

The utility of head computed tomography in the emergency department evaluation of syncope

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Objective. Current guidelines for evaluation of syncope recommend that in the absence of objective focal neurologic findings, head computed tomography (HCT) may not be necessary. Compliance with this recommendation is highly variable, which may be due in part to the lack of currently available evidence. We undertook the following investigation to determine whether HCT aids in the diagnostic investigation of syncope.

Methods. This study was a retrospective chart review of all adult patients who presented to an urban emergency department, and who had a HCT ordered for syncope, during a 6-month period in 2001. Patients with competing indications for HCT, or those with a presentation consistent with seizures were excluded. Charts were assigned to the "positive" or "negative" HCT group depending on whether the treating physician

considered HCT findings relevant to the syncopal event.

Results. A total of 202 patients had a HCT performed for syncope. Eighty-five patients met one or more of the exclusion criteria. HCT of the remaining 117 patients were analyzed. None of the 117 patients had a HCT finding that was clinically related to the syncopal event.

Conclusions. HCT yielded no relevant clinical findings in our entire sample of patients with syncope. Our findings combined with previous studies add to the growing body of evidence that HCT for syncope in the absence of focal neurologic findings may not be necessary.

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Key words: computed tomography, emergency medicine, syncope

Introduction

Syncope, defined as a sudden and transient loss of consciousness with an inability to maintain postural tone, is responsible for up to 1-3% of all emergency department (ED) visits, and 2-6% of hospital admissions^{1,2}. Finding a cause for the syncopal event is of prime importance to the emergency physician (EP) as the prognosis and disposition are inherently linked to etiology³. About 34% of patients hospitalized with syncope have a recurrent episode, many within 1 year of the first event⁴. Syncope unexplained on history and physical examination has been reported to have a 9-14% mortality within 1 year, and heart disease, congestive heart failure, abnormal electrocardiogram or serum creatinine > 2.0 mg/dl are all associated with an increased mortality⁵⁻¹⁰.

Syncopal patients often undergo a lengthy and expensive work-up, with intent to detect serious causes for the event, such as cardiac or neurologic etiologies^{11,12}. Often

this work-up includes a non-contrast head computed tomography (HCT) study¹³⁻¹⁵. A HCT is readily available to most EDs, and is a rapid and safe study, which is viewed as having the potential to "rule-out" a serious neurological cause of the syncope.

Current guidelines do not recommend obtaining a HCT for syncopal patients, unless the history and physical examination indicate otherwise^{3,16,17}. These guidelines are based upon retrospective investigations performed primarily in the 1980s, prior to the widespread use of computed tomography scanning in the ED, and also prior to the advent of today's fifth-generation and helical scanning machines that promise higher speed and better resolution^{1,11,18-23}. Fear of litigation (if a HCT is not performed) is also believed to influence the EP decision²⁴. The current study was designed to evaluate whether a HCT provides information that is helpful in the management of a patient presenting with syncope.

Methods

Prior approval was obtained from the Institutional Review Board.

The study was designed as a retrospective chart review of all adult patients who presented to an urban ED (90 000 visits/year) between June and December 2001. Patients

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were included if they were 18 years or older, and had a HCT performed with the indication of “syncope” ordered by the treating EP. Only patients who had a transient but complete loss of consciousness (i.e. excluding pre-syncope or light-headed patients) were enrolled. Any patient who was felt to have a competing indication (other than syncope) for undergoing a HCT was excluded using the following criteria: 1) patients presenting with history of trauma, including those who were assaulted or who described hitting their head during a fall; 2) patients presenting with seizures; 3) patients with acute mental status changes or decreased mental status precluding a comprehensive history and physical examination (including intoxicated patients); 4) patients with a neurological deficit on initial evaluation, defined as a new peripheral motor or sensory deficit, diplopia, dysarthria, incoordination or cranial nerve palsy. We also excluded pregnant patients and charts with incomplete documentation of the presentation (including those with no documentation of the presenting neurological examination).

All HCTs were read by in-house radiologists (radiology residents and fellows with final reading confirmed by staff radiologists), and the results from their interpretation were immediately available to the treating EP. All computed tomography scans were performed on a GE LightSpeed Plus machine (GE Healthcare, Fairfield, CT, USA) utilizing a standard protocol for unenhanced HCT imaging.

All charts were reviewed conjointly by the physician-investigators of this study. Any chart for which the primary reviewer expressed uncertainty was independently reviewed by another physician, and consensus was achieved between all physicians. Data were analyzed using simple descriptive statistics.

Co-morbidity data reported in Table 1 were extracted from the EP documentation. A positive HCT was defined as a finding that was determined to be clinically significant by the treating EP, and included any intracranial hemorrhage (epidural, subdural, subarachnoid or intraparenchymal) or intracranial space occupying lesion with mass effect (brain abscess, tumor, granuloma, etc.).

Results

A total of 202 patients met the initial inclusion criteria. Eighty-five were excluded because they met one or more of the exclusion criteria described above. The remaining 117 charts were included in the study.

Patients had a mean age of 64 years. Both sexes were equally represented (56% female). Baseline characteristics are noted in Table 1. Of the total 117 HCTs performed for syncope, none had a positive finding (Fig. 1).

Table 1. Baseline characteristics.

Age (years)	64
Female	65 (56%)
Hypertension	65 (56%)
Coronary artery disease	32 (27%)
Diabetes	19 (16%)
Any stroke	16 (14%)

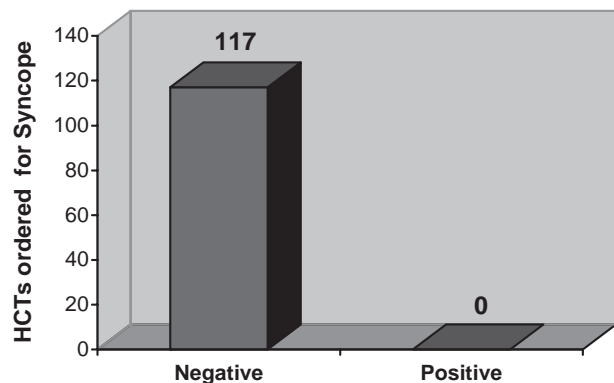


Figure 1. Primary results. HCT, head computed tomography.

Discussion

Current guidelines question the need for a “routine” HCT to evaluate syncopal patients in the ED^{3,16,17}. This is still a relatively common practice across the country^{13,14}. Our study was designed to test this practice, especially in this new era of highly sensitive computed tomography scanning machines that are readily available to almost every practising EP. Our exclusion criteria were designed to eliminate any patients who may have had an alternative indication for undergoing a HCT. Therefore all patients studied here did not have any evident reason for undergoing a HCT, other than the fact that they had a transient loss of consciousness.

In our cohort of patients, HCT did not yield any findings relevant to the evaluation and management of a patient with syncope. Our findings are significant in a number of ways. While the absence of finding of any positive HCTs is noteworthy, it is consistent with most published guidelines and data available regarding the ED evaluation of syncope³. An average age of 64 years in this series did not contribute to an increased frequency of positive findings. Our results affirm the fact that a HCT has no routine role in the ED evaluation of syncopal patients, unless a thorough history and physical examination suggests a possible intracranial abnormality. In a large urban academic center, we found that 117 HCTs were ordered for evaluation of syncope over a period of 6 months, or an average of 5 HCTs per week. This represents a considerable consumption of resources for

any hospital, and a potential for significant cost savings with a different ordering strategy by EPs.

In summary, in our study sample, HCT scanning did not provide any information that was useful in the ED management of patients with syncope.

Study limitations

Limitations of the study arise mostly from the fact that it is designed as a retrospective chart review and covers only a small sample of patients. The inclusion criteria did not cover every syncopal patient who presented to the ED, and hence no prevalence data can be extracted. The study design and interpretation is purely descriptive, and further study to look at long-term outcomes of syncopal patients may be necessary before prevalent practice can be changed.

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