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Questions 25 & 26

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Things to consider before answering these questions:

1. READ the Question and answer THE QUESTION
2. Try to find the sense (Flavour if you wish) of the question (what is it asking???—Ischemia/dysrhythmia/anything specific that I should know like ARVD,Brugada,…)
3. Consider it as a real patient in front of you or in this case a nurse showing you an ECG in a busy shift —> what's your immediate response ?
4. Have a systematic approach when describing ECGS and don't just look for diagnosis
5. Alway Interpreted or justify whatever you're describing
6. For higher Marks give appropriate extra information ie rate/axis,…

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-Just one candidate noticed "interpret " in part (a)!

- Don't make up signs (prolong QT , Extreme axis,...)

-Always justify your choice ;YOU are a "CONSULTANT "

(Not acceptable to write" TFT to check for thyroid function" !!)

-Time management is important -> don't waste your time

ie:

-i f patient stable then ... if unstable ... (you have patient's vital signs in Q26!)

or

instead of :

tachycardia,broad complex,regular ,non sinus rhythm ;rate > 150

you can easily write:

regular broad complex tachycardia rate 29x6=174 bpm

Q25:

A 23 year old man presents to the Emergency Department after feeling palpitations at home. He has had similar symptoms previously but has never been investigated. He is now feeling completely well.

His BP is 120/70 mmHg and all other observations are normal.

-Interpret his ECG giving 3 positive and 2 relevant negative findings

-DDx for this ECG and patient (ARVD) no for palpitation/syncope

-5 relevant investigations with justification

Q26:

Shortly after presentation to the Emergency Department the patient complains of palpitations. His observations are as follows:

BP 90/50 mmHg O2 sats 96%RA GCS 15 —> You have GCS and V/S

-5 relevant findings in repeat ECG + Dx

-6 steps that you preform to DCR in order

Arrhythmogenic Right Ventricular Dysplasia/ Cardiomyopathy

Background

- An inherited myocardial disease associated with paroxysmal ventricular arrhythmias and sudden cardiac death.
- Characterized pathologically by fibro-fatty replacement of the right ventricular myocardium.
- The second most common cause of sudden cardiac death in young people (after HOCM), causing up to 20% of sudden cardiac deaths in patients < 35 yrs of age.
- Typically inherited as an autosomal dominant trait, with variable penetrance and expression (there is an autosomal recessive form called Naxos Disease, which is associated with woolly hair and skin changes).
- More common in men than women (3:1) and in people of Italian or Greek descent.
- Estimated to affect approximately 1 in 5,000 people overall.

ECG Features of ARVD/C

- Epsilon wave (most specific finding, seen in 30% of patients) =Major Criterion (depolarisation Abnormality)
- T wave inversions in V1-3 (85% of patients) or beyond without RBBB = Major criterion
- T wave inversions in V1 and V2 without RBBB or in leads V1-V4 with RBBB = minor criterion
- Prolonged S-wave upstroke of 55ms in V1-3 without RBBB (95% of patients)=Terminal Activation Delay (TAD) = Minor Criteria
- Localised QRS widening of 110ms in V1-3

- Paroxysmal episodes of ventricular tachycardia with a LBBB morphology (i.e. right ventricular VT).

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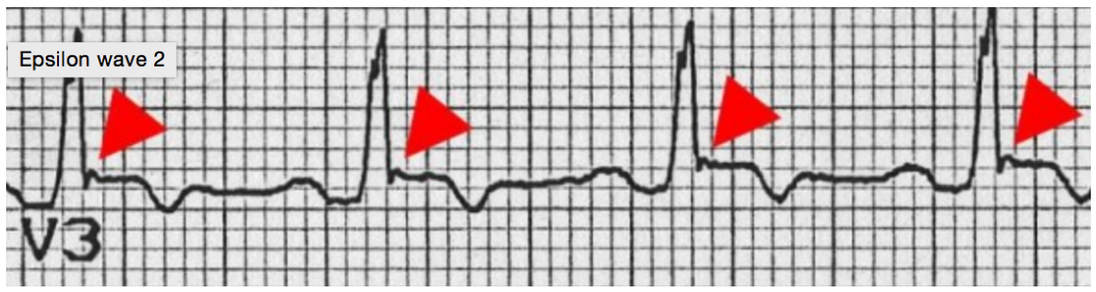
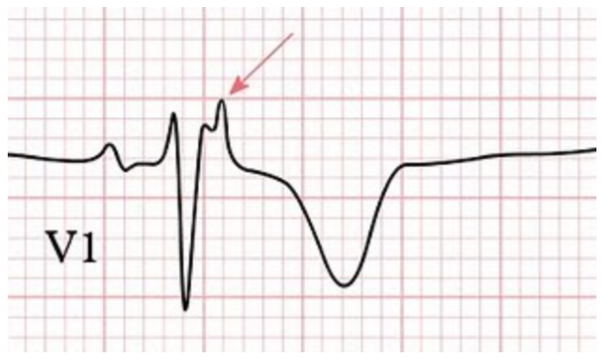
Epsilon Wave



Epsilon Wave in V1



Prolonged S-wave upstroke and localized QRS widening in V2

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Diagnosis of ARVD/C

- No single diagnostic test for ARVD
- Diagnosis is made using a combination of clinical, electrocardiographic and radiological features, defined by the (horribly complicated) 2010 Task Force Criteria.

Clinical Features:

- ARVC causes symptoms due to ventricular ectopic beats or sustained ventricular tachycardia (with LBBB morphology)
- palpitations, syncope or cardiac arrest (May be first presenting symptom) precipitated by exercis
- Over time, surviving patients also develop features of right ventricular failure, which may progress to severe biventricular failure and dilated cardiomyopathy.
- Usually a family history of sudden cardiac death

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2010 Task Force Criteria

Complicated and not expected to know in detail,however, higher mark if you mention it

Diagnostic:
- 2 major criteria,or
- 1 major + 2 minor criteria,or
- 4 minor criteria.

A *borderline diagnosis:*
- 1 major and 1 minor criteria, or
- 3 minor criteria

A *possible diagnosis:*
- 1 major criteria, or
- 2 minor criteria

1994 Task Force Criteria	2010 Task Force Criteria
2 major, 1 major + 2 minor, or 4 minor	Definite = 2 major OR 1 major + 2 minor Borderline = 1 major + 1 minor OR 3 minor Possible = 1 major OR 2 minor
I. Global/regional dysfunction/structural alterations	
Major • Severe dilatation and reduction of RVEF w/no (or only mild) LV impairment • Localized RV aneurysms (akinetic or dyskinetic areas w/diastolic bulging) • Severe segmental dilatation of the RV	**By 2D Echo** • Regional RV akinesis, dyskinesia, or aneurysm • *and* 1 of the following (end diastole): ____PLAX RVOT ≥32 mm (correct for body size [PLAX/BSA] ≥19 mm/m^2 ____PSAX RVOT ≥36 mm (correct for body size [PSAX/BSA] ≥21 mm/m^2) ____or fractional area change ≤33% **By MRI:** • Regional RV akinesia or dyskinesia or dyssynchronous RV contraction • *and* 1 of the following : ____Ratio of RV end-diast vol to BSA ≥110 mL/m^2 (male) or ≥100 mL/m^2 (female) ____or RV ejection fraction ≤40% **By RV Angiography:** • Regional RV akinesia, dyskinesia, or aneurysm
Minor • Mild global RV dilatation and/or EF reduction with normal LV • Mild segmental dilatation of the RV • Regional RV hypokinesia	**By 2D Echo:** • Regional RV akinesia or dyskinesia • *and* 1 of the following (end diastole): ___PLAX RVOT ≥29 to <32 mm (correct body size PLAX/BSA ≥16 to <19 mm/m^2) ___PSAX RVOT ≥32 to <36 mm (correct body size [PSAX/BSA] ≥18 to <21 mm/m^2) ___or fractional area change >33% to ≤40% **By MRI:** • Regional RV akinesia or dyskinesia or dyssynchronous RV contraction • *and* 1 of the following: ___Ratio of RVEDV to BSA ≥100 to <110mL/m^2 (male) or ≥90 to <100mL/m^2 (fem) ___or RV EF >40% to ≤45%
II. Tissue characterization of wall	
Major • Fibrofatty replacement of myocardium on endomyocardial biopsy	• Residual myocytes < 60% by morphometric analysis (or <50% if estimated), w/fibrosis replacement of RV free wall myocardium in ≥1 sample, w/ or w/o fatty replacement of tissue on endomyocardial biopsy
Minor	• Residual myocytes 60% to 75% by morphometric analysis (or 50% to 60% if est.) w/fibrous replacement of the RV free wall in ≥1 sample, w/ or w/o fatty replacement of tissue on endomyocardial biopsy
III. Repolarization abnormalities	
Major	• TWI (V_1, V_2, V_3) or beyond; >14 yrs; in absence of complete RBBB QRS ≥120 ms
Minor • TWI in right precordial leads (V_2 and V_3) (people age >12 yrs, in absence of RBBB)	• TWI in V_1 and V_2; >14 yrs; in absence of complete RBBB or in V_4, V_5, or V_6 • TWI in V_1 -V_4; >14 yrs; in presence of complete RBBB
IV. Depolarization/conduction abnormalities	
Major • Epsilon waves or localized prolongation (>110ms) of QRS complex in right precordial leads (V_1 to V_3)	• Epsilon wave (reproducible low-amp signals btn end of QRS complex to onset of T wave) in right precordial leads (V_1-V_3)
Minor • late potentials (SAECG)	• LP by SAECG in ≥1 of 3 parameters in absence of QRS duration of ≥110ms on ECG ___ Filtered QRS duration (fQRS) ≥114ms ___ Duration of terminal QRS <40μV (LAS duration) ≥38ms ___ RMS voltage of terminal 40 ms ≤20μV • TAD of QRS ≥55ms measured from nadir of S wave to end of QRS, including R', in V_1, V_2, or V_3, in absence of complete RBBB
V. Arrhythmias	
Major	• LBS NSVT or sustained VT (neg or indet QRS in II, III, and aVF and pos in aVL)
Minor • LBBB sustained or NSVT (ECG, Holter, ETT) • >1000 ventricular extrasystoles per 24 hours (Holter)	• NSVT or sustained VT of RV outflow configuration, LBI (pos QRS in II, III, and aVF and neg in aVL) or of unknown axis • >500 ventricular extrasystoles per 24 hours (Holter)
VI. Family History	
Major • Familial disease confirmed at necropsy or surgery	• ARVC/D confirmed in FDR who meets TFC • ARVC/D confirmed pathologically at autopsy or surgery in FDR • Pathogenic mutation (assoc or probably assoc w/ ARVC/D) in pt under eval
Minor • Fam hx of SD (<35yrs) due to suspected ARVC/D • Familial hx (clinical dx based on present criteria)	• Hx of ARVC in FDR in whom not poss or pract to determine if FM meets TFC • Premature SD (<35 yrs) due to suspected ARVC/D in FDR • ARVC/D confirmed pathologically or by current TFC in 2ndDR

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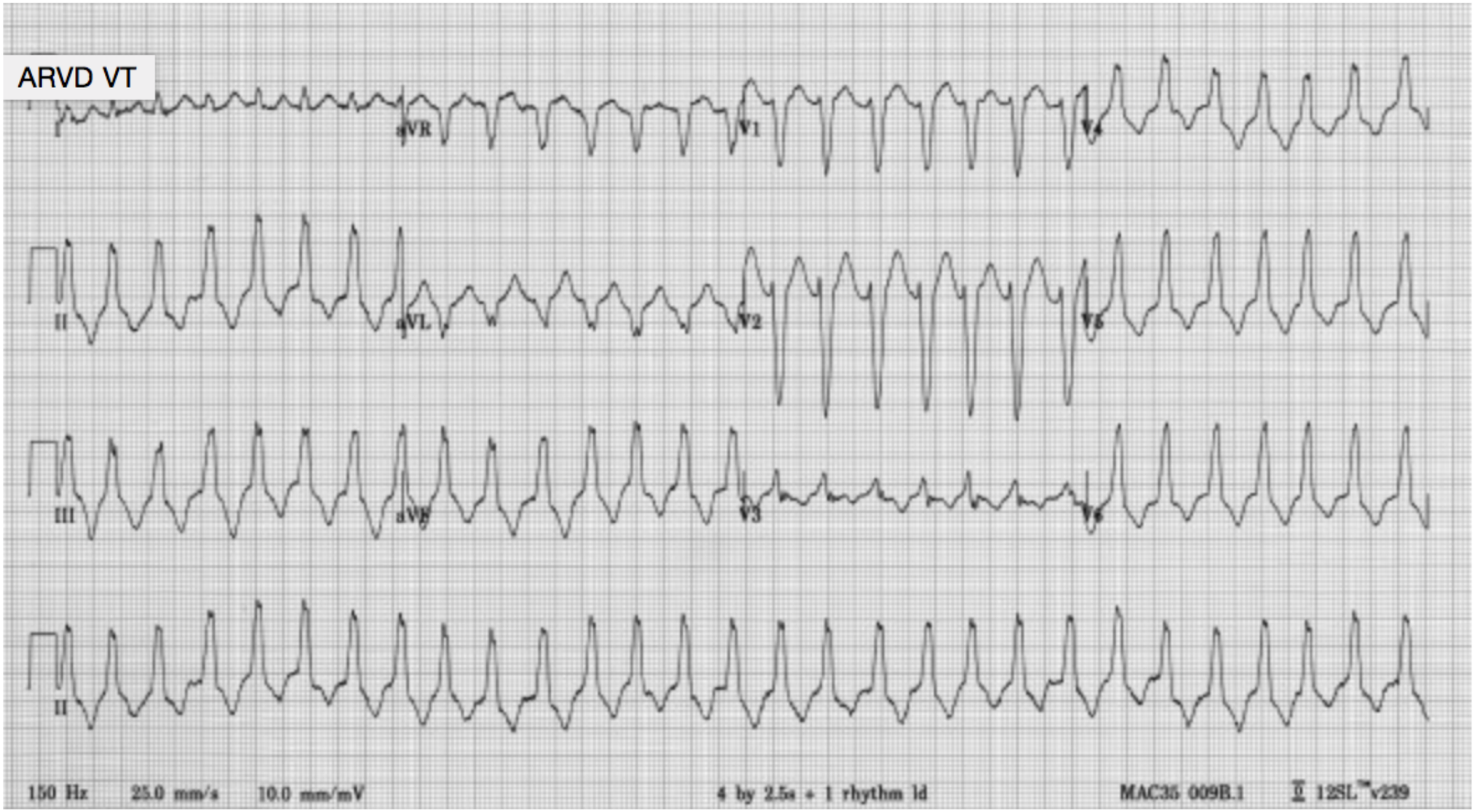
Right Ventricular VT with LBBB morphology associated with ARVD/C



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DDX of ARVD

- Idiopathic ventricular tachycardia arising from the outflow tract

- Ventricular tachycardia
(no structural abnormality, unlike in ARVD/C where commonly there is dilation of the ventricle, abnormal contraction, or reduced function)

- Right ventricular outflow tract tachycardia (RVOT) :
more common than ARVD/C , in young, otherwise healthy people.

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Diagnosis of ARVD/C

Investigations:

- Electrocardiogram
- Signal Averaged Electrocardiogram (SAECG)
- 24-hour Holter Monitor
- Exercise Stress Test
- Echocardiogram
- Cardiac Magnetic Resonance Imaging (MRI)
- Cardiac Computed Tomography (CT)
- Genetic Testing
- Electrophysiology Study
- Right Ventriculogram (RV angiogram)
- Cardiac Biopsy

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RVOT vs ARVD/C

Right ventricular outflow tract tachycardia (RVOT) can present similarly to ARVD/C. Refer to the chart below to compare the two.

	RVOT Tachycardia	ARVD/C
Family History of Arrhythmia or Sudden Cardiac Death	No	Frequnently Yes
Arrhythmias	PVBs, nonsustained VT or sustained VT at rest or with exercise	Same
Sudden Cardiac Death	Rare	1% per year
Frontal Plan QRS	Positive in leads III and AVF, negative in lead AVL	Inferior or Superior
T-wave Morphology	T wave upright V2-V5	T wave inverted beyond V1
Parietal Block	QRS duration <110 msec in V1, V2 or V3	QRS duration > 110 msec
T-wave Morphology & Parietal Block		84% sensitivity and 100% specificity
Epsilon Wave V1-V3	Absent	Present 30%
Signal Averaged ECG	Normal	Usually Abnormal
Echocardiogram	Normal	Increased RV size and/or wall motion abnormalities
RV Ventriculogram	Usually Normal	Usually Abnormal
MRI	Usually Normal, but data in literature is conflicting	increased signal intensity of RV free wall; wall motion abnormalities with CINE MRI
Response to Therapy	Acute Vagal Maneouvres Adenosine, Beta-blockers Verapamil Chronic Beta-blockers or verapamil +/- class one antiarrhythmic drugs	Sotalol Amiodrone+/- Beta blockers
RF Ablation	Usually Curative	Seldom Curative; may modify substrate to permit AA drugs effective Arrhythmias or different morphology tend to occur

When answering questions specially in ORDERS try to categorise and classify them so you don't miss anything:

i.e. for Q26 you could classify as :

-Pre procedure (consent, location, monitoring, etc)
-Procedures (IVC , fluid, oxygen, or non pharmacological/ pharmacological with appropriate dose; procedural sedation/ DCR , etc)
-Post procedure
-Extras

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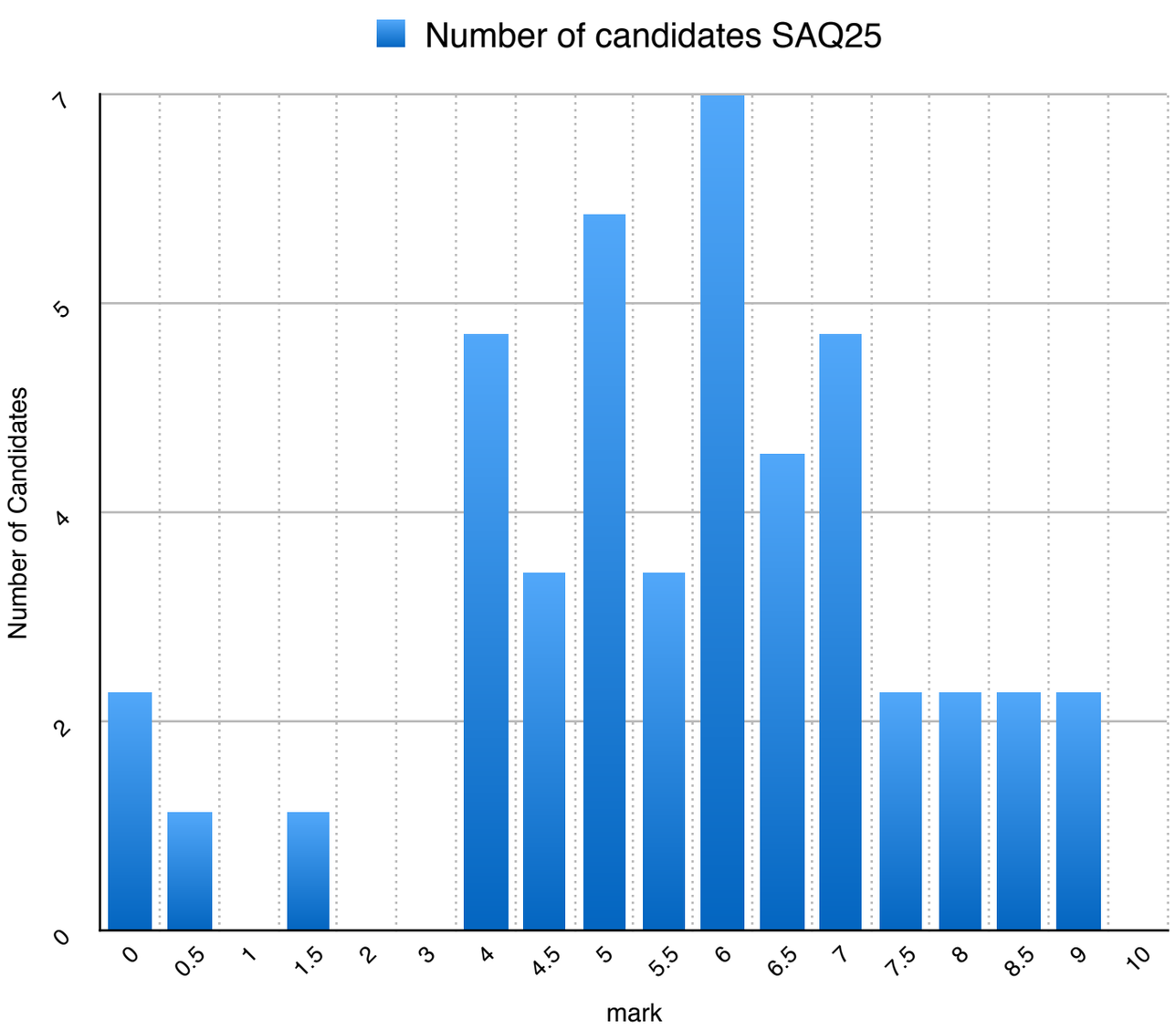

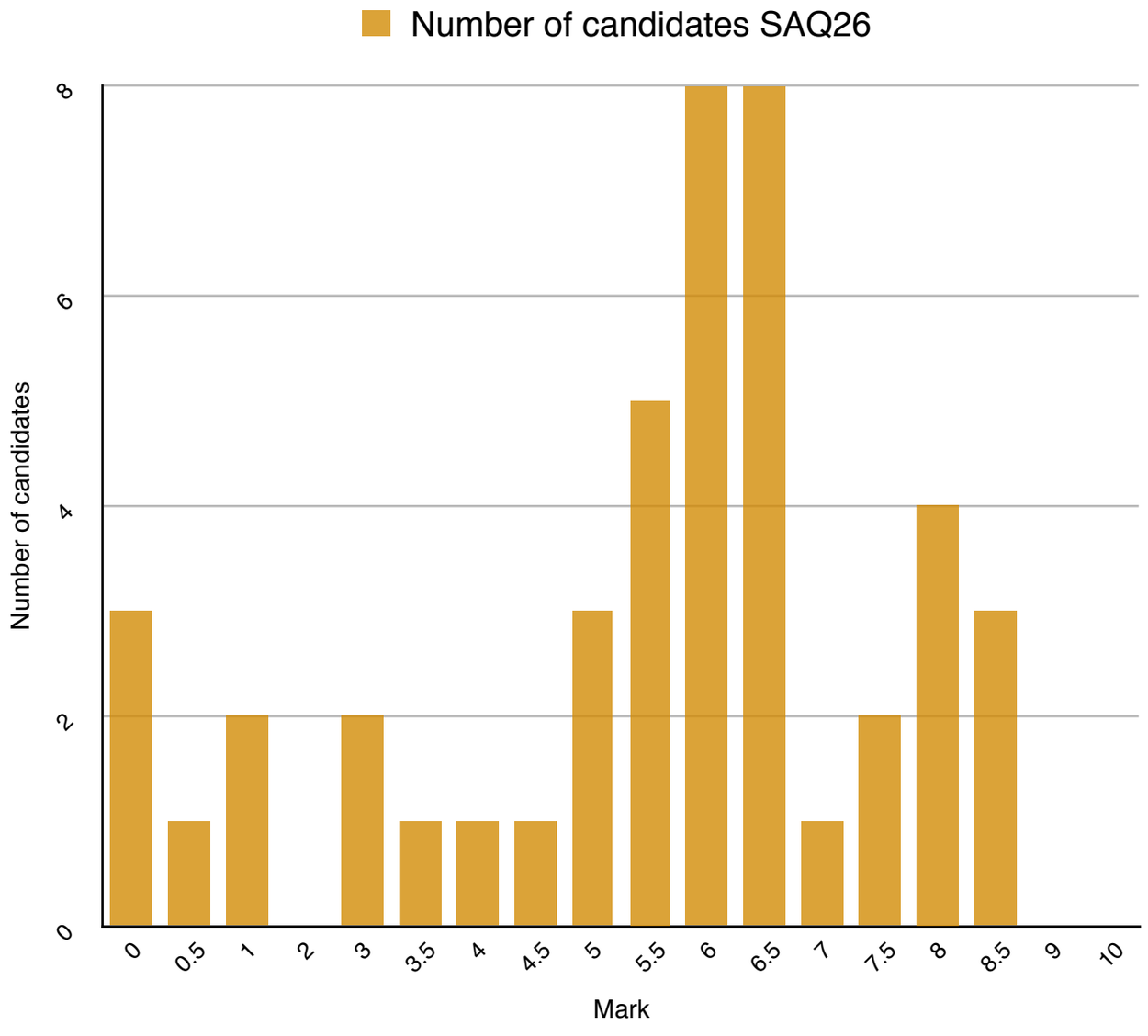

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