NICCS Network for Inherited Cardiac Conditions Scotland

Investigation and referral pathway following resuscitated VF arrest of unknown cause*

Patients with a clear precipitant (e.g. acute coronary syndrome, drug toxicity or overdose, major electrolyte imbalance) should be managed individually according to the underlying cause and usually will not require all of these investigations.

1) For all patients:

- 12-lead ECG, telemetry, electrolytes inc. Ca^{2+} / Mg^{2+}, cardiac enzymes, TFTs and transthoracic echo
- Repeat ECG inc. consideration of LQTS, type 1 Brugada pattern, ventricular pre-excitation, early repolarization* (all of which may be intermittent)
- High-lead ECG (V1/V2 in 2nd ICS) for type 1 Brugada pattern
- Family history of sudden cardiac death (SCD) / syncope / seizures

2) If no diagnosis apparent from echo / ECG:

- CTCA or coronary angiography for CAD / anomalous coronaries
- CMR esp. if cardiomyopathy suspected but not diagnosed on echo
- Adenosine challenge for latent accessory pathway (AP) - record 12-lead ECG during adenosine administration
- ETT for induction of arrhythmia, CPVT (bidirectional PVCs/VT or polymorphic VT), features of LQTS (QTc >480ms in 4th minute of recovery)
- Ajmaline challenge (V1/V2 in 2nd ICS)

3) Additional investigations which may be useful (discuss with EP / ICC team)

- Holter monitor for PVC burden ± morphology† if frequent PVCs
- Signal-averaged ECG where there is clinical suspicion of arrhythmogenic cardiomyopathy but diagnostic criteria are not reached

4) Referrals for genetic testing

- Send sample‡ for specific genetic testing if inherited cardiomyopathy / channelopathy is diagnosed or strongly suspected.
- Send sample‡ for full arrhythmia gene panel in idiopathic VF patients with a family history of SCD / channelopathy OR where circumstances of VF highly suggestive of concealed channelopathy (exercise, emotion, auditory stimuli, rest).
- If there is a family history of cardiomyopathy OR any suspicion of cardiomyopathy (i.e. non-specific ECG or echo abnormality), request a cardiomyopathy gene panel in addition to the full arrhythmia panel.

If sending sample for genetic testing:

- **Also** refer to ICC service *(inc. family history and confirm next of kin)*
- **Consider** first-degree relatives:
  Appropriate clinical screening can be arranged through the ICC service but *first-degree relatives with red-flag symptoms (syncope / seizures) should be evaluated as a priority:*
    - 12-lead ECG and high-lead ECG (V1/V2 in 2nd ICS)
    - Further investigations based on symptoms / ECG findings / circumstances of arrest

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* Should only be a diagnosis of exclusion after full investigation and EP team discussion
† consider multi-lead Holter or telemetry with a view to planning PVC ablation
ǂEDTA sample labelled as per blood transfusion to clinical genetics, if consent or type of testing is unclear DNA can be extracted and saved
ǂǂ protocol available at https://www.niccs.scot.nhs.uk/