‘Tanısı Zor’ Ölümcül Ritimler

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PLAN

1) PSEUDO PEA
2) GENİŞ QRS TAŞİKARDİLERDE VT-SVT AYRIMI=YENİ ALGORİTMA
3) VAKA SUNUMLARI

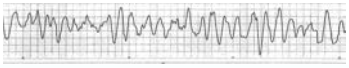
Ölümcül ritimler

- Asistoli
- Nabızsız Elektriksel Aktivite (PEA)
- Ventriküler Fibrilasyon
- Nabızsız Ventriküler Taşikardi

Disorganize Ritimler

- Asistoli

- Ventriküler Fibrilasyon



Organize Ritimler

- Nabızsız Elektriksel Aktivite

- Nabızsız Ventriküler Taşikardi

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European Resuscitation Council Guidelines for Resuscitation 2010
Section 4. Adult advanced life support

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Non-shockable rhythms (PEA and asystole)

Pulseless electrical activity (PEA) is defined as cardiac arrest in the presence of electrical activity that would normally be associated with a palpable pulse. These patients often have some mechanical myocardial contractions, but these are too weak to produce a detectable pulse or blood pressure—this sometimes described as ‘pseudo-PEA’ (see below). PEA is often caused by reversible con-

Pseudo PEA-Tanım

- Kan akımı sağlayan kardiyak kontraksiyon +
- Kan akımının ve basıncının basit bir şekilde elle tespit edilemiyor

Focused echocardiography (FE) ile

'pseudoPEA' – 'PEA' ayrımının yapılması ve

mortaliteye etkisi

Prosen G et al. J Int Med Res. 2010;38(4):1458-67.

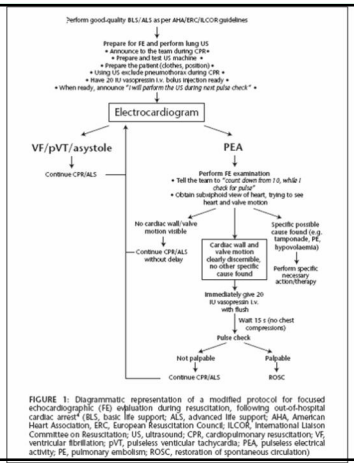

FIGURE 1: Diagrammatic representation of a modified protocol for focused echocardiographic (FE) evaluation during resuscitation, following out-of-hospital cardiac arrest[a] (BLS, basic life support; ALS, advanced life support; AHA, American Heart Association; ERC, European Resuscitation Council; ILCOR, International Liaison Committee on Resuscitation; US, ultrasound; CPR, cardiopulmonary resuscitation; VF, ventricular fibrillation; pVT, pulseless ventricular tachycardia; PEA, pulseless electrical activity; PE, pulmonary embolism; ROSC, restoration of spontaneous circulation)

TABLE 1:
Demographic and clinical characteristics of a study group with pseudo-pulseless electrical activity (pseudo-PEA) and an historical group with pulseless electrical activity (PEA) following out-of-hospital cardiac arrest

Characteristic	Pseudo-PEA study group (n = 16)	PEA historical group (n = 48)	Statistical significance
Age (years), mean ± SD	59 ± 11	65 ± 13	P = 0.044[a]
Gender, n (%)			
Male	12 (75)	32 (67)	NS[b]
Female	4 (25)	16 (33)	NS[b]
Cardiac arrest in urban area, n (%)	13 (81)	37 (77)	NS[b]
Witnessed arrest, n (%)	16 (100)	46 (96)	NS[b]
Bystander CPR, n (%)	8 (50)	28 (58)	NS[b]
Time from call to start of CPR (min), mean ± SD	5 ± 2	6 ± 3	NS[a]
Cardiovascular aetiology of cardiac arrest, n (%)	14 (88)	42 (88)	NS[b]
Initial cardiac rhythm, n (%)			
VF/pVT	8 (50)	21 (44)	NS[b]
PEA	2 (12)	4 (8)	NS[b]
Asystole	6 (38)	23 (48)	NS[b]
Duration of CPR (min), mean ± SD	19 ± 11	31 ± 13	P = 0.003[a]
Drugs given, mean ± SD			
Adrenaline, mg	3.5 ± 2.6	6.0 ± 3.2	P = 0.009[a]
Second vasopressin, IU	21.5 ± 12.8	6.7 ± 12.7	P = 0.003[a]
$P_{et}CO_2$ (mmHg), mean ± SD			
Initial	29 ± 19	17 ± 9	P = 0.022[a]
1 min	38 ± 21	32 ± 19	NS[a]
5 min	37 ± 11	35 ± 16	NS[a]
10 min	38 ± 8	35 ± 15	NS[a]
15 min	40 ± 12	34 ± 13	NS[a]
20 min	31 ± 7	33 ± 12	NS[a]
Stable with PEA	38 ± 14	30 ± 13	P = 0.037[a]
Difference in $P_{et}CO_2$[c]	2.8 ± 1.0	2.8 ± 1.3	NS[a]

Prosen G et al. J Int Med Res. 2010;38(4):1458-67.

TABLE 2:
Resuscitation outcomes in a study group with pseudo-pulseless electrical activity (pseudo-PEA) and an historical group with pulseless electrical activity (PEA) following out-of-hospital cardiac arrest

Outcome	Pseudo-PEA study group (n = 16) n (%)	PEA historical group (n = 48) n (%)	Statistical significance[a] Unadjusted	Statistical significance[a] Adjusted[b]	Odds ratio (95% CI) Unadjusted	Odds ratio (95% CI) Adjusted[b]
Primary						
ICU admission	14 (88)	24 (50)	P = 0.009	P < 0.001	8.6 (1.7 – 36.5)	22.4 (4.2 – 86.9)
Secondary						
ROSC	15 (94)	26 (54)	P = 0.006	P < 0.001	11.3 (2.8 – 48.6)	28.4 (3.9 – 96.1)
Survival at 24 h	13 (81)	20 (42)	P = 0.009	P < 0.001	7.7 (1.5 – 33.8)	19.8 (3.1 – 72.6)
Survival to hospital discharge	9 (56)	7 (15)	P = 0.002	P < 0.001	17.5 (2.4 – 63.7)	31.4 (2.9 – 85.7)
Good neurological outcome (CPC 1–2)	8 (50)	4 (8)	P = 0.001	P < 0.001	29.8 (2.8 – 82.8)	36.4 (4.8 – 115.4)

[a]Analysed using the Wald test.
[b]Adjusted by covariates with known predictive value (age, male sex, witnessed arrest, time from call to start of cardiopulmonary resuscitation [CPR], bystander CPR, initial rhythm and initial end-tidal partial pressure of carbon dioxide).
CI, confidence interval; CPC, Cerebral Performance Category; ICU, intensive care unit; ROSC, return of spontaneous circulation.

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- Sonuç olarak
  - FE ölümcül ritimlerden PEA'da, pseudo PEA'yı ayırmada kullanılabilir
    - Use of bedside cardiac echosonography has finally enabled diagnostic differentiation between PEA and pseudo-PEA.
    - "CAUSE" Cardiac Arrest Ultra-Sound Exam
      Hernandez C et al. Resuscitation 2007;76:198-206.
    - "FEER" Focused Echocardiographic Evaluation in Resuscitation
      Breitkreutz R *et al. Crit Care Med 2007;35:5.*

2-Geniş QRS Kompleks Taşikardilerde VT-SVT ayrımı

Geniş QRS Taşikardiler

- VT (en sık)
- Aberan iletili SVT

SVT-VT Ayrımı

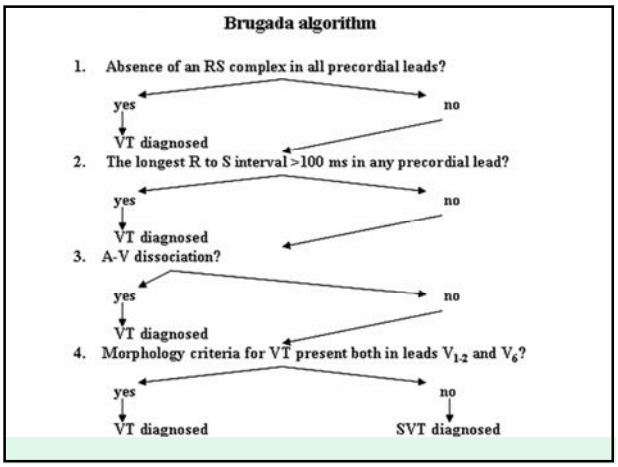
- Spesifik ritmi belirlerken %50'ye varan yanlış karar verme
- Amaç, VT olan hastayı yanlışlıkla SVT olarak değerlendirip 'AV nodal blokaj yapan ajanlar' vererek ölümcül sonuçlar ortaya çıkmasını önlemek

- 'Wellens kriterleri' ve 'Brugada algoritmi'nin sensitivite ve spesifitesi iyi değil
- Ayrımı yapılamayan tüm geniş QRS'li taşikardiler VT gibi tedavi edilmeli !

- Wellen-1978
- Kindmall-1988
- Brugada-1991

Wellen Kriterleri

	Ventriküler Taşikardi	Supraventriküler Taşikardi
Klinik Özellikler	Yaş 50 ve üzeri MI, KKY ve yapısal kalp hst VT öyküsü	Yaş 35 ve altı Hiçbirinin olmaması SVT öyküsü
Fizik Muayene	Cannon A dalgaları Arteryel nabızda değişiklikler S1'de varyasyonlar	Yok Yok Yok
EKG	Füzyon atımları AV disosiasyon QRS>14 ms Aks<-30 Vagal manevralara cevap olmaması	Yok P dalgasını takiben QRS QRS <14 ms Normal aks Vagal manevralara yanıt
Spesifik QRS patern	V1: R, qR, RS V6: S, rS, qR Defleksiyon konkordansı	V1: rSR' V6: qRs



Eski kriterler-dezavantajlar

- EKG kriterlerin tümünün kullanımıyla WCT'lerin ~%90'nında doğruluk
- Komplike
- Acil şartlarında kullanışlı değil

New algorithm using only lead aVR for differential diagnosis of wide QRS complex tachycardia

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Komplike morfolojik kriterleri dahil etmeden algoritmi daha fazla basitleştirmek ve analizi aVR derivasyonuna sınırlamak

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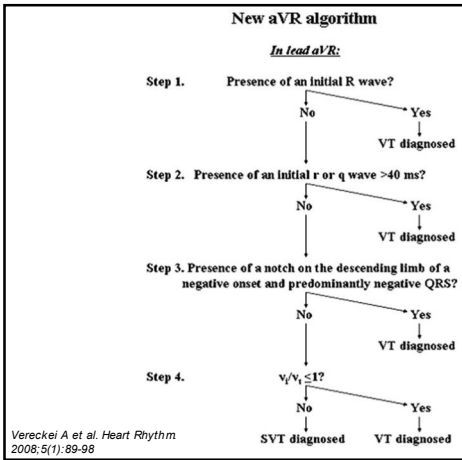

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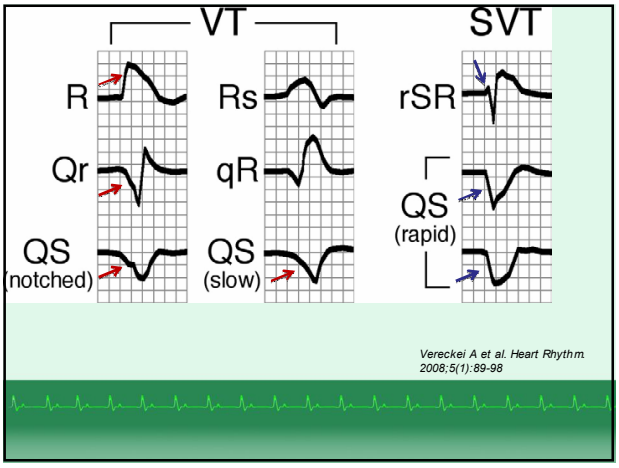

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Table 2 Percentage of correct diagnoses (test accuracy) made by different ECG criteria*,**,***,#,##,###,§§§

Criterion	Correct diagnosis
First new aVR algorithm criterion (initial R wave)	144/146 [98.6§ (96.7–100.5)]
Second new aVR algorithm criterion (r or q wave >40 ms)	65/74 [87.8 (80.4–95.3)]
Third new aVR algorithm criterion (notch)	32/37 [86.5 (75.5–97.5)]
Fourth new aVR algorithm criterion (v_6/v_1)	201/225 [89.3§§ (85.3–93.4)]
New aVR algorithm, all criteria	441/482 [91.5 (89–94)]
First criterion of our previous algorithm (AV dissociation)	43/43 [100 (100–100)]
Second criterion of our previous algorithm (initial R wave in aVR)	130/133 [97.7#,♣ (95.2–100.3)]
Third criterion of our previous algorithm (bundle branch block, fascicular block criterion)	145/162 [89.5 (84.8–94.2)]
Fourth criterion of our previous algorithm (v_6/v_1)	120/145 [82.8§ (76.6–88.9)]
Our previous algorithm, all criteria	437/482 [90.7 (88.1–93.3)]
First Brugada criterion (absence of RS)	83/89 [93.3 (88–98.5)]
Second Brugada criterion (RS >100 ms)	208/225 [92.4 (89–95.9)]
Third Brugada criterion (AV dissociation)	6/6 [100 (100–100)]
Fourth Brugada criterion (morphology in $V_{1,2}$ and V_6)	115/162 [71 (64–78)]
Brugada algorithm, all criteria	412/482 [85.5**,## (82.3–88.6)]

P=.002

Numbers represent number of correct diagnoses/total number of tracings investigated with the criterion [cpercentage = test accuracy (95% confidence intervals)]. The overall (both for ventricular tachycardia [VT] and ventricular tachycardia [SVT] diagnoses) test accuracy of all four criteria of the new aVR, our previous algorithm, and the Brugada algorithm was compared statistically. In addition, the overall test accuracy of each step of all three algorithms was compared with that of their counterparts in the same ordinal rank in the other algorithm separately.

*P <.05, **P <.01, ***P <.001 vs all criteria of the new aVR algorithm.

#P <.05, ##P <.01, ###P <.001 vs all criteria of our previous algorithm.

§P <.05, §§P <.01, §§§P <.001 vs the Brugada criterion at the same step of the Brugada algorithm.

♣P <.01 for the second criterion of our previous vs the second criterion of the new aVR algorithm.

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Table 3 Sensitivity, specificity, and positive and negative predictive values of different ECG criteria for differential diagnosis of wide QRS complex tachycardia*,+,++,♣,♣♣,♣♣♣,c,cc,d,ddd,ee

Criterion	Sensitivity VT diagnosis	Specificity VT diagnosis	PPV VT diagnosis	NPV VT diagnosis
First new aVR algorithm criterion (initial R wave)	38.9 (34–43.9)	98.2 (95.8–100.7)	98.6 (96.7–100.5)	32.7 (27.7–37.8)
Second new aVR algorithm criterion (r or q wave >40 ms)	28.8 (22.9–34.7)	91.8 (86.7–96.9)	87.8 (80.4–95.3)	38.5 (32.7–44.4)
Third new aVR algorithm criterion (notch)	19.9 (13.7–26)	95 (90.8–99.8)	86.5 (75.5–97.5)	42.7 (36.2–49.1)
Fourth new aVR algorithm criterion (V_i/V_t)	90.7 (85.7–95.7)	87.5 (80.9–94.1)	90.7 (85.7–95.7)	87.5 (80.9–94.1)
New aVR algorithm, all criteria	96.5 (94.6–98.4)	75 (82.9–96)	92.7 (90.1–95.3)	86.6 (79.8–93.4)
First criterion previous algorithm (AV dissociation)	11.6 (8.4–14.9)	100 (100–100)	100 (100–100)	25.5 (21.4–29.6)
Second criterion previous algorithm (initial R in aVR)	39.6 (34.3–44.9)	97.3 (94.3–100.3)	97.7 (95.2–100.3)	35.5 (30.2–40.9)
Third criterion previous algorithm (bundle branch block, fascicular block criterion)	73.2 (67.1–79.4)	84.4 (77.6–91.2)	89.5 (84.8–94.2)	63.4 (55.6–71.3)
Fourth criterion previous algorithm (V_i/V_t)	69.8*(57.5–82.2)	90.2 (84.1–96.3)	80.4 (69–91.9)	83.8 (76.6–91.1)
Previous algorithm, all criteria	95.7 (93.6–97.7)	74.1 (66–82.2)	92.4 (89.8–95.1)	83.8 (76.6–91.1)
First Brugada criterion (absence of RS)	22.4 (18.2–26.7)	94.6 (90.5–98.8)	93.3 (88–98.5)	27 (22.6–31.4)
Second Brugada criterion (RS >100 ms)	72.5 (67.3–77.6)	84 (77–90.9)	92.4 (89–95.9)	53 (45.4–60.5)
Third Brugada criterion (AV dissociation)	7.6 (34.3–44.9)	100 (100–100)	100 (100–100)	59.2 (52–66.4)
Fourth Brugada criterion (morphology in $V_{1,2}$ and V_6)	45.2[ccc,dd] (33.8–56.6)	92.1 (86.5–97.7)	82.5 (70.7–94.3)	67.2[a,b] (58.9–75.5)
Brugada algorithm, all criteria	89.2 [+,++,♣♣] (86–92.4)	73.2 (65–81.4)	91.7 (88.8–94.5)	67.2[¶] (58.9–75.5)

Because only two final diagnoses (ventricular tachycardia [VT] or supraventricular ventricular [SVT]) were possible with the algorithms used, the specificity and positive predictive value (PPV) for VT diagnosis were the same as the sensitivity and negative predictive value (NPV) for SVT diagnosis (respectively). Inversely, the sensitivity and NPV for VT diagnosis were the same as the specificity and PPV for SVT diagnosis, respectively. Therefore, only the sensitivity, specificity, and predictive values for VT diagnosis are shown. Numbers represent percentage values; numbers in parentheses are 95% confidence intervals. The sensitivity, specificity, and predictive values of all four criteria of the new aVR, our previous algorithm, and the Brugada algorithm were compared statistically; those of the fourth step of all three algorithms were compared separately. A significant between-groups difference in predictive values (‡vs all criteria of the new aVR algorithm, ¶vs all criteria of our previous algorithm, *fourth Brugada criterion vs fourth step of new aVR algorithm, [a]fourth Brugada criterion vs fourth step of our previous algorithm) is indicated only by disjoint (nonoverlapping) 95% confidence intervals.

For sensitivity and specificity: *P <.05,**P <.01,***P <.001 vs all criteria of the new aVR algorithm.

♣P <.05, ♣♣P <.01, ♣♣♣P <.001 vs all criteria of our previous algorithm.

[c]P <.05, [cc]P <.01, [ccc]P <.001 for the fourth Brugada criterion vs the fourth step of the new aVR algorithm.

[d]P <.05, [dd]P <.01, [ddd]P <.001 for the fourth Brugada criterion vs the fourth step of our previous algorithm.

[e]P <.01 for the fourth step of the new aVR algorithm vs the fourth step of our previous algorithm.

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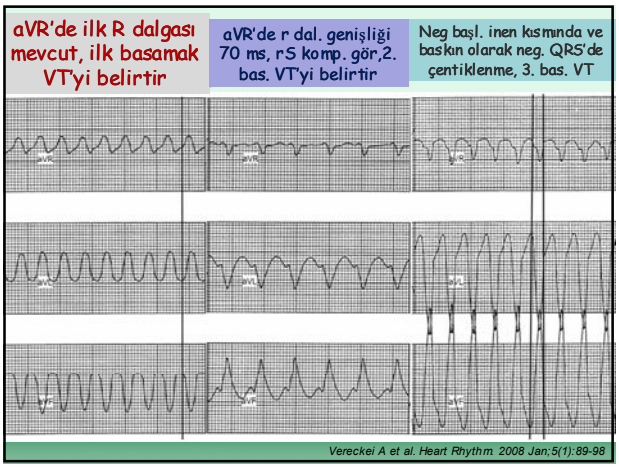
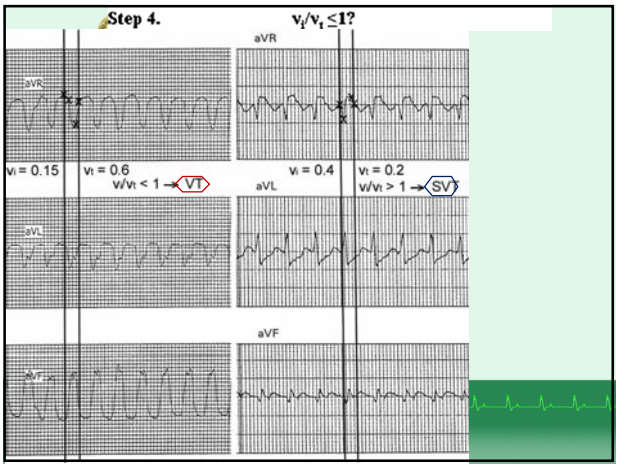
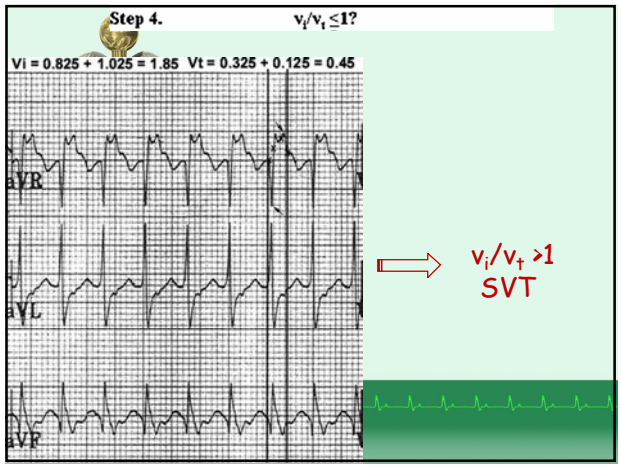






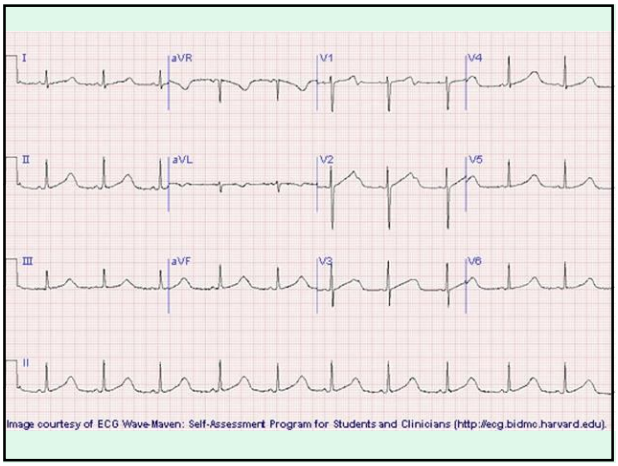
Avantajları

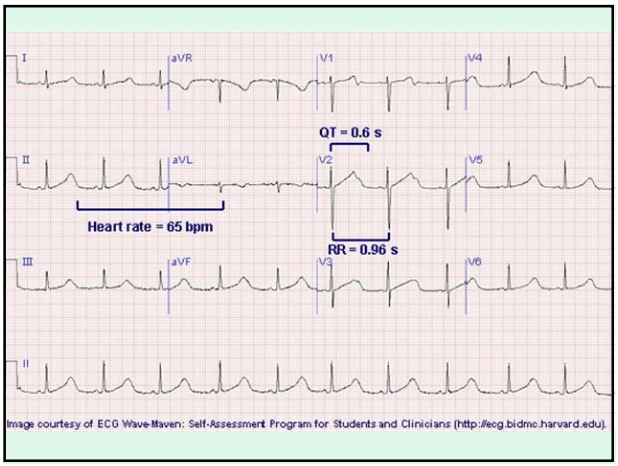
- Acil şartlara tamamen uygun
- Sadece aVR derivasyonu
  - hızlı
  - doğru
  - kolay

VAKA SUNUMLARI

1. Vaka

- Senkop, 18 y, K
- Birkaç yıl önce egzersiz yaparken benzer senkop atağı
- FM ve tetkiklerde özellik yok





Uzun QT Sendromu

- Sağlıklı genç bireylerde açıklanamayan baş dönmesi, senkop ve ani kardiyak ölüm sebebi
- Tehlikesi torsade de pointes olarak bilinen polimorfik VT'ye dönüşüm potansiyeli

LQTS

- Konjenital LQTS'da kardiyak sodyum ve potasyum kanallarında kalıtsal anormallik
  - Romano-Ward sendrom
  - Jervell ve Lange-Nielsen sendromu
- Akkiz formlar sıklıkla antiaritmik ilaçlar, elektrolit bozuklukları, miyokardiyal iskemi..

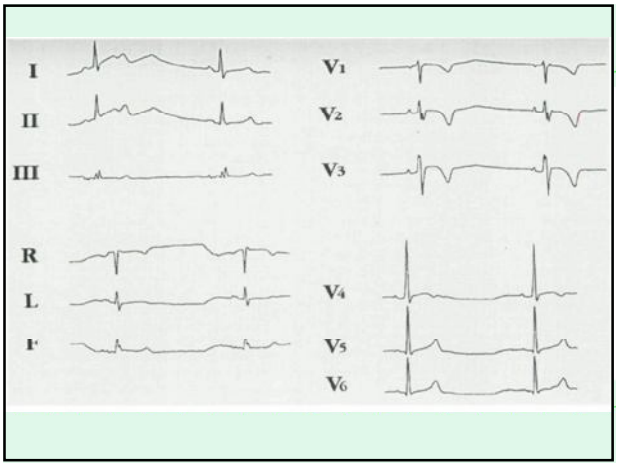
LQTS

- Bazzet eşitliği uyarınca kalp hızına göre düzeltilmiş QTc=QT/√RR interval

Age and Sex	Prolonged QTc (Seconds)	Borderline QTc (Seconds)	Reference Range (Seconds)
Children (<15 y)	>0.46	0.44-0.46	<0.44
Adult males	>0.45	0.43-0.45	<0.43
Adult females	>0.46	0.45-0.46	<0.45

2. Vaka

- 27 y, E
- atipik göğüs ağrısı
- çarpıntı ve fenalık hissi



Arrhythmogenic Right Ventricular Dysplasia/Cardiomyopathy: A Review

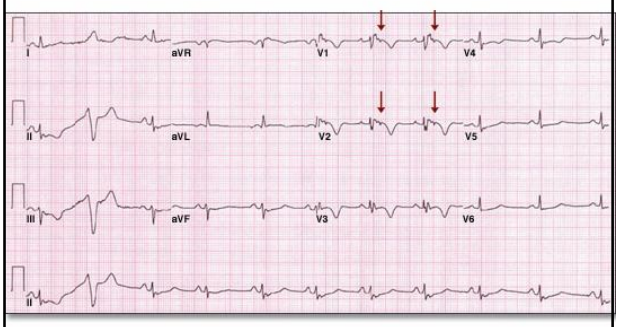
- Epsilon dalgası (%30)
- V1-3 T negatifliği, Holterde VT prezentasyonu
- Ailevi
- Genellikle 30 yaş altında
- Ani ölüm riski
- Gençlerdeki ani ölümlerin %20 nedeni
- Ablasyon, ICD hayat kurtarır

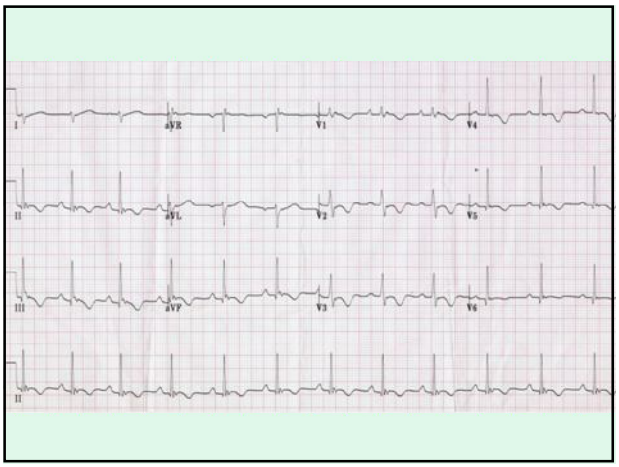
Epsilon dalgası;

•QRS kompleksinin sonunda ST segmentinin hemen başında

•küçük amplitüdlü bir post-eksitasyon potansiyeli

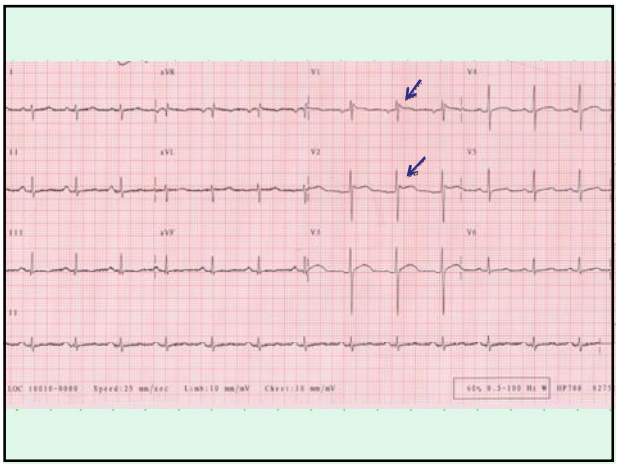
•gecikmiş sağ ventrikül aktivitesini yansıtır





3. Vaka

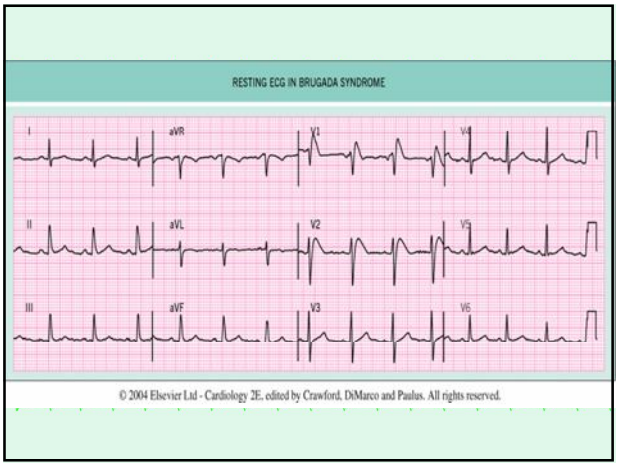
- 35 y, E
- Bayılma



Brugada Sendromu

- Tanımlanabilen yapısal kalp hast. yok
- Tipik EKG değişiklikleri (V1-V3'de ST yükselmesi, sağ dal bloğu).
- Genetik kusur doğumdan itibaren var
- Hastalık 30'lu yaşlarda başlar
- Erkeklerde daha sık
- VF riski

- Patofizyolojisinde hücre membranında voltaj bağımlı Na kanalını kodlayan SCN5A gen mutasyonları sorumlu tutulmakta
- Semptomatik, ailede ani ölüm hikayesi olan, EPS'de VT indüklenen hastalarda ICD en etkin tedavi seçeneği




SAYGILAR