

ΔΙΑΦΟΡΙΚΗ ΔΙΑΓΝΩΣΗ ΤΑΧΥΚΑΡΔΙΑΣ ΜΕ ΕΥΡΕΑ ΣΥΜΠΛΕΓΜΑΤΑ

Ζαχαροπούλου Ιωάννα
Ασκληπιείο Βούλας

n ΟΡΙΣΜΟΙ

n ΔΙΑΦΟΡΙΚΗ ΔΙΑΓΝΩΣΗ

n ΗΛΕΚΤΡΟΚΑΡΔΙΟΓΡΑΦΙΚΑ ΕΥΡΗΜΑΤΑ

n ΔΙΑΓΝΩΣΤΙΚΑ ΚΡΙΤΗΡΙΑ-ΑΛΓΟΡΙΘΜΟΙ

n ΘΕΡΑΠΕΙΑ

ΟΡΙΣΜΟΙ

- n **ΤΑΧΥΚΑΡΔΙΑ ΜΕ ΕΥΡΕΑ ΣΥΜΠΛΕΓΜΑΤΑ (WQT)** : ΔΙΑΡΚΕΙΑ QRS > 120 ms ΚΑΙ ΣΥΧΝΟΤΗΤΑ > 100 bpm.
- n **ΚΟΙΛΙΑΚΗ ΤΑΧΥΚΑΡΔΙΑ (VT)** : ΕΜΦΑΝΙΣΗ 3 Η ΠΕΡΙΣΣΟΤΕΡΩΝ ΔΙΑΔΟΧΙΚΩΝ ΕΚΤΑΚΤΩΝ ΚΟΙΛΙΑΚΩΝ ΣΥΣΤΟΛΩΝ ΜΕ ΣΥΧΝΟΤΗΤΑ ≥ 100 bpm.
- § **ΜΗ ΕΠΙΜΕΝΟΥΣΑ ΚΟΙΛΙΑΚΗ ΤΑΧΥΚΑΡΔΙΑ (NSVT)** : ΚΟΙΛΙΑΚΗ ΤΑΧΥΚΑΡΔΙΑ ΠΟΥ ΔΙΑΚΟΠΤΕΤΑΙ ΑΥΤΟΜΑΤΑ ΣΕ ΛΙΓΟΤΕΡΟ ΑΠΟ 30sec.

ΟΡΙΣΜΟΙ

n **ΕΜΜΕΝΟΥΣΑ ΚΟΙΛΙΑΚΗ ΤΑΧΥΚΑΡΔΙΑ (SVT) :**

∅ ΔΙΑΡΚΕΙΑ > 30sec

∅ ΠΡΟΚΑΛΕΙ ΑΙΜΟΔΥΝΑΜΙΚΗ ΑΣΤΑΘΕΙΑ

∅ ΑΠΑΙΤΕΙΤΑΙ ΑΜΕΣΗ ΠΑΡΕΜΒΑΣΗ ΓΙΑ ΤΟΝ ΤΕΡΜΑΤΙΣΜΟ ΤΗΣ

§ **ΜΟΝΟΜΟΡΦΗ VT :** ΟΜΟΙΟΜΟΡΦΑ ΚΑΙ ΚΑΤΑ ΚΑΝΟΝΑ ΡΥΘΜΙΚΑ ΚΟΙΛΙΑΚΑ ΣΥΜΠΛΕΓΜΑΤΑ Η ΜΕ ΜΙΚΡΗ ΔΙΑΚΥΜΑΝΣΗ ΤΩΝ RR ΔΙΑΣΤΗΜΑΤΩΝ.

§ **ΠΟΛΥΜΟΡΦΗ VT :** ΚΟΙΛΙΑΚΑ ΣΥΜΠΛΕΓΜΑΤΑ ΜΕ ΔΙΑΦΟΡΕΤΙΚΕΣ ΜΟΡΦΟΛΟΓΙΕΣ ΚΑΙ RR ΔΙΑΣΤΗΜΑΤΑ ΜΕ ΜΕΓΑΛΗ ΔΙΑΚΥΜΑΝΣΗ.

ΟΡΙΣΜΟΙ

- n **VENTRICULAR FLUTTER:** ΠΑΡΟΜΟΙΑ ΗΚΓ ΕΥΡΗΜΑΤΑ ΜΕ ΜΟΝΟΜΟΡΦΗ VT ΠΛΗΝ ΤΗΣ > ΣΥΧΝΟΤΗΤΑΣ (ΠΕΡΙΠΟΥ 300bpm).ΔΕΝ ΥΠΑΡΧΕΙ ΙΣΟΗΛΕΚΤΡΙΚΗ ΓΡΑΜΜΗ ΜΕΤΑΞΥ ΤΩΝ QRS ΔΙΑΣΤΗΜΑΤΩΝ.
- n **ΚΟΙΛΙΑΚΗ ΜΑΡΜΑΡΥΓΗ:** ΚΟΙΛΙΑΚΟΣ ΡΥΘΜΟΣ ΧΩΡΙΣ "ΟΡΓΑΝΩΣΗ" ΜΕ QRS ΣΥΜΠΛΕΓΜΑΤΑ ΠΟΥ ΔΙΑΚΡΙΝΟΝΤΑΙ ΕΛΑΧΙΣΤΑ.

ΜΟΝΟΕΣΤΙΑΚΕΣ PVC

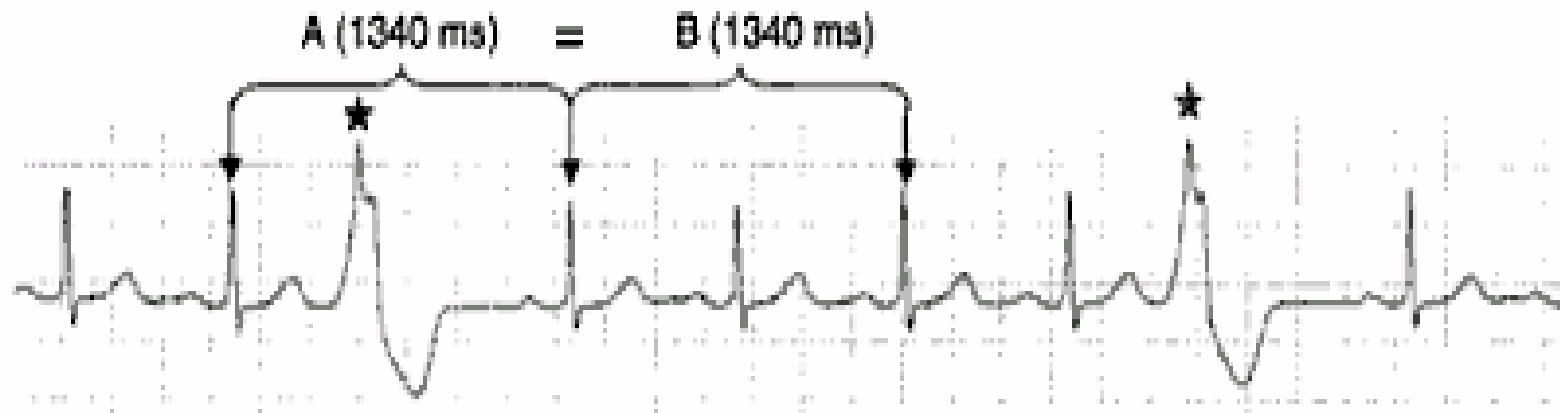


Figure 21.2: Unifocal Premature Ventricular Complexes (PVCs). The two PVCs noted in the rhythm strip, marked by stars, are identical in configuration and are unifocal in origin. Note also that the pause following the PVC is fully compensatory, meaning that distance A, which straddles the PVC, measures the same as distance B, which straddles a normal sinus impulse. ms, milliseconds.

ΠΟΛΥΕΣΤΙΑΚΕΣ PVC

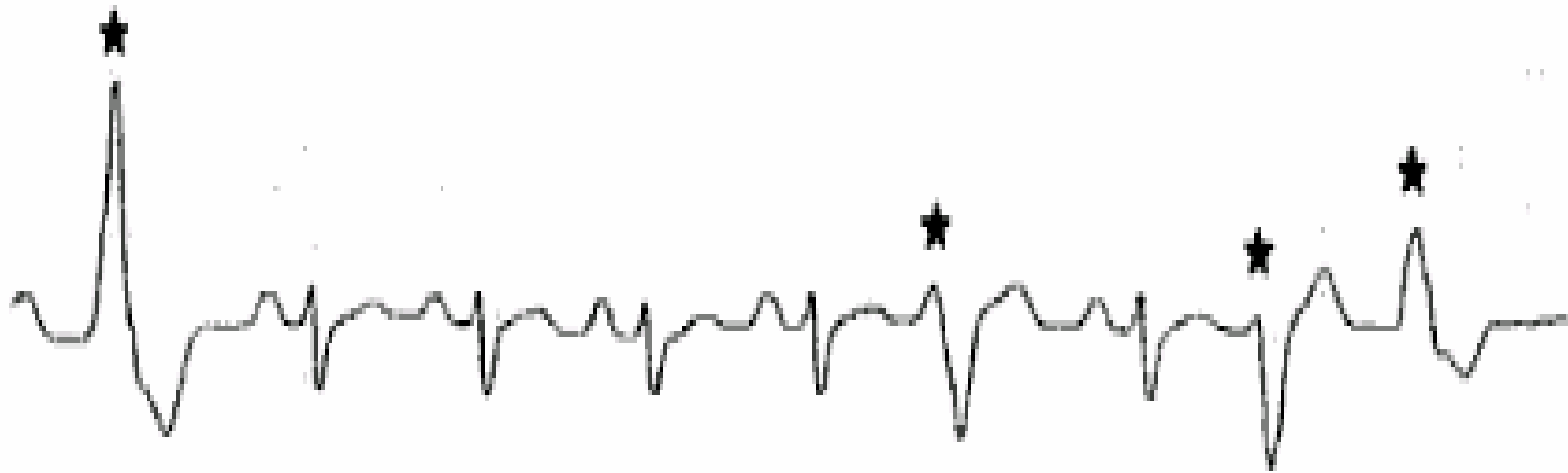
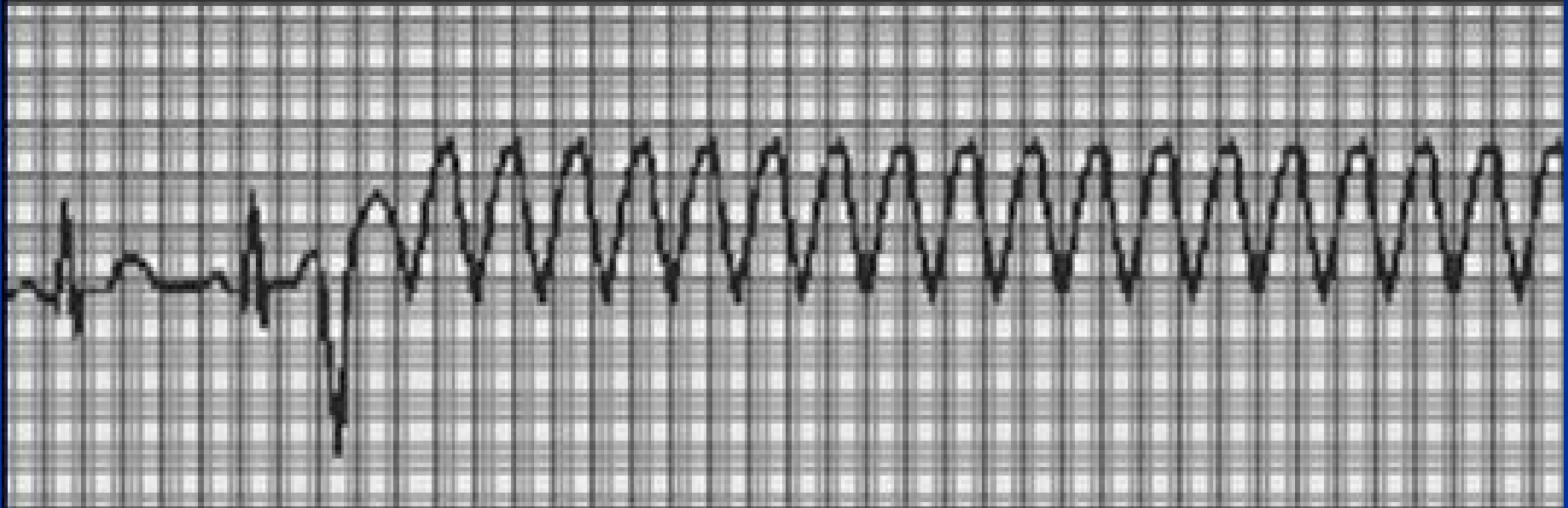


Figure 21.3: Multifocal Premature Ventricular Complexes (PVCs). The PVCs marked by the stars have different configurations and are multiformed. These PVCs originate from different locations in the ventricles and are multifocal in origin.

PVC on T-Wave



Initiates Ventricular
《 Tachycardia

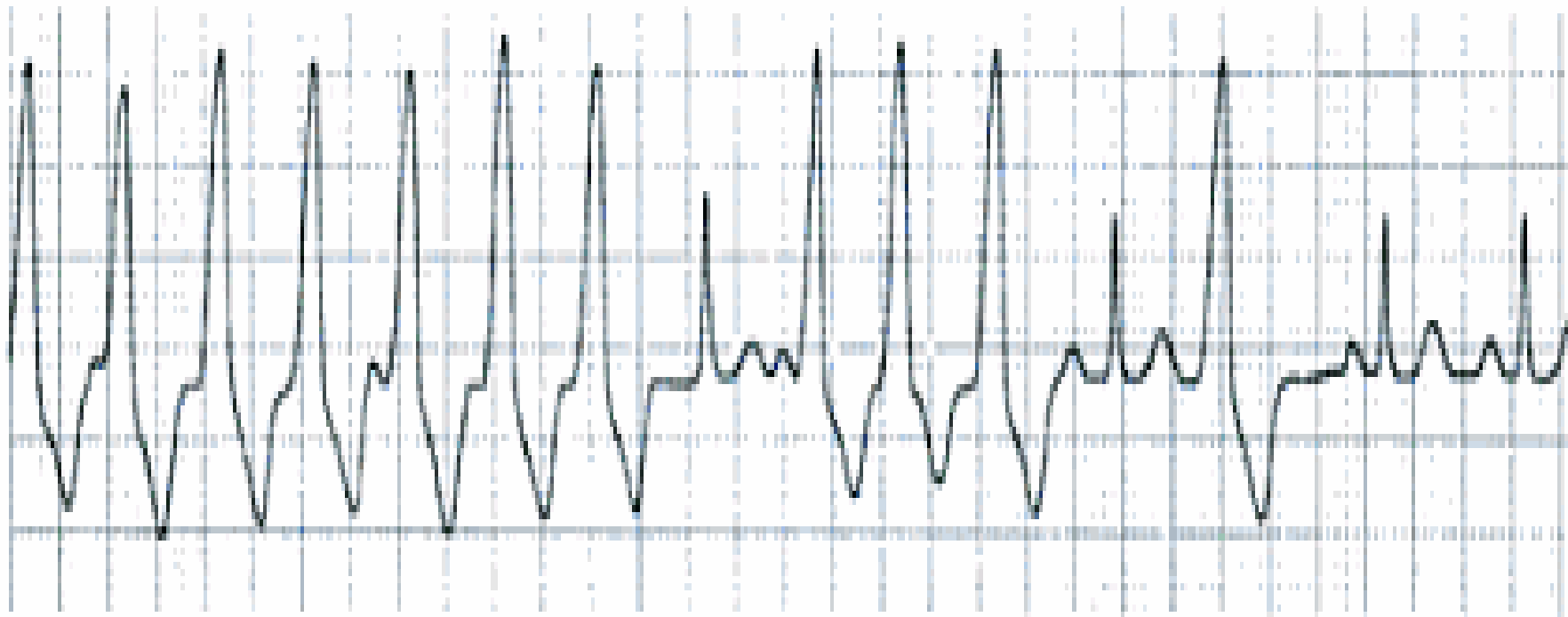
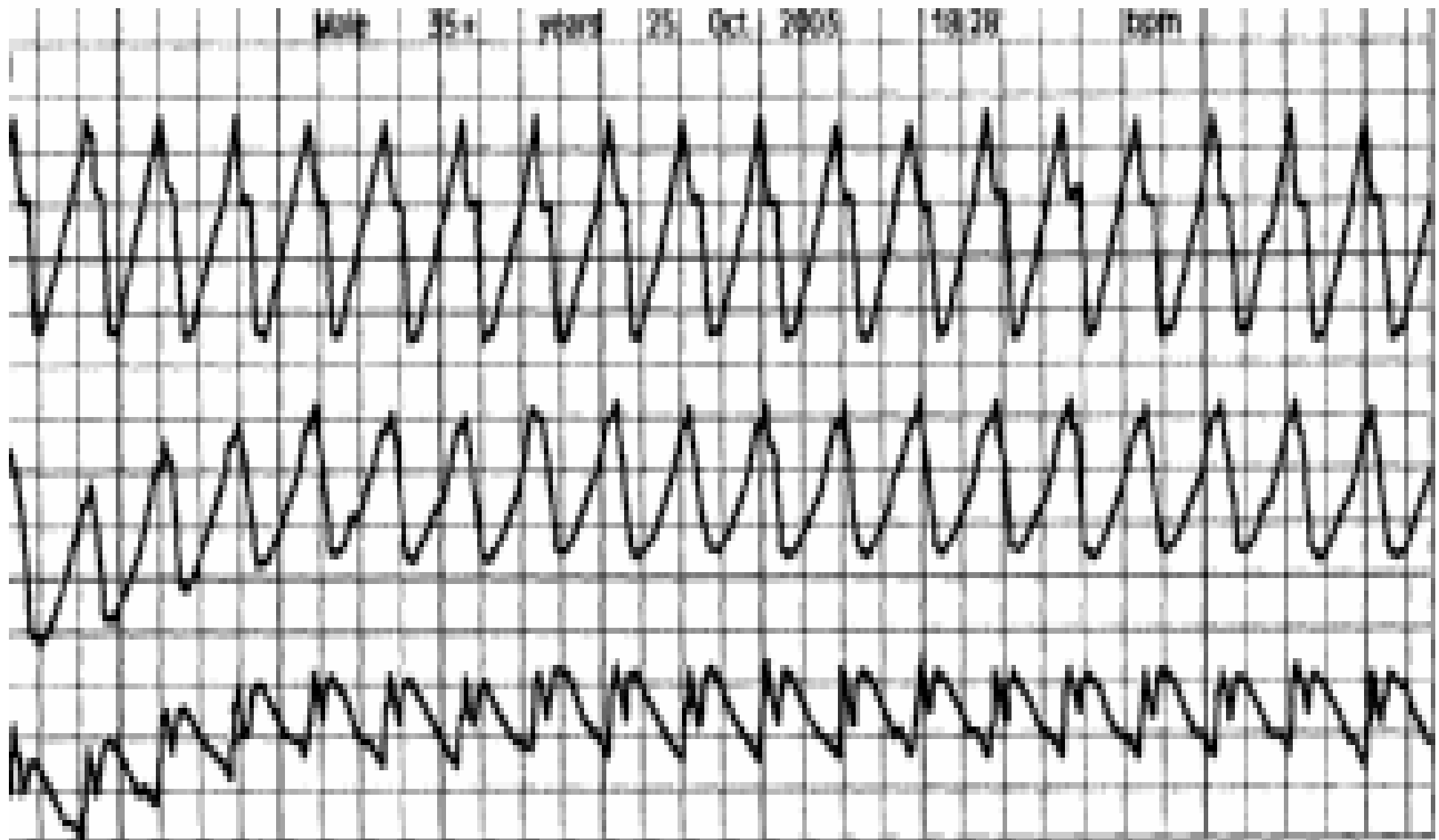


Figure 21.21: Nonsustained Monomorphic Ventricular Tachycardia (VT). Three or more consecutive premature ventricular complexes (PVCs) with a rate of >100 complexes per minute is VT. The VT is monomorphic because the ventricular complexes have the same configuration. The VT is nonsustained because the duration of the tachycardia is <30 seconds.

ΕΜΜΕΝΟΥΣΑ ΚΤ



**ΠΟΛΥΜΟΡΦΗ ΚΤ ΤΥΠΟΥ TORSADE DE POINTS ΠΟΥ
ΑΝΑΤΑΧΘΗΚΕ ΑΥΤΟΜΑΤΑ ΣΕ ΦΛΕΒΟΚΟΜΒΙΚΟ ΡΥΘΜΟ**

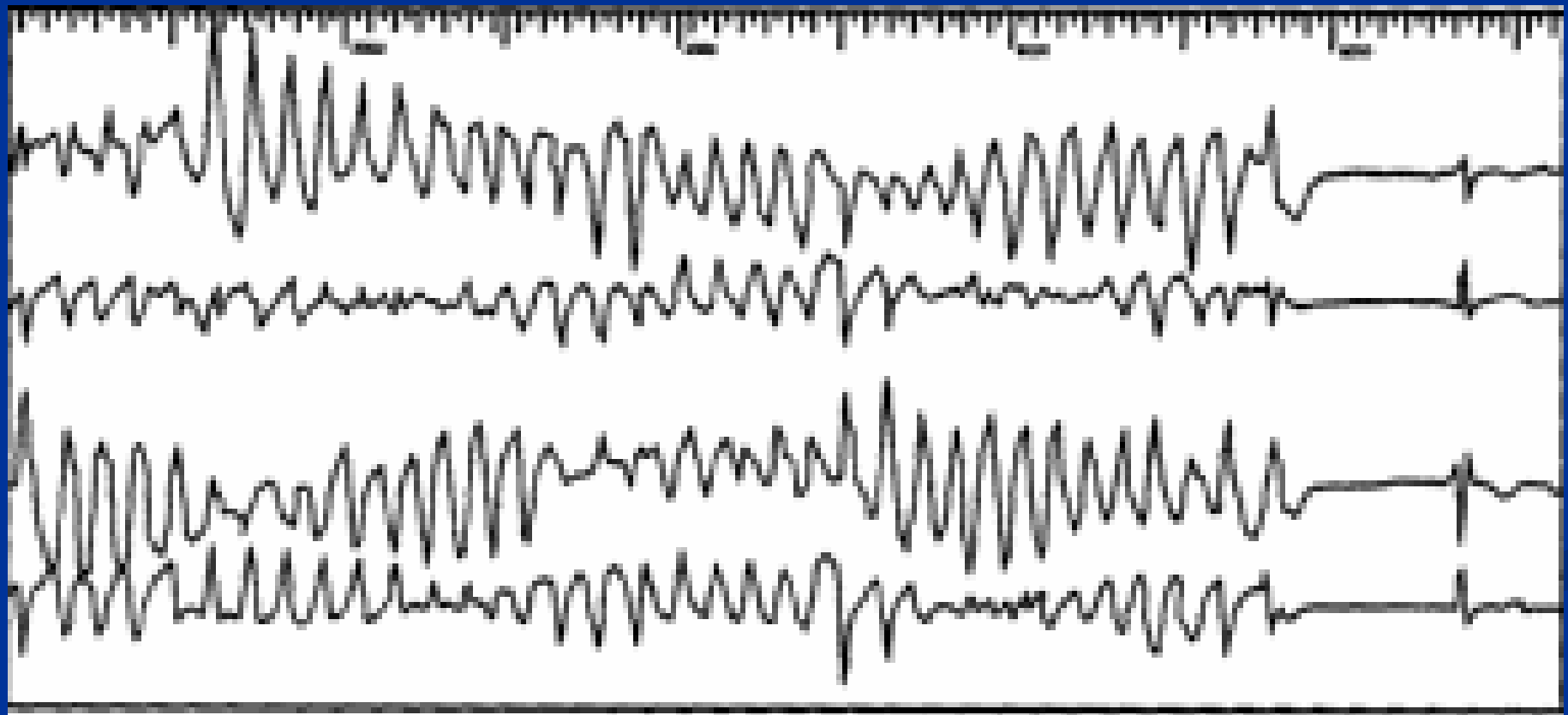




Figure 21.30: Ventricular Flutter. The QRS complexes are wide and uniform with a rate of approximately 300 beats per minute. The QRS complexes are monomorphic and there are no isoelectric intervals between the QRS complexes. Ventricular flutter is similar to monomorphic ventricular tachycardia (VT) except for the higher heart rate and has the same clinical significance.

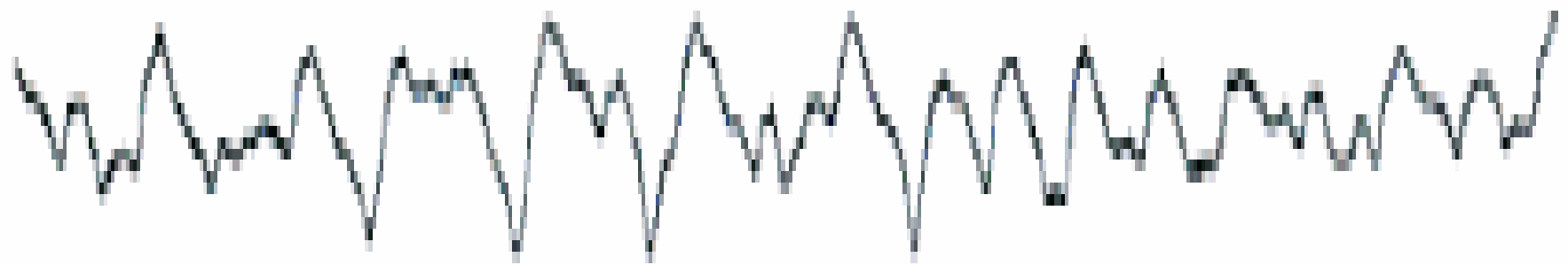


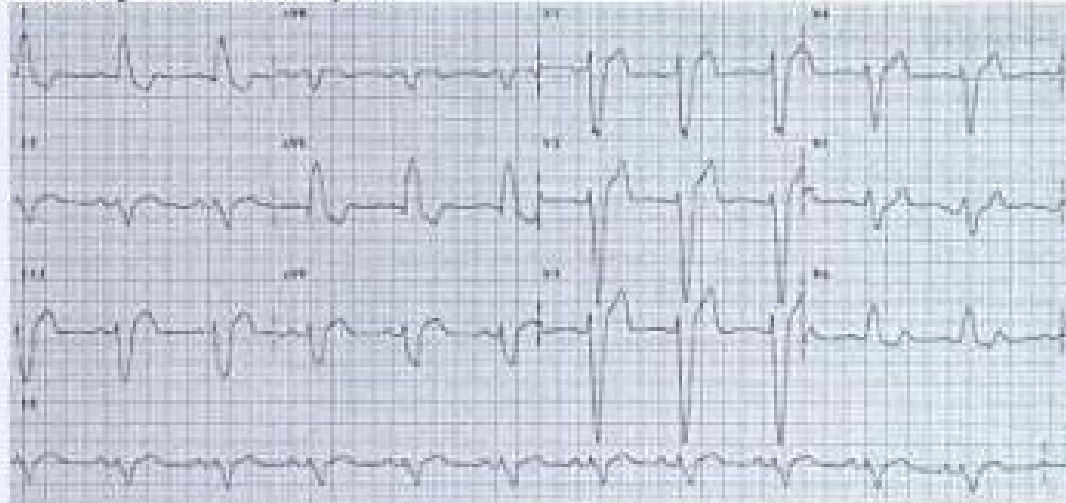
Figure 21.31: Ventricular Fibrillation. In ventricular fibrillation, the rhythm is very disorganized and ineffective with an undulating baseline. The QRS complexes are very irregular and are not well defined. This rhythm is fatal unless the patient is successfully resuscitated.

ΔΙΑΦΟΡΙΚΗ ΔΙΑΓΝΩΣΗ ΤΑΧΥΚΑΡΔΙΑΣ ΕΥΡΕΩΝ ΣΥΜΠΛΕΓΜΑΤΩΝ

1. **ΚΟΙΛΙΑΚΗ ΤΑΧΥΚΑΡΔΙΑ:** 80% ΓΕΝΙΚΟΥ ΠΛΥΘΗΣΜΟΥ ΚΑΙ ΣΕ > 95% ΤΩΝ ΑΣΘΕΝΩΝ ΜΕ ΚΑΡΔΙΟΛΟΓΙΚΟ ΙΣΤΟΡΙΚΟ.
2. **ΥΠΕΡΚΟΙΛΙΑΚΗ ΤΑΧΥΚΑΡΔΙΑ ΜΕ ΣΤΑΘΕΡΟ ΑΠΟΚΛΕΙΣΜΟ ΣΚΕΛΟΥΣ.**
3. **ΥΠΕΡΚΟΙΛΙΑΚΗ ΤΑΧΥΚΑΡΔΙΑ ΜΕ ΡΥΘΜΟΕΞΑΡΤΩΜΕΝΟ ΑΠΟΚΛΕΙΣΜΟ ΣΚΕΛΟΥΣ.**

ΥΠΕΡΚΟΙΛΙΑΚΗ ΤΑΧΥΚΑΡΔΙΑ ΜΕ ΑΠΟΚΛΕΙΣΜΟ ΣΚΕΛΟΥΣ.

A. During normal sinus rhythm



B. During tachycardia

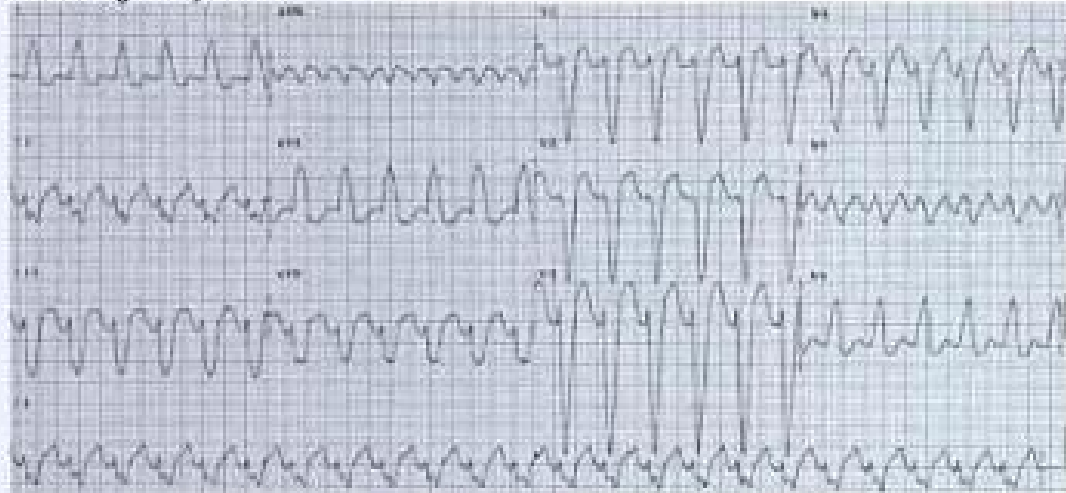


Figure 22.31: Wide Complex Supraventricular Tachycardia (SVT) from Preexistent Left Bundle Branch Block (LBBB). Electrocardiogram (A) and (B) are from the same patient. Figure (A) shows the patient during normal sinus rhythm and (B) during tachycardia. Note that the configuration of the QRS complexes during the tachycardia (B) is the same as during normal sinus rhythm (A) consistent with SVT with preexistent LBBB.

ΔΙΑΦΟΡΙΚΗ ΔΙΑΓΝΩΣΗ ΤΑΧΥΚΑΡΔΙΑΣ ΕΥΡΕΩΝ ΣΥΜΠΛΕΓΜΑΤΩΝ

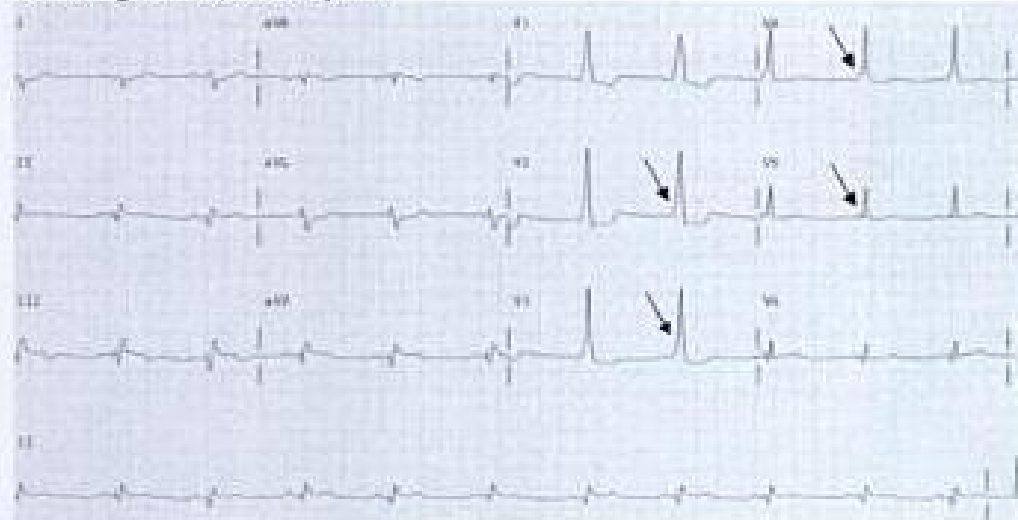
4. ΥΠΕΡΚΟΙΛΙΑΚΗ ΤΑΧΥΚΑΡΔΙΑ ΜΕ ΚΟΛΠΟΚΟΙΛΙΑΚΗ ΑΓΩΓΗ ΜΕΣΩ ΕΝΟΣ ΠΑΡΑΠΛΗΡΩΜΑΤΙΚΟΥ ΔΕΜΑΤΙΟΥ.

- ∅ ΚΑΤΑ ΤΗΝ ΔΙΑΡΚΕΙΑ ΚΟΛΠΙΚΗΣ ΜΑΡΜΑΡΥΓΗΣ-ΠΤΕΡΥΓΙΣΜΟΥ
- ∅ ΚΑΤΑ ΤΗΝ ΔΙΑΡΚΕΙΑ ΚΟΛΠΙΚΗΣ ΤΑΧΥΚΑΡΔΙΑΣ
- ∅ ΚΑΤΑ ΤΗΝ ΔΙΑΡΚΕΙΑ ΑΝΤΙΔΡΟΜΗΣ ΚΟΛΠΟΚΟΙΛΙΑΚΗΣ
ΤΑΧΥΚΑΡΔΙΑΣ ΕΠΑΝΕΙΣΟΔΟΥ

5. ΒΗΜΑΤΟΔΟΤΙΚΟΣ ΡΥΘΜΟΣ.

ΥΠΕΡΚΟΙΛΙΑΚΗ ΤΑΧΥΚΑΡΔΙΑ ΜΕ ΚΟΛΠΟΚΟΙΛΙΑΚΗ ΑΓΩΓΗ ΜΕΣΩ ΕΝΟΣ ΠΑΡΑΠΛΗΡΩΜΑΤΙΚΟΥ ΔΕΜΑΤΙΟΥ.

A. During normal sinus rhythm



B. During tachycardia

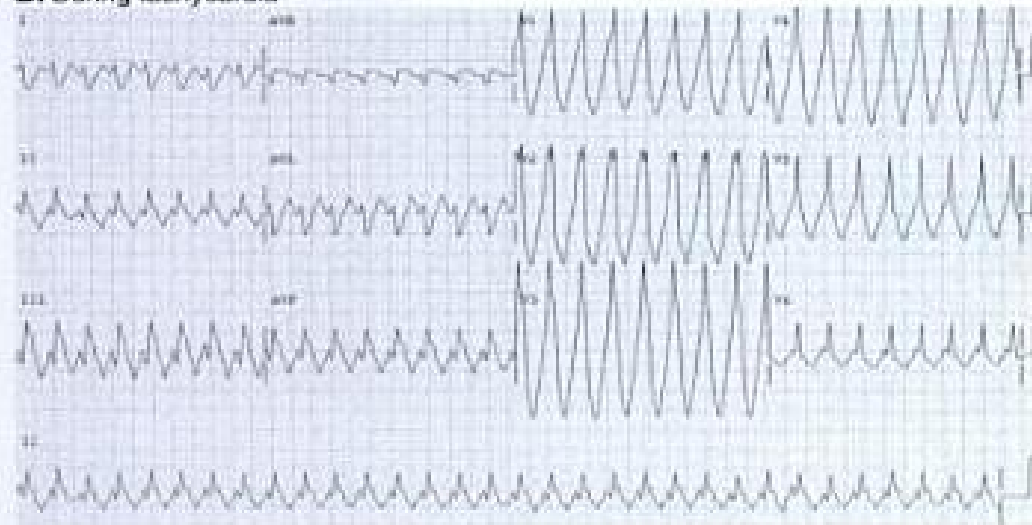


Figure 22.32: Wide Complex Supraventricular Tachycardia (SVT) from a Bypass Tract. (A) Normal sinus rhythm with short PR interval and delta waves (arrows) from preexcitation. (B) From the same patient during wide complex tachycardia. The presence of preexcitation in baseline electrocardiogram suggests that the wide complex tachycardia is due to antidromic atrioventricular reciprocating tachycardia.

Nonsustained VT		Three or more beats in duration, terminating spontaneously in less than 30 s. VT is a cardiac arrhythmia of three or more consecutive complexes in duration emanating from the ventricles at a rate of greater than 100 bpm (cycle length less than 600 ms)
	Monomorphic	Nonsustained VT with a single QRS morphology.
	Polymorphic	Nonsustained VT with a changing QRS morphology at cycle length between 600 and 180 ms.
Sustained VT		VT greater than 30 s in duration and/or requiring termination due to hemodynamic compromise in less than 30 s.
	Monomorphic	Sustained VT with a stable single QRS morphology.
	Polymorphic	Sustained VT with a changing or multiform QRS morphology at cycle length between 600 and 180 ms.
Bundle-branch re-entrant tachycardia		VT due to re-entry involving the His-Purkinje system, usually with LBBB morphology; this usually occurs in the setting of cardiomyopathy.
Bidirectional VT		VT with a beat-to-beat alternans in the QRS frontal plane axis, often associated with digitalis toxicity.
Torsades de pointes		Characterized by VT associated with a long QT or QTc, and electrocardiographically characterized by twisting of the peaks of the QRS complexes around the isoelectric line during the arrhythmia: <ul style="list-style-type: none"> ■ “Typical,” initiated following “short-long-short” coupling intervals. ■ Short coupled variant initiated by normal-short coupling.
Ventricular flutter		A regular (cycle length variability 30 ms or less) ventricular arrhythmia approximately 300 bpm (cycle length—200 ms) with a monomorphic appearance; no isoelectric interval between successive QRS complexes.
Ventricular fibrillation		Rapid, usually more than 300 bpm/200 ms (cycle length 180 ms or less), grossly irregular ventricular rhythm with marked variability in QRS cycle length, morphology, and amplitude.

BIDIRECTIONAL VT

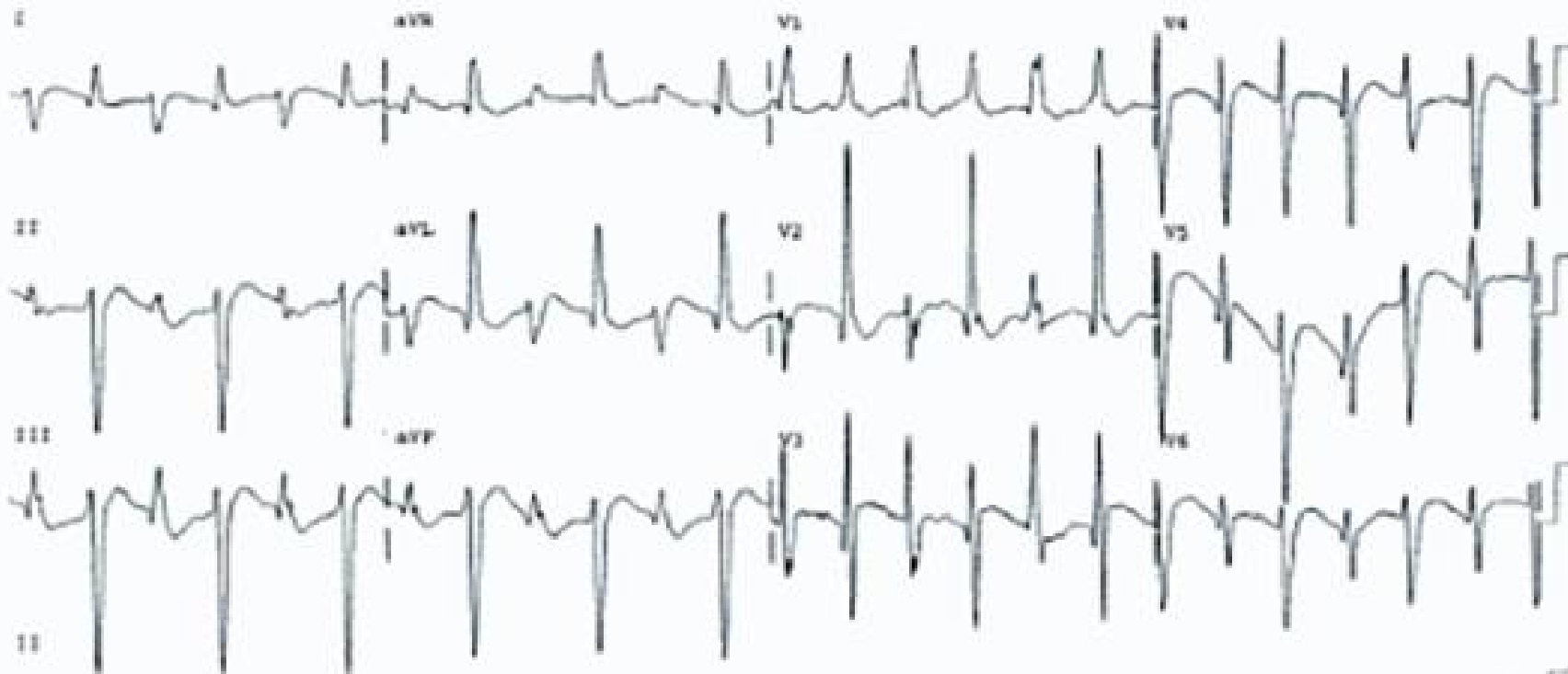


Figure 21.23: Bidirectional Ventricular Tachycardia. The QRS complexes have right bundle branch block (RBBB) configuration with tall R waves in V₁. The axis of the QRS complex in the frontal leads alternates from left axis to right axis indicating that the origin of the tachycardia alternates between left anterior and left posterior fascicles.

Classification by Disease Entity

Chronic coronary heart disease

Heart failure

Congenital heart disease

Neurological disorders

Structurally normal hearts

Sudden infant death syndrome

Cardiomyopathies

Dilated cardiomyopathy

Hypertrophic cardiomyopathy

Arrhythmogenic right ventricular
cardiomyopathy

Classification by Clinical Presentation

Hemodynamically stable	Asymptomatic	The absence of symptoms that could result from an arrhythmia.
	Minimal symptoms, e.g., palpitations	Patient reports palpitations felt in either the chest, throat, or neck as described by the following: <ul style="list-style-type: none">■ Heartbeat sensations that feel like pounding or racing■ An unpleasant awareness of heartbeat■ Feeling skipped beats or a pause
Hemodynamically unstable	Presyncope	Patient reports presyncope as described by the following: <ul style="list-style-type: none">■ Dizziness■ Lightheadedness■ Feeling faint■ "Graying out"
	Syncope	Sudden loss of consciousness with loss of postural tone, not related to anesthesia, with spontaneous recovery as reported by the patient or observer. Patient may experience syncope when supine.
	Sudden cardiac death	Death from an unexpected circulatory arrest, usually due to a cardiac arrhythmia occurring within an hour of the onset of symptoms.
	Sudden cardiac arrest	Death from an unexpected circulatory arrest, usually due to a cardiac arrhythmia occurring within an hour of the onset of symptoms, in whom medical intervention (e.g., defibrillation) reverses the event.

Zipes *et al.*

ACC/AHA/ESC Practice Guidelines

ΔΙΑΦΟΡΙΚΗ ΔΙΑΓΝΩΣΗ VT-SVT ΜΕ ΑΛΛΟΔΡΟΜΙΑ

1. ΙΣΤΟΡΙΚΟ - ΠΑΡΑΓΟΝΤΕΣ ΚΙΝΔΥΝΟΥ
2. ΗΚΓ-ΑΛΓΟΡΙΘΜΟΙ

ΠΡΟΣΟΧΗ !!!

Η ΥΠΑΡΞΗ Η ΟΧΙ ΣΥΠΤΩΜΑΤΩΝ ΚΑΘΩΣ ΚΑΙ Η ΣΥΧΝΟΤΗΤΑ ΔΕΝ ΧΡΗΣΙΜΟΠΟΙΟΥΝΤΑΙ ΓΙΑ ΤΗΝ ΔΔ.

ECG

n ΔΙΝΕΙ ΠΙΘΑΝΗ ΔΙΑΓΝΩΣΗ ΓΙΑ ΠΟΛΛΟΥΣ ΑΣΘΕΝΕΙΣ , ΑΛΛΑ Η ΣΙΓΟΥΡΗ / ΤΕΛΙΚΗ ΔΙΑΓΝΩΣΗ ΜΠΟΡΕΙ ΝΑ ΜΗΝ ΕΙΝΑΙ ΔΥΝΑΤΗ .

§ ΟΤΑΝ Η ΔΙΑΓΝΩΣΗ ΔΕΝ ΕΙΝΑΙ ΣΙΓΟΥΡΗ :

ΠΡΟΤΕΙΝΕΤΑΙ ΚΑΘΕ ΠΕΡΙΣΤΑΣΗ ΟΔΙΟΤΑΧΥ ΚΑΡΔΙΑΣ ΜΕ ΕΥΡΕΑ QRS ΝΑ ΑΝΤΙΜΕΤΩΠΙΖΕΤΑΙ ΚΑΤ'ΑΡΧΗΝ ΩΣ VT ΜΕΧΡΙ ΑΠΟΔΕΙΞΕΩΣ ΤΟΥ ΑΝΤΙΘΕΤΟΥ .

ΗΛΕΚΤΡΟΚΑΡΔΙΟΓΡΑΦΙΚΑ ΕΥΡΗΜΑΤΑ

- n ΣΥΧΝΟΤΗΤΑ
- n ΟΜΟΙΟΜΟΡΦΙΑ / ΑΝΟΜΟΙΟΜΟΡΦΙΑ
- n ΑΞΟΝΑΣ
- n ΕΥΡΟΣ QRS
- n CONCORDANCE
- n ΚΟΛΠΟΚΟΙΛΙΑΚΟΣ ΔΙΑΧΩΡΙΣΜΟΣ
- n ΣΥΣΤΟΛΕΣ ΑΠΟ ΣΥΓΧΩΝΕΥΣΗ-ΣΥΛΛΗΨΗ
- n ΜΟΡΦΟΛΟΓΙΑ QRS

ΗΛΕΚΤΡΟΚΑΡΔΙΟΓΡΑΦΙΚΑ ΕΥΡΗΜΑΤΑ

n **ΣΥΧΝΟΤΗΤΑ** : ΠΕΡΙΟΡΙΣΜΕΝΗ ΧΡΗΣΗ ΣΤΗΝ ΔΔ VT ΑΠΟ SVT.

n **ΟΜΟΙΟΜΟΡΦΙΑ** : ΣΤΗΝ ΚΤΣΥΝΗΘΩΣ ΟΜΟΙΟΜΟΡΦΙΑ ΤΟΥ ΚΟΙΛΙΑΚΟΥ ΣΥΜΠΛΕΓΜΑΤΟΣ ΣΤΙΣ ΠΡΟΚΑΡΔΙΕΣ ΑΠΑΓΩΓΕΣ ΜΕ ΜΙΚΡΗ ΔΙΑΚΥΜΑΝΣΗ RR ΔΙΑΣΤΗΜΑΤΩΝ (**ΜΟΝΟΜΟΡΦΗ** VT).

ΣΤΑΘΕΡΑ RR ΔΙΑΣΤΗΜΑΤΑ ΥΠΕΡ SVT

ΑΝΟΜΟΙΟΜΟΡΦΙΑ ΤΟΥ ΚΟΙΛΙΑΚΟΥ ΣΥΜΠΛΕΓΜΑΤΟΣ ΣΣΕ :

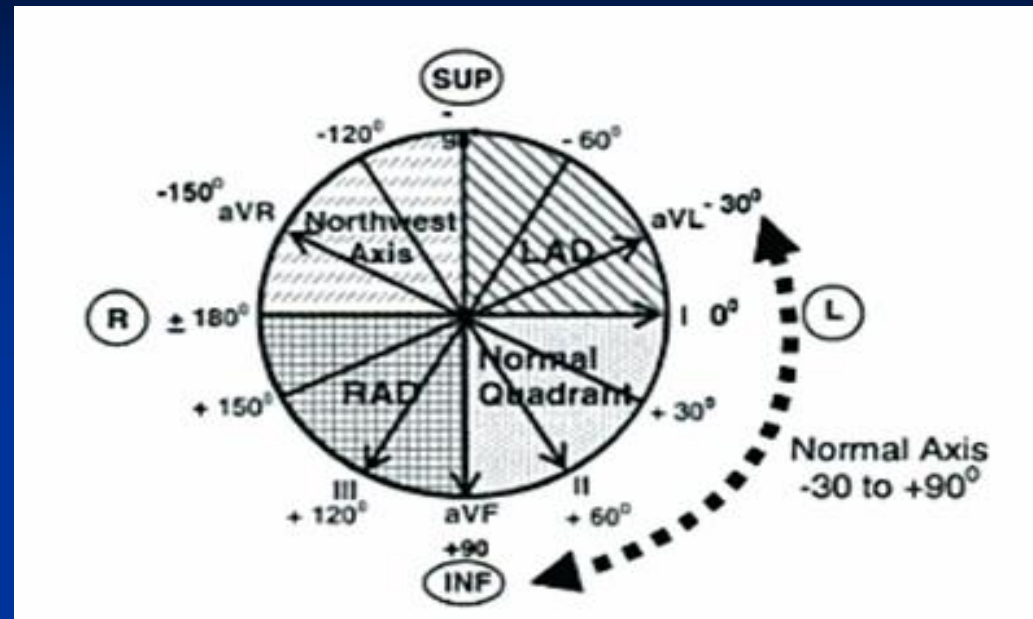
∅ **ΠΟΛΥΜΟΡΦΗ** VT

∅ **ΑΦ** ΜΕ ΚΟΛΠΟΚΟΙΛΙΑΚΗ ΑΓΩΓΗ ΜΕΣΩ ΕΝΟΣ ΠΑΡΑΠΛΗΡΩΜΑΤΙΚΟΥ ΔΕΜΑΤΙΟΥ

∅ **ΑΦ** ΜΕ ΑΠΟΚΛΕΙΣΜΟΣ ΚΕΛΟΥΣ

ΗΛΕΚΤΡΟΚΑΡΔΙΟΓΡΑΦΙΚΑ ΕΥΡΗΜΑΤΑ

§ ΑΞΟΝΑΣ



- n ΦΥΣΙΟΛΟΓΙΚΟΣ ΥΠΕΡ SVT.
- n ΥΠΕΡΔΕΞΙΟΣ ΑΞΟΝΑΣ (-90° ΕΩΣ $+180^{\circ}$) ΥΠΕΡ VT.
- n ΣΥΓΚΡΙΣΗ ΜΕ ΑΞΟΝΑ ΚΑΤΑ ΤΗΝ ΔΙΑΡΚΕΙΑ SR, ΣΤΡΟΦΗ ΤΟΥ ΑΞΟΝΑ $> 40^{\circ}$ ΚΑΤΑ ΤΗΝ WCT ΥΠΕΡ VT.
- n ΣΕ WCT ΜΕ ΜΟΡΦΟΛΟΓΙΑ RBBB, ΑΡΙΣΤΕΡΟΣ ΑΞΟΝΑΣ ΥΠΕΡ VT.
- n ΣΕ WCT ΜΕ ΜΟΡΦΟΛΟΓΙΑ LBBB, ΔΕΞΙΟΣ ΑΞΟΝΑΣ ΥΠΕΡ VT.

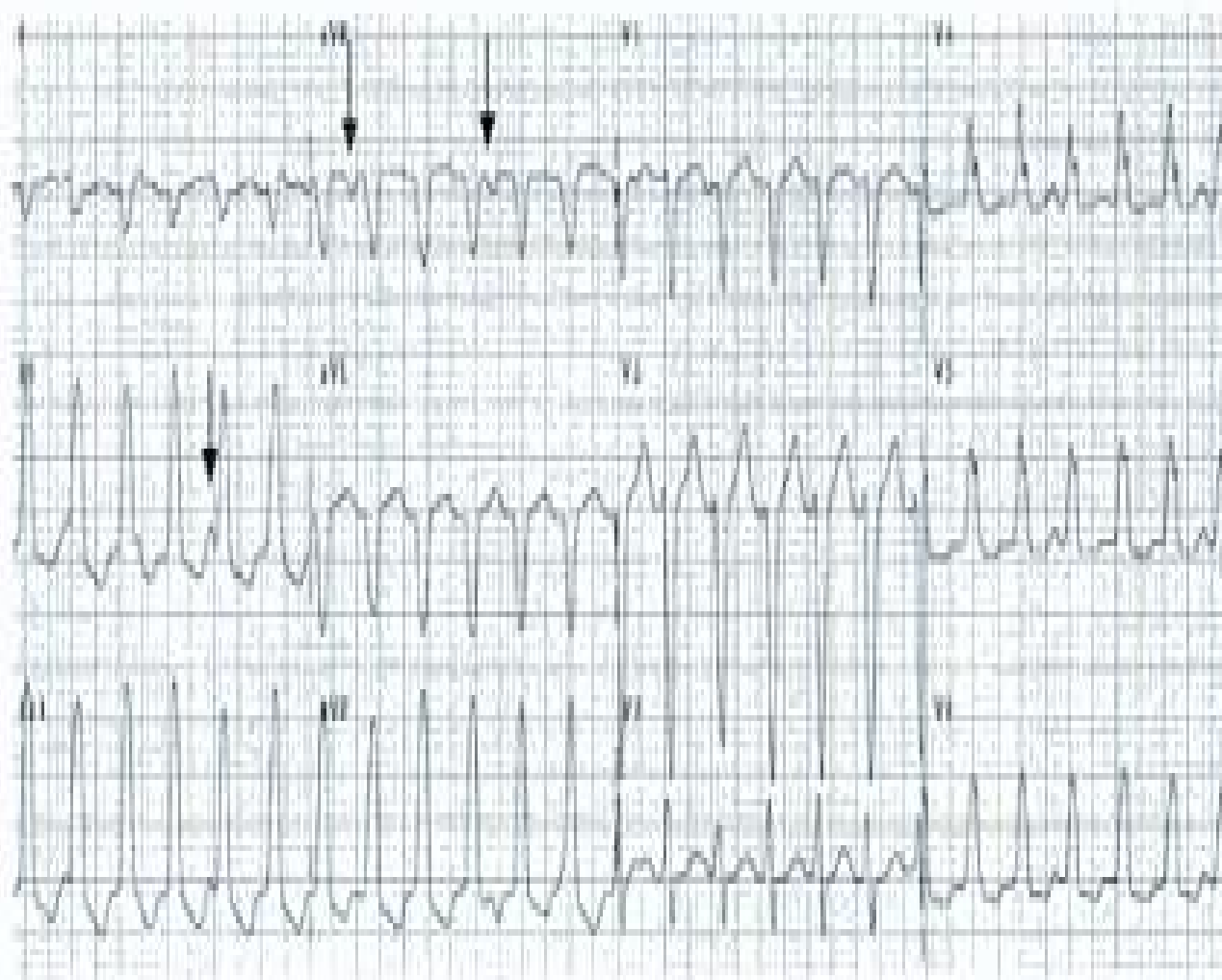


Figure 22.23: Left Bundle Branch Block with Right Axis $>90^\circ$. This finding usually indicates ventricular tachycardia (VT). Note also the presence of complete AV dissociation (arrows), which also indicates VT.

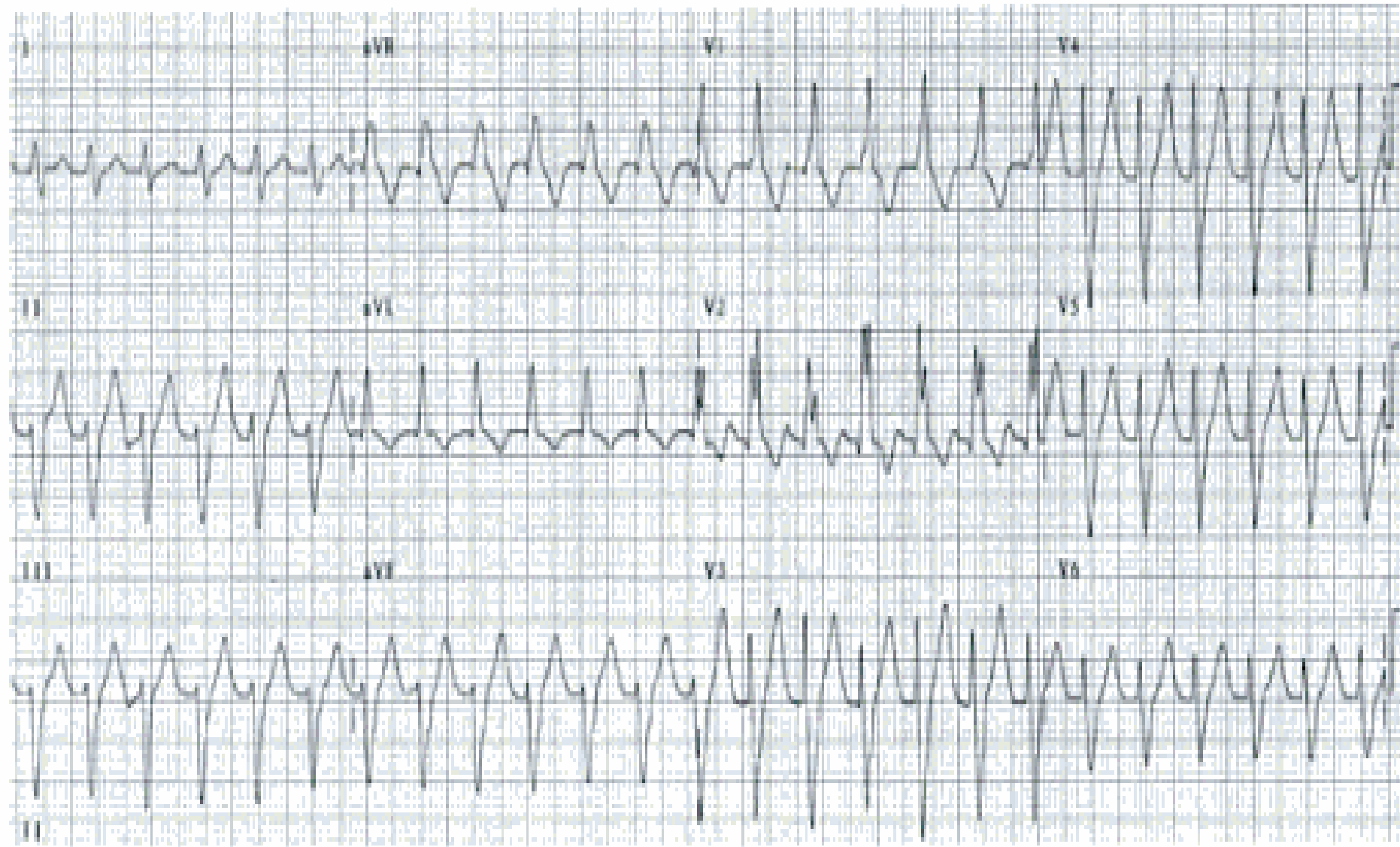


Figure 22.22: Right Bundle Branch Block with Left Axis Deviation. This finding favors ventricular tachycardia.

ΗΛΕΚΤΡΟΚΑΡΔΙΟΓΡΑΦΙΚΑ ΕΥΡΗΜΑΤΑ

ΕΥΡΟΣ QRS

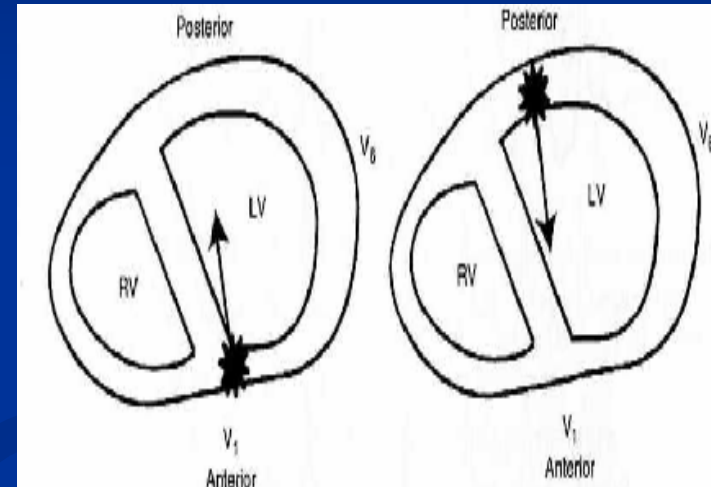
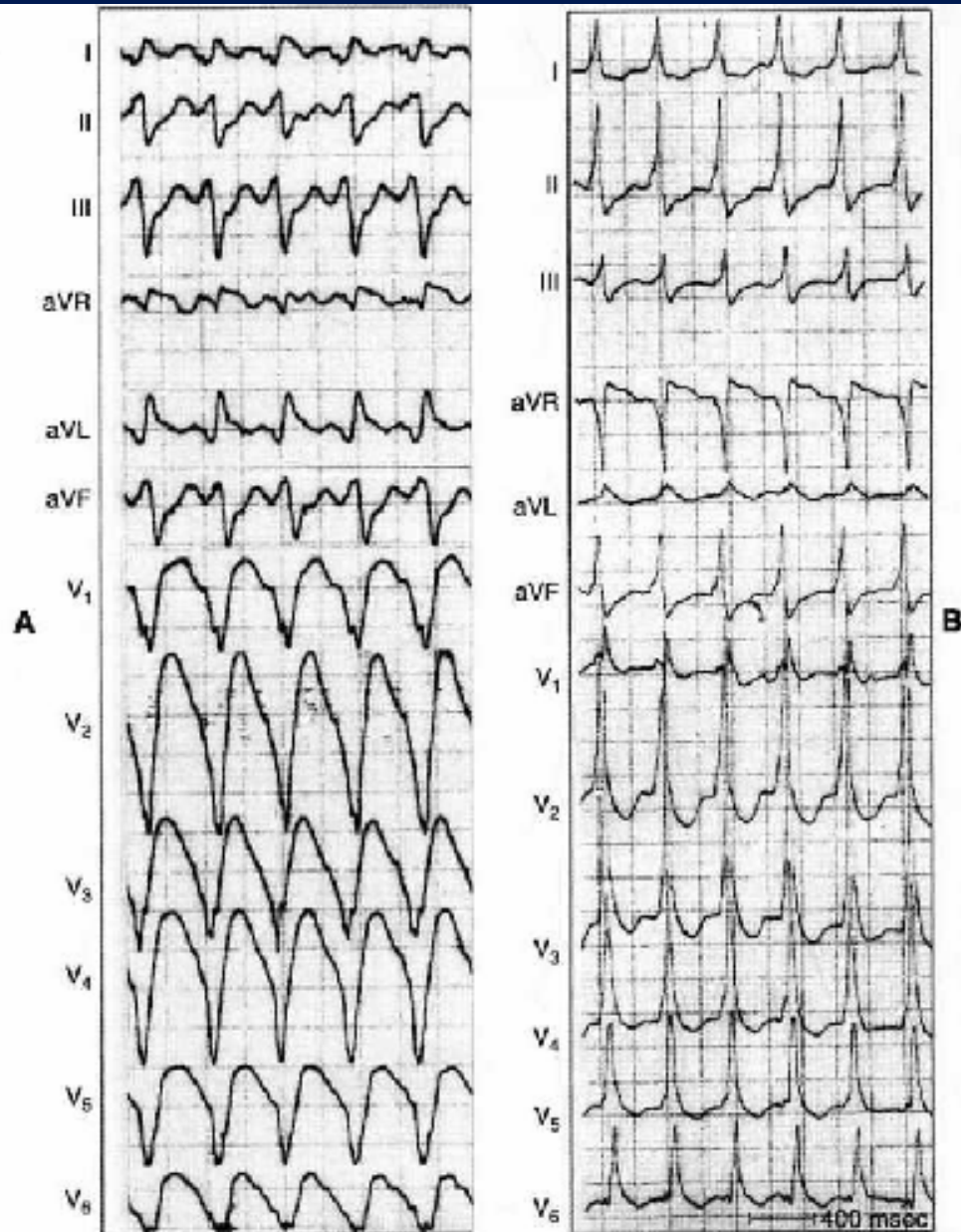
- § ΣΕ WCT ΜΕ ΜΟΡΦΟΛΟΓΙΑ RBBB, ΔΙΑΡΚΕΙΑ > 140 msec ΥΠΕΡ VT.
- § ΣΕ WCT ΜΕ ΜΟΡΦΟΛΟΓΙΑ LBBB, ΔΙΑΡΚΕΙΑ > 160 msec ΥΠΕΡ VT.
- § ΔΙΑΡΚΕΙΑ QRS < 140 msec ΔΕΝ ΑΠΟΚΛΕΙΕΙ VT (VT ΠΟΥ ΠΡΟΕΡΧΕΤΑΙ ΑΠΟ ΤΟ ΜΕΣΟΚΟΙΛΙΑΚΟ ΔΙΑΦΡΑΓΜΑ Ή ΑΠΟ ΤΟ ΣΥΣΤΗΜΑ HIS-PURKINJE).

ΗΛΕΚΤΡΟΚΑΡΔΙΟΓΡΑΦΙΚΑ ΕΥΡΗΜΑΤΑ

CONCORDANCE

- § ΟΤΑΝ ΤΑ ΣΥΜΠΛΕΓΜΑΤΑ QRS ΕΙΝΑΙ ΜΟΝΟΦΑΣΙΚΑ ΚΑΙ ΤΗΣ ΙΔΙΑΣ ΠΟΛΙΚΟΤΗΤΑΣ ΣΤΙΣ ΠΡΟΚΑΡΔΙΕΣ ΑΠΑΓΩΓΕΣ (90% ΕΙΔΙΚΟΤΗΤΑ ΓΙΑ ΔΔ VT).
- § ΑΠΟΥΣΙΑ CONCORDANCE ΟΤΑΝ ΣΕ ΜΙΑ ΑΠΟ ΤΙΣ ΠΡΟΚΑΡΔΙΕΣ ΑΠΑΓΩΓΕΣ ΥΠΑΡΧΕΙ ΔΙΦΑΣΙΚΟ QRS.
Η ΑΠΟΥΣΙΑ CONCORDANCE ΔΕΝ ΕΙΝΑΙ ΔΙΑΓΝΩΣΤΙΚΑ ΧΡΗΣΙΜΗ.

CONCORDANCE

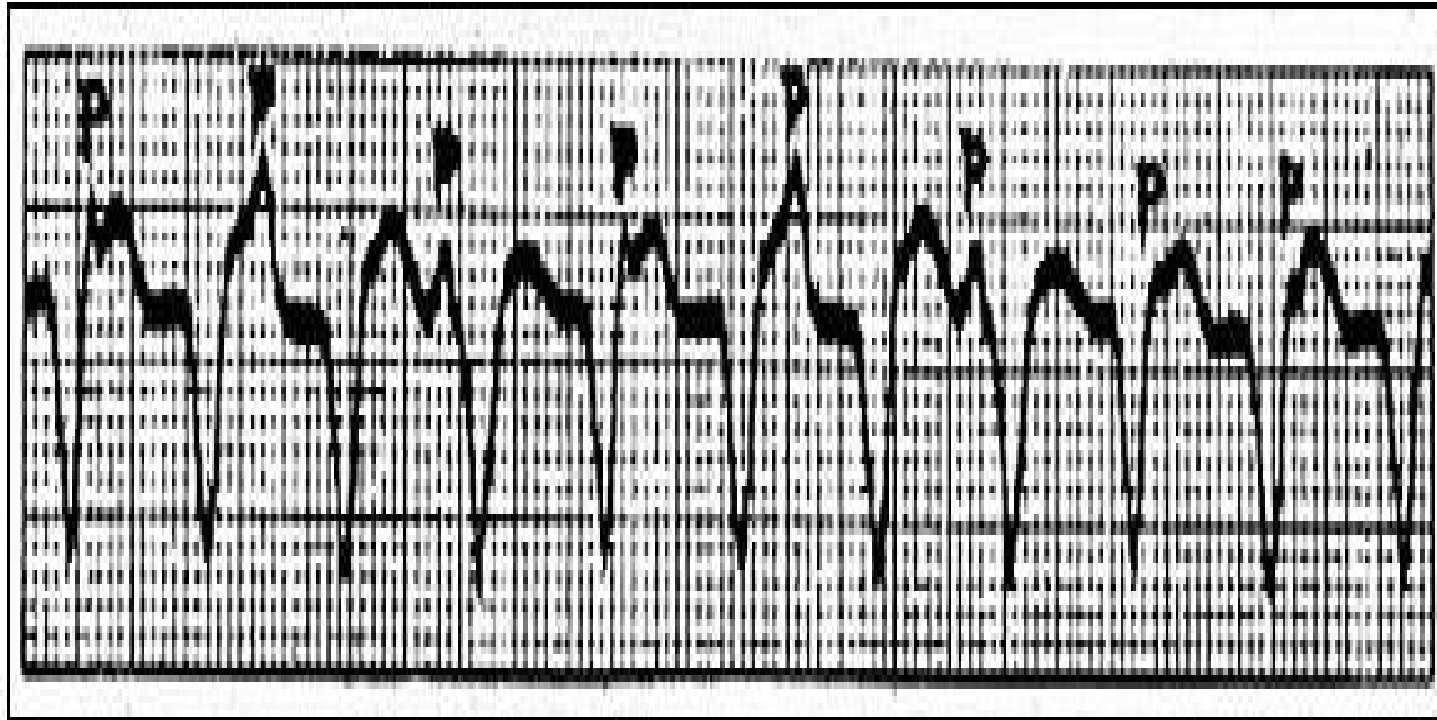


ΗΛΕΚΤΡΟΚΑΡΔΙΟΓΡΑΦΙΚΑ ΕΥΡΗΜΑΤΑ

ΚΟΛΠΟΚΟΙΛΙΑΚΟΣ ΔΙΑΧΩΡΙΣΜΟΣ

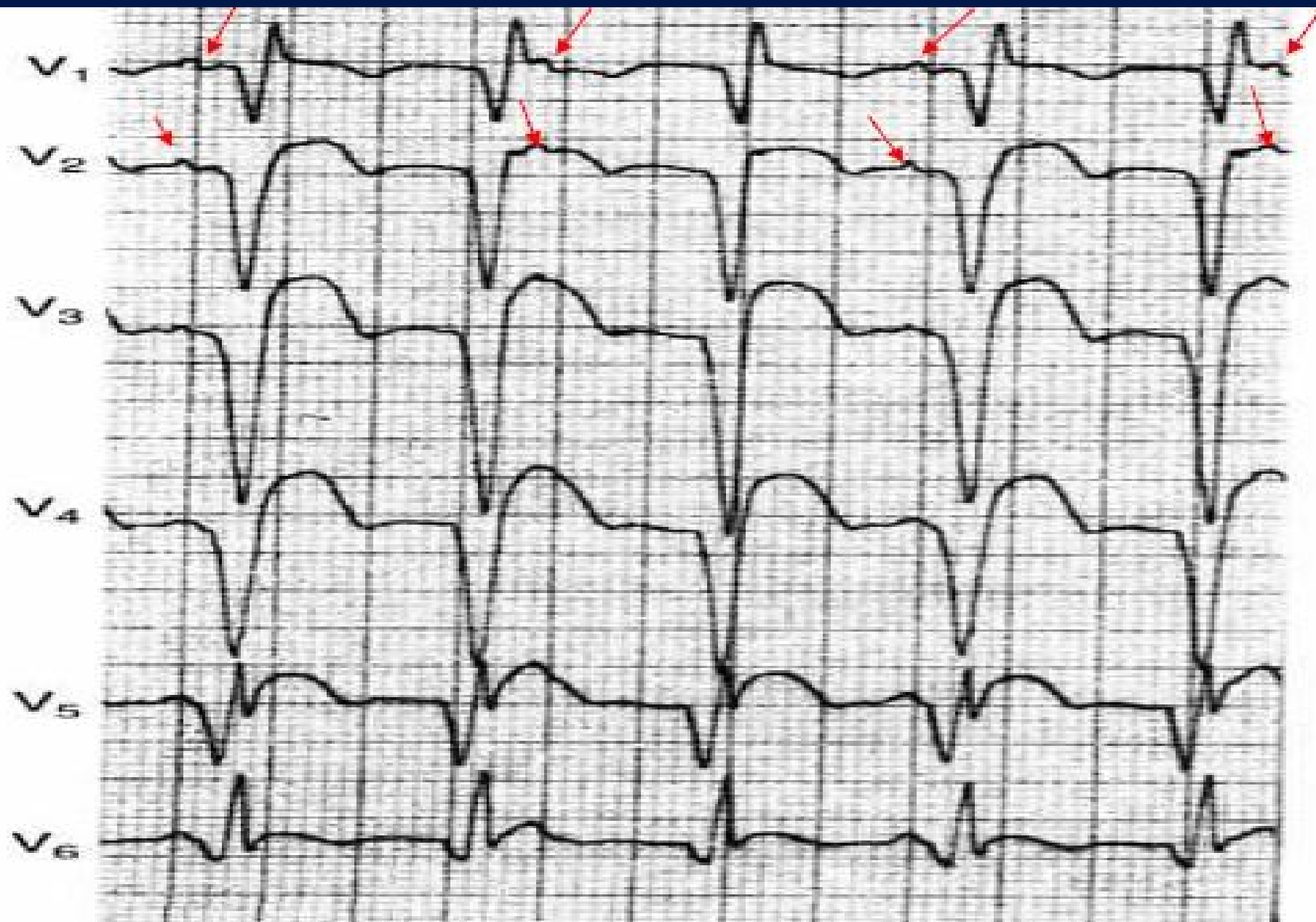
- § **ΑΝΕΞΑΡΤΗΤΗ ΚΟΛΠΙΚΗ –ΚΟΙΛΙΑΚΗ ΔΡΑΣΤΗΡΙΟΤΗΤΑ ΣΤΟ 20-50% ΤΩΝ VT ΚΑΙ ΣΧΕΔΟΝ ΠΟΤΕ ΣΤΙΣ SVT.**
- n **ΚΟΛΠΙΚΗ ΣΥΧΝΟΤΗΤΑ < ΚΟΙΛΙΑΚΗ ΣΥΧΝΟΤΗΤΑ ΥΠΕΡ VT.**
- n **ΚΟΛΠΙΚΗ ΣΥΧΝΟΤΗΤΑ > ΚΟΙΛΙΑΚΗ ΣΥΧΝΟΤΗΤΑ ΥΠΕΡ SVT.**
- § **Η ΠΑΡΟΥΣΙΑ ΚΚΔ ΕΠΙΒΕΒΑΙΩΝΕΙ ΤΗΝ ΔΙΑΓΝΩΣΗ ΤΗΣ VT ΑΛΛΑ Η ΑΠΟΥΣΙΑ ΚΚΔ ΔΕΝ ΑΠΟΚΛΕΙΕΙ VT.**

ΚΟΛΠΟΚΟΙΛΙΑΚΟΣ ΔΙΑΧΩΡΙΣΜΟΣ



Atrioventricular (AV) dissociation. Ventricular tachycardia and complete AV dissociation. P waves are marked.

ΚΟΛΠΟΚΟΙΛΙΑΚΟΣ ΔΙΑΧΩΡΙΣΜΟΣ



ΣΥΣΤΟΛΕΣ ΑΠΟ ΣΥΓΧΩΝΕΥΣΗ ΚΑΙ ΣΥΣΤΟΛΕΣ ΑΠΟ ΣΥΛΛΗΨΗ

- n **ΣΥΣΤΟΛΗ ΑΠΟ ΣΥΓΧΩΝΕΥΣΗ:** ΟΤΑΝ ΕΝΑ ΕΡΕΘΙΣΜΑ ΠΟΥ ΠΡΟΕΡΧΕΤΑΙ ΑΠΟ ΤΗΝ ΚΟΙΛΙΑ ΚΑΙ ΕΝΑ ΔΕΥΤΕΡΟ ΠΟΥ ΠΡΟΕΡΧΕΤΑΙ ΑΠΟ ΤΟ ΜΥΟΚΑΡΔΙΟ ΠΑΝΩ ΑΠΟ ΤΙΣ ΚΟΙΛΙΕΣ ΜΕΤΑΔΙΔΕΤΑΙ ΤΑΥΤΟΧΡΟΝΑ ΣΤΟ ΚΟΙΛΙΑΚΟ ΜΥΟΚΑΡΔΙΟ.
- n **ΣΥΣΤΟΛΗ ΑΠΟ ΣΥΛΛΗΨΗ:** ΚΑΝΟΝΙΚΗ ΣΥΣΤΟΛΗ ΠΟΥ ΣΤΙΓΜΙΑΙΑ ΛΑΜΒΑΝΕΙ ΤΟΝ ΕΛΕΓΧΟ ΑΠΟ ΤΟ ΚΟΙΛΙΑΚΟ ΚΕΝΤΡΟ.

ΣΥΣΤΟΛΕΣ ΑΠΟ ΣΥΓΧΩΝΕΥΣΗ ΚΑΙ ΣΥΣΤΟΛΕΣ ΑΠΟ ΣΥΛΛΗΨΗ

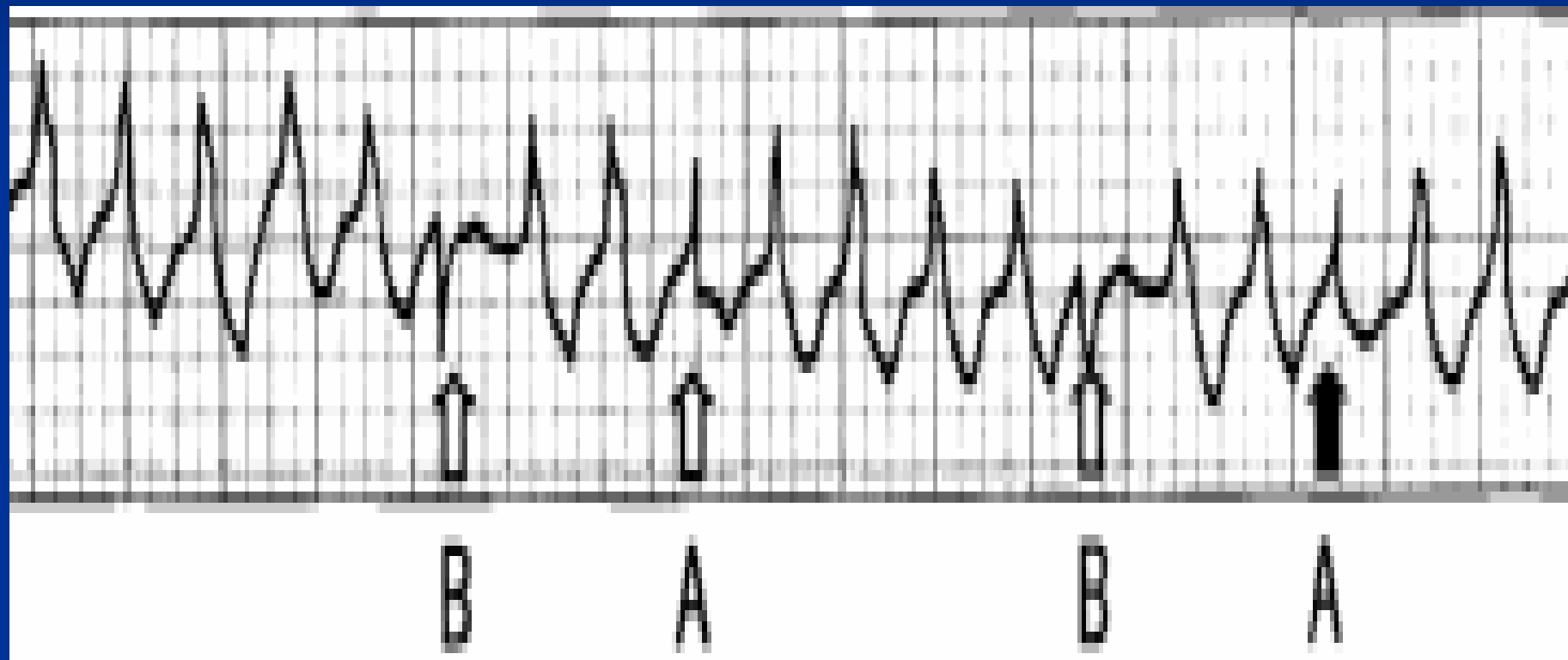
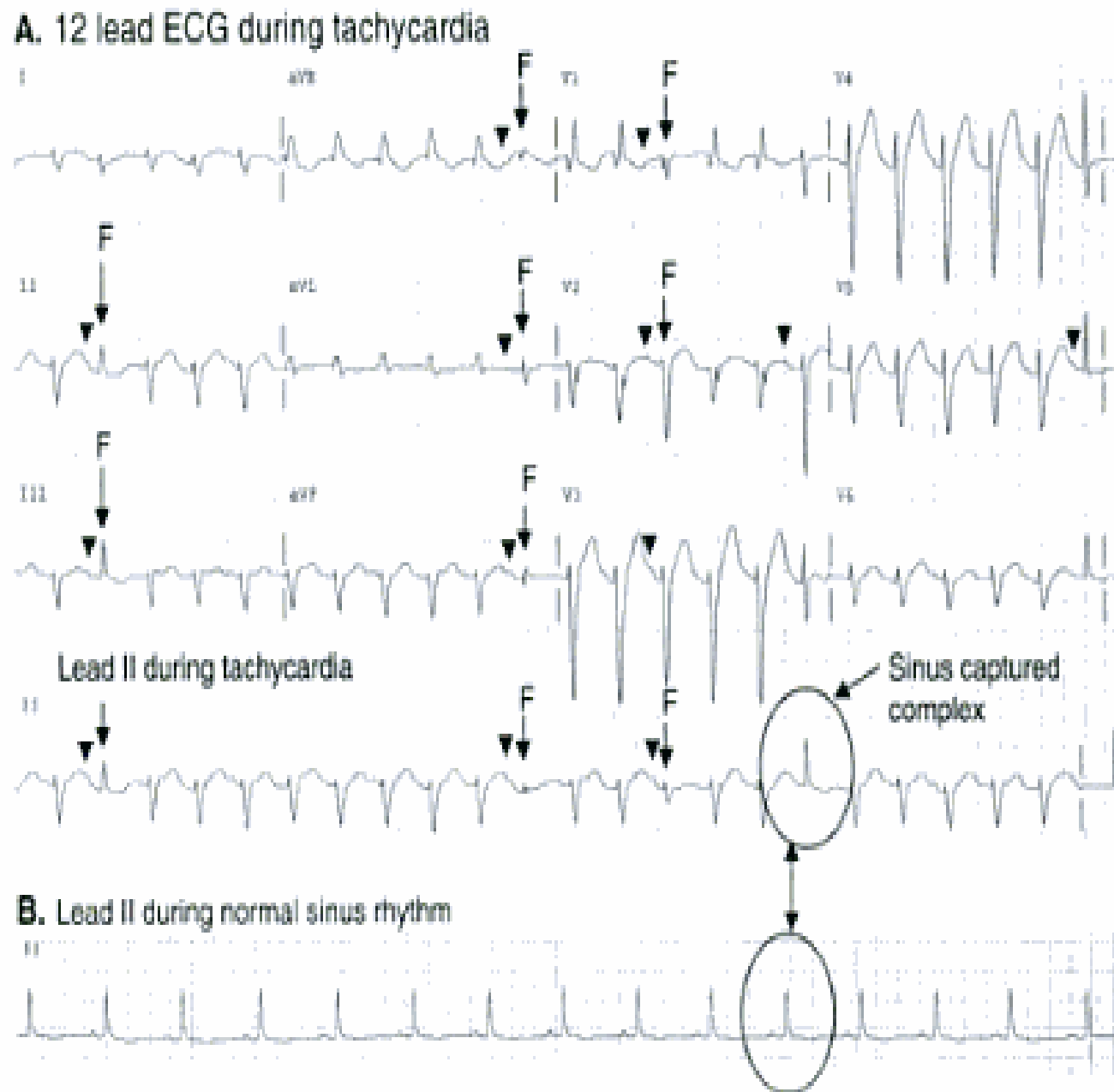


Figure 22.7: Sinus Captured and Ventricular Fusion Complexes. (A) 12-lead electrocardiogram during wide complex tachycardia. Ventricular fusion complexes are marked by the letter F. The fusion complexes are preceded by sinus P waves (arrowheads). A sinus captured complex, also called Dressler's beat, is circled. (B) Lead II rhythm strip from the same patient recorded separately during normal sinus rhythm. The sinus-captured complex recorded in lead II is identical to the QRS complex during sinus rhythm and are both circled for comparison.



ΗΛΕΚΤΡΟΚΑΡΔΙΟΓΡΑΦΙΚΑ ΕΥΡΗΜΑΤΑ

ΜΟΡΦΟΛΟΓΙΑ QRS

- n **ΜΟΡΦΟΛΟΓΙΑ RBBB** : QRS ΜΕ "ΘΕΤΙΚΗ" ΠΟΛΙΚΟΤΗΤΑ ΣΤΙΣ ΑΠΑΓΩΓΕΣ V1-V2.
- n **ΜΟΡΦΟΛΟΓΙΑ LBBB** : QRS ΜΕ "ΑΡΝΗΤΙΚΗ" ΠΟΛΙΚΟΤΗΤΑ ΣΤΙΣ ΑΠΑΓΩΓΕΣ V1-V2.

ΗΛΕΚΤΡΟΚΑΡΔΙΟΓΡΑΦΙΚΑ ΕΥΡΗΜΑΤΑ

ΜΟΡΦΟΛΟΓΙΑ RBBB

- n **ΑΠΑΓΩΓΗ V1:** ΜΟΝΟΦΑΣΙΚΟ R 'Η ΔΙΦΑΣΙΚΟ qR ΣΥΜΠΛΕΓΜΑ ΥΠΕΡ VT.
- n ΤΡΙΦΑΣΙΚΟ ΣΥΜΠΛΕΓΜΑ RSR' 'Η R_sR' ΥΠΕΡ SVT.
- n **ΑΠΑΓΩΓΗ V6:** rS ΣΥΜΠΛΕΓΜΑ ΥΠΕΡ VT.
- § R_s ΣΥΜΠΛΕΓΜΑ ΥΠΕΡ SVT.

ΜΟΡΦΟΛΟΓΙΑ QRS

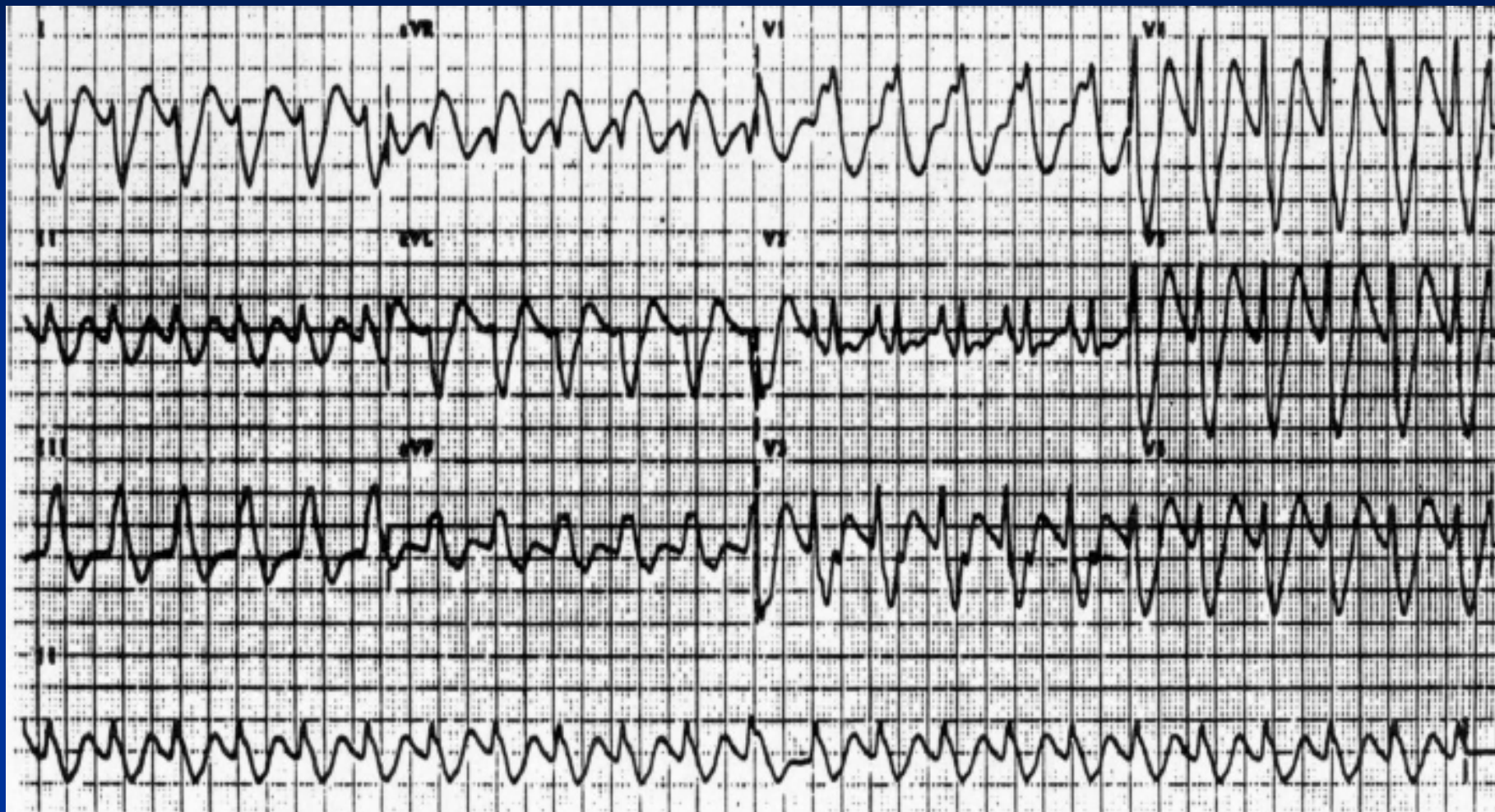


Figure 11. A 12-lead ECG of a RBBB morphology ventricular tachycardia. Lead V₁ demonstrates a monophasic R wave and lead V₆ demonstrates rS complex with R:S ratio <1.

ΗΛΕΚΤΡΟΚΑΡΔΙΟΓΡΑΦΙΚΑ ΕΥΡΗΜΑΤΑ

ΜΟΡΦΟΛΟΓΙΑ LBVB

- § **ΑΠΑΓΩΓΕΣ V1-V2** : ΕΥΡΗ ΑΡΧΙΚΟ ΚΥΜΑ R ΔΙΑΡΚΕΙΑΣ > 30 msec ΥΠΕΡ VT.
- § ΥΠΑΡΞΗ ΚΟΜΒΩΣΗΣ ΣΤΟ ΚΑΤΙΩΝ ΣΚΕΛΟΣ ΤΟΥ ΚΥΜΑΤΟΣ S ΥΠΕΡ VT.
- § ΔΙΑΡΚΕΙΑ ΑΠΟ ΤΗΝ ΑΡΧΗ ΤΟΥ QRS ΣΥΜΠΛΕΓΜΑΤΟΣ ΕΩΣ ΤΟ ΝΑΔΙΡ ΤΟΥ Qs 'Η ΤΟΥ S ΚΥΜΑΤΟΣ ≥ 60 msec , ΥΠΕΡ VT.
- § **ΑΠΑΓΩΓΗ V6** : ΥΠΑΡΞΗ ΚΥΜΑΤΟΣ Q 'Η Qs ΥΠΕΡ VT.

ΜΟΡΦΟΛΟΓΙΑ QRS

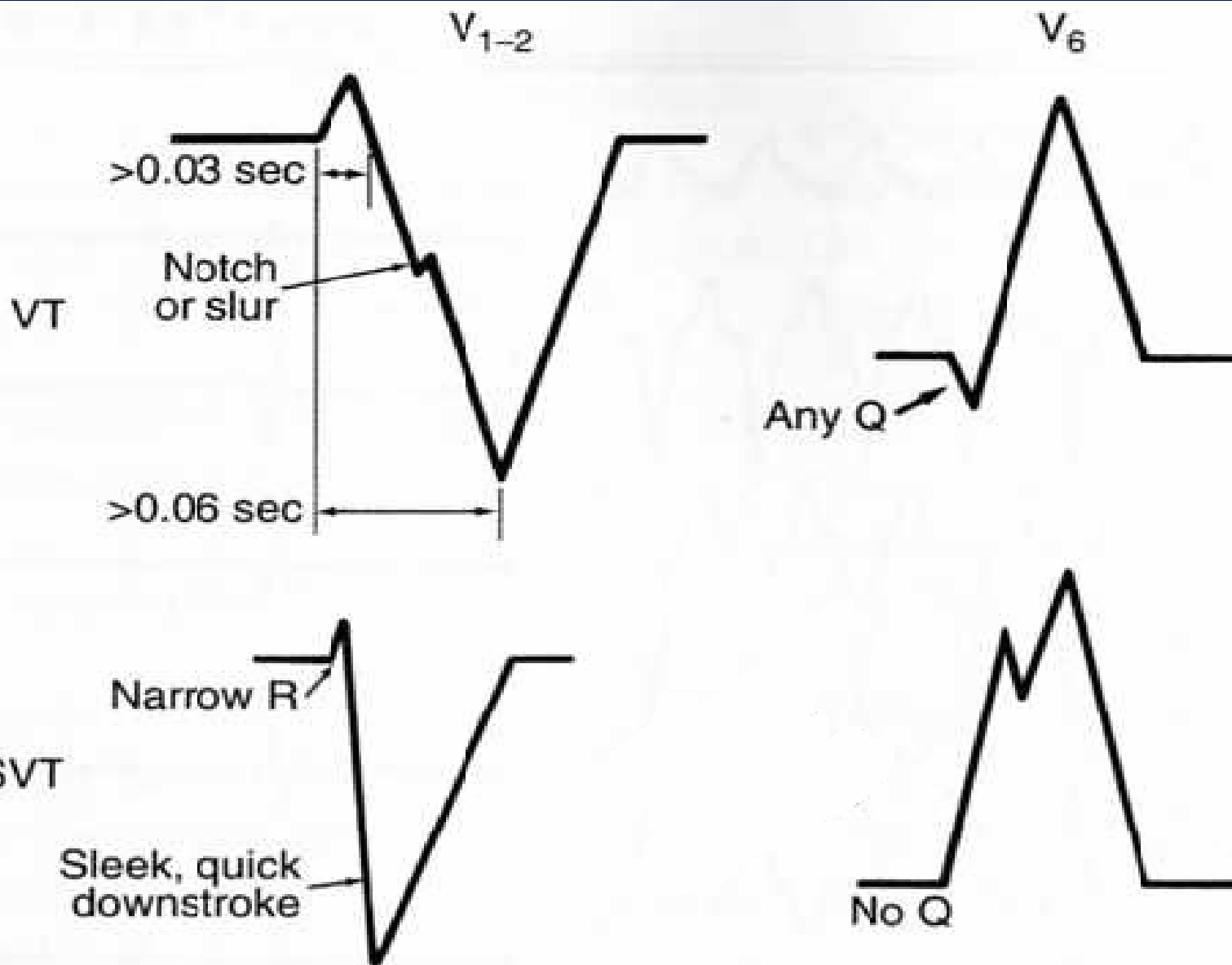

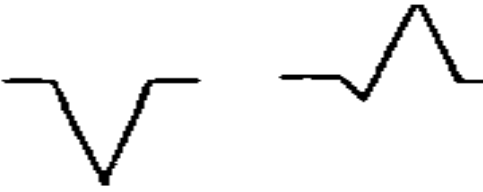
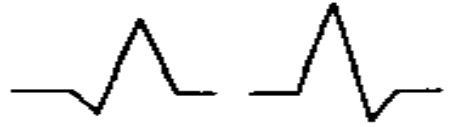

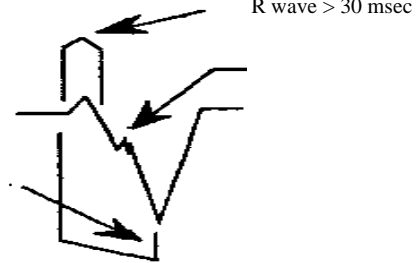
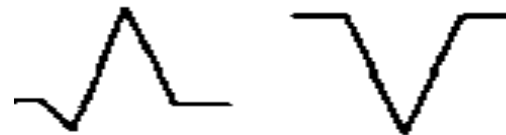


Table II.

Morphology Criteria for VT	
Right bundle type requires waveform from	both V1 and V6.
V1	V6
Monophasic R wave 	QS or QR 
QR or RS 	R/S < 1 
Left bundle type requires any of the below morphologies.	
V1 or V2	V6
Greater than 60msec nadir S wave 	QR or QS 

Adapted from Brugada et al. A new approach to the differential diagnosis of regular tachycardia with a wide QRS complex. Circulation 1991; 83:1649-59.

ΑΛΓΟΡΙΘΜΟΣ BRUGADA

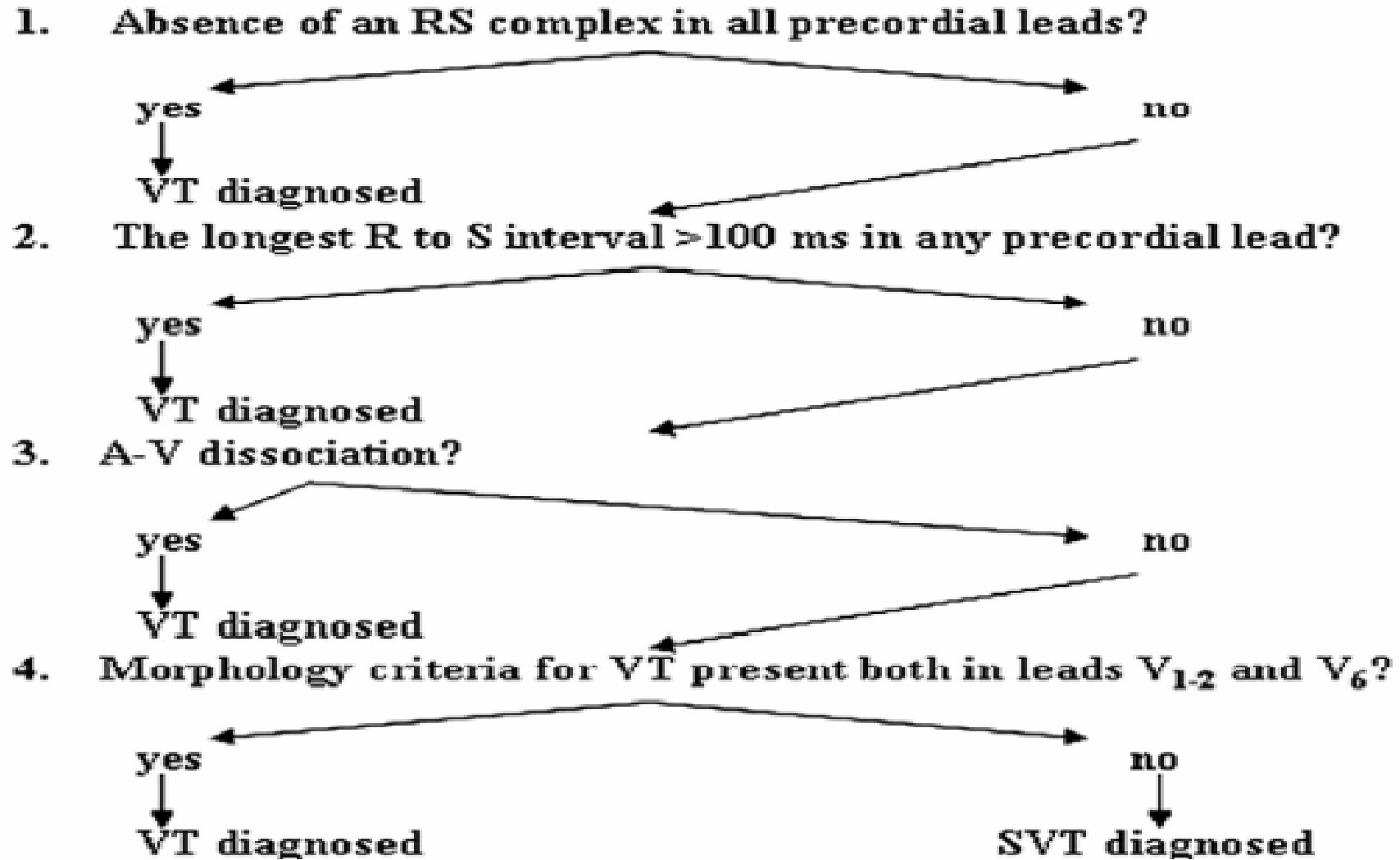

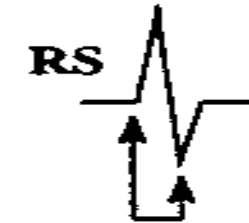


Table I.

Diagnosis Of Wide QRS Complex Tachycardia With A Regular Rhythm	
Step 1	. Is there absence of an RS complex in all precordial leads V1 – V6?
 <p>RS</p> <p>If yes, then the rhythm is VT.</p> <ul style="list-style-type: none"> • Sens 0.21 Spec 1.0 	
Step 2.	Is the interval from the onset of the R wave to the nadir of the S wave greater than 100 msec in any precordial leads?
 <p>RS</p> <p>If yes, then the rhythm is VT.</p> <ul style="list-style-type: none"> • Sens 0.66 Spec 0.98 	
Step 3	. Is there AV dissociation?
<p>If yes, then the rhythm is VT.</p> <ul style="list-style-type: none"> • Sens 0.82 Spec 0.98 	
Step 4.	Are morphology criteria for VT present? <i>See Table II.</i>
<p>If yes, then the rhythm is VT.</p> <ul style="list-style-type: none"> • Sens 0.99 Spec 0.97 	

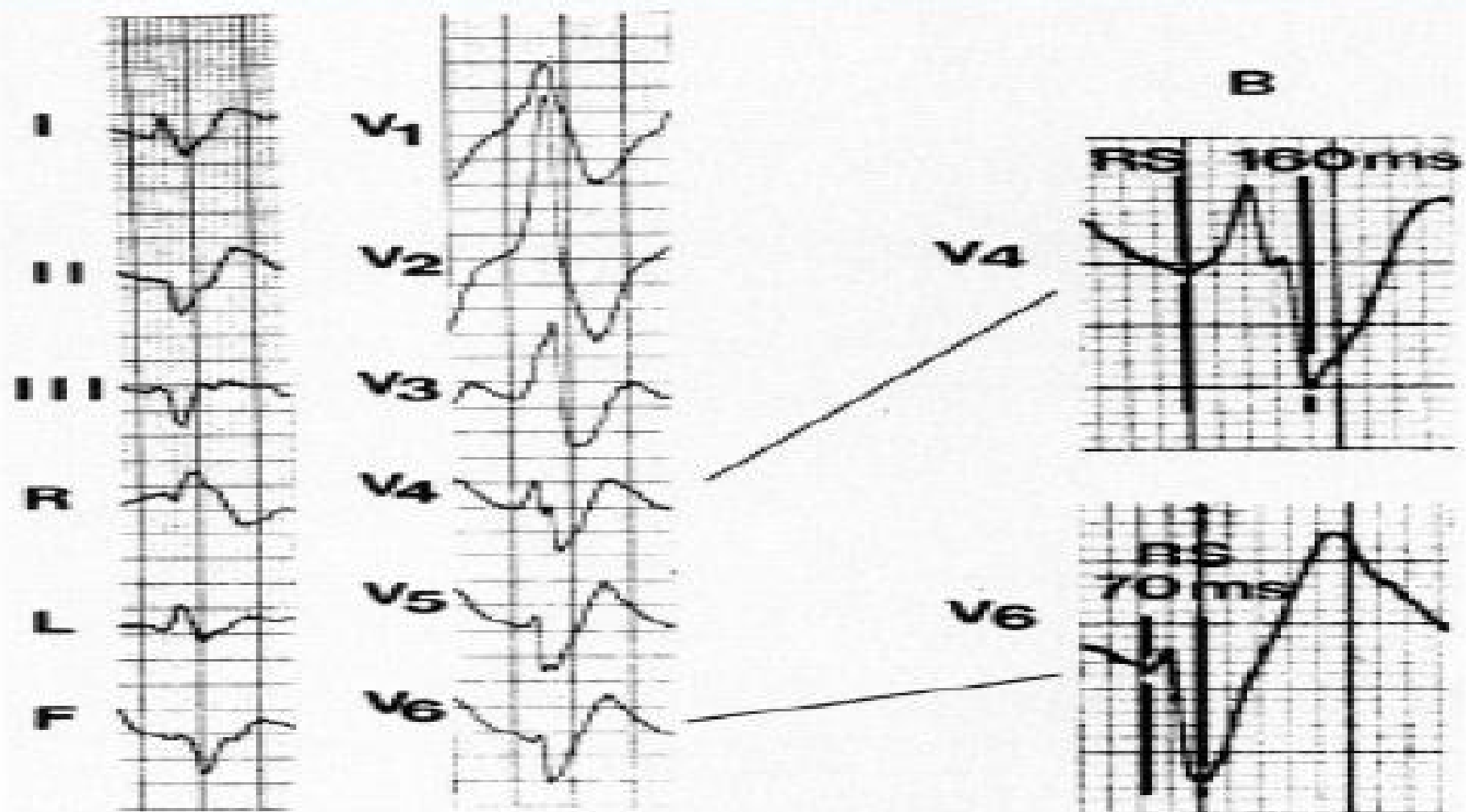


FIGURE 6. Tracings from the 12-lead electrocardiogram illustrating the measurement of the RS interval. A ventricular tachycardia with a right bundle branch blocklike QRS complex is shown. An RS complex is observed in the precordial leads V_3 to V_6 . S wave is, however, not sharp enough in lead V_3 to measure confidently an RS interval. RS interval (enlarged in the right panel) measures 160 msec in lead V_4 and 70 msec in lead V_6 . Thus, the longest RS interval is more than 100 msec and diagnostic of ventricular tachycardia. Paper speed was 25 mm/sec.

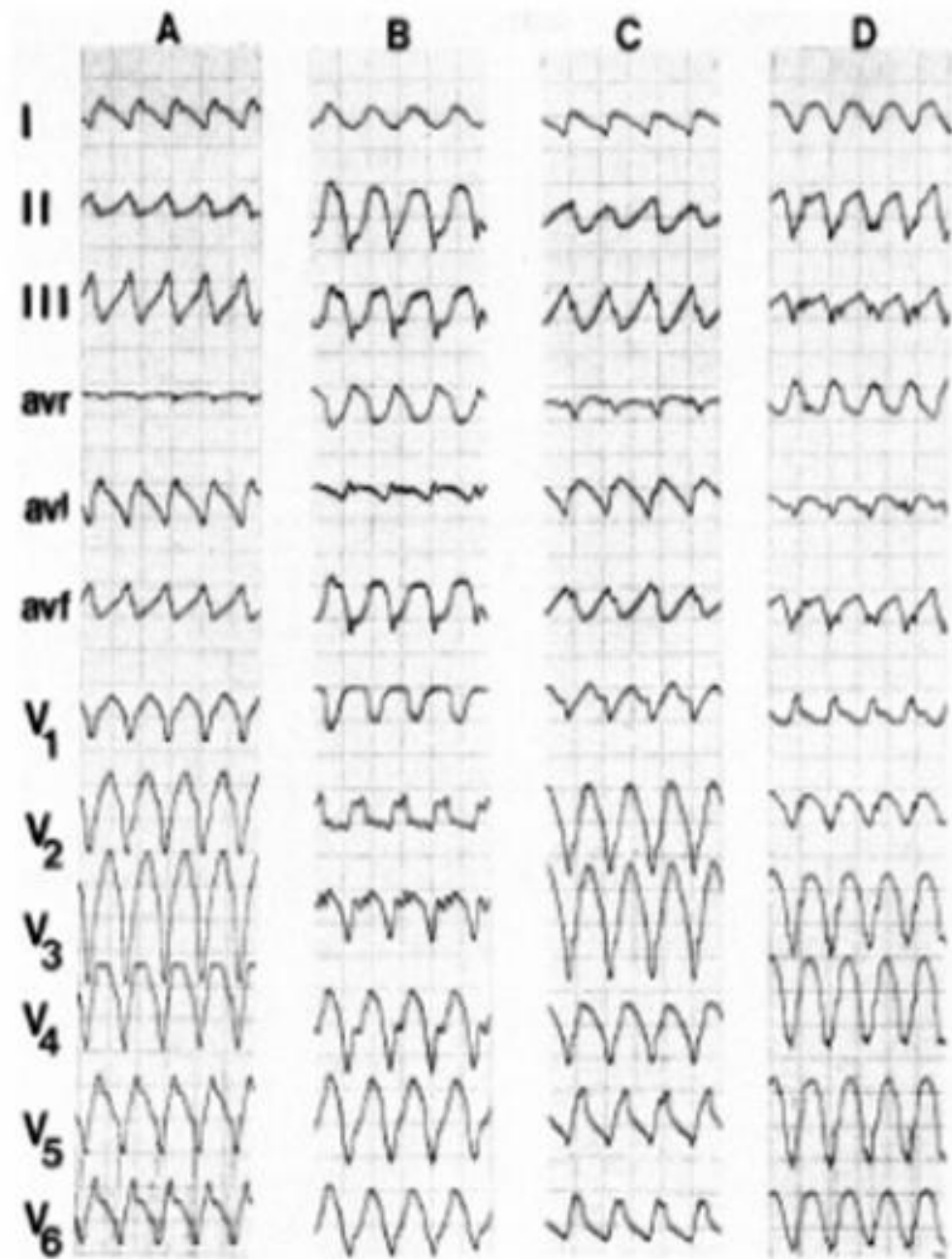
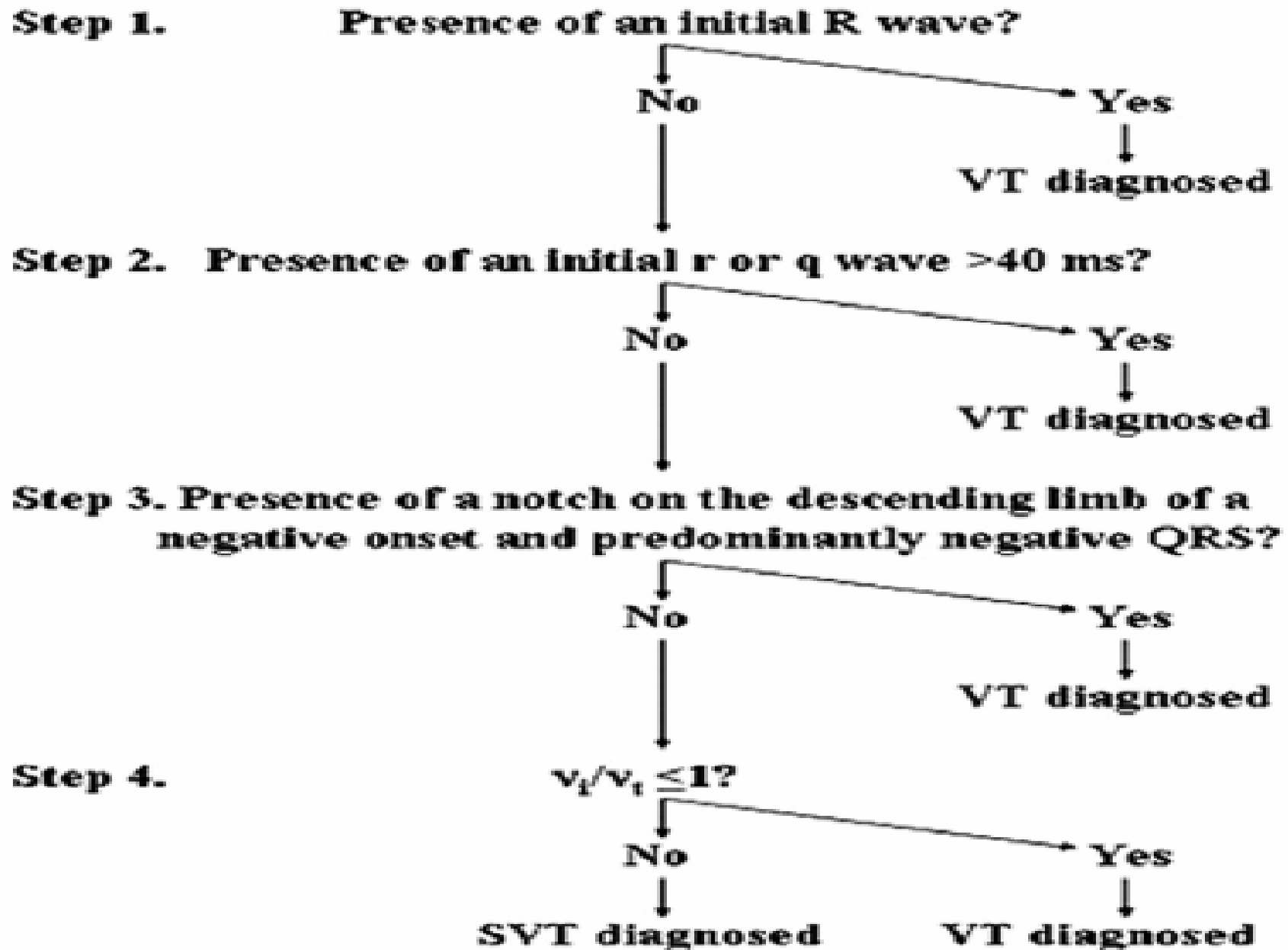
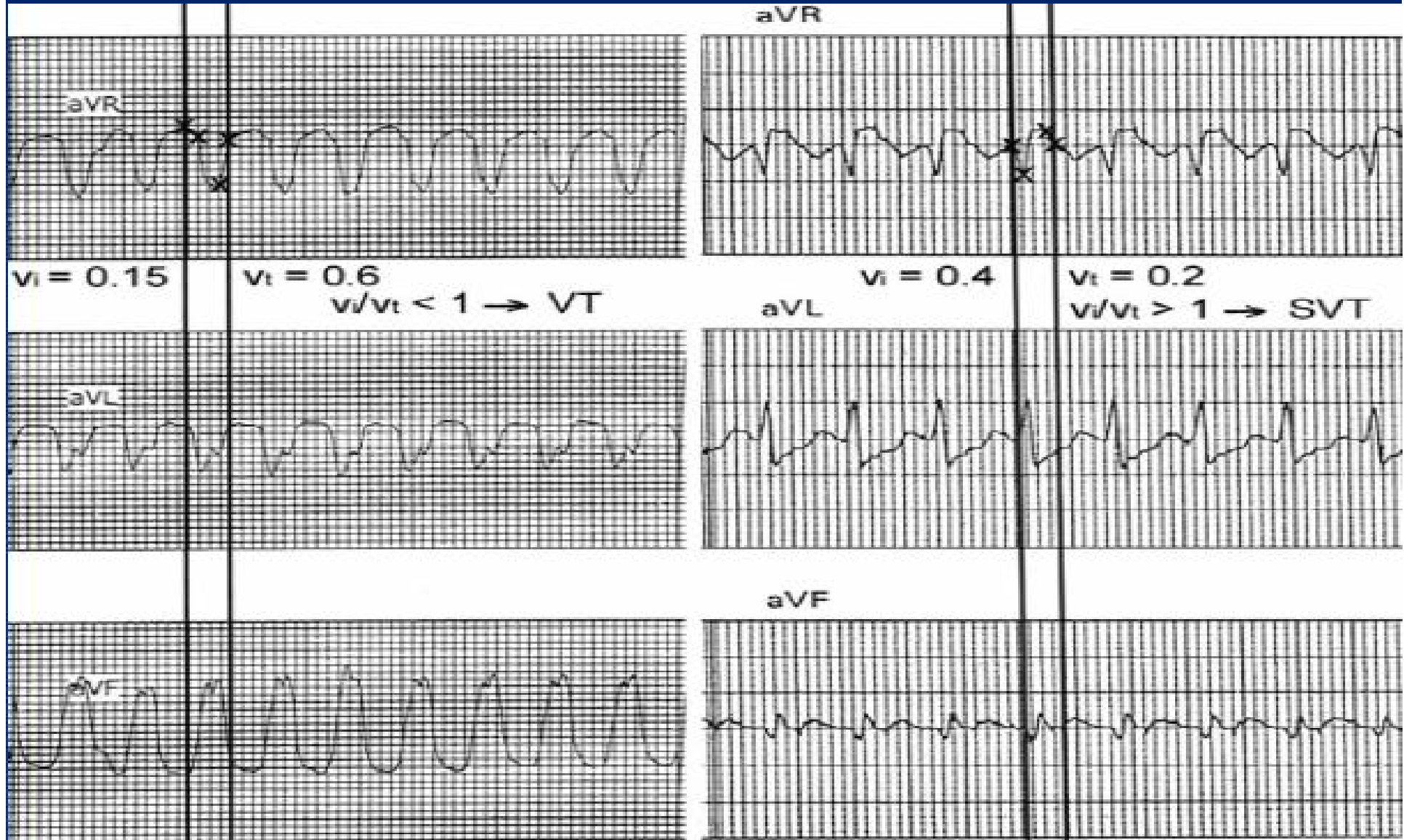


FIGURE 5. Twelve-lead electrocardiograms showing ventricular tachycardias without RS complexes in any precordial lead. This finding is 100% specific for the diagnosis of ventricular tachycardia. Only QS, QR, or monophasic R complexes are observed.

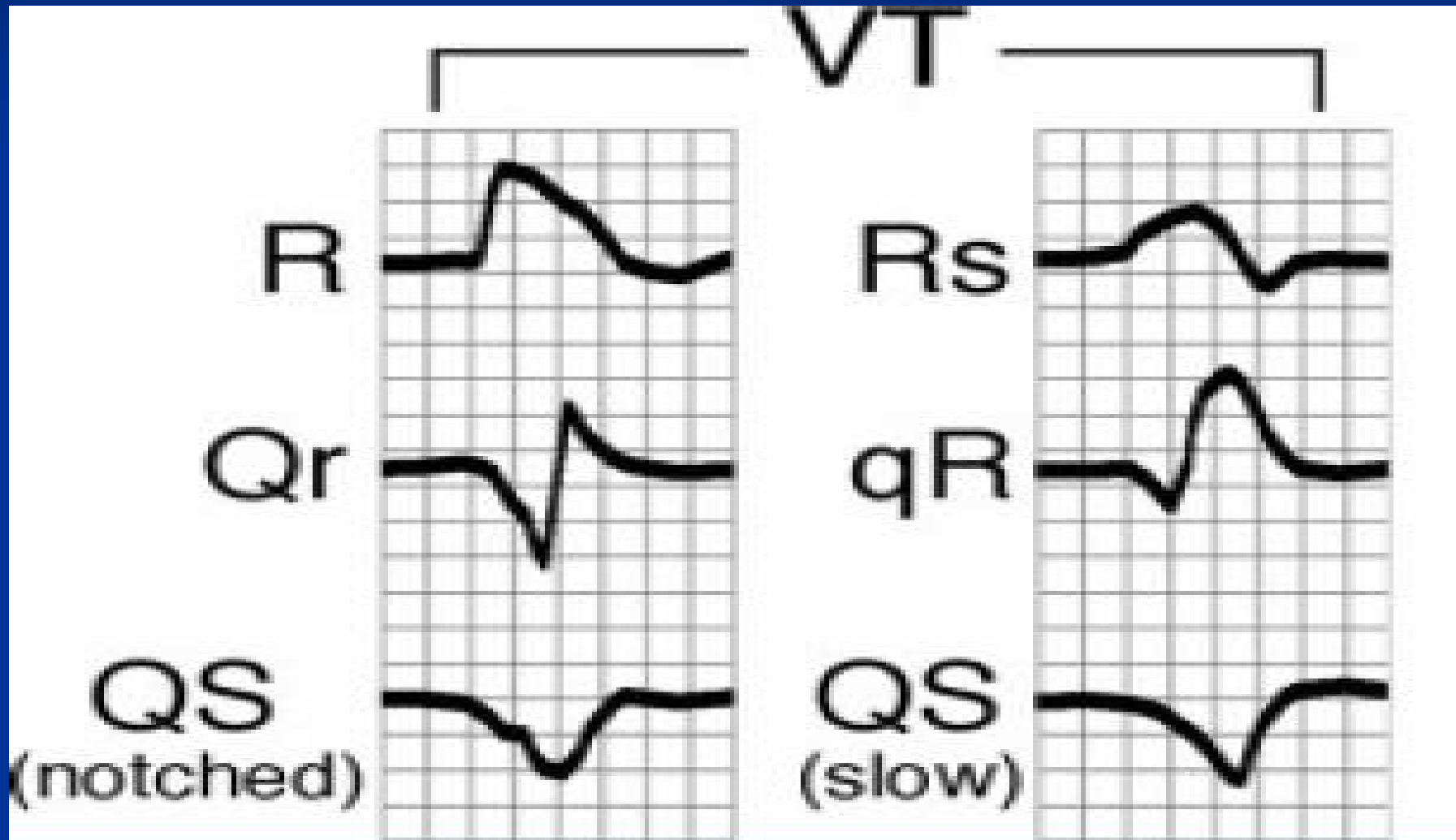
ΝΕΟΣ ΑΛΓΟΡΙΘΜΟΣ aVR



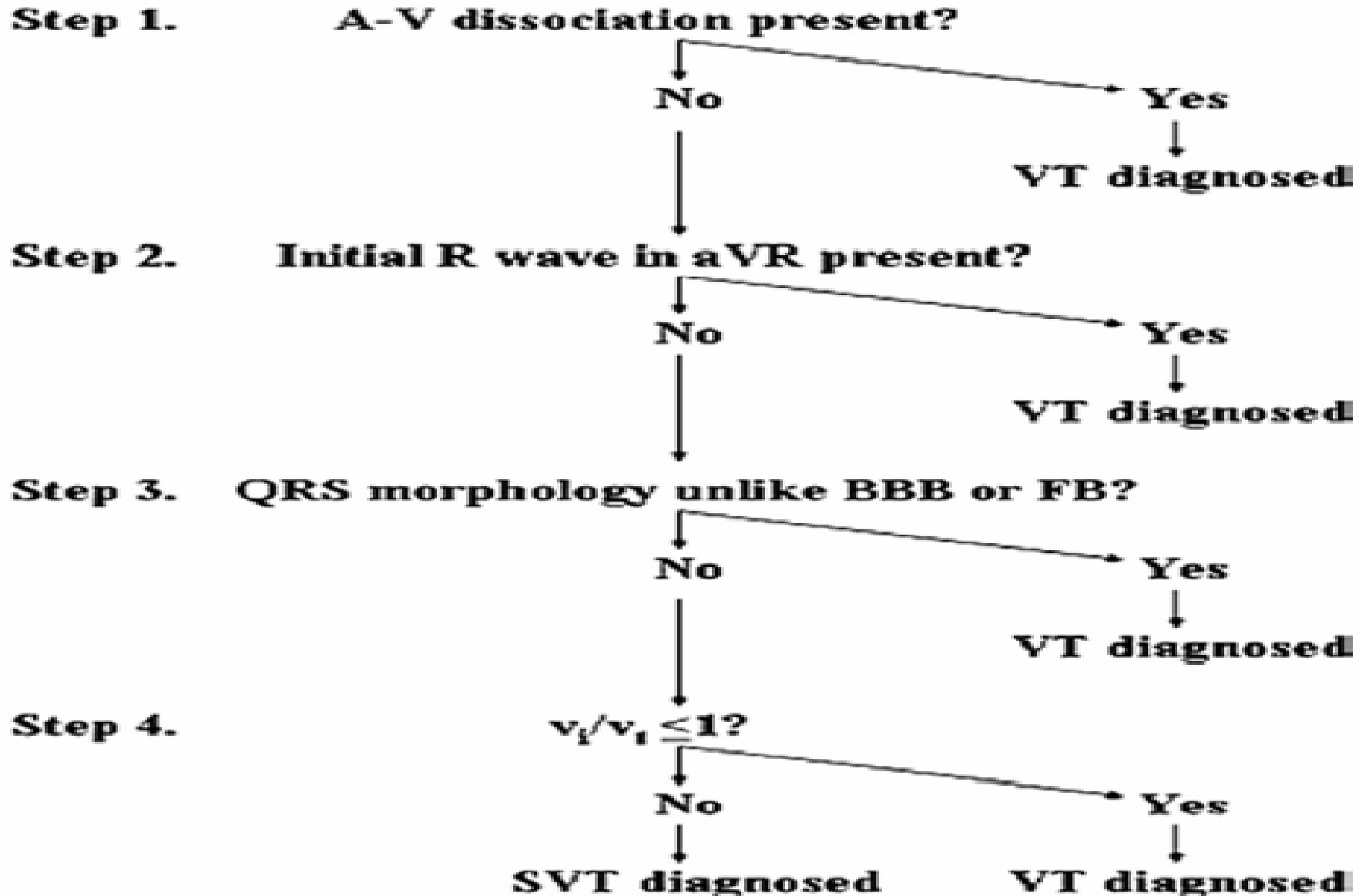
Evaluation of V_i/V_t



ECG PATTERNS IN aVR



ΠΑΛΑΙΟΤΕΡΟΣ ΑΛΓΟΡΙΘΜΟΣ



ΘΕΡΑΠΕΙΑ ΚΤ

n ΕΞΑΡΤΑΤΑΙ ΑΠΟ ΤΗΝ ΚΛΙΝΙΚΗ ΕΙΚΟΝΑ ΤΟΥ ΑΣΘΕΝΟΥΣ

ΑΣΤΑΘΗΣ ΑΙΜΟΔΥΝΑΜΙΚΑ → ΚΑΡΔΙΟΑΝΑΤΑΞΗ

ΣΤΑΘΕΡΟΣ ΑΙΜΟΔΥΝΑΜΙΚΑ → ΦΑΡΜΑΚΕΥΤΙΚΗ ΑΓΩΓΗ Η΄

ΚΑΡΔΙΟΑΝΑΤΑΞΗ

§ Η ΠΑΡΟΥΣΙΑ Η΄ ΑΠΟΥΣΙΑ ΔΥΣΛΕΙΤΟΥΡΓΙΑΣ ΤΗΣ ΑΡ ΚΟΙΛΙΑΣ ΚΑΘΟΡΙΖΕΙ ΤΗΝ ΦΑΡΜΑΚΕΥΤΙΚΗ ΑΓΩΓΗ

ΚΤ ΣΕ ΑΣΘΕΝΕΙΣ ΜΕ ΕΠΗΡΕΑΣΜΕΝΗ ΑΠΟΔΟΣΗ ΑΡ ΚΟΙΛΙΑΣ

n ΦΑΡΜΑΚΟ ΕΚΛΟΓΗΣ : ΑΜΙΟΔΑΡΩΝΗ

§ ΚΑΡΔΙΟΑΝΑΤΑΞΗ

§ ΑΝΤΕΝΔΕΙΞΗ: ΠΡΟΚΑΙΝΑΜΙΔΗ

ΚΤ ΣΕ ΑΣΘΕΝΕΙΣ ΧΩΡΙΣ ΕΠΗΡΕΑΣΜΕΝΗ ΑΠΟΔΟΣΗ ΑΡ ΚΟΙΛΙΑΣ

n ΚΑΡΔΙΟΑΝΑΤΑΞΗ

n ΑΜΙΟΔΑΡΩΝΗ

n ΠΡΟΚΑΙΝΑΜΙΔΗ

n ΛΙΔΟΚΑΙΝΗ

ANTIARRHYTHMIC DRUGS (AHA 2006)

DRUG	DOSE
AMIODARONE	<p>CARDIAC ARREST: 300mg iv push. Consider repeating 150mg iv push in 3-5min. Max: 2,2 griv/24h .</p> <p>WCT (STABLE): 150mg in 10min, repeat 150mg/10min as needed.MAINTENANCE INFUSION : 540 mg iv over 18h (0,5 mg/min)</p>
PROCAINAMIDE	<p>RECURRENT VF/VT: 20mg/min iv infusion. In urgent situations, up to 50 mg/min max 17 mg/ kg.</p>
LIDOCAINE	<p>CARDIAC ARREST FROM VF/VT: 1,0-1,5 mg/kgr iv. Refractory VF additional 0,5-0,75 mg/kgr iv push, repeat in 5-10 min. MAX: 3mg/ kgr.</p> <p>STABLE VT, WQT: as above.</p> <p>MAINTENANCE INFUSION: 1-4 mg/min (30-50 µg/kgr/min)</p>

SUSTAINED MONOMORPHIC VENTRICULAR TACHYCARDIA

Recommendations

ACC/AHA/ESC Guidelines

Class I

- (1) Wide-QRS tachycardia should be presumed to be VT if the diagnosis is unclear. *(Level of Evidence: C)*
- (2) Direct current cardioversion with appropriate sedation is recommended at any point in the treatment cascade in patients with suspected sustained monomorphic VT with hemodynamic compromise. *(Level of Evidence: C)*

SUSTAINED MONOMORPHIC VENTRICULAR TACHYCARDIA

Class IIa

ACC/AHA/ESC Guidelines

- (1) Intravenous procainamide (or ajmaline in some European countries) is reasonable for initial treatment of patients with stable sustained monomorphic VT. (*Level of Evidence: B*)
- (2) Intravenous amiodarone is reasonable in patients with sustained monomorphic VT that is hemodynamically unstable, refractory to conversion with countershock, or recurrent despite procainamide or other agents. (*Level of Evidence: C*)
- (3) Transvenous catheter pace termination can be useful to treat patients with sustained monomorphic VT that is refractory to cardioversion or is frequently recurrent despite antiarrhythmic medication. (*Level of Evidence: C*)

Class IIb

Intravenous lidocaine might be reasonable for the initial treatment of patients with stable sustained monomorphic VT specifically associated with acute myocardial ischemia or infarction. (*Level of Evidence: C*)

SUSTAINED MONOMORPHIC VENTRICULAR TACHYCARDIA

Class III

ACC/AHA/ESC Guidelines

Calcium channel blockers such as verapamil and diltiazem should not be used in patients to terminate wide-QRS-complex tachycardia of unknown origin, especially in patients with a history of myocardial dysfunction. (*Level of Evidence: C*)

REPETITIVE MONOMORPHIC VENTRICULAR TACHYCARDIA

Recommendations

Class IIa

Intravenous amiodarone, beta blockers, and intravenous procainamide (or sotalol or ajmaline in Europe) can be useful for treating repetitive monomorphic VT in the context of coronary disease³⁷⁵ and idiopathic VT.
(Level of Evidence: C)

POLYMORPHIC VT

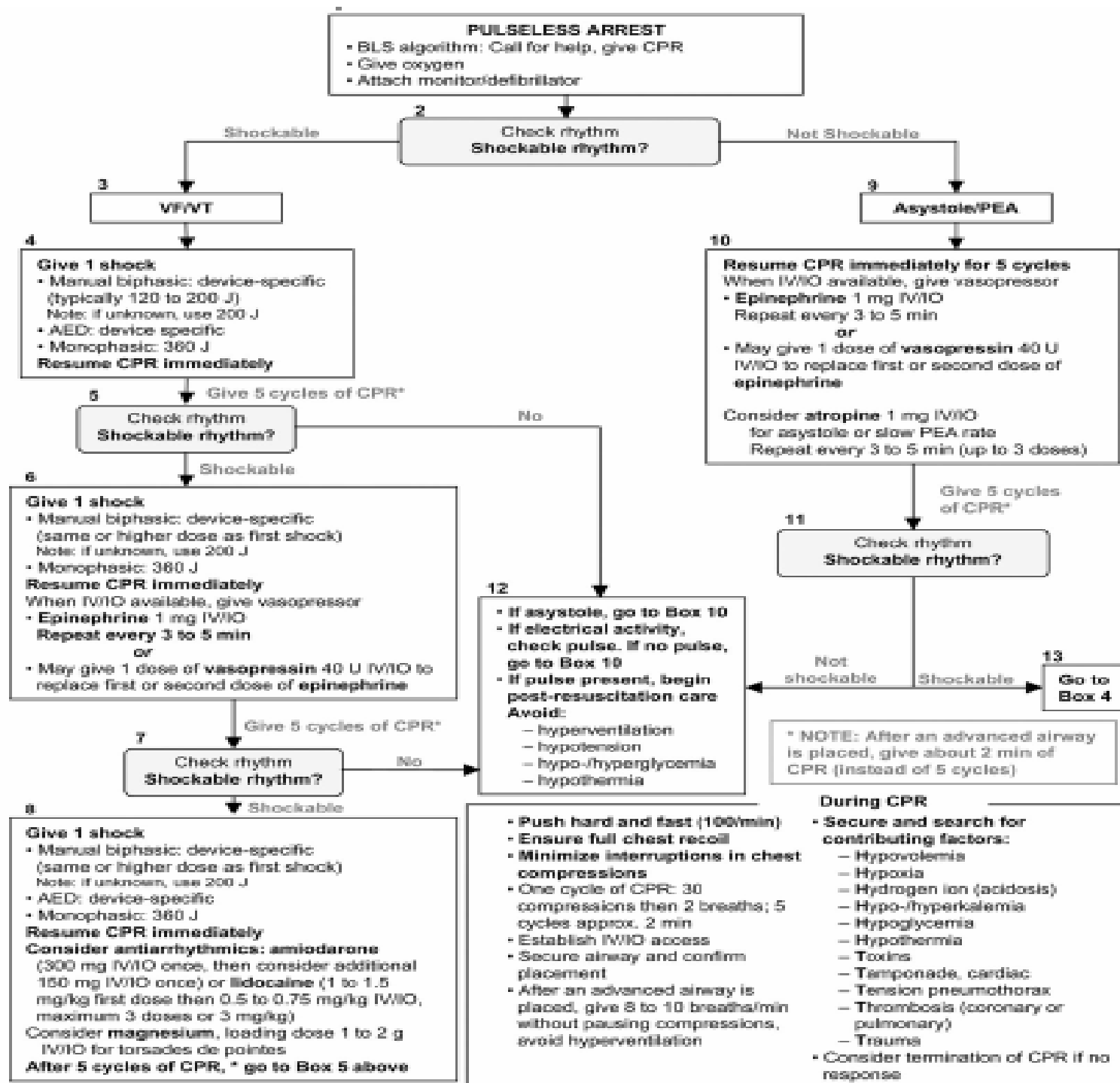
Recommendations

Class I

- (1) Direct current cardioversion with appropriate sedation as necessary is recommended for patients with sustained polymorphic VT with hemodynamic compromise and is reasonable at any point in the treatment cascade. (*Level of Evidence: B*)
- (2) Intravenous beta blockers are useful for patients with recurrent polymorphic VT, especially if ischemia is suspected or cannot be excluded. (*Level of Evidence: B*)
- (3) Intravenous loading with amiodarone is useful for patients with recurrent polymorphic VT in the absence of abnormal repolarization related to congenital or acquired LQTS. (*Level of Evidence: C*)
- (4) Urgent angiography with a view to revascularization should be considered for patients with polymorphic VT when myocardial ischemia cannot be excluded. (*Level of Evidence: C*)

Class IIb

Intravenous lidocaine may be reasonable for treatment of polymorphic VT specifically associated with acute myocardial ischemia or infarction. (*Level of Evidence: C*)



A 67 year old male with history of previous infarct and reduced LV function presents with palpitations and dizziness. His blood pressure is 80/40. The appropriate next step is ?

- n A. Synchronized cardioversion for VT
- n B. I.V. Procainamide for Atrial Fibrillation with WPW syndrome
- n C. Synchronized cardioversion for unstable SVT with aberrancy.
- n D. I.V. Amiodarone for SVT with aberrancy in a patient with reduced LV function.

06.09418

PR 92
D 258
264
C 499
--AXES--
P -70
QRS 108
T -81

DIAG
TACHYCARDIA
ATTN. DR
1068 012012
Requested by
012012
Tech JC
Room 4
Edited C-KP708

ST ANTHONY CENTRAL - EMERGENCY DEPT

A. Sulzer, M.D.

01023 - 10 MAR 2001 15:18:25



Answer A.

- n This patient has ventricular tachycardia. An RS interval of greater than 100 msec is clearly visible. In addition, by history this patient is overwhelmingly likely to present with VT with a wide complex rhythm. Also this patient is not stable with relative hypotension requiring immediate cardioversion as opposed to pharmacologic therapy.