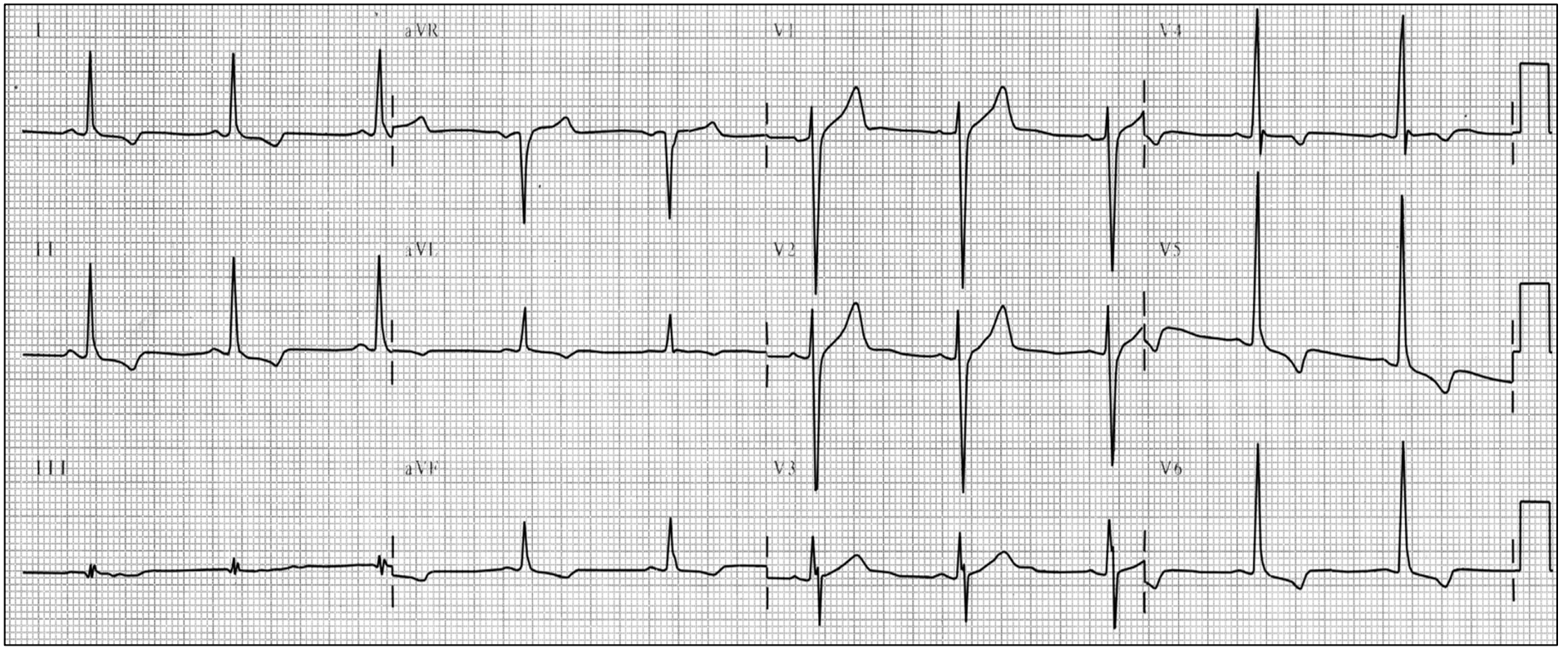
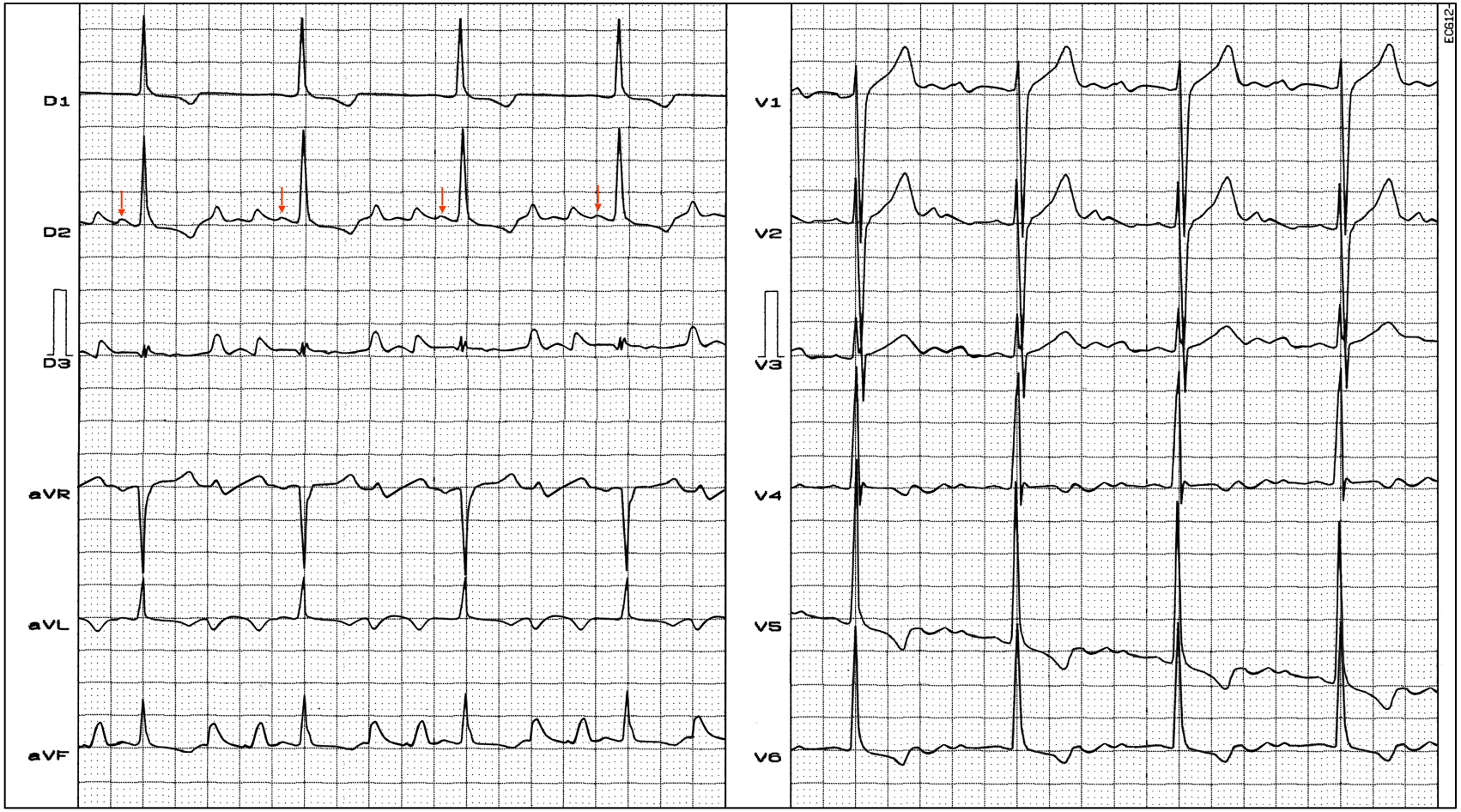
Name: PPA; **Sex:** Male; **Age:** 43 y; **Race:** White; **Weight:** 78 Kg;
Height: 1.72 m **Biotype:** Athletic; **Date:** 02/10/2002.



Clinical diagnosis: hypertensive heart disease. Essential systemic hypertension, Parkinson disease.
Medications: Clortalidone 12.5mg, Enalapril 20mg 2 times/day, Carbidopa-Levodopa 25mg/100mg

ECG diagnosis: Typical systolic pattern of LVE: secondary alteration of ventricular repolarization (DI, aVL, V5 and V6) and in inferior wall. Depressed ST segment, upwardly convex and inverted T waves of asymmetrical branches with the first slow descending portion and fast ascending portion and final positive part: in V5, V6, DI, aVL, and in inferior leads DII and aVF (vertical heart). Absence of Q wave in V5 and V6. Longer QRS/T angle > 100^0.

Name: PPA; **Sex:** Male; **Age:** 43 y; **Race:** White; **Weight:** 77 Kg;
Height: 1.72 m; **Biotype:** Athletic; **Date:** 02/01/2003.



Clinical diagnosis: hypertensive heart disease. Essential systemic hypertension, Parkinson disease. Bilateral asymmetrical upper extremity tremor, pseudo flutter tremor on inferior and precordial leads
Medications: Clortalidone 12.5mg, Enalapril 20mg 2 times/day, the patient did not take any medications for Parkinson's disease for 60 days (Carbidopa-Levodopa). Rest tremor of the limbs at the frequency
ECG diagnosis: Tremor induced ECG artifact mimicking atrial flutter. Red arrow shows P wave and instable baseline on the lead II.

Measurement	Result	Comments
Rhythm	Sinus	
Heart Rate	60bpm	
P-wave axis, shape, duration, voltage	$+30^0$ and to front, 90ms 1,5mm. pseudo flutter tremor on inferior and precordial leads. There are isoelectrical line between de pseudo F waves.	Normal P wave. In Atrial flutter is characteristic the absence of isoelectrical "plateau" between F waves. In this case there are not waves with sawtooth or picket fence appearance (F waves) with a heart rate between 250 and 350 bpm, observed better in the inferior wall and V1 with slowly descending and rapidly ascending ramp. These waves resemble an inverted P wave, followed by an ascending ramp: "Tp" waves.
PR interval	130ms	Normal
QRS duration	100ms, +350 and to back, positive Sokolow and Lyon criteria	
QT interval	400ms	Normal
QTc	386ms	Normal
ST segment level	Depressed ST segment, upwardly convex: V5, V6, I and VL	Strain pattern or systolic overload
T wave axis, shape	inverted T waves of asymmetrical branches with the first slow descending portion and fast ascending portion and final positive part: in V5, V6, I, VL, and in inferior leads II and VF (vertical heart).	Systolic pattern. For QRSd >90ms (1 point) + strain pattern (3 points) = 4 points: probleble LVH ROMHILT SCORE[2]
Specific finding		

PARKINSON DISEASE AND PARKINSONISMS ECG FEATURES

- Electrocardiographic alteration: it resembles tachyarrhythmias as atrial flutter (pseudo-flutter) with irregularity sometimes constant and gross in the baseline, with a rate close to 300 oscillations per minute, caused by muscular tremor or even ventricular tachycardia. The placement of electrodes in the roots of limbs lessens the interference caused by myopotentials and it enables the true rhythm of the patient to manifest in ECG. Electrocardiographic artifacts simulating atrial flutter in patients undergoing continuous veno-venous hemodialysis are described. As end-stage renal disease and hemodialysis are associated with atrial tachyarrhythmias, physicians should be aware of the possibility of such artifacts induced by the dialysis equipment itself(1).

PARKINSON DISEASE AND PARKINSONISMS ECG FEATURES

VT is mimicked when myopotentials originate oscillations of high frequency and great voltage. Additionally electrocardiographic artifacts mimicking VT could be observed during high-frequency oscillatory ventilation(2).

ECG artifact is a common finding in patients requiring evaluation and monitoring in the prehospital, emergency department, or intensive care unit settings.

Artifact results from both internal (physiological) and external (nonphysiological) sources. In most instances, artifact is recognized as an incorrect ECG signal--its only impact producing interference in ECG interpretation; artifact may also produce ECG signals which mimick disease--these signals the physician must recognize as artifact.

Causes of “pseudo Flutter pattern”

- Broken wire in extremity electrode
- Myoclonic contractions of the pectoralis major muscle secondary to (cold induced tremor)(3)

REFERENCES

1) Kostis WJ, Cohen L, Dominiecki SM.Continuous veno-venous hemodialysis pseudoflutter. J Electrocardiol. 2007; 40: 316-318.

2) Patel S. Electrocardiographic artifact mimicking ventricular tachycardia during high-frequency oscillatory ventilation: a case report. Am J Crit Care. 2006;15:310-311.

3) Golder RL, et al. JAMA 1973; 226:200