Data Supplement 1. Initial Set of Candidate Guideline Elements

Instructions

Please rate all of the survey items on the following Likert scale:
1- Strongly agree; 2- Agree; 3-Don't know/ depends; 4- Disagree; 5- Strongly disagree

Definition of syncope

The following components should be included in the definition of syncope for ED-based studies:

1. Transient loss of consciousness (LOC)
2. Sudden
3. Inability to maintain postural tone
4. Immediate recovery
5. Spontaneous recovery without medical intervention
6. Complete recovery (to pre-existing mental status and neurological function)
7. Due to transient global hypoperfusion

The following patients should be excluded from syncope risk stratification studies:

8. Alcohol or illicit drugs as presumptive cause of LOC
9. Seizure as presumptive cause of LOC
10. Stroke/ transient ischemic attack as presumptive cause of LOC
11. Head trauma followed by LOC
12. Hypoglycemia as presumptive cause of LOC

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Relevant Outcome Time Frame for ED Decision-making

Prior risk stratification studies have used a wide range of outcome time frames, from the ED encounter itself (e.g. include serious outcomes identified during the ED visits) up to one year after the index ED visit. The questions in this section are designed to identify the clinically relevant outcome time frame for ED decision-making and risk stratification.

An ED-based risk stratification tool should:

13. Identify serious outcomes that are recognized during the ED evaluation*

*ED evaluation ends with a disposition decision, e.g. admission, admission but boarding in ED, observation unit, elope/leave against medical advice, or discharge

14. Identify serious outcomes occurring within 7 days after the ED visit
15. Identify serious outcomes occurring between 7 – 30 days after the ED visit
16. Identify serious outcomes occurring between 31-180 days after the ED visit
17. Identify serious outcomes occurring between 181-365 days after the ED visit

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Please rate all of the survey items on the following Likert scale:
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Relevant Outcomes for ED Decision-making

Explicit risk prediction for serious outcomes may improve clinical decision-making. Clinically important serious outcomes that should be predicted by a risk stratification tool include:

Mortality

18. All-cause death
19. Cardiac death
20. Syncope-related death

Arrhythmias

21. Ventricular fibrillation
22. Ventricular tachycardia > 30 seconds
23. Symptomatic* ventricular tachycardia < 30 seconds
24. Non-symptomatic* ventricular tachycardia < 30 seconds
25. Symptomatic sinus bradycardia < 60 beats/minute
26. Sinus bradycardia < 40 beats/minute
27. Sick sinus syndrome with alternating sinus bradycardia and tachycardia
28. Sinus pause > 3 seconds
29. Symptomatic Mobitz type I atrioventricular heart block
30. Mobitz type II atrioventricular heart block
31. Complete heart block
32. Junctional / idioventricular rhythm
33. Symptomatic supraventricular tachycardia with rate > 100/minute
34. Symptomatic atrial flutter/fibrillation with ventricular rate >100/min
35. Symptomatic atrial flutter/fibrillation with ventricular rate <60/min
36. Pacemaker or implantable cardioverter-defibrillator malfunction with cardiac pauses

* Symptomatic refers to concurrent light-headedness/dizziness, syncope/presyncope, or systolic BP < 90 mmHg with arrhythmia. Presyncope is the sensation of imminent loss of consciousness, without actual syncope

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Relevant Outcomes for ED Decision-making

Explicit risk prediction for serious outcomes may improve clinical decision-making. Clinically important serious outcomes that should be predicted by a risk stratification tool include:

Electrophysiology Study Findings

37. Corrected sinus node recovery time > 550 milliseconds
38. His-ventricular intervals >100 milliseconds
39. Inducible ventricular tachycardia for > 30 seconds
40. Inducible polymorphic ventricular tachycardia or ventricular fibrillation in patients with Brugada
41. Inducible polymorphic ventricular tachycardia or ventricular fibrillation in patients with ventricular dysplasia
42. Inducible polymorphic ventricular tachycardia or ventricular fibrillation in patients with previous cardiac arrest
43. Infra-Hisian block

Structural Heart Disease

44. Aortic stenosis with valve area ≤ 1 cm^2
45. Hypertrophic cardiomyopathy with outflow tract obstruction
46. Hypertrophic cardiomyopathy without outflow tract obstruction
47. Left atrial myxoma or thrombus with outflow tract obstruction
48. Pericardial effusion with effect on ventricular wall motion or pericardial tamponade
49. Pulmonary hypertension with a mean arterial pressure > 30 mmHg
50. Mitral stenosis with valve area ≤ 2 cm^2
51. Left ventricular ejection fraction <40%

Ischemic Heart Disease

52. Myocardial Infarction

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Relevant Outcomes for ED Decision-making

Explicit risk prediction for serious outcomes may improve clinical decision-making. Clinically important serious outcomes that should be predicted by a risk stratification tool include:

Non-cardiac outcomes

53. Cortical stroke
54. Vertebrobasilar stroke
55. Pulmonary embolus
56. Aortic dissection
57. Internal hemorrhage or anemia requiring transfusion
58. Ectopic pregnancy
59. Abdominal aortic aneurysm
60. Subarachnoid hemorrhage
61. Pneumothorax or pleural effusion
62. Sepsis
63. Syncope resulting in major traumatic injury (trauma that requires admission, or that requires procedural/surgical intervention)

Medical/ Procedural Interventions

64. Permanent pacemaker or defibrillator placement
65. Coronary artery bypass graft or coronary artery stent
66. Cardiac valve surgery
67. Elective cardioversion in the absence of objective evidence that tachyarrhythmia is responsible for the syncope
68. Balloon-pump insertion
69. Heart transplant
70. Initiation of anti-arrhythmia medical therapy
71. Ventricular assist device
72. Endoscopic/ surgical treatment of esophageal varices
73. Endoscopic/ surgical treatment of gastric/ duodenal ulcerations
74. Dialysis for electrolyte abnormalities
75. Use of vasopressors
76. Cardiopulmonary resuscitation
77. Admission to the intensive care unit

Health Services Use

78. Return visit for syncope/fall resulting in admission, but without any of the above events

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ECG Abnormalities

ECG testing is routinely performed in the evaluation of syncope, and ECG abnormalities are strongly predictive of serious outcomes.

ECG Abnormalities
The following ECG findings should be considered abnormal:

79. Non-sinus rhythms (includes paced rhythm)
80. Frequent PVCs (>3 on standard 10 second tracing)
81. Sinus bradycardia ≤ 40
82. Left ventricular hypertrophy
83. Right ventricular hypertrophy
84. Left axis deviation
85. Right axis deviation
86. Complete left bundle branch block
87. Complete right bundle branch block
88. First degree block (>200 ms)
89. Short PR interval (<10 ms)
90. Delta waves (e.g. Wolff-Parkinson-White)
91. Prolonged QRS (>100 ms)
92. Prolonged QTc (>450 ms) - indicate value (ms)
93. Brugada pattern
94. Q/ST/T changes consistent with acute or chronic ischemia
95. Non-specific ST/ T changes

ECG Interpretation
96. Report who is interpreting the ECG (e.g. ED physician, cardiology overread, research team, etc)

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Candidate Predictors
Data on the following elements should be collected and reported:

Demographic characteristics

97. Age
98. Gender
99. Race and ethnicity (self reported)
100. Insurance status
101. Mode of arrival (self transport, ambulance, transfer from another facility)
102. Body mass index

Historical features

103. Exertion
104. While driving
105. While working
106. Time of syncope event
107. Supine position
108. Sitting position
109. Lack of warning symptoms
110. Chest discomfort
111. Shortness of breath
112. Palpitations
113. Traumatic injury (laceration, fracture, intracranial bleed, thoraco-abdominal visceral injury)
114. Vertigo
115. Headache
116. Incontinence of urine or stool
117. Lightheadedness
118. Standing from supine/ sitting position
119. Post-prandial (within 1 hour of meal)
120. Nausea/ vomiting
121. Abdominal pain
122. Feeling of warmth
123. Feeling of cold
124. Diaphoresis
125. Cyanosis noted by bystander
126. Blurred vision
127. Any prodromes lasting greater than 5 seconds
128. Triggered by painful/ emotionally distressing stimulus
129. Triggered by turning head/ cough/ micturation/ defecation
130. Recent history of diarrhea
131. Recent history of decreased oral intake

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Candidate Predictors
Data on the following elements should be collected and reported:

Co-morbidities

132. Premature (<50 years) sudden death in sibling or parents
133. Congestive heart failure
134. Coronary artery disease (past MI/ PTCA/ CABG)
135. Peripheral vascular disease
136. Stroke / TIA
137. Congenital heart disease
138. Structural heart disease- aortic stenosis
139. Structural heart disease- outflow tract disease, excluding aortic stenosis (e.g. idiopathic hypertrophic subaortic stenosis)
140. Structural heart disease- ejection fraction <40% by objective testing (e.g. echocardiogram, cardiac catheterization) within one year
141. Structural heart disease- pulmonary hypertension
142. Structural heart disease- cardiac valve disease, excluding aortic stenosis and mitral prolapse
143. Arrhythmia- ventricular tachycardia/ ventricular fibrillation/ sudden death
144. Arrhythmia- SVTs, including PSVT, atrial fibrillation, atrial flutter
145. Arrhythmia- sick sinus syndrome, Mobitz II heart block, complete heart block, junctional rhythm
146. Implanted permanent pacemaker
147. Implanted defibrillator
148. Diabetes requiring medication
149. Hypertension requiring medication
150. Renal insufficiency (creatinine >2 mg/dL in the ED)
151. Syncope in the prior year
152. First syncope episode prior to age 35
153. Prior gastrointestinal bleeding

Medications

154. Diuretics
155. Digoxin
156. Alpha-blocker (e.g. tamsulosin, terazosin)
157. Beta-blocker
158. Calcium channel blockers
159. Nitrates
160. Other antiarrhythmics not listed above (e.g. amiodarone, sotalol)

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Candidate Predictors

Data on the following elements should be collected and reported:

Physical examination findings

161. Triage systolic blood pressure
162. Highest systolic blood pressure measured in ED
163. Lowest systolic blood pressure measured in ED
164. Triage pulse
165. Highest pulse measured in ED
166. Lowest pulse measured in ED
167. Orthostatic vital signs (blood pressure and pulse measured lying and measured standing)
168. Pulse oximetry on room air
169. Heart murmur
170. S3 or S4 gallop
171. Carotid bruit
172. New neurologic deficits
173. Fecal occult blood
174. Dry mucous membranes

Laboratory tests

175. Blood urea nitrogen
176. Creatinine
177. Calculated creatinine clearance using Cockroft-Gault formula: CrCl (mL/min)= [(140-age) x weight (kg)]/ 72 x serum creatinine (mg/dL)(x0.85 for women)
178. Glucose
179. Hematocrit
180. Hemoglobin
181. Initial troponin
182. Serial troponin at least 4 hours after initial troponin
183. Natriuretic peptide (BNP or NT-proBNP)
184. Pregnancy test