[HOSPITAL / HEALTH AUTHORITY NAME]

PALPITATIONS AND ACUTE TACHYARRHYTHMIAS OR BRADYARRHYTHMIAS PATHWAY

Protocol 22: Rapid Rhythm Recognition, Stabilization, Cardioversion, Pacing, Reversible-Cause Treatment, Monitoring, and Safe Disposition

DRAFT FOR EMERGENCY MEDICINE, INTERNAL MEDICINE, CARDIOLOGY, ELECTROPHYSIOLOGY, ANAESTHESIA, CRITICAL CARE, PAEDIATRICS, OBSTETRICS, GERIATRICS, PHARMACY, LABORATORY, EMS, TRANSFER, AND CLINICAL-GOVERNANCE REVIEW

IMMEDIATE SAFETY RULE: Treat the patient, not the monitor. If tachycardia or bradycardia is causing hypotension, acute altered mental status, shock, ischaemic chest discomfort, acute heart failure, syncope, or rapidly worsening perfusion, begin resuscitation and definitive electrical treatment without waiting for a perfect rhythm diagnosis. If there is no pulse, activate the cardiac-arrest pathway immediately.

STATUS: This is a draft clinical-governance document. Exact triage categories, cardioversion energies, defibrillator operation, sedation regimens, vagal manoeuvres, antiarrhythmic and rate-control drugs, electrolyte targets, pacing method, temporary transvenous-pacing pathway, anticoagulation rules, device management, paediatric dosing, pregnancy guidance, monitoring duration, admission thresholds, and transfer arrangements must be approved locally before implementation. Adult doses in this document require independent medication checking and do not apply to children.

Document control	Details
Document owner	Emergency Department / Medical Services Directorate / Nursing Services / Clinical Governance
Clinical leads	Emergency Medicine; Internal Medicine; Cardiology / Electrophysiology; Anaesthesia / Critical Care
Supporting departments	Paediatrics; Obstetrics; Geriatrics; Pharmacy; Laboratory; Radiology; EMS; Patient Transport / Transfer Coordination
Applies to	All staff involved in recognition, triage, stabilization, rhythm assessment, treatment, monitoring, referral, transfer, admission, discharge, and follow-up of patients with palpitations or suspected acute tachyarrhythmia or bradyarrhythmia
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Related protocols	Protocol 1 - Emergency Department Patient Journey; Protocol 3 - Resuscitation and Initial Stabilization; Protocol 4 - Clinical Assessment and Documentation; Protocol 5 - Investigations and Critical Results; Protocol 7 - Monitoring and Reassessment; Protocol 13 - Acute Chest Pain / ACS; Protocol 14 - Acute Breathlessness; Protocol 16 - Shock; Protocol 17 - Altered Mental Status; Protocol 21 - Syncope / TLoC; cardiac-arrest, toxicology, hyperkalaemia, procedural-sedation, pregnancy, paediatric-resuscitation, and transfer protocols

1. Purpose

To provide a standardized emergency-department pathway for patients with palpitations, suspected or confirmed tachyarrhythmia, bradyarrhythmia, conduction disturbance, pacemaker or implantable-cardioverter-defibrillator concern, or rhythm-related instability. The protocol supports immediate stabilization, safe rhythm classification, time-critical electrical therapy, targeted medication use, treatment of reversible causes, repeated reassessment, specialist escalation, and safe disposition.

2. Scope

This protocol applies from first clinical contact until discharge, admission, transfer, or activation of another definitive pathway. It covers adults and provides escalation principles for children and pregnancy; paediatric dosing and specialist obstetric-cardiac management remain governed by approved age- and pregnancy-specific protocols. It does not replace the cardiac-arrest algorithm, acute coronary syndrome pathway, toxicology guidance, or specialist electrophysiology advice.

3. Core policy statements

- All patients with ongoing palpitations, abnormal pulse, syncope, chest discomfort, breathlessness, haemodynamic symptoms, or an arrhythmia on monitoring must have prompt observations, pulse assessment, and a 12-lead ECG whenever this does not delay emergency treatment.
- Clinical instability must be attributed carefully. Sinus tachycardia is often a compensatory response to sepsis, haemorrhage, hypoxia, pain, fever, pulmonary embolism, or metabolic disturbance; suppressing the rate without treating the cause may cause harm.
- Unstable tachyarrhythmia with a pulse requires synchronized cardioversion except polymorphic ventricular tachycardia, which requires immediate unsynchronized high-energy shock. Unstable bradyarrhythmia requires simultaneous reversible-cause treatment and atropine, pacing, and/or vasoactive support according to the approved algorithm.
- A regular monomorphic wide-complex tachycardia must be managed as ventricular tachycardia unless a safer alternative diagnosis is established. Verapamil or diltiazem must not be given to an undifferentiated wide-complex tachycardia.
- Adenosine is reserved for appropriate regular rhythms with continuous monitoring and resuscitation readiness. It must not be used for unstable, irregularly irregular, or polymorphic wide-complex tachycardia.
- Irregular wide-complex tachycardia may represent pre-excited atrial fibrillation. AV-nodal-blocking drugs, including beta-blockers, diltiazem/verapamil, digoxin, and IV amiodarone, must not be given when pre-excitation is suspected; urgent cardioversion and expert advice are required.
- All electrical procedures and IV antiarrhythmic treatment require defibrillation/pacing capability, appropriately trained staff, medication checks, continuous monitoring, and explicit reassessment.
- Every disposition decision must account for the rhythm, underlying cause, structural heart disease, ECG abnormalities between episodes, recurrence, treatment response, comorbidity, social safety, follow-up access, and risk of sudden deterioration.

4. Definitions

Term	Operational definition
Palpitations	An uncomfortable awareness of heartbeat described as racing, pounding, fluttering, skipping, or irregularity. The symptom may reflect arrhythmia, sinus rhythm, ectopy, heightened awareness, or a non-cardiac cause.
Tachyarrhythmia	A pathologically rapid rhythm. In adult resuscitation pathways, clinically important tachyarrhythmia is commonly above 150/min, but dangerous rhythms can occur at lower rates depending on the patient and mechanism.
Bradyarrhythmia	A slow rhythm or conduction disorder. Clinical significance depends on symptoms and perfusion rather than a number alone; a rate below 50/min is a common operational threshold in adults.
Unstable / cardiopulmonary compromise	Hypotension, acute altered mental status, signs of shock, ischaemic chest discomfort, acute heart failure, syncope, severe ongoing dyspnoea, or other evidence that the rhythm is impairing perfusion.
Narrow-complex tachycardia	Tachycardia with QRS duration under 0.12 second, generally supraventricular in origin.
Wide-complex tachycardia	Tachycardia with QRS duration 0.12 second or more due to ventricular origin, bundle-branch block, pre-excitation, ventricular pacing, hyperkalaemia, or sodium-channel blockade.
Monomorphic / polymorphic VT	Ventricular tachycardia with a consistent QRS shape / beat-to-beat changing QRS morphology. Sustained polymorphic VT is treated as electrically unstable.
Pre-excited AF/flutter	Atrial fibrillation or flutter conducted partly through an accessory pathway, often producing a very rapid irregular wide-complex rhythm with risk of ventricular fibrillation.
Torsades de pointes	Polymorphic ventricular tachycardia associated with a prolonged QT interval, often pause- or bradycardia-dependent and related to drugs, electrolyte disturbance, or congenital long-QT syndrome.
Electrical storm	Three or more sustained ventricular arrhythmia episodes, appropriate ICD therapies, or recurrent unstable VT/VF within 24 hours; local definitions may vary and specialist escalation is mandatory.

5. Roles and accountability

Role	Minimum responsibility
Triage / first-contact clinician	Recognize danger symptoms, obtain pulse and observations, prioritize immediate ECG and monitored placement, and activate resuscitation for instability or absent pulse.
Lead ED clinician	Direct ABCDE care, determine whether the rhythm is causing instability, classify the rhythm, select electrical or pharmacological treatment, seek expert advice, and own disposition.
Resuscitation team	Prepare defibrillator/pacing pads, airway and sedation equipment, IV/IO access, medication, rhythm recording, synchronized cardioversion or defibrillation, and post-procedure reassessment.
Nursing team	Provide monitoring, IV access, medication checks, pacing/cardioversion assistance, skin and comfort care, serial observations, and immediate escalation of recurrence or deterioration.
Cardiology / electrophysiology	Advise on wide-complex rhythms, recurrent SVT, AF/flutter strategy, ventricular arrhythmia, high-grade block, temporary pacing, device interrogation, inherited conditions, and admission or transfer.
Anaesthesia / critical care	Support airway management, procedural sedation, refractory shock, mechanical ventilation, vasoactive infusions, and critical-care transfer.
Pharmacy / laboratory	Support high-risk medication verification, interaction and QT review, electrolyte replacement, toxicology guidance, and rapid communication of critical results.
EMS / transfer team	Preserve rhythm strips, describe prehospital symptoms and treatments, maintain monitoring and resuscitation readiness, and provide direct structured handover.

6. Pathway activation and triage

Category	Operational criteria
RED / immediate resuscitation	Absent pulse; persistent hypotension or shock; acute altered mental status; ongoing ischaemic chest pain; acute pulmonary oedema; severe hypoxaemia; sustained VT; polymorphic VT; very rapid irregular wide-complex rhythm; recurrent syncope with rhythm abnormality; high-grade AV block with poor perfusion; pacemaker failure in a dependent patient; repeated ICD shocks; peri-arrest deterioration.
ORANGE / very urgent	Sustained tachycardia or bradycardia while currently stable; new AF/flutter with rapid response; wide-complex rhythm; long-QT pattern; recurrent palpitations with syncope/presyncope; exertional events; known cardiomyopathy or structural disease; implanted device; significant electrolyte disturbance; suspected drug toxicity; pregnancy/postpartum; congenital or inherited arrhythmia concern.
YELLOW / urgent	Intermittent palpitations now resolved but with abnormal ECG, frequent ectopy, persistent symptoms, medication trigger, anaemia/thyroid/metabolic concern, older age/frailty, recurrent unexplained episodes, or incomplete diagnostic confidence.
GREEN / routine	Only after clinician assessment confirms complete symptom resolution, normal observations and ECG, no syncope/chest pain/dyspnoea, no high-risk history or structural disease, no significant drug/electrolyte concern, and reliable follow-up. Triage category never substitutes for clinical assessment.

DO NOT MISS: A rhythm may be the cause of shock, or it may be a response to shock. Before giving rate-slowing medication, ask whether sepsis, haemorrhage, hypoxia, pulmonary embolism, pain, fever, thyrotoxicosis, or another driver explains the tachycardia.

7. First 10 minutes: parallel action

Action	Required practice
Assess pulse and perfusion	Confirm a pulse manually. If absent or uncertain in an unresponsive patient, start the cardiac-arrest pathway. Assess BP, mental state, capillary refill, skin, chest pain, heart failure, and shock.
Monitor and record	Apply cardiac monitor/defibrillator and pulse oximetry. Record rhythm strips before, during, and after treatment. Obtain a 12-lead ECG during symptoms whenever possible.
Place pads early	Apply defibrillation/pacing pads to any unstable patient, sustained wide-complex tachycardia, high-grade block, recurrent syncope with bradycardia, repeated ICD therapy, or rhythm likely to deteriorate.
Support ABC	Maintain airway, give oxygen for hypoxaemia, assist ventilation, establish IV/IO access, and treat shock. Do not delay shock therapy for access or laboratory tests.
Classify quickly	Is the patient unstable because of the rhythm? Is the rhythm fast or slow? For tachycardia: narrow or wide, regular or irregular, monomorphic or polymorphic?
Treat and reassess	Cardiovert, defibrillate, pace, or administer approved medication as indicated. Recheck pulse, BP, mental state, rhythm, symptoms, QRS/QT, and complications after every intervention.

8. Immediate stabilization: ABCDE

8.1 Airway and breathing

- Open and protect the airway; suction and ventilate as required. Use oxygen for hypoxaemia rather than routinely in normoxaemic stable patients.
- Look for pulmonary oedema, pulmonary embolism, pneumothorax, asthma, pneumonia, aspiration, or respiratory failure that may trigger or worsen the rhythm.
- Prepare airway equipment before cardioversion or sedation, but do not delay immediate electrical therapy in a peri-arrest patient.

8.2 Circulation

- Assess central and peripheral pulse, BP, perfusion, JVP, heart sounds, signs of heart failure, bleeding, dehydration, and temperature. Use cautious fluids when hypovolaemia is likely and avoid indiscriminate fluid loading in heart failure.
- Obtain IV access; use IO if needed in critical deterioration. Draw blood without delaying cardioversion, defibrillation, or pacing.
- Correct reversible causes in parallel: hypoxia, ischaemia, electrolyte disorder, acidosis, hypothermia, hypovolaemia, sepsis, drug toxicity, and endocrine/metabolic triggers.

8.3 Disability and exposure

- Document GCS/mental status, glucose when indicated, focal neurological findings, seizure activity, syncope, and injury. Persistent altered consciousness activates Protocol 17; focal deficit activates Protocol 18.
- Expose sufficiently to assess rash, fever, trauma, medication patches, dialysis access, implanted device, pregnancy, bleeding, and toxic exposure while preventing heat loss.
- After any shock, pacing, or sedating medication, reassess neurological status, airway, breathing, circulation, pain, and skin.

9. Rhythm confirmation and rapid ECG classification

Question	Operational interpretation
Is the monitor rhythm real?	Check the patient and pulse; inspect leads, gain, artifact, electrode contact, and a second lead. Never treat artifact as ventricular tachycardia.
Is the rhythm causing instability?	Serious symptoms must be temporally and physiologically attributable to the rhythm. Do not cardiovert compensatory sinus tachycardia while ignoring the underlying shock state.
Fast or slow?	Record ventricular rate and compare with symptoms. A rate threshold supports, but does not replace, assessment of perfusion.
Narrow or wide?	QRS under 0.12 s suggests supraventricular origin; QRS 0.12 s or more requires a wide-complex pathway and assumption of VT when uncertain.

Question	Operational interpretation
Regular or irregular?	Regular narrow rhythm suggests sinus tachycardia, AVNRT/AVRT, flutter with fixed block, or atrial tachycardia. Irregular narrow rhythm suggests AF, variable flutter, or multifocal atrial tachycardia. Irregular wide rhythm is high risk.
Monomorphic or polymorphic?	A consistent wide QRS may be monomorphic VT or SVT with aberrancy. Beat-to-beat changing morphology suggests polymorphic VT, AF with pre-excitation, or VF and requires immediate expert-level management.
What is the baseline ECG?	After conversion, repeat a 12-lead ECG and examine PR, QRS, QTc, ST-T changes, pre-excitation, Brugada pattern, conduction disease, pacing, and ectopy. Compare with prior ECGs.

10. Reversible causes and mimics

Domain	Examples / required action
Physiological sinus response	Pain, anxiety, fever, sepsis, hypovolaemia, haemorrhage, anaemia, hypoxia, pulmonary embolism, pregnancy, exercise. Treat the cause rather than reflexively slowing the heart rate.
Cardiac	Acute coronary syndrome, myocarditis, heart failure, valve disease, cardiomyopathy, tamponade, post-operative state, congenital disease, device malfunction.
Electrolyte / metabolic	Hyperkalaemia, hypokalaemia, hypomagnesaemia, hypocalcaemia, acidosis, hypoglycaemia, renal failure, dehydration, thyrotoxicosis, adrenal disorder, hypothermia.
Medication / toxin	Beta-blockers, calcium-channel blockers, digoxin, antiarrhythmics, QT-prolonging drugs, sodium-channel blockers, stimulants, cocaine/amphetamines, caffeine/energy products, alcohol, withdrawal, herbal or weight-loss products.
Neurological / autonomic	Seizure, raised intracranial pressure, autonomic dysfunction, vagal episodes, spinal cord pathology.
Artifact / non-arrhythmic symptoms	Muscle tremor, loose leads, ectopy, hypervigilance, panic, oesophageal or chest-wall sensation. A normal ED ECG does not exclude intermittent arrhythmia.

11. Focused history and examination

History	Key questions
Episode	Onset sudden or gradual; offset sudden or gradual; duration; regular or irregular sensation; neck pounding; activity/posture; recurrence; captured pulse/watch tracing; response to vagal manoeuvre or medication.
Associated danger features	Syncope/presyncope, chest pain, dyspnoea, neurological symptoms, diaphoresis, shock symptoms, heart failure, seizure, injury, exertional or supine onset.
Cardiac background	Prior arrhythmia, cardioversion, ablation, MI, heart failure, valve disease, cardiomyopathy, congenital disease, long QT, Brugada, family history of sudden death, pacemaker/ICD.
Triggers and causes	Fever, infection, bleeding, dehydration, pregnancy, pain, thyroid symptoms, stimulant/recreational drug use, alcohol, sleep loss, recent surgery, dialysis, medication changes or missed doses.
Medication / anticoagulation	All prescribed, non-prescribed, herbal, and topical medicines; rate-control/antiarrhythmic use; QT-prolonging combinations; anticoagulant name, dose, adherence, last dose, bleeding history.

History	Key questions
Examination	Complete observations, perfusion, volume status, pulse regularity, murmurs, heart failure, lung findings, thyroid signs, fever, bleeding, neurological status, pregnancy/obstetric concern, device pocket and scars.

12. Targeted investigations

Investigation	Indication / interpretation
12-lead ECG	Required for ongoing or suspected arrhythmia unless immediate electrical treatment cannot wait. Repeat after conversion and after significant medication or electrolyte correction.
Continuous monitoring	For active arrhythmia, high-risk symptoms, wide-complex rhythm, significant bradycardia, QT prolongation, electrolyte disturbance, IV antiarrhythmic use, pacing, or post-cardioversion care.
Electrolytes / renal function	Check potassium, magnesium, calcium, bicarbonate, and renal function when arrhythmia is sustained, recurrent, wide-complex, QT-related, drug-related, or associated with renal disease/diuretics.
Glucose / blood count	Glucose for altered state or metabolic concern; full blood count for anaemia, infection, or bleeding concern.
Troponin / ACS testing	Use when symptoms, ECG, or context suggest myocardial ischaemia/injury. Tachycardia alone can elevate troponin and must be interpreted clinically.
Thyroid testing	For new AF, unexplained persistent tachycardia, or clinical suspicion; it need not delay acute treatment.
Pregnancy test	When pregnancy is possible and the result affects medication, imaging, or disposition.
Toxicology / drug levels	Targeted testing for digoxin, lithium, or specific toxin concern; contact poison services early. Routine broad screens rarely direct immediate care.
Imaging / echocardiography	Chest imaging, POCUS, formal echo, CT, or PE imaging only for a documented clinical question. Echo is important with heart failure, murmur, cardiomyopathy, recurrent VT, or structural disease concern.
Ambulatory recording	Arrange Holter, patch, event monitor, or loop-recorder pathway according to symptom frequency and risk when ED ECG does not capture the event.

13. Unstable tachyarrhythmia with a pulse

UNSTABLE TACHYCARDIA: Hypotension, acute altered mental status, shock, ischaemic chest discomfort, acute heart failure, or rapidly worsening perfusion attributable to the rhythm requires immediate electrical treatment.

Step	Required action
1. Prepare	Call for senior/resuscitation support. Apply pads, oxygen if hypoxaemic, monitor, suction, airway equipment, IV access, and medication. Record a rhythm strip if this does not delay treatment.
2. Synchronize	For regular narrow, AF/flutter, and monomorphic VT with a pulse, activate synchronization and confirm markers fall on every QRS. Reconfirm synchronization after each shock.
3. Energy	Use the approved defibrillator-specific setting. AHA 2025 reference starting points: AF 200 J biphasic; atrial flutter 200 J; regular narrow-complex tachycardia 100 J; monomorphic VT 100 J. If device recommendation is unknown, use the maximum available synchronized setting and escalate after failure.
4. Sedation	Provide rapid procedural sedation/analgesia when feasible and safe, but never delay cardioversion in a peri-arrest patient. Ensure airway capability and monitoring.

5. Shock and reassess	Deliver synchronized shock, immediately reassess pulse, rhythm, BP, mental status, and symptoms. Escalate energy, optimize pads/contact, and seek expert help if unsuccessful.
6. Polymorphic rhythm	Do not attempt synchronization for sustained polymorphic VT. Deliver immediate high-energy unsynchronized shock at the manufacturer maximum setting and follow the defibrillation/cardiac-arrest pathway if pulseless.
7. Treat cause	Correct hypoxia, ischaemia, electrolytes, acidosis, drug toxicity, and other triggers. Obtain post-conversion ECG and monitor for recurrence.

14. Stable regular narrow-complex tachycardia

Action	Required practice
Confirm suitability	Ensure the patient is stable and the rhythm is regular and narrow. Distinguish sinus tachycardia from re-entrant SVT; sinus tachycardia usually has a physiological driver and should not receive adenosine merely because the rate is high.
Vagal manoeuvre	Use an approved modified Valsalva manoeuvre with monitoring and staff support. Avoid unsafe carotid sinus massage; local policy must define whether it is permitted and contraindications.
Adenosine	If appropriate, give 6 mg rapid IV push followed immediately by saline flush; if needed, give 12 mg. Use continuous ECG recording and resuscitation readiness. A lower initial dose may be required with a central line or denervated transplanted heart under expert/local guidance.
Adenosine cautions	Do not use in irregular or polymorphic wide-complex tachycardia. Avoid in severe/reactive bronchospasm. Expect transient flushing, chest pressure, breathlessness, or sense of dread; warn the conscious patient.
Persistent rhythm	If the rhythm persists, reassess diagnosis. Approved IV beta-blocker or diltiazem/verapamil may be considered in selected stable regular narrow-complex tachycardia, avoiding hypotension, pre-excitation, decompensated heart failure, and other contraindications. Seek cardiology advice.
Escalation	Cardiovert if the patient becomes unstable or if stable tachycardia remains symptomatic and pharmacological treatment is ineffective or contraindicated. Record post-conversion ECG and consider electrophysiology referral for recurrent SVT.

15. Stable irregular narrow-complex tachycardia

- Common causes include atrial fibrillation, atrial flutter with variable conduction, and multifocal atrial tachycardia. Confirm with 12-lead ECG and assess the underlying trigger.
- Treat sepsis, hypoxia, pulmonary disease, heart failure, electrolyte disturbance, thyrotoxicosis, pain, and hypovolaemia before or alongside rate control.
- For AF/flutter without pre-excitation, selected IV beta-blocker or nondihydropyridine calcium-channel blocker may be used for acute rate control under the approved formulary. Avoid diltiazem/verapamil and IV beta-blockers in left-ventricular systolic dysfunction with decompensated heart failure.
- IV amiodarone may be considered for rate control in selected critically ill patients without pre-excitation when standard agents are unsuitable, with senior/cardiology oversight and awareness that it may cardiovert.
- Multifocal atrial tachycardia is usually driven by pulmonary or metabolic disease; focus on oxygenation, respiratory treatment, magnesium/electrolytes, and the precipitating illness rather than cardioversion.

16. Stable wide-complex tachycardia

DEFAULT SAFETY POSITION: Treat a regular monomorphic wide-complex tachycardia as ventricular tachycardia until proven otherwise. Keep the defibrillator connected and ready.

Action	Required practice

Immediate setup	Continuous monitoring, pads in place, IV access, 12-lead ECG, senior clinician, and cardiology consultation. Any deterioration triggers immediate cardioversion.
Adenosine limitation	Adenosine may be considered only when the patient is stable and the wide-complex rhythm is regular and monomorphic, for treatment or diagnostic clarification. Do not use it for unstable, irregularly irregular, or polymorphic wide-complex tachycardia.
Antiarrhythmic option	Use one locally approved regimen with expert oversight. AHA reference: procainamide 20-50 mg/min until suppression, hypotension, QRS increase over 50%, or 17 mg/kg maximum; maintenance 1-4 mg/min; avoid prolonged QT or heart failure. Alternatively, amiodarone 150 mg over 10 minutes, repeat if VT recurs, then 1 mg/min for 6 hours.
Do not combine casually	Avoid sequential or combined antiarrhythmic drugs without expert direction because additive hypotension, QRS/QT prolongation, and proarrhythmia may occur.
Prohibited drugs	Do not administer verapamil or diltiazem to an undifferentiated wide-complex tachycardia. Do not give AV-nodal blockers to suspected pre-excited AF.
Disposition	All sustained VT, recurrent non-sustained VT with symptoms/structural disease, or unexplained wide-complex tachycardia requires monitored admission or specialist transfer unless a senior cardiology-led plan explicitly states otherwise.

17. Polymorphic VT, torsades de pointes, and electrical storm

Condition	Emergency management
Sustained polymorphic VT	Treat as electrically unstable with immediate unsynchronized high-energy shock. If pulseless, follow the cardiac-arrest algorithm.
Torsades / long QT	Stop QT-prolonging drugs; correct potassium, magnesium, and other electrolytes; give IV magnesium under the approved emergency-drug protocol for recurrent torsades; avoid QT-prolonging antiarrhythmics. Seek urgent electrophysiology/critical-care advice.
Pause/bradycardia-dependent torsades	Expert measures may include overdrive pacing or isoproterenol. Prepare transvenous pacing and transfer; do not delay defibrillation of sustained episodes.
Polymorphic VT with normal QT	Suspect acute myocardial ischaemia or another malignant ventricular mechanism. Defibrillate sustained episodes, activate ACS/coronary reperfusion pathways, and consider specialist-directed lidocaine or amiodarone.
Electrical storm / repeated ICD shocks	Resuscitation-area care, pads attached, correct electrolytes/ischaemia/hypoxia, provide analgesia and anxiolysis/sedation, interrogate device, and obtain immediate cardiology/electrophysiology/critical-care support. Do not place a magnet without a defined indication and competent device guidance.

18. Atrial fibrillation and atrial flutter

Decision	Required practice
Is the patient unstable?	If instability is attributable to AF/flutter with rapid ventricular response, perform immediate synchronized cardioversion. Do not withhold life-saving cardioversion because duration or anticoagulation status is uncertain.
Is rate control appropriate?	In stable patients, treat triggers and select a rate-control drug according to ventricular function, BP, comorbidity, current medicines, and local formulary. Avoid excessive rate reduction and reassess perfusion.

Decision	Required practice
Is rhythm control safe?	Record symptom/onset timing, prior AF, anticoagulation adherence, stroke risk, bleeding risk, and structural disease. Stable elective cardioversion must follow the locally adopted anticoagulation/TOE pathway; uncertain duration requires specialist review rather than reflex ED cardioversion.
Thromboembolism prevention	Assess eligibility for anticoagulation using the locally adopted stroke-risk framework and contraindications. Emergency cardioversion should be accompanied by anticoagulation as soon as clinically appropriate unless contraindicated, with a documented follow-up plan.
Pre-excitation warning	A very rapid irregular wide-complex rhythm may be pre-excited AF/flutter. Do not give beta-blocker, diltiazem, verapamil, digoxin, or IV amiodarone. Use urgent cardioversion and expert advice.
Discharge planning	New AF/flutter requires documented trigger evaluation, ventricular-rate assessment, anticoagulation decision or named decision owner, medication reconciliation, follow-up timing, and return precautions.

19. Bradyarrhythmia with a pulse

SYMPTOMATIC BRADYCARDIA: Treat when the slow rhythm is associated with hypotension, altered mental status, shock, ischaemic chest discomfort, acute heart failure, syncope, or other poor perfusion. Simultaneously correct the cause.

Step	Required action
1. Support and investigate	Airway/oxygen if required, monitor, IV/IO access, 12-lead ECG, glucose and targeted labs. Consider MI/ischaemia, hypoxia, hyperkalaemia, hypothermia, drugs/toxins, infection, raised intracranial pressure, and device failure.
2. Atropine	For adult acute symptomatic bradycardia, give atropine 1 mg IV; repeat every 3-5 minutes to a maximum total 3 mg. Do not allow atropine attempts to delay pacing in high-grade block or severe instability.
3. If ineffective	Begin transcutaneous pacing and/or dopamine infusion 5-20 micrograms/kg/min or epinephrine infusion 2-10 micrograms/min, titrated to response, under continuous monitoring.
4. Pacing readiness	For unstable high-grade AV block, immediate pacing may be required even before IV access. Ensure electrical and mechanical capture, provide analgesia/sedation if perfusion allows, and monitor skin and BP.
5. Definitive escalation	Seek urgent cardiology/critical-care help and prepare for temporary transvenous pacing when instability persists, the block is infranodal/high grade, recurrence is likely, or the cause cannot be rapidly reversed.
6. Reassess	Document pulse, BP, mental state, symptoms, ECG, capture threshold, drug/infusion dose, and response after each intervention. Do not accept monitor capture without a palpable pulse or arterial waveform.

20. Conduction disease, myocardial infarction, and implanted devices

- New Mobitz II, high-grade AV block, complete heart block, alternating bundle-branch block, or symptomatic pauses require monitored care and urgent cardiology assessment even if temporarily stable.
- Bradycardia or block with suspected acute MI requires simultaneous ACS management and early reperfusion/cardiology discussion. Inferior MI may be transient; anterior MI with block is particularly high risk.
- For pacemaker/ICD patients, identify device type, manufacturer, indication, dependency, recent procedures, shocks, and remote alerts. Obtain ECG, chest radiograph when lead displacement is possible, electrolytes, and urgent device interrogation.
- Pacemaker spikes without QRS complexes suggest failure to capture; absent spikes may reflect failure to pace or inhibition. Treat the patient with external pacing and resuscitation support rather than waiting for interrogation when unstable.
- Keep external pads away from the generator when possible and use an anterior-posterior or alternative safe position. Follow local device and peri-arrest guidance.

21. Drug, electrolyte, and toxicological arrhythmias

Pattern / exposure	Key emergency actions
Hyperkalaemia	Recognize peaked T waves, PR prolongation, QRS widening, bradycardia, sine-wave pattern, or unexplained wide rhythm. Activate the hyperkalaemia protocol immediately; do not wait for laboratory confirmation when ECG and context are compelling.
Hypokalaemia / hypomagnesaemia	Replace promptly and stop causative drugs, especially with QT prolongation, ventricular ectopy, or torsades. Use local IV replacement concentrations and monitoring rules.
Beta-blocker / calcium-channel blocker toxicity	Early poison-service/critical-care consultation; treat shock and bradycardia under the toxicology pathway. Standard atropine may be insufficient; high-dose insulin, calcium, vasopressors, glucagon, or lipid therapy require protocolized specialist use.
Digoxin toxicity	Consider with bradyarrhythmia, AV block, atrial tachycardia with block, bidirectional VT, renal dysfunction, or hyperkalaemia. Stop digoxin, obtain level/electrolytes/renal function, and urgently assess for digoxin immune Fab.
Sodium-channel blocker toxicity	Wide QRS, terminal R in aVR, ventricular arrhythmia, seizure, or shock after tricyclic or similar exposure requires immediate sodium-bicarbonate-based toxicology management and poison consultation.
Stimulants / cocaine	Treat agitation, hyperthermia, ischaemia, hypertension, and arrhythmia under the toxicology/ACS pathway; avoid simplistic rate control without addressing catecholamine excess.
QT-prolonging medicines	Stop contributing agents, check interactions and renal dosing, correct electrolytes, monitor QTc, and escalate if QTc is markedly prolonged or ventricular ectopy/torsades occurs.

22. Special populations

22.1 Children and adolescents

- Use the current paediatric advanced life-support tachycardia and bradycardia algorithms, age/weight-based dosing, and paediatric cardiology advice. Adult doses in this protocol must not be used.
- Differentiate sinus tachycardia from SVT using age-appropriate rates, variability, P waves, and clinical context. In children, bradycardia commonly reflects hypoxia and may require ventilation and CPR before medication.
- Congenital heart disease, myocarditis, channelopathy, family history of sudden death, exertional symptoms, or pre-excitation requires specialist evaluation and a low threshold for transfer.

22.2 Pregnancy and postpartum

- Position to reduce aortocaval compression when appropriate, assess maternal causes such as haemorrhage, PE, pre-eclampsia, sepsis, and cardiomyopathy, and involve obstetrics and cardiology early.
- Synchronized cardioversion should not be delayed when maternal instability is caused by the arrhythmia. Arrange fetal assessment when gestation is viable and resources permit, without delaying maternal resuscitation.
- Adenosine may be used for appropriate regular SVT under the approved pathway. Drug selection for rate/rhythm control and anticoagulation must consider fetal, maternal, and lactation issues and follow current pregnancy-cardiology guidance.

22.3 Older adults and frailty

- Review polypharmacy, renal function, dehydration, infection, falls/syncope, conduction disease, digoxin, beta-blocker, calcium-channel blocker, and QT-prolonging combinations.
- Use lower and slower medication strategies where appropriate, but do not undertreat life-threatening instability. Assess mobility, delirium, caregiver capacity, and medication understanding before discharge.

22.4 Athletes, inherited conditions, and heart transplant

- Asymptomatic athletic bradycardia may be physiological, but exertional palpitations, syncope, family history of sudden death, abnormal ECG, or ventricular ectopy requires restriction from sport pending specialist review.
- Suspected long-QT, Brugada, catecholaminergic polymorphic VT, arrhythmogenic cardiomyopathy, or hypertrophic cardiomyopathy requires urgent cardiology/electrophysiology input and family-risk consideration.
- Denervated transplanted hearts may respond unusually to atropine and adenosine. Use expert guidance, consider reduced adenosine dosing, and move early to pacing/adrenergic support for unstable bradycardia.

22.5 Renal failure and dialysis

- Assume hyperkalaemia until excluded in unexplained bradycardia, conduction disturbance, or wide QRS. Treat ECG-toxic hyperkalaemia immediately and arrange urgent dialysis when indicated.

- Adjust renally cleared drugs, check dialysis timing and access, and avoid fluid or electrolyte replacement that does not account for renal failure.

23. Monitoring, observation, and reassessment

Situation	Minimum monitoring / reassessment
Unstable or electrically treated	Continuous ECG and oximetry, frequent BP, pads attached, airway readiness, post-shock ECG, serial perfusion/mental-state checks, and monitored admission/transfer.
IV antiarrhythmic or rate-control drug	Continuous ECG and BP during and after administration; document baseline and post-dose rhythm, QRS/QT, symptoms, haemodynamics, and adverse effects.
Transcutaneous pacing	Continuous ECG plus mechanical-capture confirmation by pulse/BP/arterial waveform; analgesia/sedation review, skin checks, battery/pad security, and preparation for definitive pacing.
Electrolyte/QT disorder	Repeat electrolytes and ECG at intervals defined by severity and replacement route; continue monitoring until the provoking condition and QT/rhythm risk are acceptably corrected.
Resolved palpitations	Repeat observations and ECG, review rhythm evidence and high-risk features, and ensure a named plan for ambulatory monitoring, cardiology review, or primary-care follow-up.
All patients	Document explicit reassessment after each intervention, recurrence, transfer, and before discharge. Record who owns pending results and follow-up.

24. Consultation, escalation, and transfer

Urgency	Examples
Immediate cardiology / critical care	Refractory unstable tachycardia or bradycardia; sustained VT; polymorphic VT/torsades; electrical storm; high-grade or complete AV block with symptoms; temporary transvenous pacing need; repeated cardioversion; shock or ventilation requirement.
Urgent cardiology / electrophysiology	Stable wide-complex tachycardia; new ventricular arrhythmia; pre-excited AF; recurrent SVT; significant QT prolongation; new conduction disease; unexplained syncope with rhythm abnormality; pacemaker/ICD malfunction or shocks; inherited-arrhythmia concern.
Other specialty	ACS/reperfusion team, toxicology/poison centre, renal/dialysis, obstetrics, paediatric cardiology, anaesthesia, or neurology according to the precipitating condition.
Transfer standard	Transfer in a monitored setting with trained escort, functioning defibrillator/pacing capacity, pads attached when indicated, adequate medication/oxygen/battery, copies of all ECGs and rhythm strips, treatment timeline, and direct clinician-to-clinician handover.

25. Disposition

Disposition	Typical criteria
Resuscitation / ICU / monitored transfer	Ongoing or recurrent instability; sustained VT/polymorphic VT; electrical storm; high-grade block requiring pacing/infusion; refractory AF/flutter; significant shock, heart failure, ischaemia, toxicology, electrolyte, or airway risk.
Monitored admission	New significant arrhythmia; symptomatic bradycardia; recurrent SVT requiring treatment; cardioversion; new AF/flutter needing inpatient strategy; structural disease; abnormal troponin/ECG; major comorbidity; uncertain diagnosis with significant risk.
Observation / short stay	Selected stable patients requiring serial ECG/troponin, electrolyte correction, medication observation, recurrent-symptom capture, or expedited cardiology planning, with explicit goals and maximum duration.

Disposition	Typical criteria
Discharge	Symptoms resolved; haemodynamically stable; no dangerous rhythm or high-risk ECG; serious underlying cause excluded or safely managed; medication/anticoagulation plan complete; follow-up and monitoring arranged; reliable transport/support; clear return precautions.
Do not discharge solely because rhythm converted	Conversion does not erase the cause or recurrence risk. The decision must address structural heart disease, ischaemia, thromboembolism, drug toxicity, electrolyte disorder, syncope, and follow-up reliability.

26. Discharge information and safety

- Explain the working diagnosis, whether an arrhythmia was captured, treatments given, medication changes, anticoagulation decision, and required follow-up in plain language.
- Provide immediate-return instructions for syncope, chest pain, breathlessness, sustained or worsening palpitations, weakness/focal symptoms, repeated vomiting, bleeding, device shocks, or medication adverse effects.
- Advise on hydration and avoidance of identified triggers, stimulants, recreational drugs, excess alcohol, and non-prescribed QT-prolonging products as clinically relevant.
- Give individualized driving, work-at-height, machinery, swimming, diving, and sport restrictions according to local law and specialist guidance, especially after syncope or suspected malignant arrhythmia.
- Arrange ambulatory monitoring according to symptom frequency, and provide a clear process for obtaining urgent care if symptoms recur before follow-up.

27. Documentation and handover

[ ] Time of symptom onset, arrival, deterioration, ECGs, medications, shocks, pacing, conversion, recurrence, consultation, and transfer.

[ ] Instability criteria and the clinician judgement linking symptoms to the rhythm.

[ ] Rhythm classification: rate, QRS width, regularity, morphology, QTc, baseline ECG features, and differential diagnosis.

[ ] All rhythm strips and 12-lead ECGs before, during, and after treatment, labelled with time and intervention.

[ ] Cardioversion mode, synchronization confirmation, energy, pad position, sedation, result, and complications.

[ ] Pacing mode/rate/current, electrical and mechanical capture, analgesia/sedation, and response.

[ ] Drug name, dose, route, time, independent check, contraindication review, and clinical response.

[ ] Reversible causes considered and treated, including electrolytes, ischaemia, infection, hypoxia, drugs/toxins, and bleeding.

[ ] Consultations, transfer decisions, pending results, anticoagulation decision, and named follow-up owner.

[ ] Disposition rationale, discharge advice, restrictions, and patient/carer understanding.

28. Quality indicators and audit

Indicator	Suggested measure
Rapid ECG	Percentage of eligible patients receiving a 12-lead ECG within the locally defined target.
Instability recognition	Percentage of unstable arrhythmia cases with documented serious signs and treatment without avoidable delay.
Electrical-treatment safety	Synchronization and post-shock reassessment documented; no inappropriate synchronized shock for polymorphic VT.
Medication safety	Correct adenosine rhythm selection; no verapamil/diltiazem in undifferentiated WCT; no AV-nodal blocker in suspected pre-excited AF.
Bradycardia care	Reversible causes assessed; atropine/pacing/infusion sequence and mechanical capture documented.
ECG preservation	Pre-, intra-, and post-treatment rhythm strips retained in the record.
Disposition safety	Follow-up, anticoagulation decision, medication reconciliation, and return precautions documented for discharged AF/palpitations patients.
Outcomes	Unplanned return, cardiac arrest, ICU transfer, delayed pacing, stroke/systemic embolism, medication adverse event, and 30-day serious arrhythmia reviewed.

29. Training and implementation

- All clinicians expected to manage unstable arrhythmia must maintain current adult or paediatric resuscitation competency appropriate to role, including synchronized cardioversion, defibrillation, transcutaneous pacing, and rhythm recognition.
- Conduct multidisciplinary simulation for unstable SVT, monomorphic VT, polymorphic VT/torsades, pre-excited AF, complete heart block, pacemaker failure, and repeated ICD shocks.
- Use locally approved bedside cards for energy settings, drug doses, pacing steps, anticoagulation/cardioversion rules, electrolyte replacement, and device contacts.
- Review every serious adverse event, delayed cardioversion/pacing, wrong-rhythm medication, failure to preserve ECG evidence, or unsafe discharge through clinical governance.

ANNEX A. One-page arrhythmia workflow

Step	Action
1. Pulse?	No pulse or uncertain in an unresponsive patient -> cardiac-arrest algorithm.
2. Unstable?	Hypotension, altered mental status, shock, ischaemic chest discomfort, acute heart failure, or severe poor perfusion attributable to rhythm.
3. Unstable tachycardia	Pads, synchronization for regular narrow/AF/flutter/monomorphic VT, cardiovert; polymorphic VT -> unsynchronized high-energy shock.
4. Stable tachycardia	Classify narrow/wide and regular/irregular. Regular narrow -> vagal/adenosine. Wide -> presume VT. Irregular wide -> suspect pre-excitation/polymorphic mechanism; avoid AV-nodal blockers.
5. Unstable bradycardia	Atropine 1 mg IV, repeat 3-5 min to 3 mg max; if ineffective or high-grade block -> pacing and/or dopamine/epinephrine; prepare transvenous pacing.
6. Treat cause	Hypoxia, ischaemia, electrolytes, sepsis, bleeding, PE, drugs/toxins, endocrine/metabolic disease, device malfunction.
7. Reassess and disposition	Repeat ECG/observations, preserve strips, monitor, consult, admit/transfer or discharge only with safe follow-up and return precautions.

ANNEX B. Instability red-flag card

[ ] Hypotension or falling BP with symptoms.

[ ] Acute altered mental status, seizure, syncope, or severe presyncope.

[ ] Cool/clammy skin, poor capillary refill, oliguria, or shock.

[ ] Ongoing ischaemic chest discomfort or dynamic ischaemic ECG change.

[ ] Acute pulmonary oedema, severe dyspnoea, or worsening hypoxaemia.

[ ] Sustained VT, polymorphic VT, very rapid irregular wide rhythm, or recurrent malignant ectopy.

[ ] High-grade AV block, long pauses, pacemaker failure in a dependent patient.

[ ] Repeated ICD shocks or peri-arrest deterioration.

ANNEX C. Rapid rhythm-classification card

QRS / regularity	Think first	Immediate caution
Narrow + regular	Sinus tachycardia, AVNRT/AVRT, atrial tachycardia, flutter with fixed block	Treat underlying cause if sinus; vagal/adenosine only when appropriate and stable.
Narrow + irregular	AF, variable flutter, multifocal atrial tachycardia	Treat triggers; choose rate control by ventricular function and contraindications.
Wide + regular monomorphic	VT until proven otherwise; SVT with aberrancy; paced rhythm	Pads on; no verapamil/diltiazem; adenosine only if stable regular monomorphic.
Wide + irregular	Pre-excited AF, polymorphic VT, AF with aberrancy, electrolyte/toxin	High risk; avoid AV-nodal blockers if pre-excitation possible; urgent expert/electrical therapy.
Wide + polymorphic	Torsades, ischaemic polymorphic VT, VF	Immediate unsynchronized shock if sustained; assess QT and cause afterward.

QRS / regularity	Think first	Immediate caution
Slow rhythm	Sinus bradycardia, AV block, junctional/ventricular escape, paced rhythm	Treat symptoms/perfusion and cause; early pacing for high-grade block.

ANNEX D. Synchronized cardioversion checklist

[ ] Confirm pulse and instability attributable to tachyarrhythmia.
[ ] Call for help; attach monitor/defibrillator and pads; prepare airway/suction/IV access.
[ ] Choose synchronized mode and visually confirm a sync marker on every QRS.
[ ] Choose device-approved energy; AHA reference: AF 200 J, flutter 200 J, narrow 100 J, monomorphic VT 100 J.
[ ] Sedate/analgesia when feasible without delaying life-saving shock.
[ ] Announce clear; ensure oxygen source is not over chest; deliver shock.
[ ] Immediately reassess pulse, rhythm, BP, mental state, and symptoms.
[ ] Reselect/reconfirm synchronization before every subsequent shock.
[ ] Escalate energy and optimize pads/contact; treat reversible cause.
[ ] Record pre/post rhythm strips, energy, synchronization, sedation, response, and complications.

ANNEX E. Electrical-therapy energy card

Rhythm	Reference initial treatment
Atrial fibrillation with serious instability	Synchronized biphasic cardioversion 200 J; escalate according to device and response.
Atrial flutter with serious instability	Synchronized biphasic cardioversion 200 J; escalate according to device and response.
Regular narrow-complex tachycardia with serious instability	Synchronized cardioversion 100 J.
Monomorphic VT with a pulse and serious instability	Synchronized cardioversion 100 J.
Sustained polymorphic VT	Unsynchronized high-energy shock at manufacturer maximum setting.
Paediatric tachycardia	Use current PALS weight-based algorithm; do not use this adult card.

Local approval note: Device-specific manufacturer recommendations and the locally adopted resuscitation guideline override this reference card. Reconfirm synchronization before every repeat synchronized shock.

ANNEX F. Adenosine safety checklist

[ ] Patient stable; rhythm regular and narrow, or stable regular monomorphic wide rhythm under senior direction.
[ ] Not sinus tachycardia from a physiological cause.
[ ] Not irregularly irregular, polymorphic, unstable, or suspected pre-excited AF.
[ ] No severe active bronchospasm/asthma contraindication.
[ ] Defibrillator, monitoring, IV access, and resuscitation-trained staff ready.
[ ] Continuous ECG recording enabled; patient warned of brief unpleasant symptoms.
[ ] Adult dose: 6 mg rapid IV push plus immediate flush; then 12 mg if required.
[ ] Consider reduced initial dose for central line or transplanted heart under local/expert guidance.
[ ] Record rhythm response even when tachycardia does not terminate.

ANNEX G. Stable wide-complex tachycardia checklist

[ ] Presume VT; pads attached and defibrillator ready.
[ ] Confirm stable perfusion and obtain 12-lead ECG without delaying treatment.
[ ] Check prior ECG, structural disease, medications, potassium, magnesium, ischaemia, and toxicology.
[ ] Do not give verapamil or diltiazem.
[ ] Adenosine only if regular monomorphic and stable.
[ ] Use one approved antiarrhythmic regimen; avoid casual combination/sequencing.
[ ] Continuous ECG/BP and immediate cardioversion if deterioration.
[ ] Urgent cardiology/electrophysiology consultation and monitored admission/transfer.

ANNEX H. AF / flutter ED checklist

[ ] Instability attributable to AF/flutter? If yes, immediate synchronized cardioversion.

[ ] Onset time and reliability; prior AF/flutter; previous cardioversion/ablation.

[ ] Underlying trigger: infection, heart failure, ACS, PE, thyroid, bleeding, alcohol, drugs, electrolyte disturbance.

[ ] Pre-excitation excluded before AV-nodal blockers.

[ ] Ventricular function, BP, decompensated heart failure, and drug contraindications assessed.

[ ] Current anticoagulant, adherence, last dose, stroke and bleeding risk documented.

[ ] Rhythm-control/cardioversion safety reviewed under local anticoagulation/TOE pathway.

[ ] Post-treatment rate, rhythm, symptoms, BP, and ECG documented.

[ ] Named decision owner for anticoagulation, medication, and follow-up.

ANNEX I. Pre-excited AF danger card

SUSPECT WHEN: Very rapid, irregular, wide-complex tachycardia with varying QRS morphology/width, especially in a young patient or one with known WPW/pre-excitation.

- Do not administer beta-blockers, diltiazem, verapamil, digoxin, or IV amiodarone.
- If unstable: immediate synchronized cardioversion. If the rhythm becomes polymorphic or synchronization is unreliable: high-energy unsynchronized shock.
- If stable: keep pads on, obtain immediate cardiology/electrophysiology advice, and use only the locally approved pathway such as specialist-directed procainamide.
- Arrange monitored admission and definitive accessory-pathway evaluation.

ANNEX J. Adult symptomatic-bradycardia card

Step	Action
Assess	Airway/breathing, monitor, pulse, BP, IV/IO, 12-lead ECG; treat hypoxia, MI, hyperkalaemia, hypothermia, drugs/toxins.
Atropine	1 mg IV; repeat every 3-5 minutes; maximum total 3 mg.
If ineffective / high-grade block	Transcutaneous pacing and/or dopamine 5-20 micrograms/kg/min or epinephrine 2-10 micrograms/min.
Pacing	Confirm electrical and mechanical capture; provide analgesia/sedation if feasible; monitor skin and perfusion.
Definitive	Urgent expert consultation and prepare temporary transvenous pacing.
If pulseless	Cardiac-arrest algorithm immediately.

ANNEX K. Transcutaneous-pacing checklist

[ ] Pads positioned according to device/local guidance and not directly over implanted generator.

[ ] Demand mode selected unless local specialist direction states otherwise.

[ ] Pacing rate selected under protocol; current increased until electrical capture, then above threshold.

[ ] Mechanical capture confirmed by palpable pulse, BP, pulse oximeter waveform, or arterial waveform.

[ ] Analgesia/sedation provided when perfusion permits; airway equipment ready.

[ ] Cause treated and cardiology/critical-care contacted for transvenous pacing plan.

[ ] Battery, leads, pad adhesion, skin, rate, output, threshold, and capture checked repeatedly.

[ ] Transfer undertaken with pacing-capable monitor, spare supplies, trained escort, and direct handover.

ANNEX L. Electrolyte, QT, and toxicology card

Finding	Immediate response
Wide QRS/bradycardia in renal failure	Treat suspected hyperkalaemia immediately under protocol; repeat ECG and potassium; arrange dialysis when indicated.
QTc markedly prolonged / torsades risk	Stop QT drugs, correct K/Mg/Ca, continuous monitoring, avoid bradycardia and QT-prolonging antiarrhythmics.
Digoxin pattern	Stop drug, level/electrolytes/renal function, poison/cardiology advice, assess for immune Fab.

Finding	Immediate response
Beta-blocker/CCB toxicity	Poison/critical-care pathway; atropine often insufficient; protocolized antidotal and haemodynamic treatment.
Sodium-channel blockade	Sodium-bicarbonate toxicology pathway; seizure and shock control.
Stimulant exposure	Control agitation/hyperthermia/ischaemia and catecholamine excess under toxicology/ACS pathway.

ANNEX M. Paediatric safety card

[ ] Use current PALS algorithm and weight in kilograms.

[ ] Assess whether tachycardia is sinus or SVT using age-appropriate rate and variability.

[ ] Treat hypoxia/ventilation first in bradycardia; start CPR when indicated by PALS.

[ ] Use weight-based adenosine, cardioversion energy, and medication doses only from approved paediatric references.

[ ] Involve paediatrics/paediatric cardiology early for congenital disease, myocarditis, pre-excitation, inherited arrhythmia, or uncertain wide-complex rhythm.

[ ] Adult dose cards removed from bedside during paediatric resuscitation to reduce selection error.

ANNEX N. Pregnancy / postpartum checklist

[ ] Maternal ABCDE and haemodynamic stability prioritized.

[ ] Assess haemorrhage, PE, sepsis, pre-eclampsia, cardiomyopathy, thyroid disease, and medication causes.

[ ] Left uterine displacement/positioning when appropriate.

[ ] Cardioversion not delayed for fetal monitoring when maternal instability is present.

[ ] Obstetrics and cardiology contacted early; fetal assessment arranged when feasible.

[ ] Medication and anticoagulation selected under current pregnancy-cardiology guidance.

[ ] Postpartum thromboembolic and cardiomyopathy risk explicitly considered.

ANNEX O. Low-risk palpitations discharge checklist

[ ] Symptoms resolved and repeat observations stable.

[ ] 12-lead ECG normal or non-dangerous and reviewed by responsible clinician.

[ ] No syncope, exertional event, chest pain, breathlessness, heart failure, or neurological deficit.

[ ] No structural heart disease, inherited-arrhythmia concern, significant family history, or implanted-device problem.

[ ] No significant electrolyte, anaemia, infection, thyroid, drug, or toxicology concern requiring inpatient care.

[ ] Medication reconciliation completed and stimulant/QT-drug advice provided.

[ ] Ambulatory monitoring and follow-up matched to symptom frequency and risk.

[ ] Return precautions and driving/work/sport advice understood.

[ ] Pending results and follow-up ownership documented.

ANNEX P. Transfer and handover minimum dataset

[ ] Working rhythm diagnosis and differential; current rhythm, rate, BP, oxygenation, and mental state.

[ ] All ECGs and rhythm strips, including before/during/after treatment.

[ ] Instability signs and treatment timeline.

[ ] Cardioversion/defibrillation mode, energy, pad position, sedation, and response.

[ ] Pacing mode, rate, output, capture threshold, mechanical capture, and analgesia.

[ ] Medications/infusions with dose, time, response, and adverse effects.

[ ] Electrolytes, troponin, renal function, toxicology, pregnancy, and other critical results.

[ ] Underlying cause, comorbidities, device details, anticoagulation, allergies, and resuscitation status.

[ ] Recurrence risk, anticipated deterioration, and contingency plan during transfer.

[ ] Receiving clinician/service confirmation and direct handover time.

ANNEX Q. Audit tool

Case review item	Yes / No / N/A / notes
Pulse and instability assessed promptly	

Case review item	Yes / No / N/A / notes
12-lead ECG/rhythm strip obtained without delaying emergency treatment	
Tachycardia classified by QRS width and regularity	
Sinus tachycardia underlying cause considered	
Pads applied early when deterioration risk present	
Synchronization documented for cardioversion	
Polymorphic VT treated with unsynchronized shock	
Adenosine used only for an eligible rhythm	
No verapamil/diltiazem given to undifferentiated WCT	
Pre-excited AF recognized and AV-nodal blockers avoided	
Bradycardia reversible causes assessed	
Mechanical capture documented during pacing	
Electrolyte/toxic/drug causes addressed	
Pre/post treatment ECGs preserved	
Monitoring and specialist escalation appropriate	
Disposition, anticoagulation, follow-up, and return advice documented	
Adverse event or 30-day return reviewed	

ANNEX R. Local configuration checklist

[ ] Current adult and paediatric resuscitation algorithms displayed and controlled for version.

[ ] Defibrillator models, synchronized cardioversion energies, pad positions, and competency validation.

[ ] Procedural sedation and airway-support pathway for emergency cardioversion.

[ ] Approved adult adenosine, antiarrhythmic, AF rate-control, atropine, dopamine, epinephrine, magnesium, and electrolyte-replacement regimens.

[ ] Independent high-risk medication check and infusion-pump standards.

[ ] Transcutaneous and transvenous pacing equipment, training, contact pathway, and transfer readiness.

[ ] Hyperkalaemia, digoxin, beta-blocker/CCB, sodium-channel blocker, stimulant, and QT-drug toxicology pathways.

[ ] AF cardioversion timing, TOE access, stroke/bleeding assessment, anticoagulation initiation, and follow-up ownership.

[ ] Pacemaker/ICD interrogation access, manufacturer contacts, magnet policy, and after-hours support.

[ ] Cardiology/electrophysiology, critical care, paediatric cardiology, obstetrics, poison centre, dialysis, and transfer contact list.

[ ] Observation duration, telemetry capacity, ambulatory-monitoring referral, and rapid arrhythmia-clinic pathways.

[ ] Patient discharge leaflets, driving/work/sport guidance, audit lead, simulation schedule, and incident-review process.

ANNEX S. References and source tools

1. American Heart Association. 2025 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Part 9: Adult Advanced Life Support. Circulation. 2025;152(suppl 2).
2. American Heart Association. Adult Tachyarrhythmia With a Pulse Algorithm. 2025 Guidelines for CPR and ECC.
3. American Heart Association. Adult Bradycardia With a Pulse Algorithm. 2025 Guidelines for CPR and ECC.
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5. American Heart Association and American Academy of Pediatrics. 2025 Guidelines for Pediatric Advanced Life Support.
6. Van Gelder IC, Rienstra M, Bunting KV, et al. 2024 ESC Guidelines for the management of atrial fibrillation. European Heart Journal. 2024;45:3314-3414.
7. Joglar JA, Chung MK, Armbruster AL, et al. 2023 ACC/AHA/ACCP/HRS Guideline for the Diagnosis and Management of Atrial Fibrillation. Circulation. 2024;149:e1-e156.
8. Brugada J, Katritsis DG, Arbelo E, et al. 2019 ESC Guidelines for the management of patients with supraventricular tachycardia. European Heart Journal. 2020;41:655-720.
9. Zeppenfeld K, Tfelt-Hansen J, de Riva M, et al. 2022 ESC Guidelines for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death. European Heart Journal. 2022;43:3997-4126.

10. Glikson M, Nielsen JC, Kronborg MB, et al. 2021 ESC Guidelines on cardiac pacing and cardiac resynchronization therapy. European Heart Journal. 2021;42:3427-3520.
11. European Heart Rhythm Association. Management of patients with an electrical storm or clustered ventricular arrhythmias: clinical consensus statement. EP Europace. 2024.
12. European Heart Rhythm Association. Practical compendium of antiarrhythmic drugs: clinical consensus statement. EP Europace. 2025.
13. European Society of Cardiology. 2025 Guidelines for the management of cardiovascular disease during pregnancy.
14. World Health Organization and International Committee of the Red Cross. Basic Emergency Care: Approach to the Acutely Ill and Injured. WHO; 2018.
15. Local source tools to attach before approval: current ACLS/PALS cards; defibrillator instructions; emergency drug monographs; sedation protocol; electrolyte and toxicology protocols; anticoagulation/cardioversion policy; device-interrogation and transfer contacts; discharge and driving guidance.