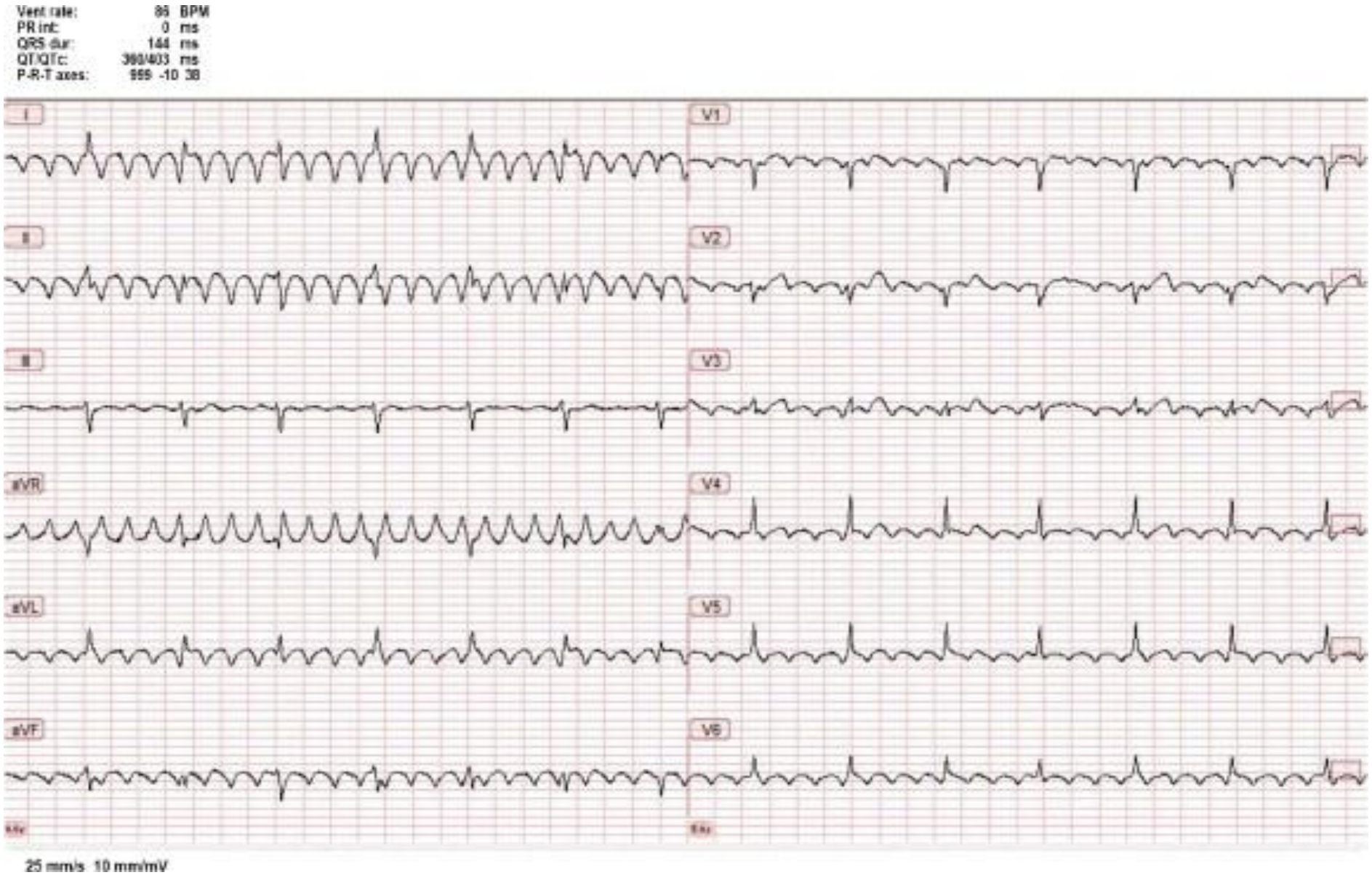
- **Dar QRS (<0.12sn) kompleks taşikardiler**
  - Sinüs taşikardisi
  - Atrial fibrilasyon/flutter
  - Paroksismal supraventriküler taşikardi
  - MAT
  - Atrial taşikardi
- **Geniş QRS (>0.12 sn) kompleks taşikardiler**
  - Ventriküler taşikardi
    - Monomorfik
    - Polimorfik
  - Aberran iletili SVT
  - WPW

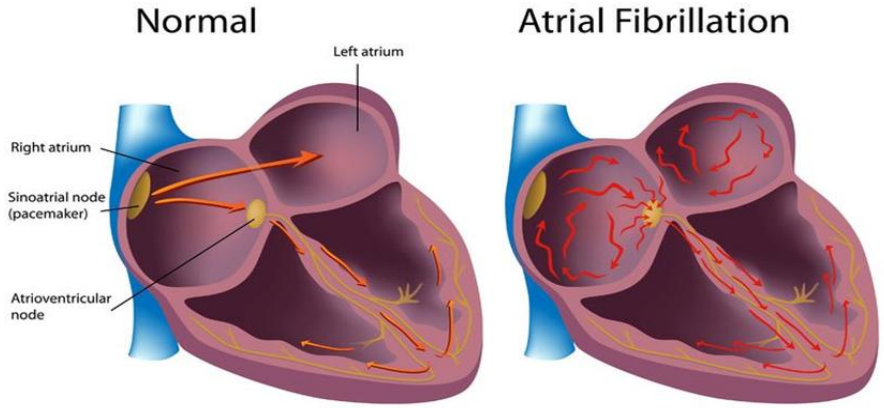

Dar QRS'li taşikardi
Düzensiz ritim
Düzenli ritim
P dalgası yok
Flutter dalgası var
Multipl morfolojide p dalgaları
Sinüs taşikardisi
PSVT
Atrial Fibrilasyon
Atrial Flutter
Multiatriyal taşikardi
AVRT
AVNRT
SANRT
JET



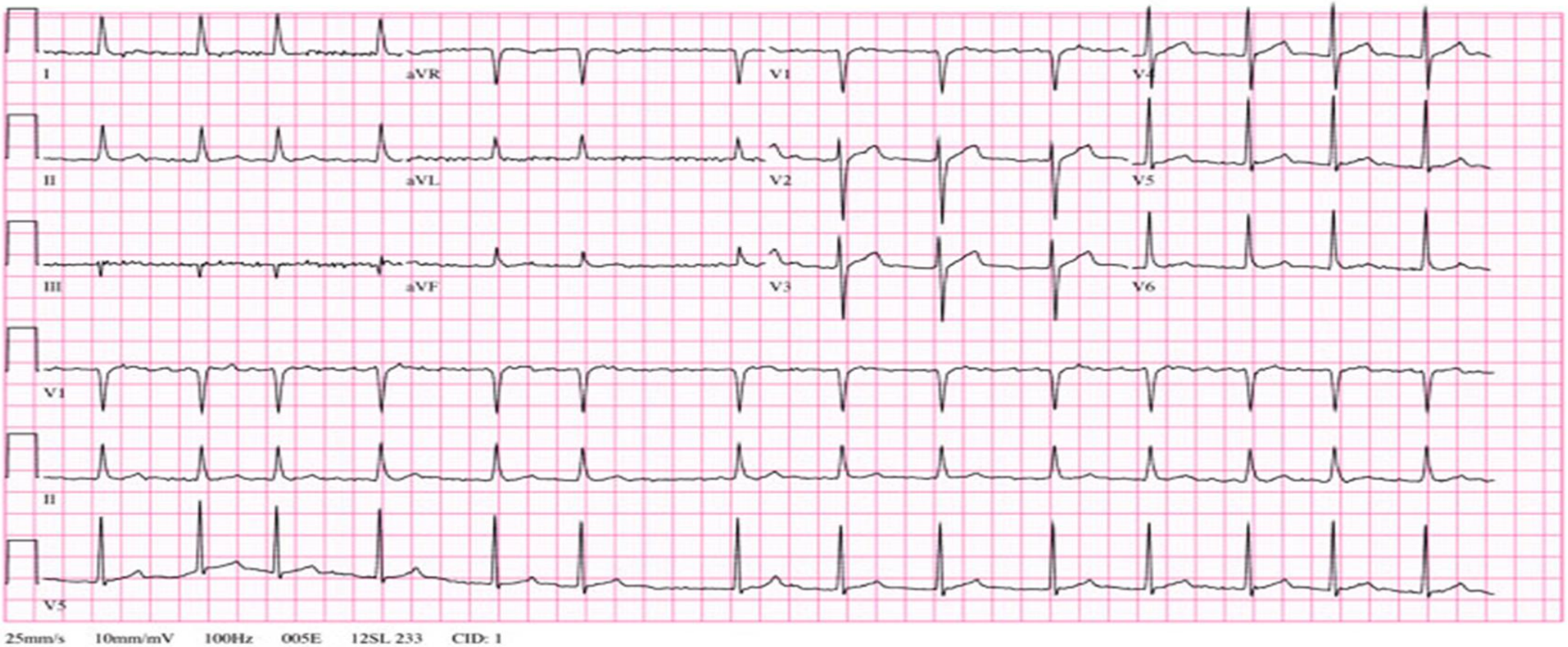
- **Atrial Flutter:**
- Atrial hız 250-350 vuru/dk
- Düzenli düzensizlik
- F dalgaları

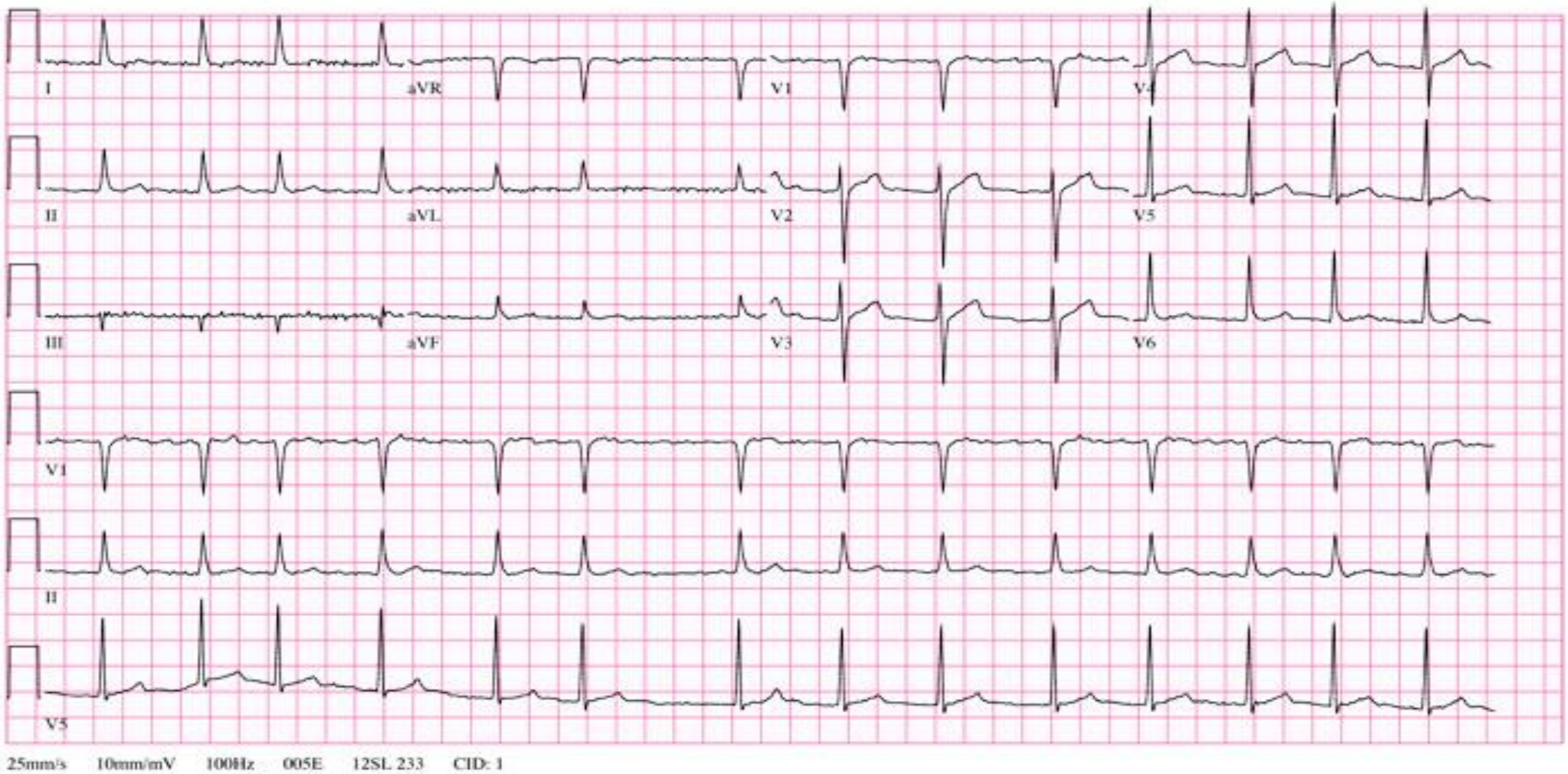


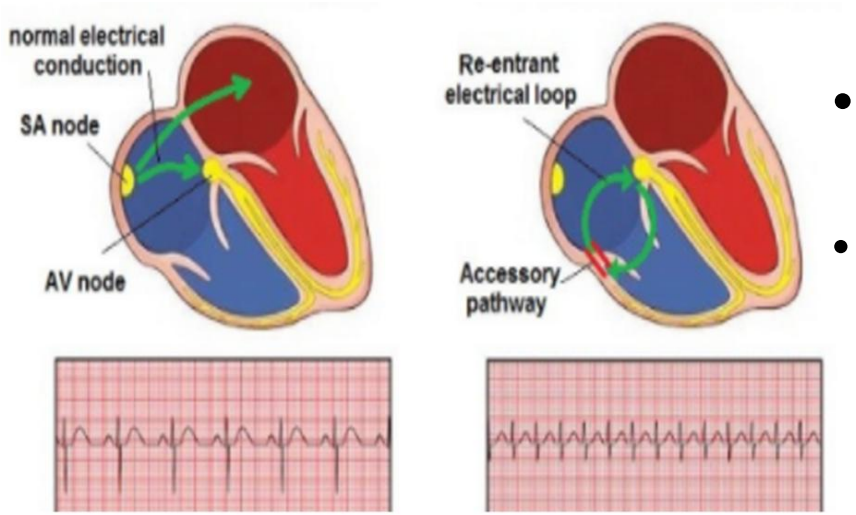

Vent rate: 86 BPM
PR int: 0 ms
QRS dur: 144 ms
QT/QTc: 360/403 ms
P-R-T axes: 999 -10 38
I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6
25 mm/s 10 mm/mV



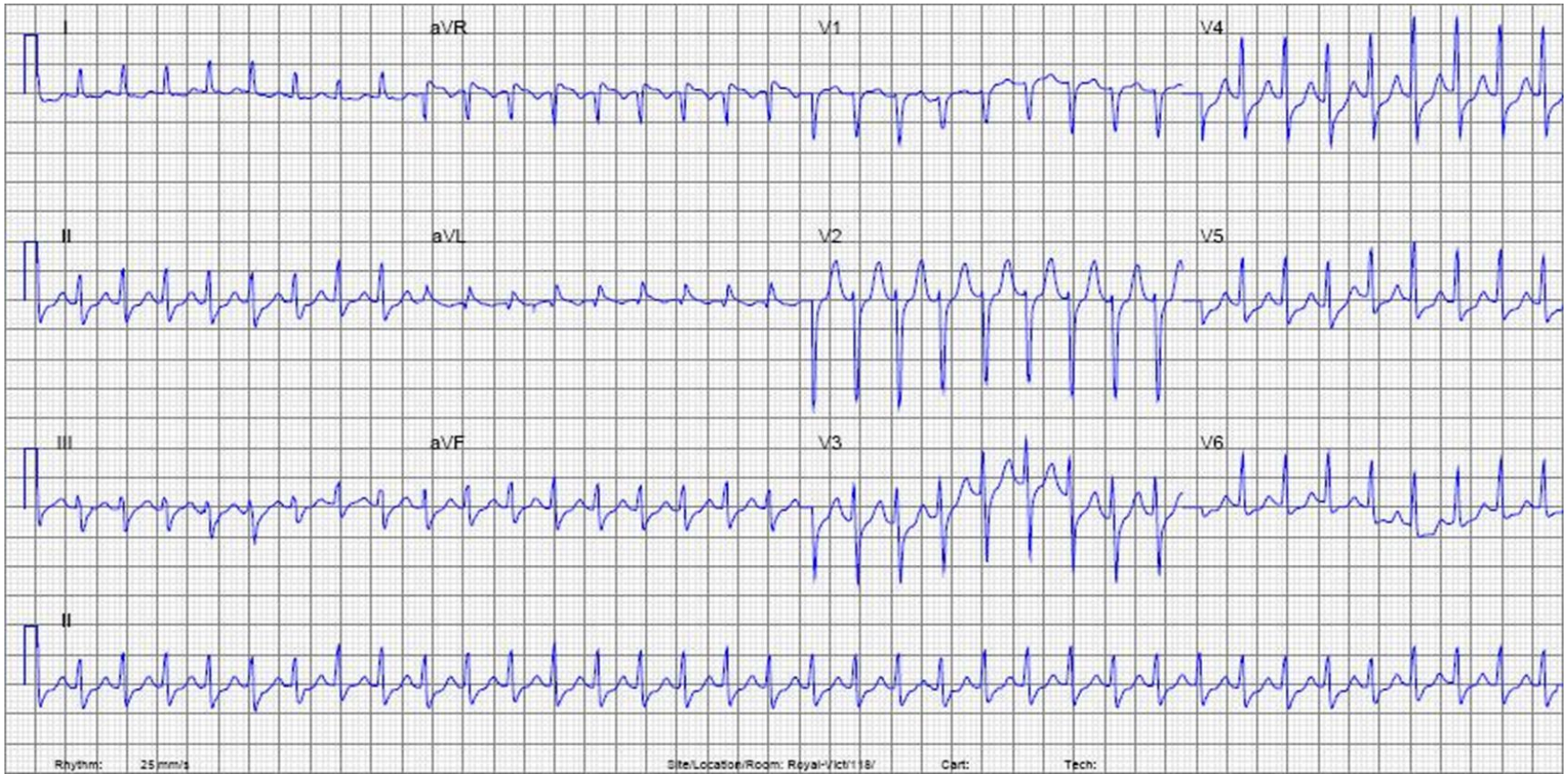
- **Atrial Fibrilasyon:**
- Ektopik bir çok odaktan hızlı, düzensiz ve kaotik bir atım
- Atrial hız 400 vuru/dk
- Ritim düzensiz(R-R mesafesi eşit değil)




I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
V1
II
V5
25mm/s 10mm/mV 100Hz 005E 12SL 233 CID: 1



- **Paroksismal supraventriküler taşikardi:**
- EKG'de
  - P dalgası görülmez,
  - 150-250 vuru/dk
  - R-R mesafesi eşit



- Vagal manevralar
- Adenozin
- KKB
- Beta Bloker
- Kardiyoversiyon

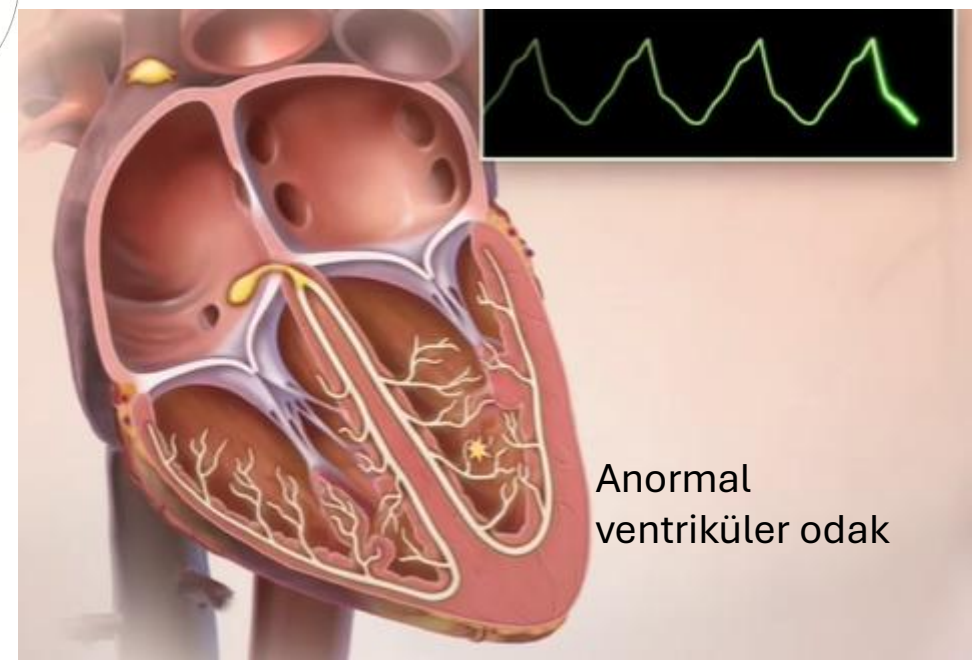
Geniş QRS kompleks taşikardiler

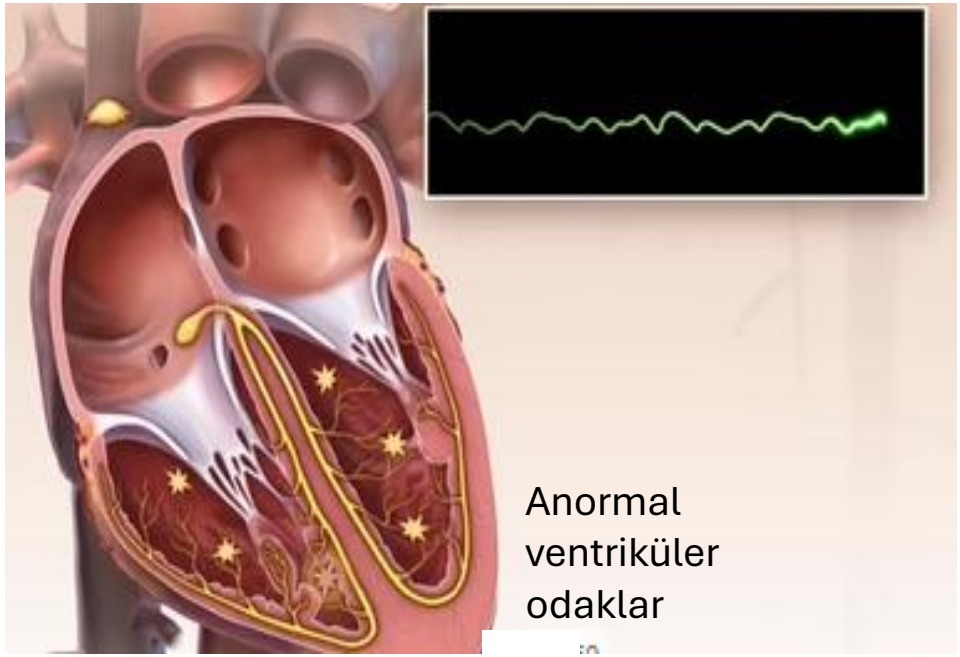
Ritim düzenli

Monomorfik ventriküler taşikardi
Aberran iletili supraventriküler taşikardi
Dal bloklu supraventriküler taşikardi
Aberran iletili atrial flutter
Hızlanmış pace ritmi

Ritim düzensiz

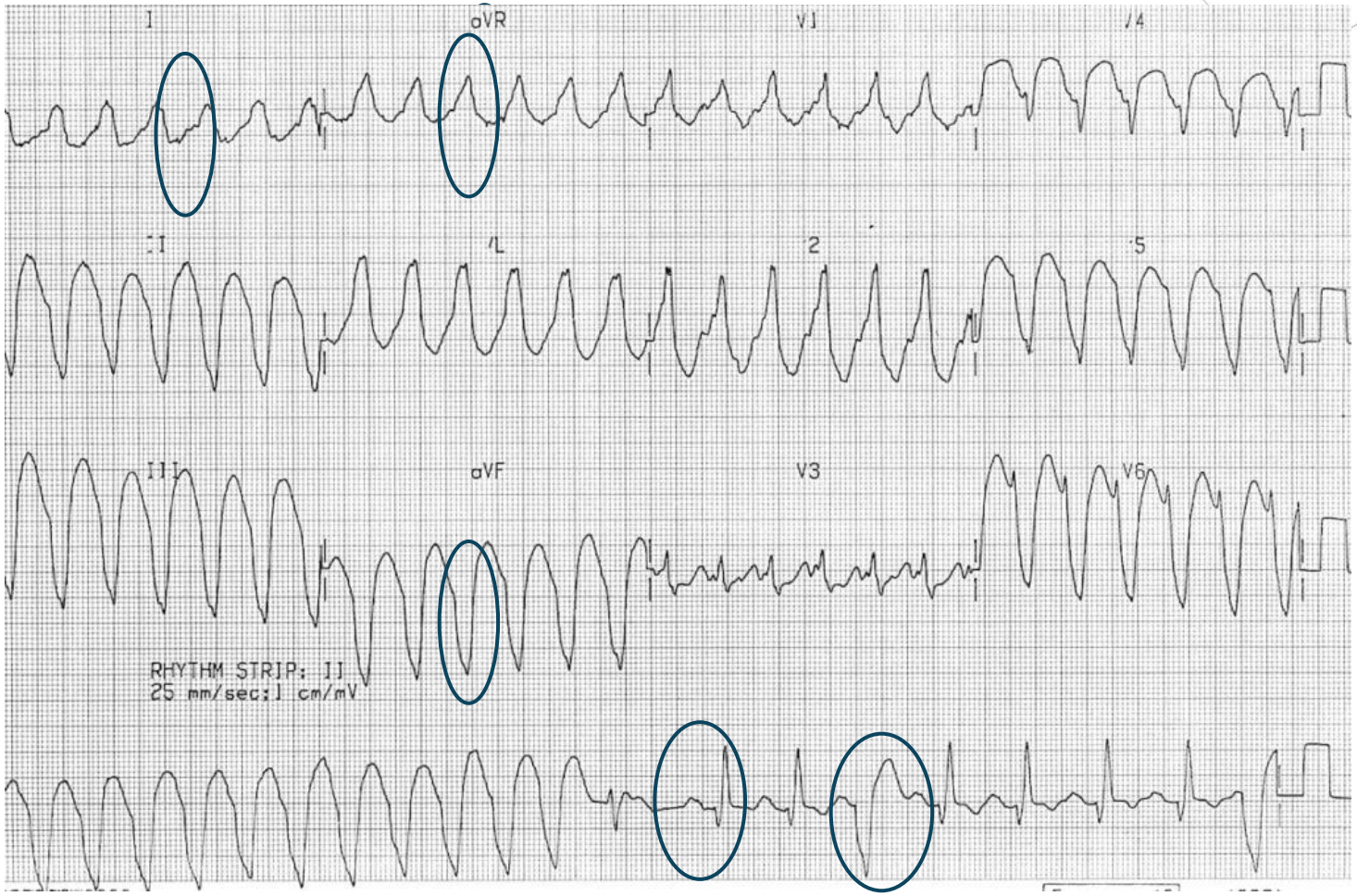
Ventriküler fibrilasyon
Torso de pointes
Aberran iletili atrial fibilasyon
WPW sendromunda AF
Dal bloklu hızlı ventriküler yanıtlı AF

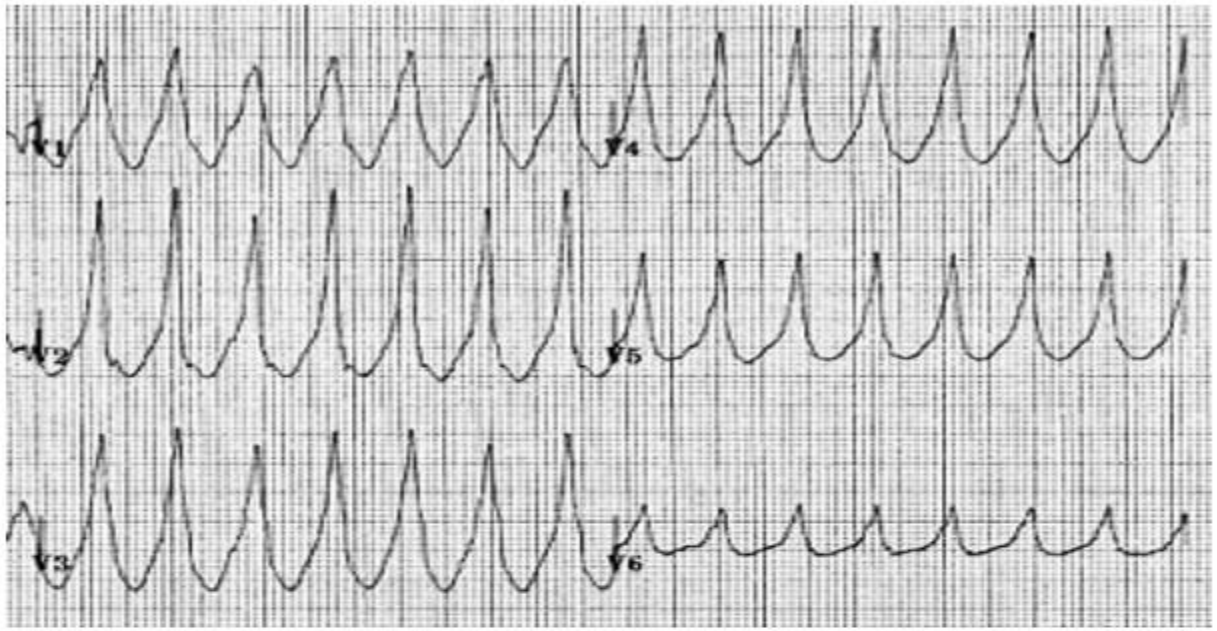


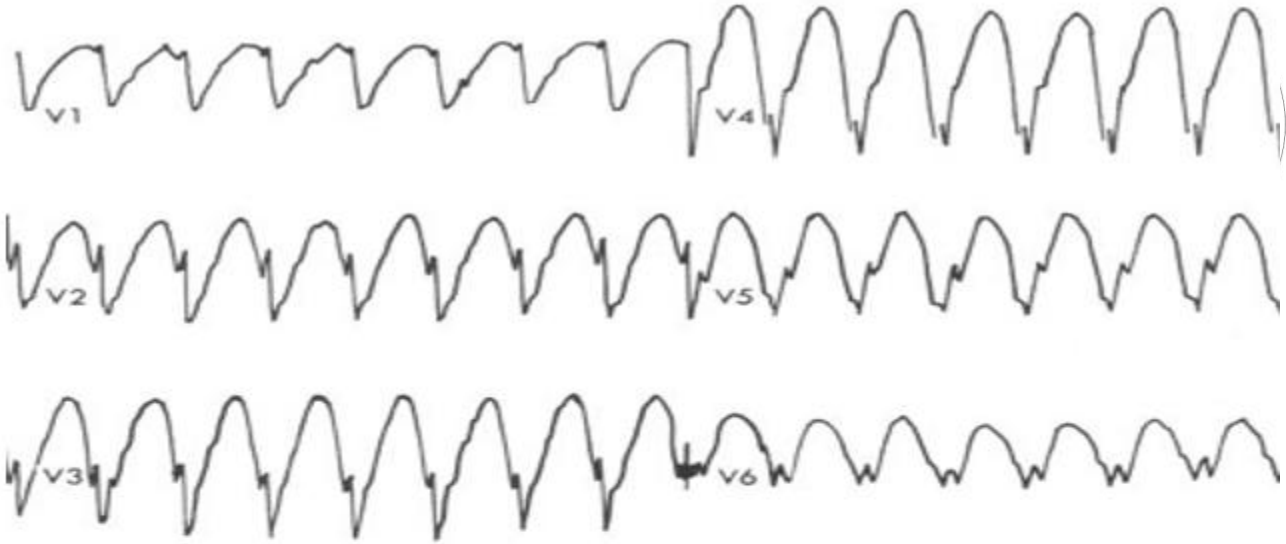


- **Ventriküler taşikardi:**
- Monomorfik?
- Polimorfik?

- **Ventriküler taşikardi:**
- Tipik sağ dal bloğu veya sol dal bloğu morfolojisi yokluğu,
- Aşırı aks sapması (“kuzeybatı aksı”) – QRS AVR’de pozitif ve DI + AVF’de negatif,
- Çok geniş QRS (> 160 ms),
- AV disosiasyon (farklı hızlarda P ve QRS kompleksleri),
- Fusion ve capture atımları,
- V1-6 tamamında pozitif veya negatif QRS,
- V1'de yüksek monophasic R dalgası ve V6'da rS kompleksi (küçük R dalgası, büyük S dalgası)

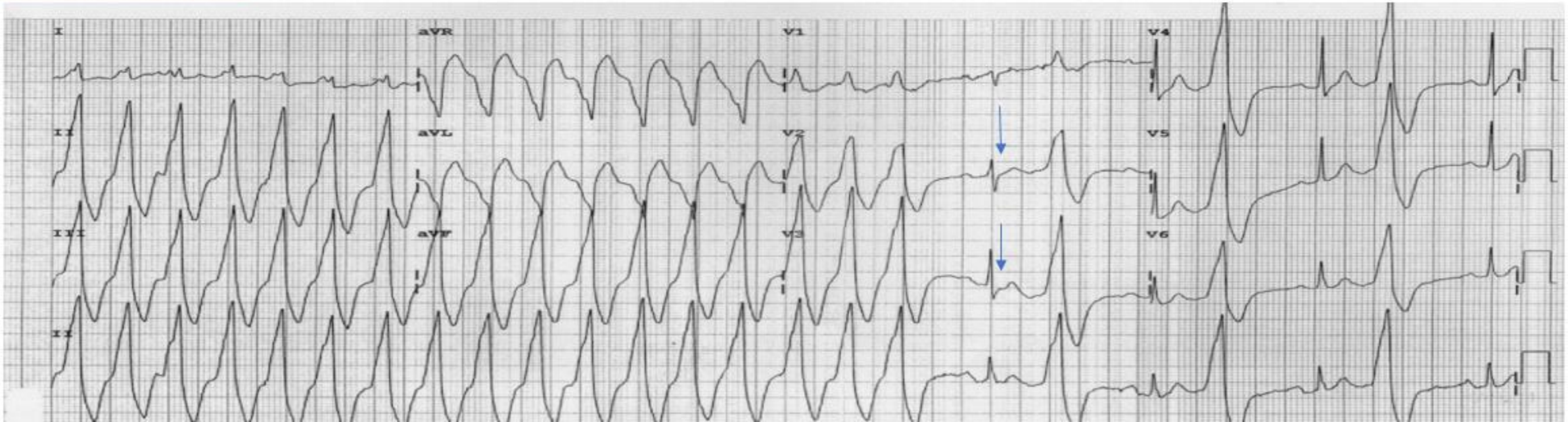






- Göğüs derivasyonlarında pozitif konkordans

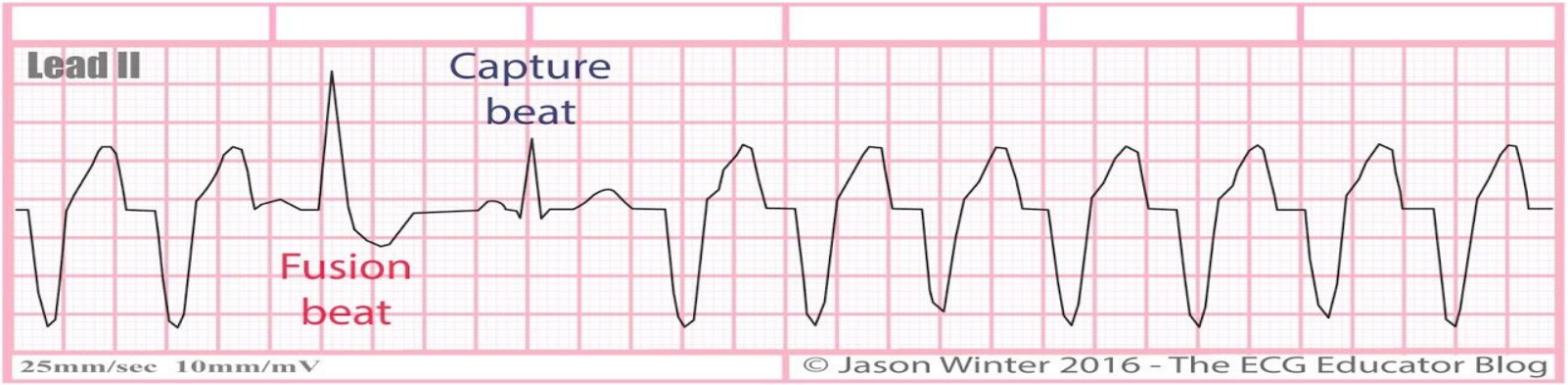
- Negatif konkordans



- **Fuzyon atımı:** Sinüs/ supraventriküler ve ventriküler atım aynı anda: hibrid QRS

- **Capture atımı:** SA ventriküler uyarıyı bir noktada yakalar: normal QRS

Ventricular Tachycardia with Fusion and Capture beats



A **fusion beat - Dressler beat** occurs when sinus and ventricular electrical impulses coincides at the same time to produce a hybrid complex/beat. If it acts upon the ventricular chambers it is called a ventricular fusion beat.

A **capture beat** occurs from the production of a ventricular complex by a supraventricular source in the cardiac cycle after atrioventricular (AV) dissociation, for the atria to regain control of the ventricles.

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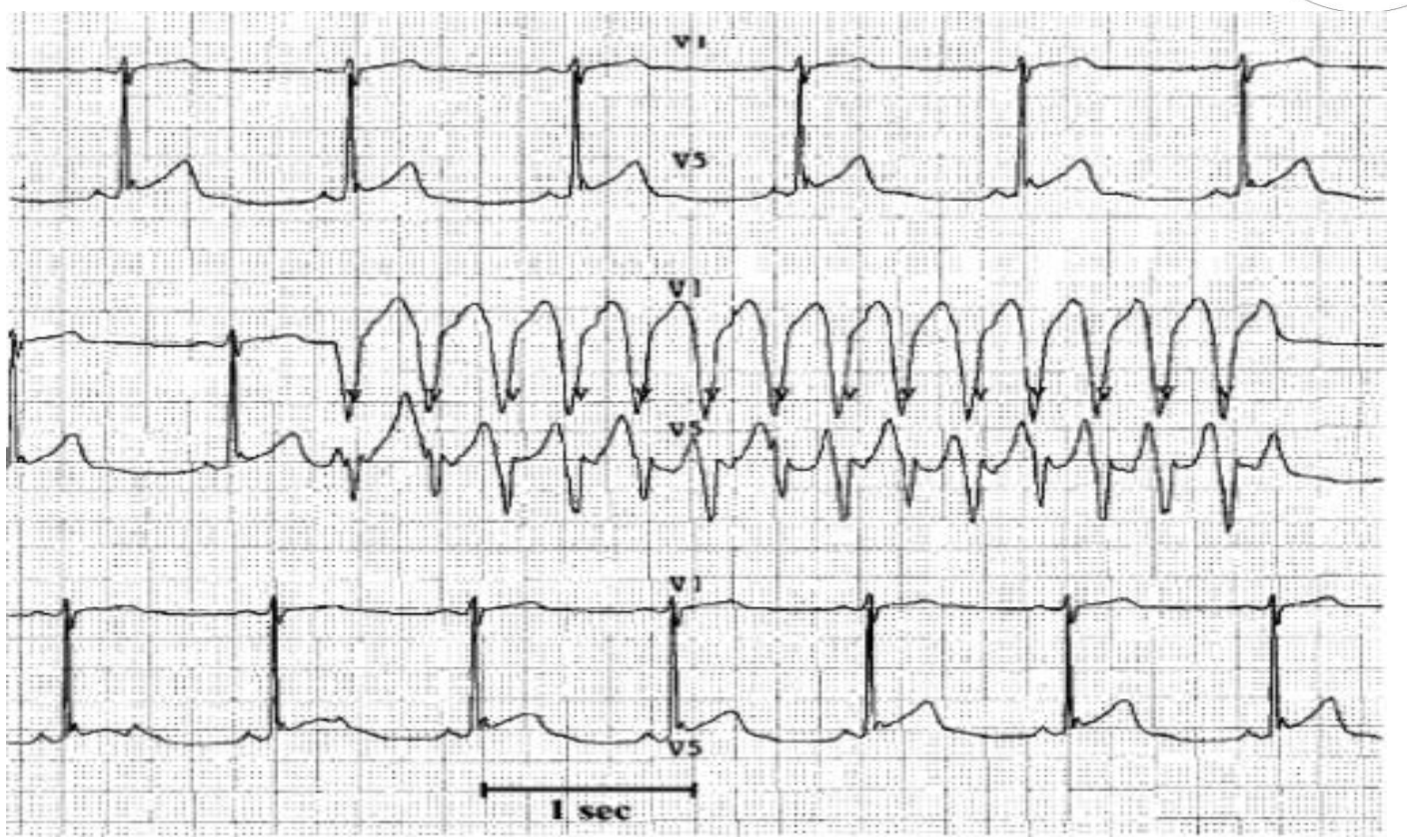
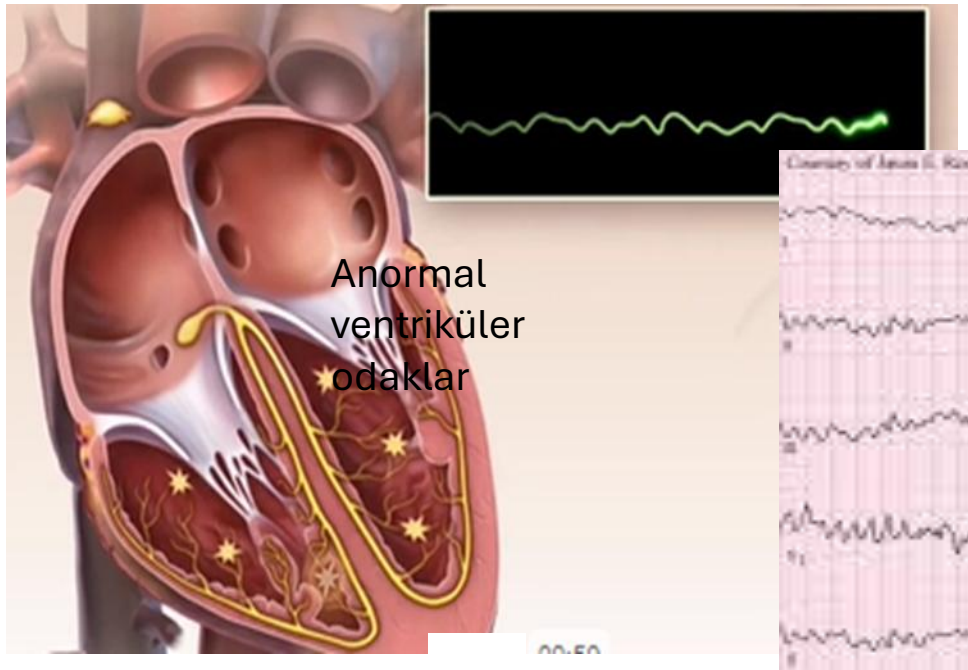
- Sustained vt
  - 30 sn den uzun
- Non-sustained vt
  - 3 ya da daha fazla ardışık ventriküler atım 30 snden kısa





- **Ventriküler fibrilasyon:**
- Ventrikül myokardı kasılamaz, organize olmayan kaotik bir biçimde titreşir
- Ritim genelde PVC veya VT tarafından tetiklenir
- Defibrilasyon

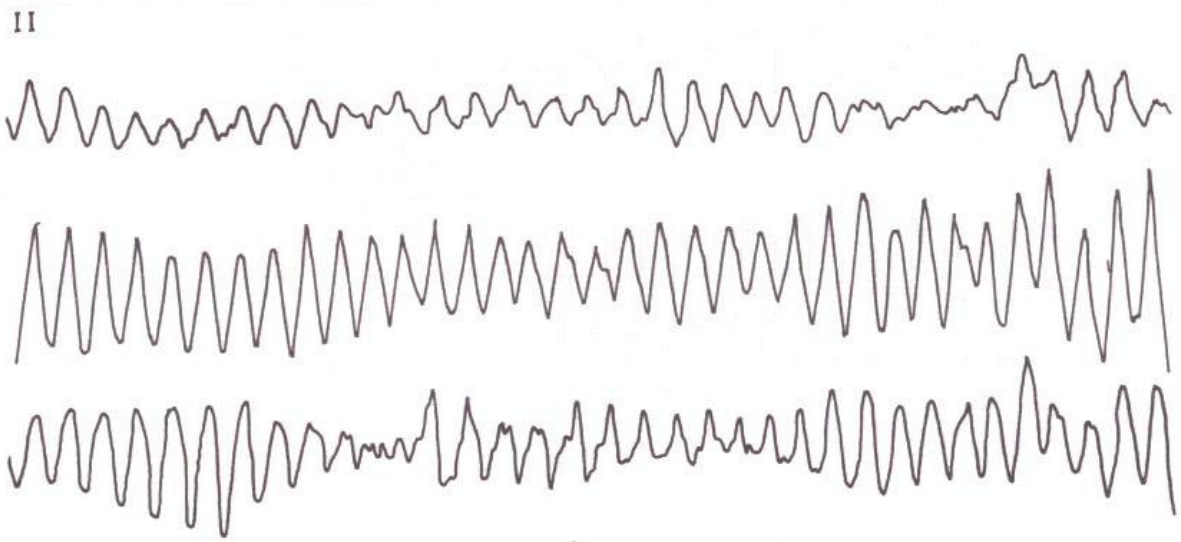
Torsades de pointes

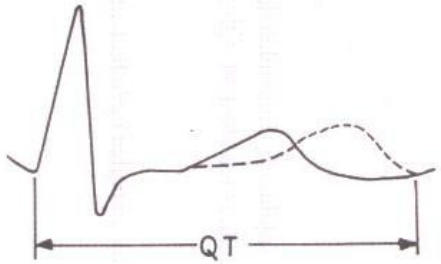
QRS kompleksinin aksı taşikardi esnasında değişkendir

Acil servise arrest olarak gelebilir

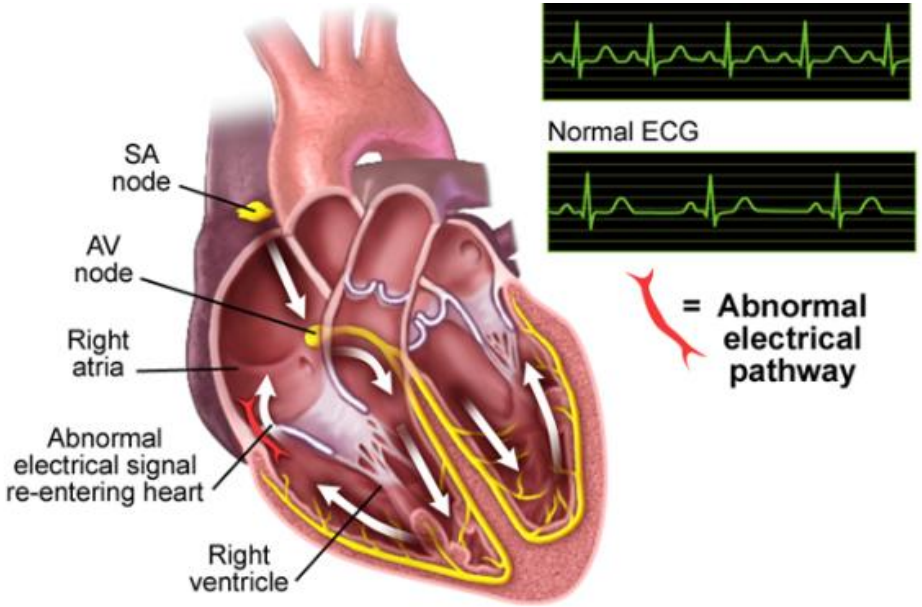
Genellikle uzun QT ile ilişkilidir

Tedavide Mg 1-2 gr

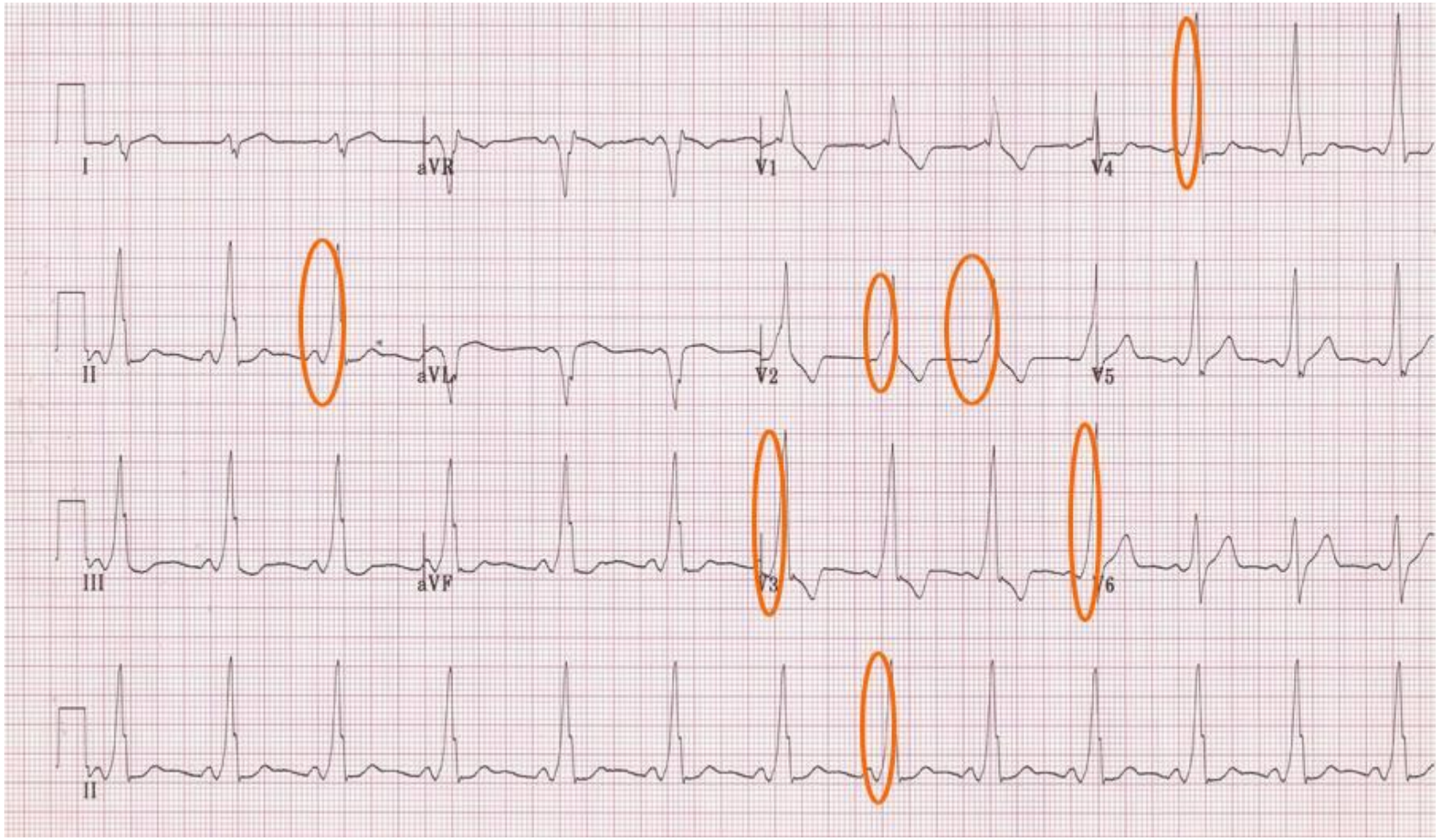




- **Wolf Parkinson White:**
- Özelikle AV nodu bypas eden aksesuar yolaklar mevcut.
- Kısa PR <0.12,
- Delta dalgası,
- Geniş QRS,
- QRS ile diskordans T,
- Senkop, çarpıntı, SVT, AF, ani kardiyak ölüm



- Kısa PR,
- Delta dalgası,
- AF oluşursa:
  - AV nodu tam bloke edecek ajanlar
  - **A** (Adenozin, Amiodoron)
  - **B**(B- bloker)
  - **C** (Ca kanal bloker),
  - **D**(Digoksin),
  - **L** (Lidokain) kontrendike
- Prokainamid, ibutilid
- Kardiyoversiyon,
- Pace kullanımı



Stabil hasta

Taşidisritmi

- Adenozin
- Verapamil
- Diltiazem
- Esmolol
- Metoprolol
- Prokainamid
- Amiodarone
- Lidokain
- Magnezyum sülfat
- İbutilid
- Propafenon

DANGER
Do not use defibrillator in the presence of flammable agents or concentrated oxygen.
Defibrillator must only be operated by trained and qualified medical personnel. Do not touch patient during defibrillation.
NIHON K
ActiBiphasic
cardiolife
PADDLE
10:46
0J
DISARM
AED
MONITOR
SETUP
BASIC CHECK
OFF
MIC
SYNC
CHARGE
AED
DAHİLİ RES 2

- Kardiyoversiyon da defibrilasyon da defibrilatör ile yapılır.
- Kardiyoversiyon işleminde defibrilatör (genelde tüm defibrilatörlerin senkronize kardiyoversiyon yapma özelliği de mevcuttur) R dalgalarını takip eder, analiz eder ve R dalgasının geldiği anda akımı hastaya verir.
- R dalgasına senkronize edilmesinin sebebi hastada şiddetli kısır bir döngü "reentry" mekanizması olmasıdır.
- Bu döngüyü bozmak için kalp üzerinden belli bir miktar akım geçirmek gerekmektedir.
- Bu akım kesinlikle T dalgası üzerine verilmez eğer verilirse hastanın VF"ye girme ihtimali artar.

ENERJİ DÜZEYLERİ

- Defibrilasyon pediatrik hasta:
  - İlk doz 2 j/kg
  - 2. şoklama 4 j/kg
  - Sonraki şoklar ≥4 j/kg(maks 10 j/kg veya yetişkin dozu
- Kardiyoversiyon pediatrik hasta:
  - 0.5-1 j/kg ile başla,
  - Etkin olmaz ise 2 j/kg

ENERJİ DÜZEYLERİ

- Defibrilasyon Yetişkin hasta:
  - Bifazik: Üretici önerisi (genellikle 10-200 j) bilinmiyorsa maks enerji düzeyi
  - Eğer şok başarısız olursa: Enerji 200–360 J arasında kademeli artırılabilir
  - Monofazik:360 j (Ama öncelik bifaziklerde)
  - Sonraki şoklar ≥4 j/kg(maks 10 j/kg veya yetişkin dozu
- Kardiyoversiyon erişkin hasta:
  - AF ve flutter 200 j
  - Dar kompleksli taşikardi 100 j
  - Monomorfik VT:100 j

Tachycardia
With serious signs and symptoms caused by the tachycardia

↓

If ventricular rate is >150/min, prepare for **immediate cardioversion**. May give brief trial of medications based on specific arrhythmias. Immediate cardioversion is generally not needed if heart rate is ≤150/min.

↓

Have available at bedside
- Oxygen saturation monitor
- Suction device
- IV line
- Intubation equipment

↓

Sedate whenever feasible*

↓

Synchronized cardioversion†‡
Atrial fibrillation: 200 J
Atrial flutter: 200 J
Narrow-complex tachycardia: 100 J
Monomorphic VT: 100 J
Polymorphic VT: unsynchronized, high-energy shock (defibrillation)

Notes

*Effective regimens have included a sedative **(eg, diazepam)** with or without an analgesic agent **(eg, fentanyl)**. Many experts recommend anesthesia if service is readily available.
†Note possible need to resynchronize after each cardioversion.
‡If delays in synchronization occur and clinical condition is critical, go immediately to unsynchronized shocks.

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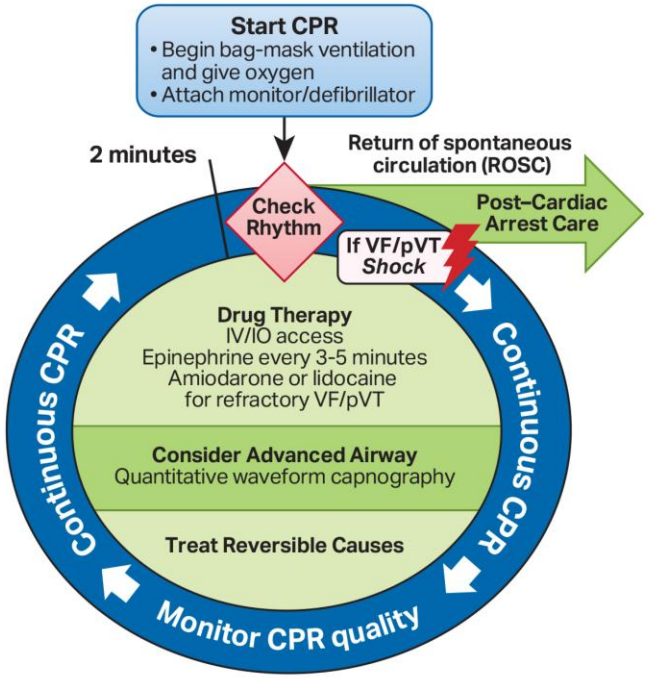

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High-Quality CPR

- Push hard (at least 2 inches [5 cm]).
- Push fast (100-120/min) and allow complete chest recoil.
- Minimize interruptions in compressions.
- Avoid excessive ventilation.
- Change compressor every 2 minutes, or sooner if fatigued.
- If no advanced airway, 30:2 compression-ventilation ratio.
- If advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions.
- Continuous waveform capnography
  – If $ETCO_2$ is low or decreasing, reassess CPR quality.

Shock Energy for Defibrillation

- **Biphasic:** Manufacturer recommendation (eg, initial dose of 120-200 J); if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered.
- **Monophasic:** 360 J

Drug Therapy

- **Epinephrine IV/IO dose:** 1 mg every 3-5 minutes
- **Amiodarone IV/IO dose:** First dose: 300 mg bolus. Second dose: 150 mg.
  or
- **Lidocaine IV/IO dose:** First dose: 1-1.5 mg/kg. Second dose: 0.5-0.75 mg/kg.

Advanced Airway

- ET intubation or supraglottic advanced airway
- Continuous waveform capnography or capnometry to confirm and monitor ET tube placement
- Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions

Reversible Causes

- **H**ypovolemia
- **H**ypoxia
- **H**ydrogen ion (acidosis)
- **H**ypo-/hyperkalemia
- **H**ypothermia
- **T**ension pneumothorax
- **T**amponade, cardiac
- **T**oxins
- **T**hrombosis, pulmonary
- **T**hrombosis, coronary

TEŞEKKÜRLER