SYNCOPE EVALUATION IN THE TRAUMA PATIENT

SUMMARY

Syncope is a common condition in trauma patients resulting in hospital admission. The goal of syncope evaluation is to identify patients at risk for recurrent events or death. Cardiac syncope is associated with a higher mortality. Syncope evaluation in trauma patients often results in extensive testing with unnecessary expense and little information yield. Such evaluations should initially focus upon history, physical examination, and EKG findings with patients at increased cardiac risk undergoing further testing.

RECOMMENDATIONS

- **Level 1**
  - **Inpatient telemetry monitoring is appropriate in the patient with structural heart disease or life threatening arrhythmia.**
  - **Laboratory studies are indicated if there is concern for decreased volume status or a metabolic cause for the syncope-like disorder.**
- **Level 2**
  - **For all patients presenting with syncope, a thorough history, physical examination, orthostatic blood pressure measurement, and EKG upon admission will determine whether a patient needs further workup.**
  - **Long term risk of morbidity and mortality from syncope is increased in patients with a history of cardiovascular disease or congestive heart failure.**
  - **Brain natriuretic peptide (BNP) levels >300 pg/ml support an increased risk for serious outcome following a syncopal event.**
- **Level 3**
  - **Patients who present with traumatic fall and syncope should be evaluated with clinical judgement and electrocardiogram (EKG).**
  - **Predictors of cardiac syncope after fall include: age >65 years, coronary artery disease, and pathological Q waves on EKG.**

INTRODUCTION

Syncope is a transient loss of consciousness associated with the loss and subsequent spontaneous and complete recovery of postural tone (1-3). It accounts for 1-3% of hospital admissions in the United States (2). Cardiogenic syncope is common and associated with a high mortality due to sudden cardiac death. Thus, the primary goal of syncope evaluation is to determine which patients are at increased risk for fatal complications of their event (1).

Syncope can be caused by multiple factors and is age dependent. The most common cause of syncope in the general population is neurocardiogenic (1). Other causes include arrhythmias (23%), neurologic and/or psychiatric (1%) and unexplained (18%) (3).

EVIDENCE DEFINITIONS

- **Class I:** Prospective randomized controlled trial.
- **Class II:** Prospective clinical study or retrospective analysis of reliable data. Includes observational, cohort, prevalence, or case control studies.
- **Class III:** Retrospective study. Includes database or registry reviews, large series of case reports, expert opinion.
- **Technology assessment:** A technology study which does not lend itself to classification in the above-mentioned format. Devices are evaluated in terms of their accuracy, reliability, therapeutic potential, or cost effectiveness.

LEVEL OF RECOMMENDATION DEFINITIONS

- **Level 1:** Convincingly justifiable based on available scientific information alone. Usually based on Class I data or strong Class II evidence if randomized testing is inappropriate. Conversely, low quality or contradictory Class I data may be insufficient to support a Level I recommendation.
- **Level 2:** Reasonably justifiable based on available scientific evidence and strongly supported by expert opinion. Usually supported by Class II data or a preponderance of Class III evidence.
- **Level 3:** Supported by available data, but scientific evidence is lacking. Generally supported by Class III data. Useful for educational purposes and in guiding future clinical research.

Syncope causes

- Neurocardiogenic or Vasovagal Syncope
- Arrhythmias: Long QT syndrome, Wolf-Parkinson-White, Tachyarrhythmia , Bradyarrhythmia
- Neurologic or Psychiatric: Conversion, Panic
- Unexplained

Non-syncopal causes

- Disorders without any impairment of consciousness (Falls, cataplexy, drop attacks, TIA)
- Disorders with partial or complete loss of consciousness (Metabolic disorders, epilepsy, intoxications, TIA)

While neurocardiogenic syncope is common at all ages, pediatric and young adults are more likely to have psychiatric and primary arrhythmias as a cause of syncope. Middle age adults are most likely to have neurocardiogenic causes. Older adults are more likely to have cardiac output obstruction, orthostatic and panic disorders as causes (1).

Many causes of syncope can be determined with a careful history and physical examination. Determining if the patient has true syncope or a non-syncopal condition is the first challenge in evaluating syncope. The mechanism of syncope can remain undetermined in up to 40% of people (1). In obtaining a history, it is important to illicit signs occurring before and after the syncopal event. Seizure-like activity may be associated with either cardiac or neurogenic causes. The presence of a prodrome, aura, premonition, and post-ictal confusion prior to the syncopal event are more likely to suggest a neurogenic cause (1).

A review of the patient's medications as well as cardiac history should be performed. Antiarrhythmic, antihypertensive and some tricyclic antidepressants can cause arrhythmia or orthostasis. A history of myocardial or ventricular dysfunction should raise the concern for a cardiac cause of syncope. Physical examination should include measurement of vital signs (blood pressure, heart rate, respiratory rate, temperature). A careful examination of cardiac and pulmonology systems should be performed. Heart murmurs could be significant cardiac causes of syncope. Carotid bruits could identify coronary artery disease or raise the concern for stroke. Evaluation of neurologic status should be performed by paying close attention to abnormalities of cognition, speech, visual fields, motor strength, sensation, tremor or gait disturbances.

An EKG should be obtained to determine information about rhythm and atrioventricular (AV) nodal conduction. Sick sinus syndrome or AV block can be identified with prolonged PR interval or bundle branch blocks. Wolff-Parkinson White syndrome could be identified with delta wave near QRS complex and genetic diseases can be seen with long QT syndrome. Abnormalities identified on EKG in syncopal evaluation could lead to a need for echocardiogram (ECHO) and complete cardiac evaluation for causes of syncope (1,3).

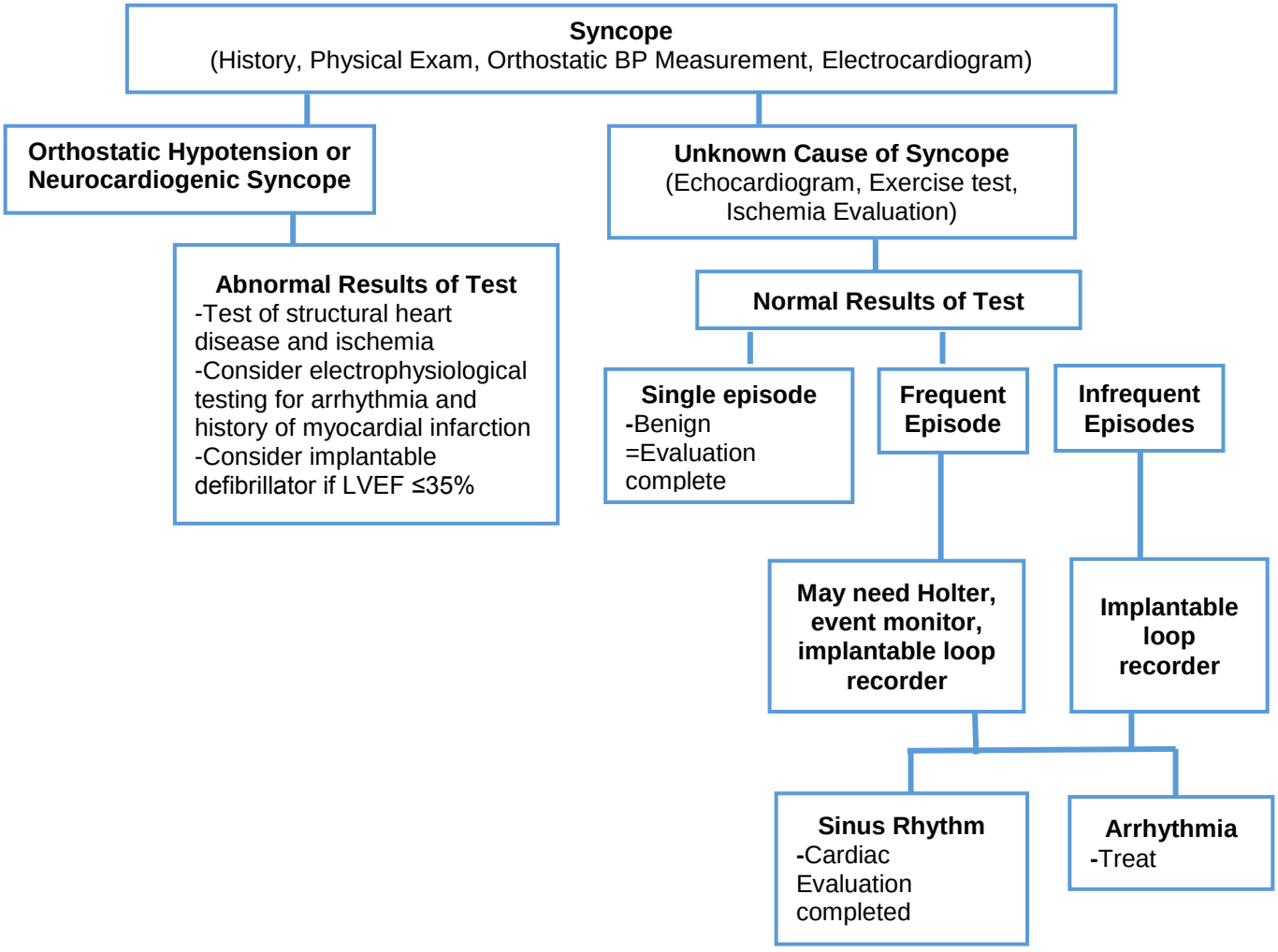
ECHO is helpful when the history, physical examination and EKG do not provide a specific cause of syncope in a patient with cardiac disease. An ECHO can identify valvular disease, structural heart disease or even suggest pulmonary embolism if there is evidence of right heart dysfunction. ECHO can be useful in the young adult athlete when there is concern for hypertrophic cardiomyopathy which is a cause of sudden cardiac death.

Patients with a history of cardiac disease should also be evaluated for myocardial ischemia in their syncope evaluation. Patients with a history of cardiac disease and no identified cause of syncope should undergo exercise testing (1).

If the initial history, physical examination and EKG do not provide a cause for syncope, further workup can be performed depending upon the frequency/number of syncopal occurrences as well as the risk for future events. Further workup may include ECHO, telemetry, Holter monitor testing, implantable loop recorder, CT Head, EEG, carotid duplex studies, or electrophysiology studies. However, each workup is patient dependent (4-6).

Initial Evaluation by the Clinician Should Include:

- Obtain a thorough **History**
  - Review the syncopal event
    - Type & number of episodes
    - Associated symptoms
    - Prodrome or auras
    - Sudden onset
    - Provocative factors
    - Exertional syncope
  - Past Medical History
  - Surgical History
  - Family Medical History
  - Medications
- Perform a **Physical Exam**
  - Vital signs
  - Cardiac
    - Murmur, rhythm, heart rate, carotid bruits, pulses
  - Pulmonology
  - Neurologic
    - Cognition and speech, motor strength, sensation, gait, visual fields, presence of tremor
- Carotid sinus massage
- Electrocardiogram
- Basic laboratory testing



LITERATURE REVIEW

For evaluating syncope in the general population (not trauma specific), guidelines have been developed by the European Society of Cardiology and American Heart Association (7-9). Several scoring systems have been developed to determine whether syncope warrants hospital admission. These include the Risk Stratification of Syncope in the Emergency Department (ROSE), the San Francisco Syncope Rule (SFSR) and Osservatorio Epidemiologico sulia Sincope nel Lazio (OESIL) score. The ROSE risk score was developed from a observational prospective study of patients presenting to emergency departments in Britain with syncope (10). The study objective was to evaluate one month serious outcome and mortality in patients presenting to emergency department with syncope. Out of 529 patients who presented in the initial study, 7.3% had a serious outcome (myocardial infarction, massive intracranial hemorrhage, pulmonary embolus, life threatening arrhythmia, etc…) or died within one month after presenting with syncope. In the ROSE study, 16.5% of patients admitted had a serious outcome compared to 1.5% in those who were not admitted (10,11). BNP levels >300 pg/ml demonstrated an increased risk of cardiovascular event of 36% and mortality of 89% (12). The OESIL Risk Score is based upon another prospective study of 270 patients and later validated in additional studies, which demonstrates a sensitivity of 88-95% for identifying patients at risk for mortality within 1 month of presenting with syncopal events (11).

Scores for Stratifying Risk After an Episode of Syncope (11)

	SFSR	**ROSE Risk Score**	**OESIL Risk Score**
Risk Factors	SBP < 90 mmHg SOB EKG with non-sinus rhythm or new changes present History of CHF Hct < 30%	BNP ≥ 300 pg/ml Bradycardia <50 bpm Rectal with fecal occult blood Anemia or Hg <9.0 g/dl Chest pain with syncope ECK with Q waves (not in lead III) Oxygen saturation ≤94% on room air	Age >65 years History of cardiovascular disease Syncope without prodrome Abnormal EKG change
Risk Groups	No factors present 0.3% ≥ 1 factor present 15.2%	No factors present 1.5% ≥ 1 factor present 16.5%	0 to 1 factors present 0.5% 2 to 4 factors present 31%
Accuracy of Score	98% sensitive 50% specific	87% sensitive 66% specific	97% sensitive 73% specific

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