

Great Imitator: Tips and Tricks for Hyperkalemia

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ACIBADEM
MEHMET ALİ AYDINLAR
ÜNİVERSİTESİ

Plan

- General approach
- Emergency management of hyperK
- HyperK and ECG
- Take home messages

General approach

- Patient's presentation
- Clinical complaints
- Trends on the ECG



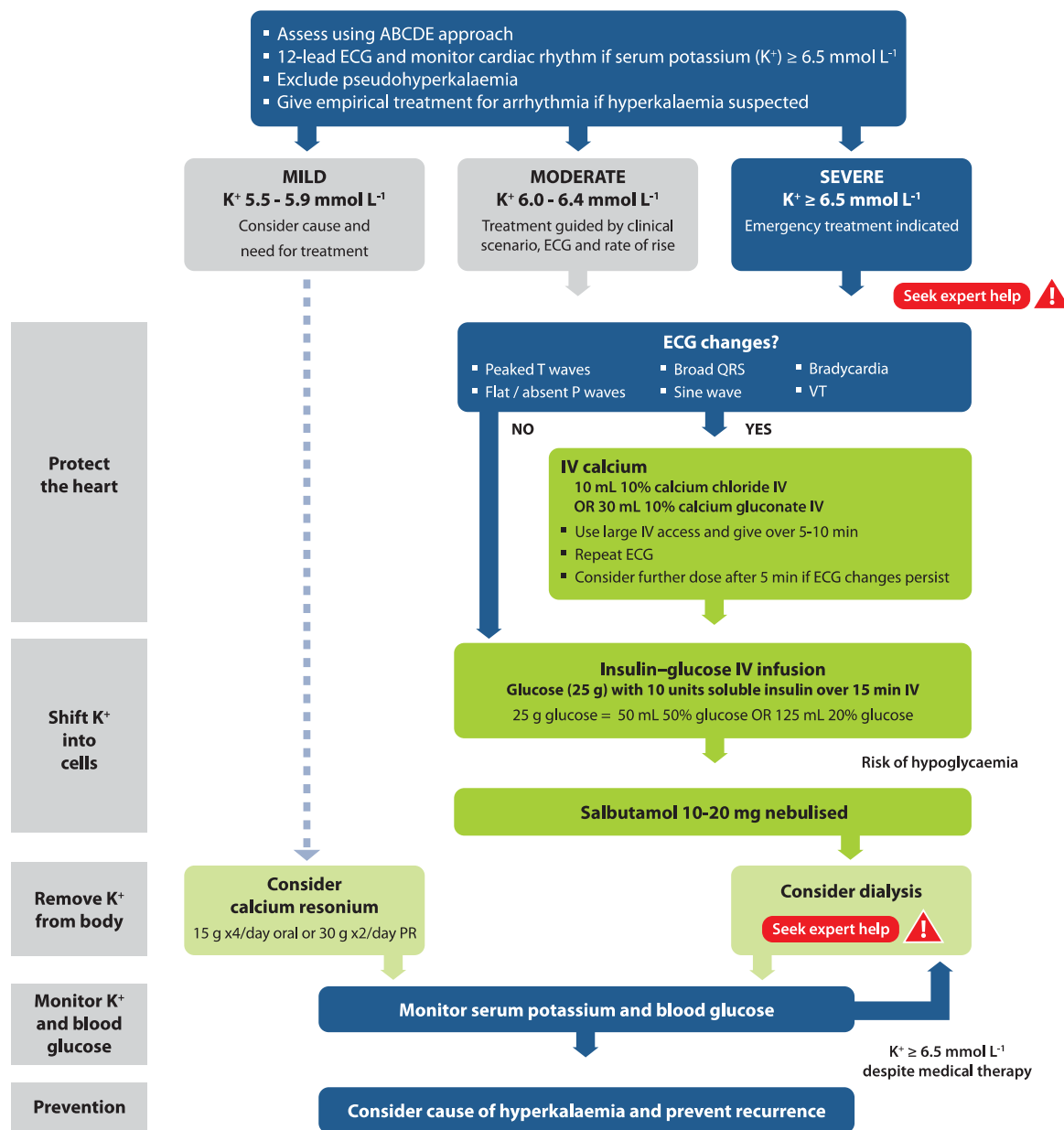
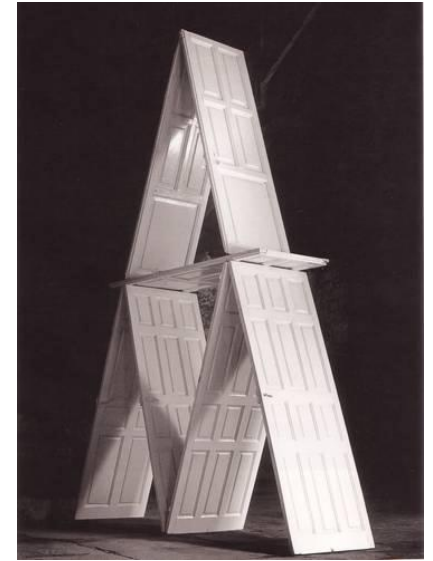


Fig. 4.1. Emergency treatment of hyperkalaemia. PR per rectum; ECG electrocardiogram; VT ventricular tachycardia. Reproduced with permission from Renal Association and Resuscitation Council (UK).

Management

- Monitor
- IV access (large well flowing)
- ECG
- Ca, insulin-glukoz, beta agonist, bicarb, fluids, furosemide
- Dialysis



Hyperkalemia

- R/O pseudohyperkalemia
 - hemolyzed sample
 - poor phlebotomy
 - leukocytosis
 - thrombocytosis

Underlying causes



- Medications
ACEi, Potassium sparing diuretics, ARBs, B-Blockers, NSAIDs, Trimethoprim, tacrolimus and Non-prescription salt substitutes
- Renal failure
- Cell death
Rhabdomyolysis, massive transfusion, crush or burn injuries.
- Acidosis
Addisons crisis, primary adrenal insufficiency and DKA

Principles

- Stabilize the cardiac membrane

 - K>6.5mmol

 - P or QRS changes in ECG

 - CaChlorid has 3 times more elemental Ca than CaGluconate

- Drive K into cells

 - K>5mmol w any hyperK ECG changes or K>6.5mmol wo ECG findings

- Eliminate K

 - NS IV boluses if hypovolemia

 - Achieve euvolemia, establish good urine flow

 - Furosemide IV only hypervolemic

 - Consider PEG po, Kayexalate causing GI necrosis and perforation.

 - Milk magnesia, fleet enema contraindicated in renal failure patients

 - Dialysis

- Monitor

 - Rhythm strip, Glu at 30 mins, K and ECG at 60 mins, repeat as needed until K below 6, ECG has normalized and/or dialysis has been started

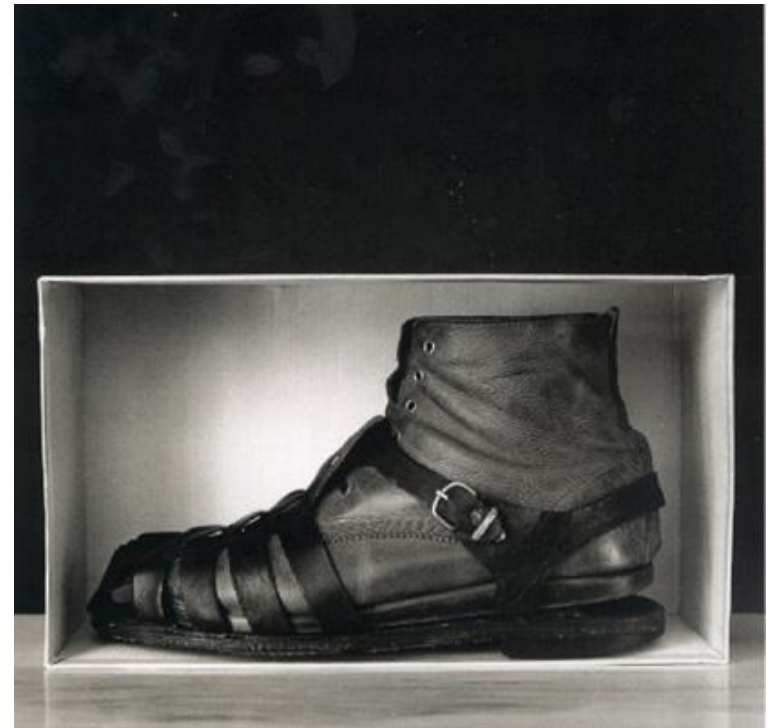
Dialysis

- Arrest
- Peri arrest
- Dialysis patient
- Severe renal failure



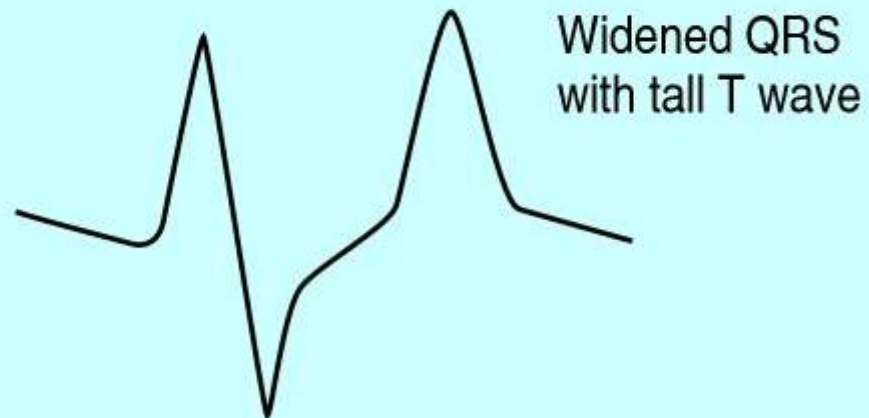
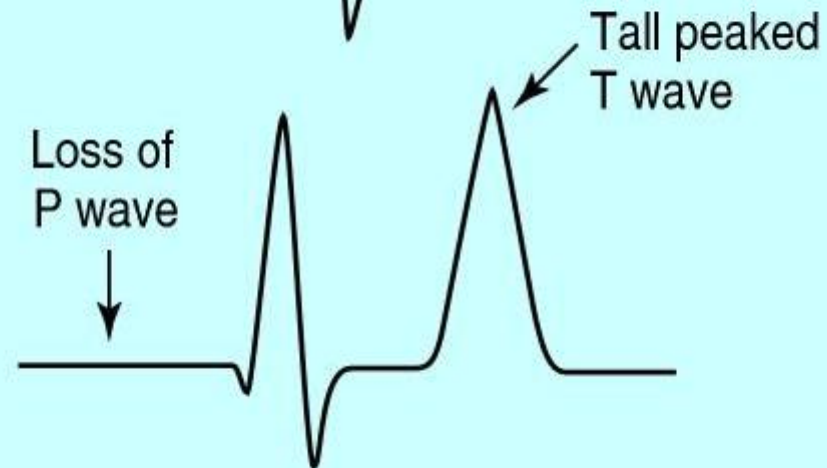
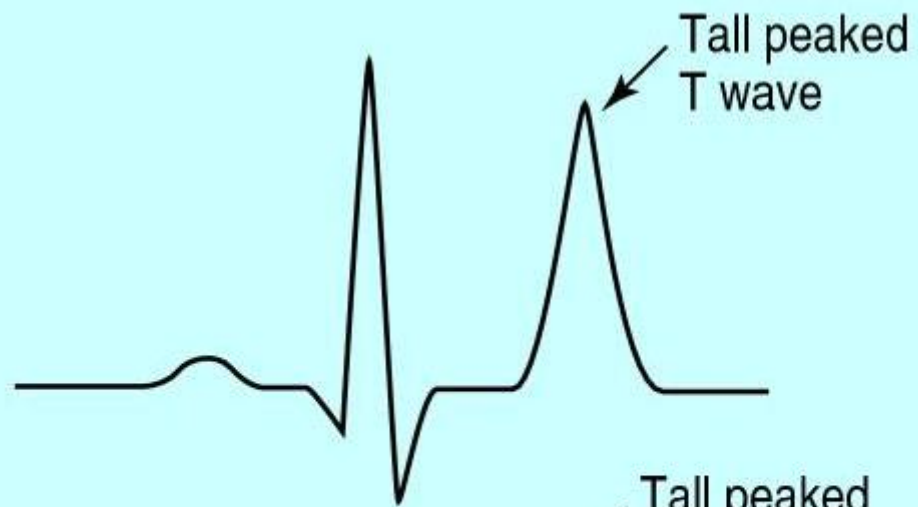
The Great Imitator

- Medical conditions that feature nonspecific symptoms and may be confused with a number of other diseases.

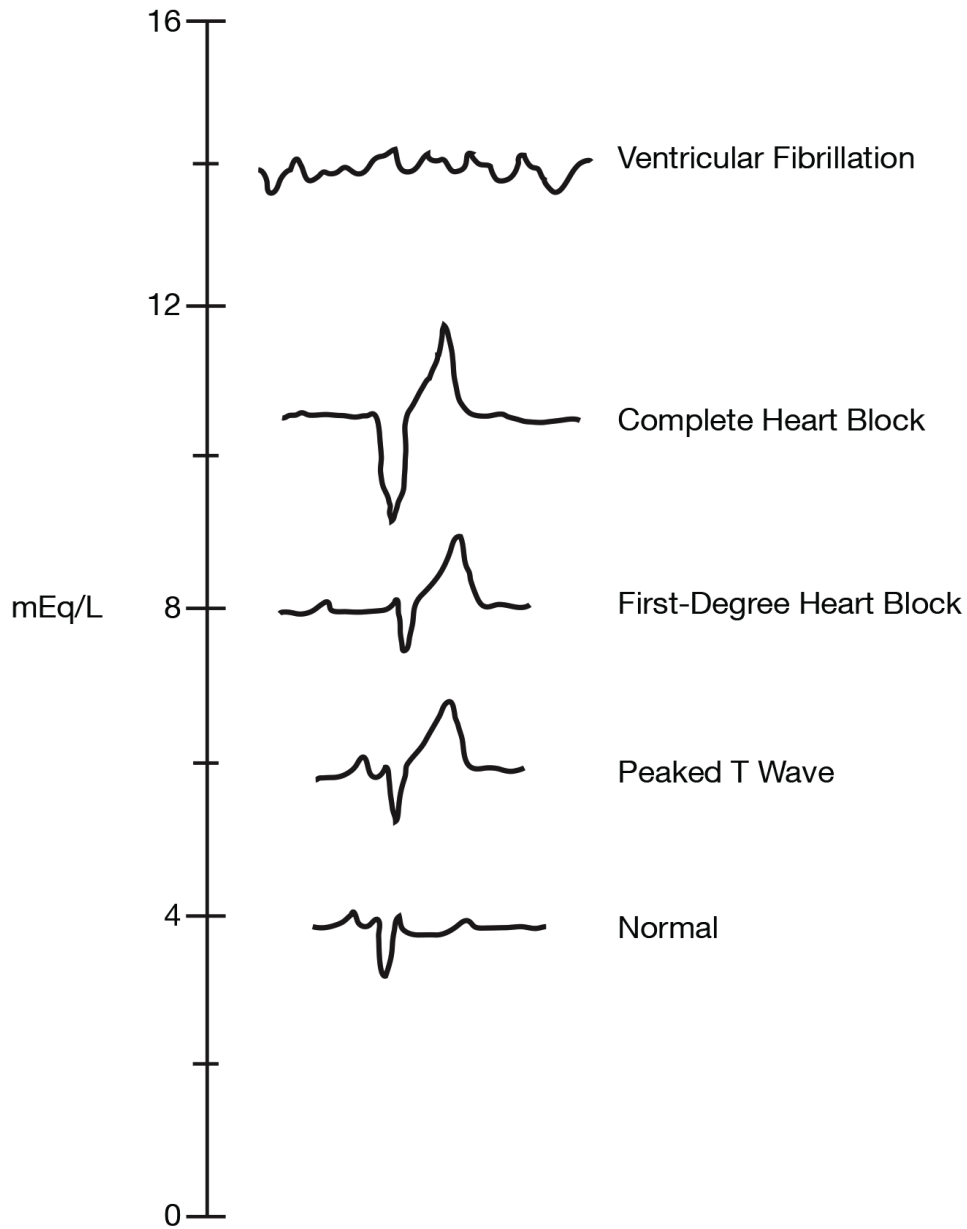


Wide variety of abnormal EKG findings

- Peaked T-waves
- Prolonged PR interval
- Flattening and eventual loss for p-waves
- Advanced AV Blocks and sinus pauses
- Widening of the QRS
- Sine waves (with extremely severe hiperK)
- Pseudo ACS, new BBB's, ST-segment changes
- Slow VT, VF, PEA,
- Bradyarrhythmias



ECG changes in hyperkalemia



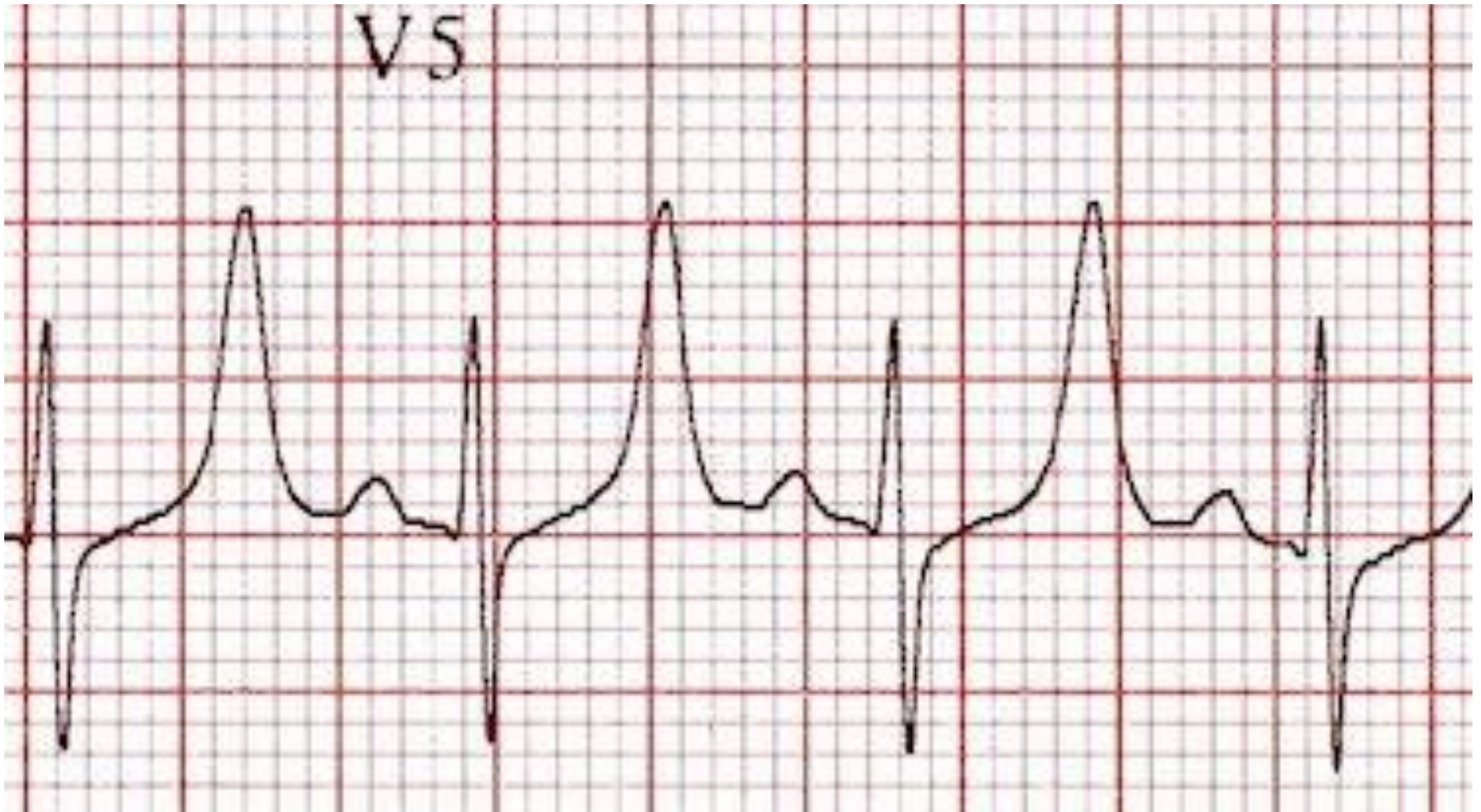
Warning!

TABLE 17-18 ECG Changes Associated with Hyperkalemia	
[K⁺] (mEq/L)	ECG Changes*
6.5–7.5	Prolonged PR interval, tall peaked T waves, short QT interval
7.5–8.0	Flattening of the P wave, QRS widening
10–12	QRS complex degradation into a sinusoidal pattern

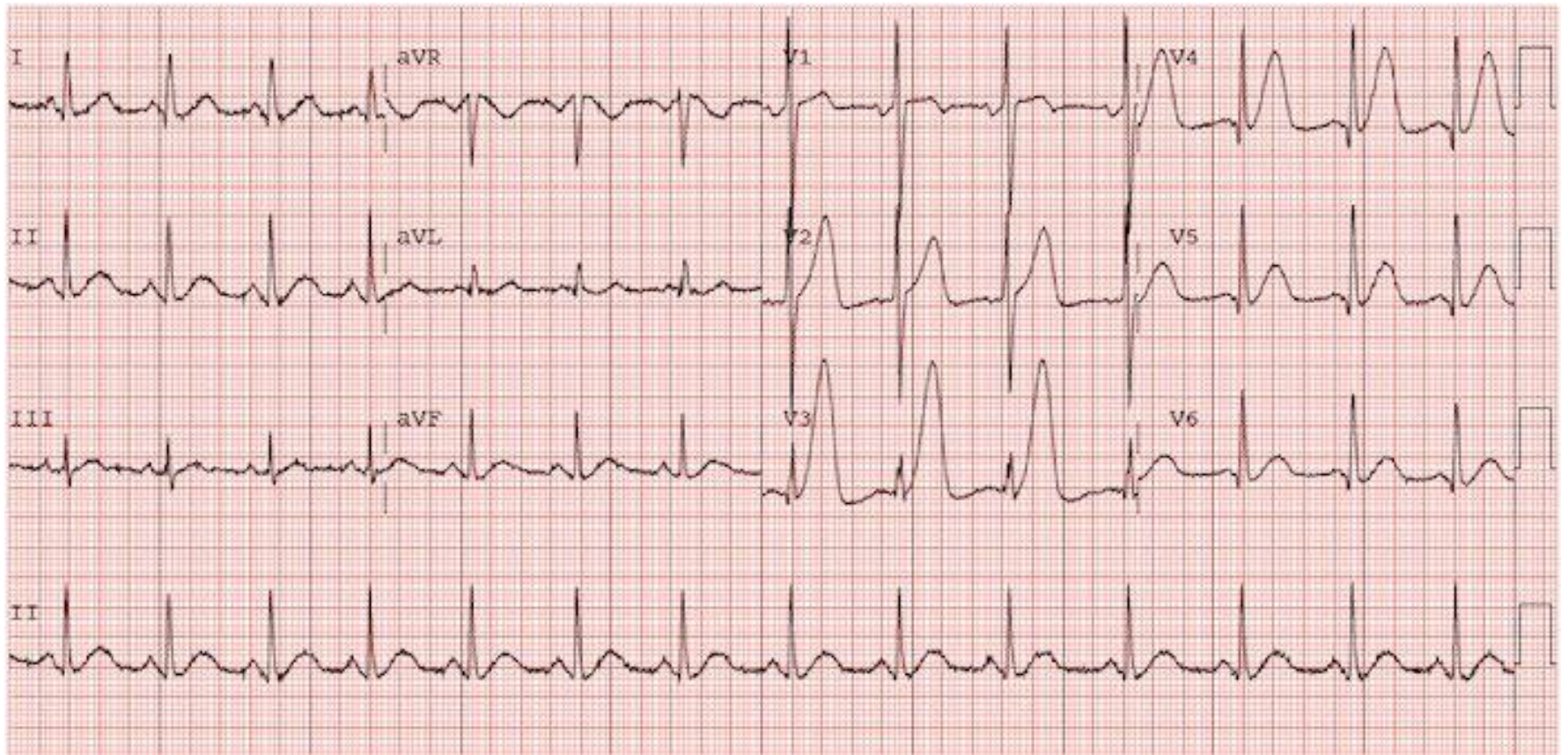
*In chronic or slowly developing hyperkalemia, ECG changes may not occur until higher [K⁺] levels are reached.

- Though it is good to know the classic ECG progression of hyperK, don't be fooled by a normal or nonspecific ECG in hyperK.
- The relationship between serum K and ECG manifestation is not cut and dry as we are taught. Don't get into a false sense of security. Treat the patient in front of you!

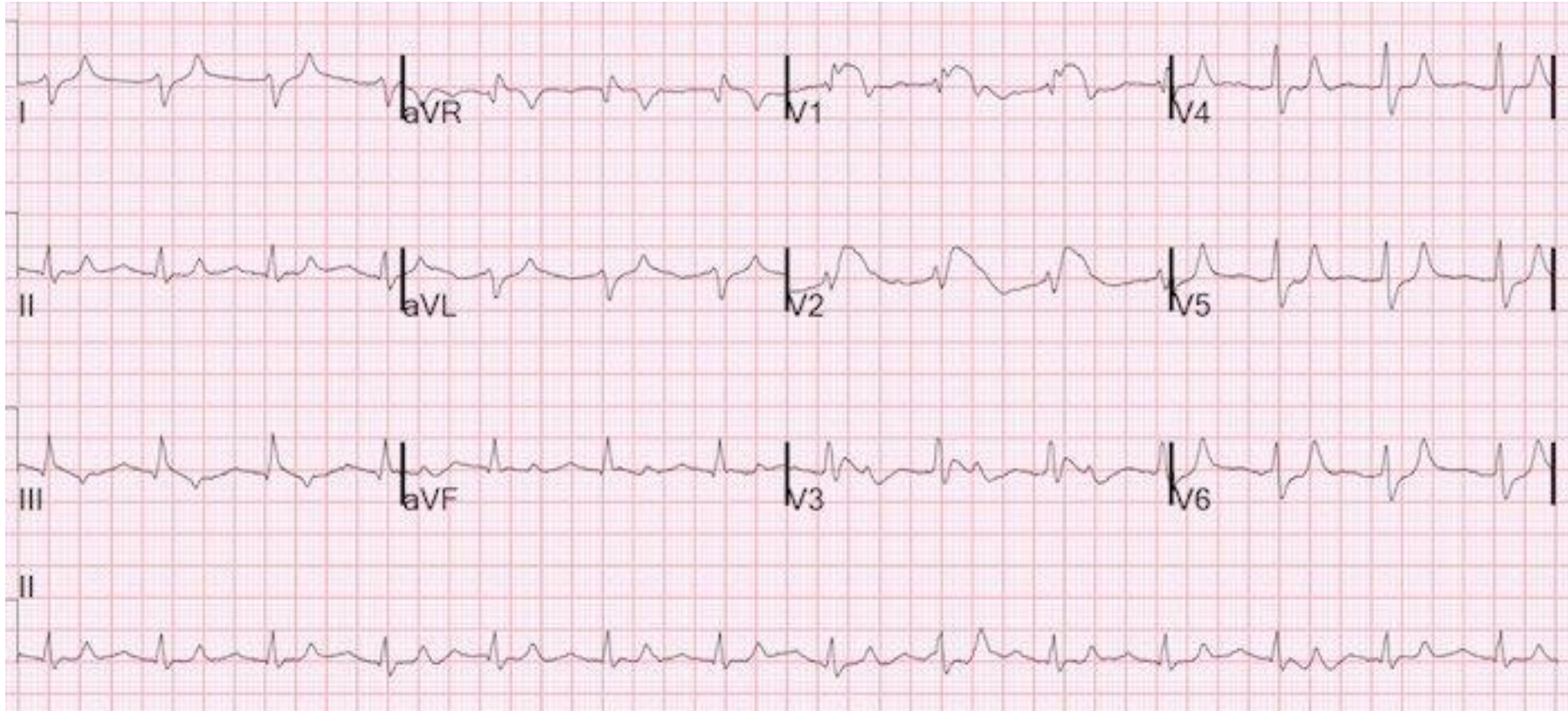
Peaked T wave (K 5.5-6.5)



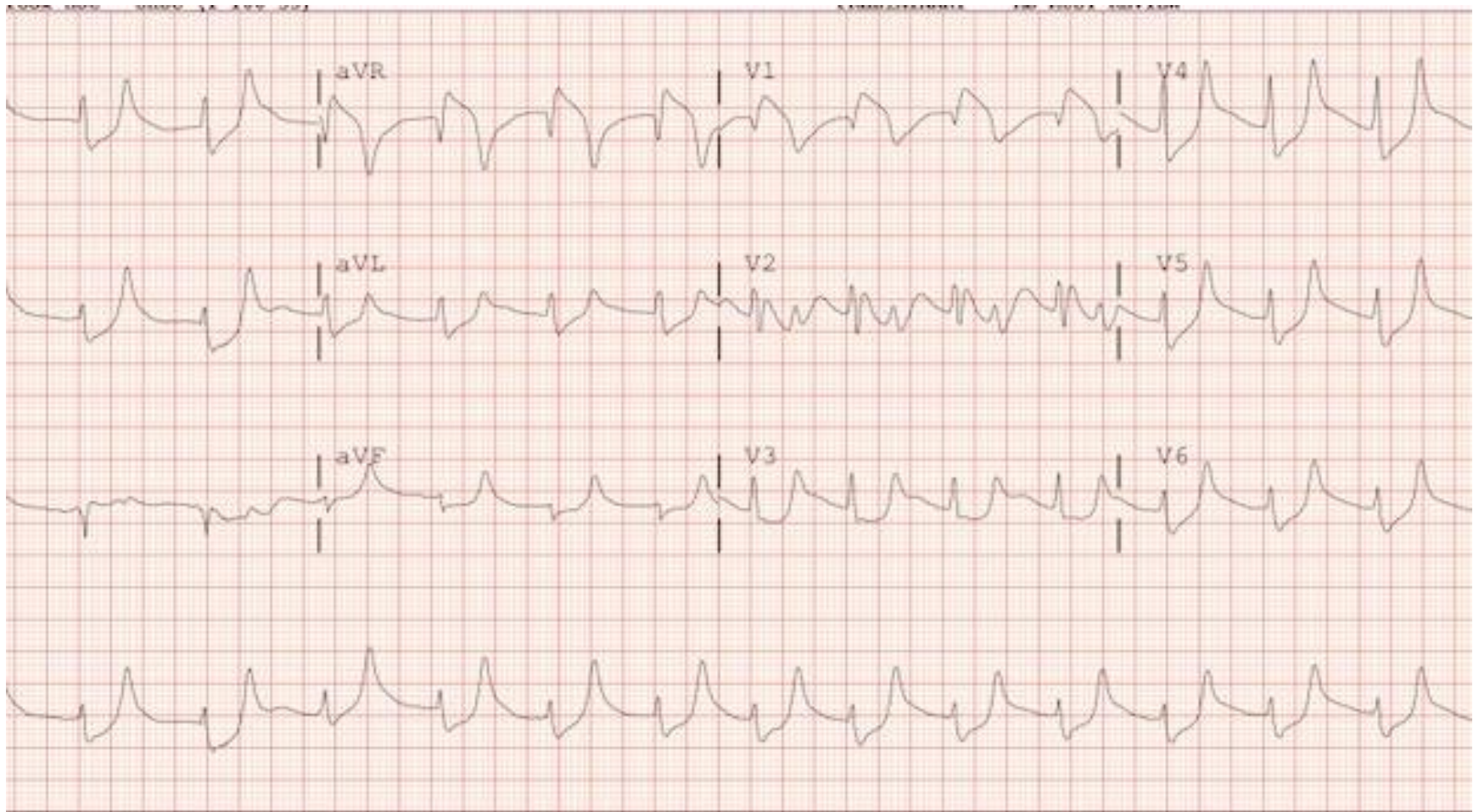
Hyperacute T waves



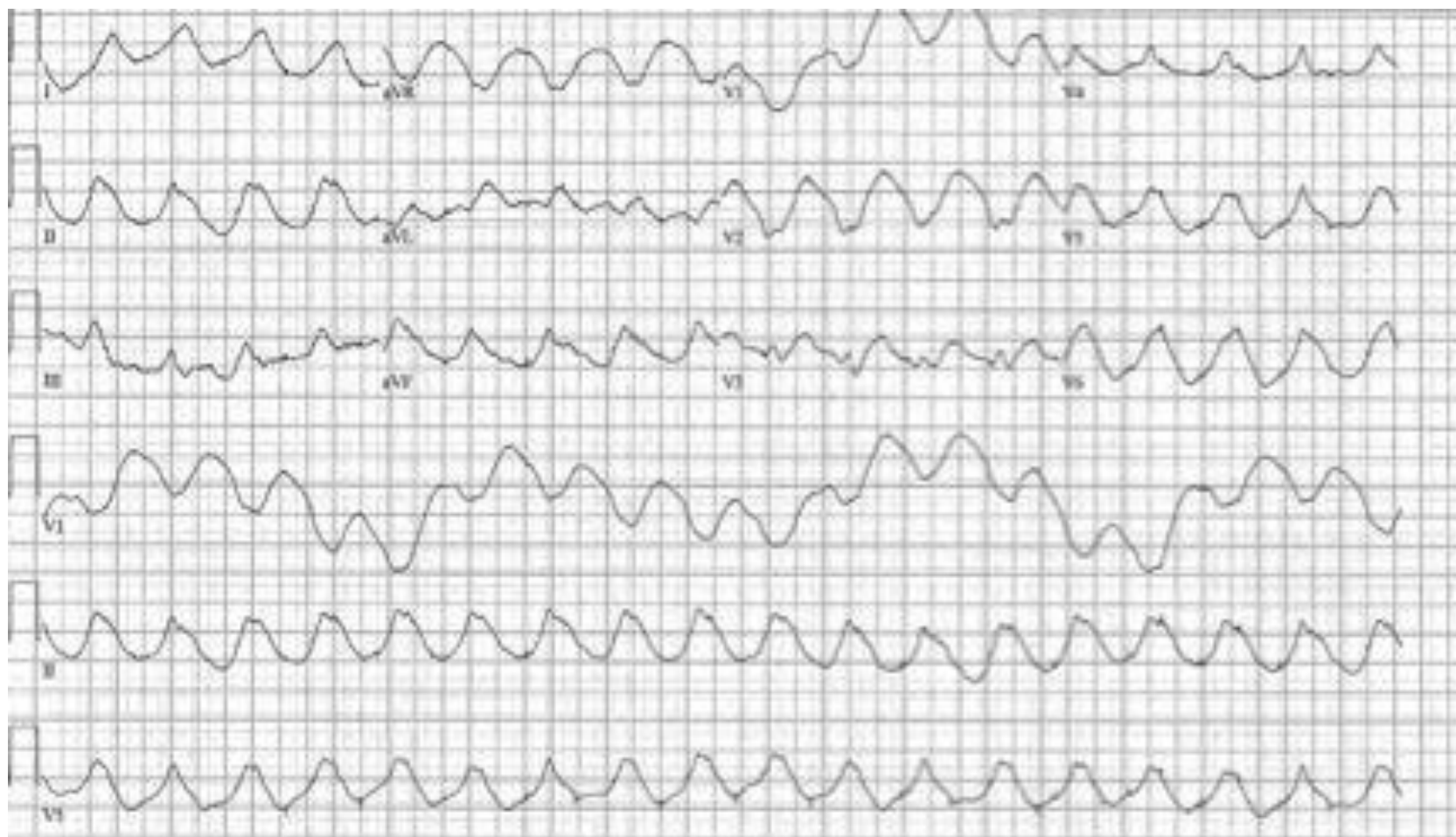
Prolonged PR, flattening or disappearance P wave (K 6.5-7.5)



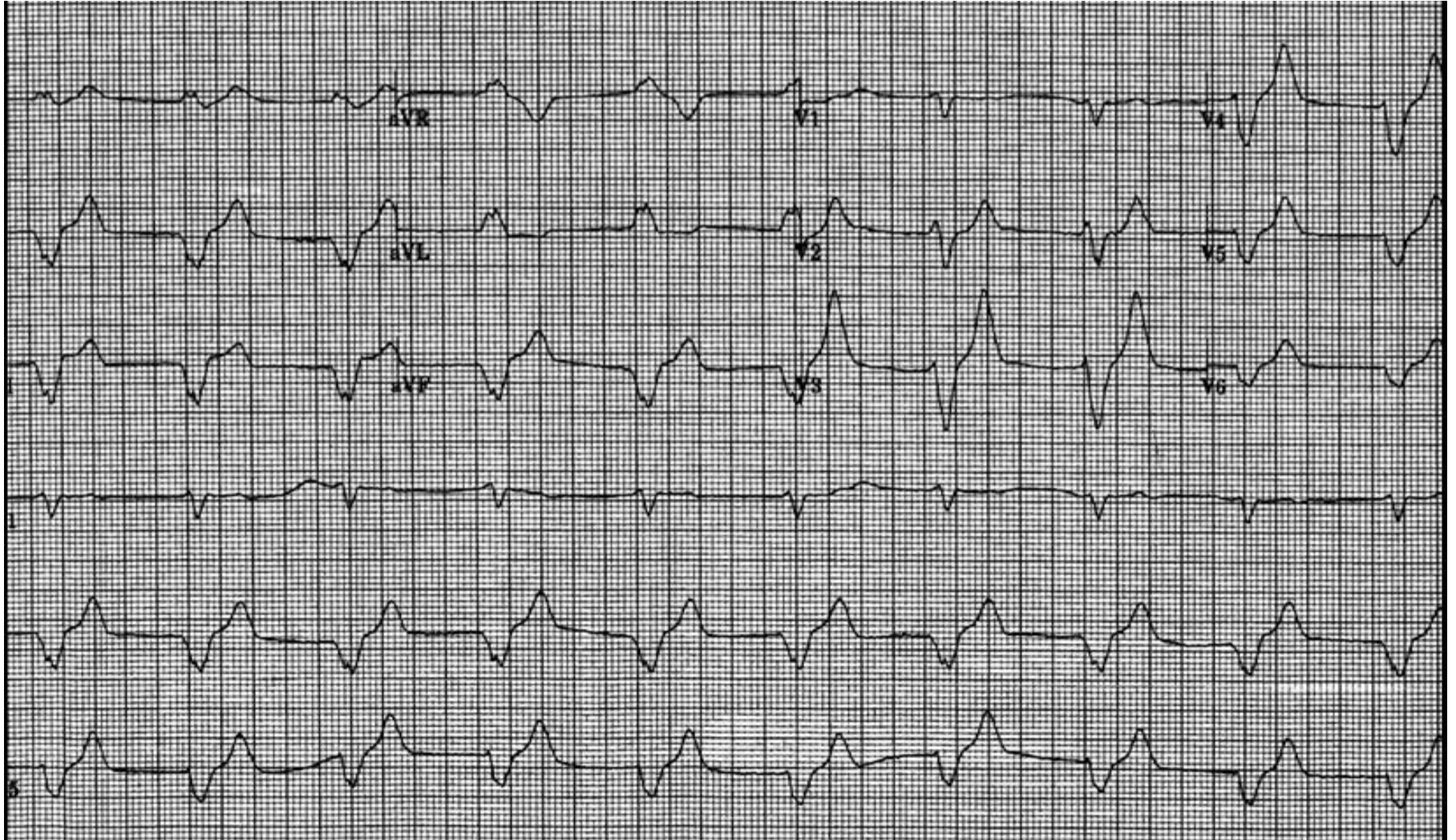
Widening of the QRS



Sine wave pre terminal



ECG changes of hyperkalemia



Case

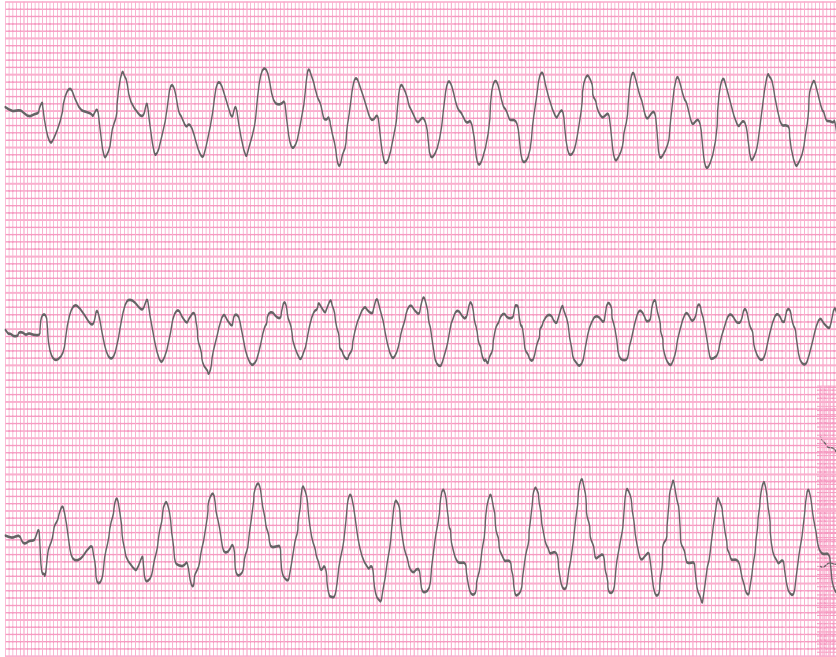


FIGURE 17-8. Monitor strip (V₁-V₆) of a 35-year-old patient in critical condition, who was hypotensive and fatigued and rapidly deteriorated into cardiac arrest. Potassium level was 9.1 mEq/L. She was on spironolactone and steroid therapy.



FIGURE 17-9. The same patient as in Figure 17-8 during calcium chloride infusion. She regained a pulse and became conscious. The QRS and T wave narrowed, as compared with Figure 17-8.

Hyperkalemia in cardiac arrest

- History and rhythm
- ABG look at K
- ACLS
- IV Ca chloride, repeat until the QRS <100 ms
- Epinephrine (shifts K intracellularly)
- Bicarb (severe acidosis)
- NS
- Insulin Glu then B agonist but together
- Dialysis (intra arrest)

Take home messages

- Hyperkalemia has been known to cause almost any dysrhythmia. Pay special attention to patients in “slow VT” and wide-complex bradycardia and consider treating them empirically as hyperkalemia.



Take home messages

- Sx of hyperK are usually nonspecific, risk factors must be used to suspect the diagnosis
- It is possible for hyperkalemic patient to progress rapidly from a normal ECG to Vfib.
- IV Ca is the antidote of choice for life-threatening arrhythmias related to hyperK, but its effect is brief and additional agents must be used.

Take home messages

- In cases of cardiac arrest due to hyperK, perform CPR until hyperK is corrected.
- Intra arrest dialysis is related to good neurologic outcome.
- Beta agonists act synergistically w insulin, can lower serum K by 1.2 mmol in an hour. Insulin glu be given first.
- Repeat Ca as needed to achieve QRS<100ms and p waves re appear.



Thank you

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