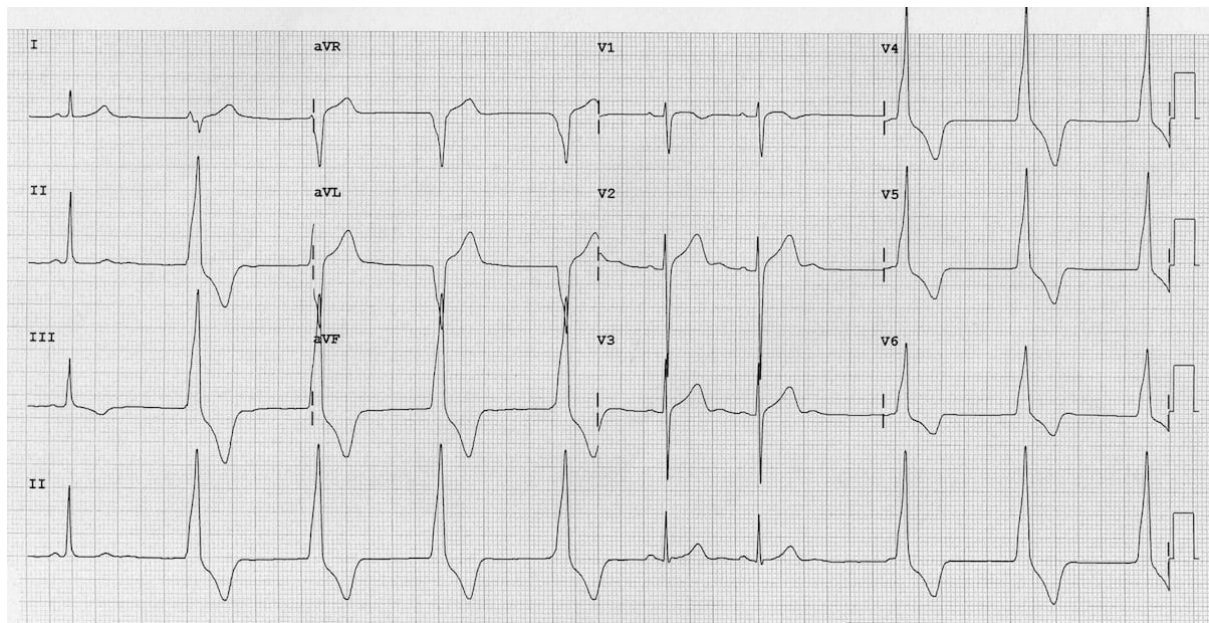


ACCELERATED IDIOVENTRICULAR RHYTHM (AIVR)

Accelerated Idioventricular Rhythm (AIVR), or Accelerated Ventricular Rhythm, occurs when an ectopic ventricular pacemaker's rate surpasses the sinus node rate, typically influenced by increased vagal tone and decreased sympathetic tone.

ECG Features of AIVR:

- Regular rhythm with a rate of 50-120 bpm
- At least three ventricular complexes with a QRS duration over 120ms
- Presence of fusion and capture beats



Pathophysiology:

AIVR may arise from enhanced ventricular pacemaker automaticity or triggered activity, especially in ischemia or digoxin toxicity. It is commonly observed in the reperfusion phase following acute STEMI and is usually a benign, self-limiting arrhythmia.

Ventricular Rate Classification:

- Rates below 50 bpm indicate a Ventricular Escape Rhythm.
- Rates above 110 bpm suggest Ventricular Tachycardia.

Causes of AIVR:

- Most commonly linked to the reperfusion phase of an acute myocardial infarction (MI).
- Can be induced by beta-sympathomimetics like isoprenaline or adrenaline, drug toxicity (e.g., digoxin, cocaine, volatile anaesthetics like desflurane), electrolyte imbalances, cardiomyopathy, congenital heart disease, myocarditis, and athletic heart.

- It may also follow cardiac arrest due to acute MI during Return of Spontaneous Circulation (ROSC).

Management

AIVR typically does not require intervention as it resolves when the sinus rate outpaces the ventricular focus. Treatment focuses on addressing the underlying cause, such as electrolyte correction or myocardial perfusion restoration. In severe biventricular failure, atropine might be used to enhance sinus rate and AV conduction.

AVR Vs VT

Feature	AIVR	VT
Rate	Typically 50-120 bpm	Typically > 100 bpm (often > 120 bpm)
Rhythm	Regular	Usually regular, can be irregular
QRS Duration	> 120 ms	Often > 120 ms
QRS Morphology	Ventricular; may have fusion beats	Broad and bizarre
P Waves	Absent, hidden within QRS or dissociated	Absent, hidden within QRS or dissociated
Response to Therapy	Self-limiting; rarely requires intervention	Often requires anti-arrhythmic drugs or cardioversion
Onset	Gradual onset with the ventricular rate exceeding sinus rate	Sudden onset
Associated Conditions	Commonly post-reperfusion in acute MI, electrolyte imbalances	May occur in the context of structural heart disease, ischemia, cardiomyopathy
Capture Beats	May be present	Less commonly present
Fusion Beats	May be present	May be present
Hemodynamic Impact	Usually well tolerated	May cause significant instability

Fusion Beats

- **Definition:** A fusion beat occurs when a depolarization wave from the sinus node (or another supraventricular source) and a depolarization wave from a ventricular ectopic pacemaker occur simultaneously and merge. This results in a hybrid QRS complex that has features of both a normal (supraventricular) and an abnormal (ventricular) beat.
- **Appearance on ECG:** The QRS complex of a fusion beat combines elements of both the sinus rhythm and the ectopic ventricular rhythm. It will appear different from both a purely sinus-originated beat and a purely ectopic beat, usually falling somewhere in between in terms of morphology.
- **Clinical Significance:** Fusion beats can indicate the presence of an underlying ventricular tachycardia but are also seen in situations where there is a benign ventricular ectopy.

Capture Beats

- **Definition:** A capture beat occurs when the normal sinus rhythm momentarily "captures" the ventricles during an episode of ventricular tachycardia, producing a single beat with a normal QRS complex. It shows that the sinus node is still active and able to depolarize the ventricles, overcoming the ectopic pacemaker.
- **Appearance on ECG:** The QRS complex of a capture beat will look normal or near-normal, reflecting the typical ventricular activation pattern driven from the AV node, distinctly different from the broad, bizarre complexes characteristic of ventricular tachycardia.
- **Clinical Significance:** Capture beats are important in diagnosing ventricular tachycardia; their presence is a definitive sign of VT and can help differentiate it from other conditions like supraventricular tachycardia with aberrancy.

