Certificate in Physician Leadership for Hospital Medicine

Capstone Project

Name: Gilbert-Roy B. Kamoga MD FACP
Title: Associate Program Director Internal Medicine Residency Program/Hospitalist
Institution: White River Medical Center
Email: rkamoga@wrmc.com

Title:

Evaluation of the utilization of imaging (CT and MRI) among patients presenting with simple syncope in the Emergency Department at White River Medical Center (WRMC) with a focus on promoting High Value Care.

Introduction/Project description:

Syncope is a transient loss of consciousness, associated with loss of postural tone, with spontaneous return to baseline neurological function requiring no resuscitative efforts. The underlying mechanism is global hypoperfusion of both the cerebral cortices or focal hypoperfusion of the reticular activating system. It is not to be confused with loss of consciousness associated with altered mental status or stroke and similarly with vague dizziness and chronic lightheadedness in patients with pre-syncope.

Syncope is a common complaint in the Emergency Department (ED), accounting for 1 to 3 percent of all ED visits and hospital admissions in the United States. The differential diagnosis is broad and management focuses on the underlying cause when it is discernible. There are broad categories for etiology behind syncope including vasovagal, cardiogenic, orthostatic, medication induced and neurogenic. ED initial evaluation often involves an attempt to rule out dangerous or life threatening causes; this includes obtaining a focused history and performing a thorough physical examination, orthostatic blood pressure measurements, 12 lead ECG, Head CT, laboratory and imaging studies as indicated by the history and physical exam findings. If there are no emergent findings or concerns that need to be addressed immediately, the patient is often admitted for further evaluation by hospital medicine.

With the advent of High Value Care and the Choosing Wisely Campaign, the American College of Emergency Physicians, American College of Physicians and American Academy of Neurology have made recommendations regarding routine neurological imaging utilization for patients presenting with syncope.

1) Avoid CT of the head in asymptomatic adult patients in the emergency department with syncope, insignificant trauma and normal neurological evaluation. ACEP 2014.

2) In the evaluation of simple syncope and a normal neurological examination, don't obtain brain-imaging studies (CT or MRI). ACP 2012.

3) Do not perform imaging of the carotid arteries for simple syncope without other neurologic symptoms. AAN 2013.

This Quality improvement project will seek to review the utilization of brain imaging studies among patients presenting with syncope in the emergency department at WRMC. The deliverable goal of this project is outlining process improvement strategies to comply with Choosing Wisely guidelines and High Value Care for patients at WRMC and the community served by WRHS.

Objective:

1) Evaluate the number of syncope patients with documented normal neurological physical examinations receiving brain imaging in the emergency department.

2) Educate and recommend established evidence based guidelines for the evaluation of patients presenting with syncope with normal neurological examination to all stakeholders (ED physicians, Hospitalists, Residents, ED/Hospitalist Nurse Practitioners, ED/Hospitalist Physician Assistants and the Departments of Radiology, Quality and Finance).

3) Design a standardized process for the assessment of the need for brain imaging among patients presenting with syncope.

4) Measure the effectiveness of standardized process regarding brain imaging among patients presenting with syncope.

Methodology and Timeline:

1) The initial step involved joint meetings with leadership of the Emergency Department, Hospitalist, Radiology and Quality Departments at White River Medical Center to discuss this particular issue, highlight the importance of High Value Care and assess interest and motivation in addressing it. (Completed as part of the proposal preparation process).

2) Abstract data gathering of patients who presented with syncope to the ED over the preceding 6 months. Analyze by chart review, those who received brain imaging in absence of documented abnormal neurological physical examination. (1-2 months).

3) Discuss results with Leadership. Share current guidelines regarding syncope and brain imaging to all stakeholders. Create a strategic planning committee involving representatives from ER and Hospital medicine geared at developing agreed upon, standardized process for utilization of brain imaging among patients presenting with syncope. (1-2 months).

4) Initiate a series of PDSA (Plan-Do-Study-Act) cycles to implement these processes/actions (1 month cycles; anticipate 2-3 cycles over 3 months)

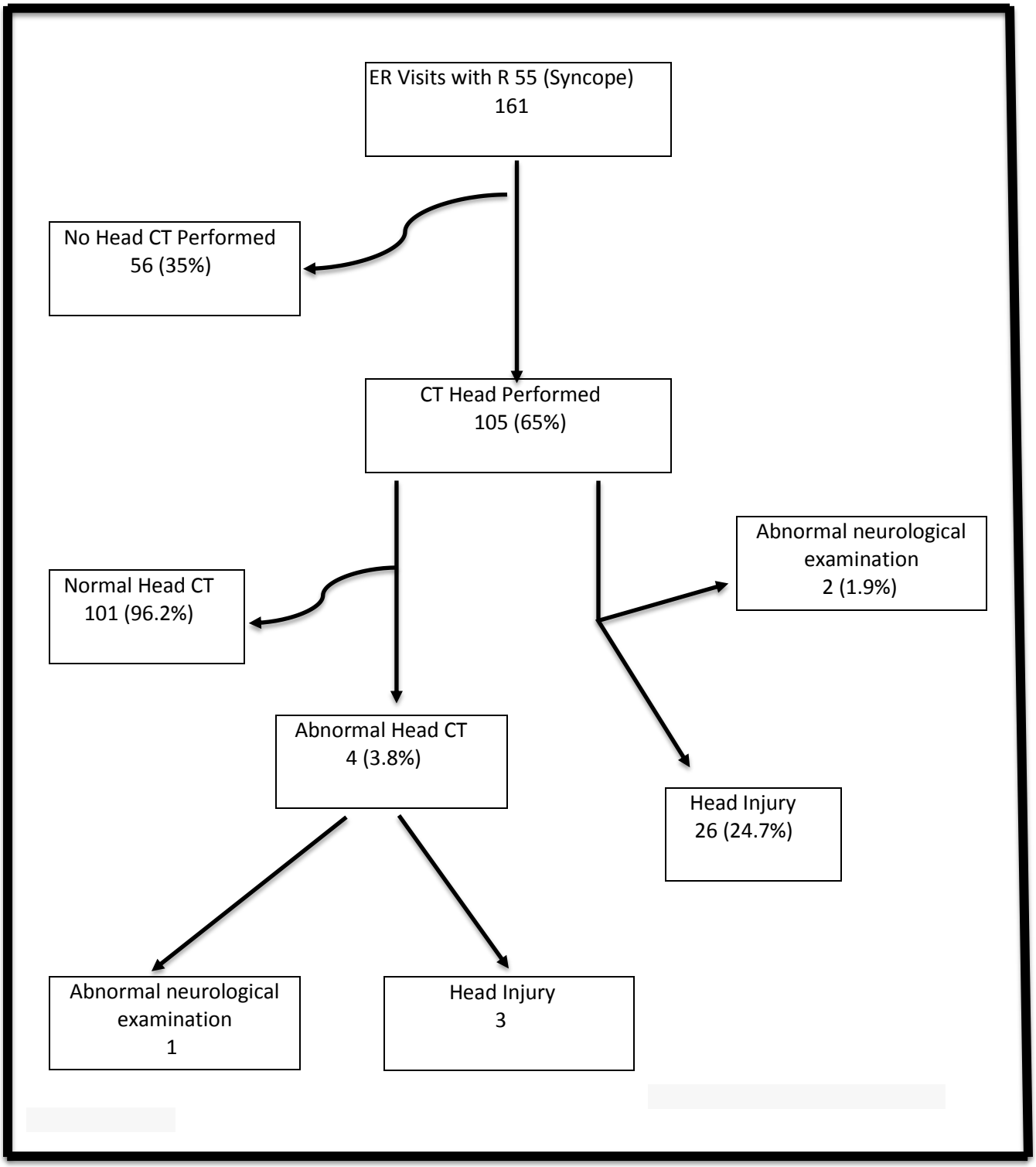
5) Assess the need for additional PDSA cycles. Review the entire project and outcome, including possibly formalizing successful interventions as part of standard institutional operating procedure (1 month).

Results and Findings:

Data extraction and analysis was conducted for a period of time spanning 6 months from April 2018 through end of September 2018. We analyzed all visitors to the ER whose final ICD-10 diagnosis code was “Syncope” or “ R55”. Among this patient population, we reviewed charts of those who underwent evaluation with CT scan of the head without contrast. We evaluated the physical exam section among these patients looking for the presence of abnormal neurological examination findings. We also looked for history documentation of head injury/trauma before or during the syncopal event, both of these are clear indications for performing brain-imaging studies in assessment of simple syncope per the guidelines. We also looked at the proportion of patients with “syncope/R55” who did not have a head CT performed.

To further highlight the guidelines from the choosing wisely campaign, we looked at the diagnostic findings among those who had brain-imaging studies done, specifically looking for any abnormal findings of the head/brain CT. These results are illustrated in the flow diagram below.

Brain imaging among patients presenting with syncope



In this 6-month period, 161 patients presented to the Emergency Room and their stay was coded as R55 (Syncope). 105 (65%) of these 161 patients had a CT of the head without contrast performed. 2 (1.9%) patients of the 105 who had CT scans of the head done had documented abnormal neurology examination findings. 26 (24.7%) patients of the 105 who had CT scans of the head done had documented history of head trauma. Of all the CT scans of the head performed (105), only 4 (3.8%) were abnormal; 3 abnormal CT scans of the head had documented history of head injury and 1 had abnormal neurology examination findings.

We presented these findings to the leadership of the Administration, Emergency department, Radiology and Hospitalists. Together we came up with an intervention to attempt to improve utilization of brain imaging in syncope. The first step involved education of the providers regarding the current guidelines, which was completed in the provider meetings in each department. We then develop an order-based intervention for Head CT of the brain without contrast outlining appropriate diagnoses and the diagnoses we chose included; syncope with abnormal neurological examination, syncope with head injury/trauma, Headaches, Altered mental status, Stroke like symptoms and seizures. We then went back and provided education to providers on the intentions of this diagnosis tied order and how to appropriately use it. In our facility (White River Medical Center), there is a separate focused order for CT head without contrast for those who present with massive Head trauma (such as motor vehicle accident) and for ARsaves (witnessed cerebrovascular accident) both of which would not carry diagnosis code of R55.

We began implementation for the diagnosis CT head order in February 2019. In February 2019, there were a total of 12 Emergency room visits coded as R55 (syncope), 6 (50%) of these patients had CT head performed. Regarding indications placed on the order for head CT, 1 had syncope with head injury and 1 had syncope with abnormal neurological examination and both of these patients had no clear documentation of history of head injury or abnormal neurological examination. The other 4 CT heads done were for diagnoses of altered mental status (1), headache (2) and undisclosed/uncaptured diagnosis (1). We also noted that many presenting complaints and evaluations included dizziness, altered mental status, frank head injury preceding collapse, stroke-like symptoms, seizures, shortness of breath and chest heaviness all coded out as R55. Since we only had 12 visits, we proceeded to another month cycle to make sure this was representative.

In March 2019, there were a total of 21 Emergency room visits coded as R55 (syncope), 16 (76.1%) of these patients had CT head performed. Regarding indications placed on the order for head CT, 1 had syncope with head injury and 2 had syncope with abnormal neurological examination and all these patients had no clear documentation of history of head injury or abnormal neurological examination. The other 13 CT heads done were for order diagnoses of, stroke like symptoms (1), Head trauma (5), Altered mental status (3), headache (3) and undisclosed/uncaptured diagnosis (1). These results were similar to findings in February.

Discussion:

The findings above regarding appropriate use of brain imaging studies for simple syncope were enlightening regarding the culture at our institution. The providers were very receptive regarding the guidelines and concept behind focusing on providing high quality care for our patients. We know that at least 65% of patients presenting with syncope (R55) have brain imaging done. We also know that 3.8% of those CT scans of the head done actually showed pathology and among those abnormal CT scans of the head there was either finding of abnormal neurological physical examination or history of head injury occurring from the syncopal episode. This latter finding clearly supports the guidelines from both ACP and ACEP.

In terms of the quality intervention proposed, following provider education, there are clear shortcomings. The use of standardized order interventions to achieve quality process improvements has been thought to be an effective and powerful tool but must be implemented with judicious continuous user/provider feedback. We did see that providers may have chosen inappropriate diagnoses on the order for the Head CT scan or may have entered a wrong indication to simply to get the CT head/brain test completed without much hassle.

There was also a disconnect between the indications highlighted on the order for the head CT scan and the neurological examination documented in the chart. This could reflect either poor documentation in general or again the provider simply choosing an indication in order to get the test completed. We also noted from chart review that the R55 code might not always truly represent the diagnosis for which the patient presented. We found cases of frank head trauma preceding collapse; complaints of dizziness, altered mental status, shortness of breath, chest heaviness and sudden collapse with neurological sequelae; stroke-like symptoms; seizures; etc. More appropriate diagnosis codes may have provided an accurate picture. This same concept likely affected the initial data analyzed. It is possible that the magnitude of the concern is smaller than what we found.

With the current data we cannot report how well we are following the guidelines and thus continued process improvement is paramount.

Opportunities and Way Forward:

1) Continue to engage all providers regarding the current guidelines for brain imaging for simple syncope. We will expand the assessment for use of brain imaging to all providers and not only the Emergency room. These orders are generated from outpatient providers and hospitalist as well.

2) Continue to educate the providers on the utility of the head CT scan order and appropriate selection of the indication. Emphasis on clear documentation will also be highlighted. For simple syncope, it is critical to pay attention to documentation of head injury resulting from a syncopal episode and a focused precise neurological physical examination. These increase the pre-test probability of abnormal brain imaging.

3) Engage hospital coders to identify what criteria they use for R55 code and if identifying head injury or abnormal neurological examination would increase the severity index for the patient and visit.

4) Continue to perform PDSA cycles over the next 6-12 months concurrently with continued engagement and education of all stakeholders. The goal is to obtain greater than 50% adherence to imaging guidelines for patients presenting with simple syncope among providers at White River Health System.

5) Finally, convince administration, through quality department initiatives to focus on this as one of the quality objectives to attain for year 2019/2020.

References:

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