Appropriateness of Ordering Head CT for Trauma Patients

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Purpose and Rationale

This project aims to ensure that head CT is only used for trauma patients that meet the appropriate evidence-based criteria.

There is strong evidence that head CT is only appropriate for trauma patients who meet certain criteria. There are validated clinical prediction rules in the Emergency Medicine and Radiology literature that defines the patient population that should get head CT studies. However inappropriate utilization still occurs.

Resources

Ian G Stiell, George A Wells, Katherine Vandemheen, Catherine Clement, Howard Lesiuk, Andreas Laupacis, R Douglas McKnight, Richard Verbeek, Robert Brison, Daniel Cass, Mary A Eisenhauer, Gary H Greenberg, James Worthington, for the CCC Study Group. The Canadian Head CT Rule for Patients with Minor Head Injury. The Lancet. 357: May, 2001, pp. 1391-1396.

Micelle J. Haydel, M.D., Charles A. Preston, M.D., Trevor J. Mills, M.D., Samuel Luber, B.A., Erick Blaudeau, M.D., and Peter M.C. DeBlieux, M.D. Indications for Computed Tomography in Patients with Minor Head Injury. NEJM. 343(2): July, 2000, pp. 100-105.

Measure

Numerator	# of CT exams for head trauma with appropriate indications
Denominator	total # of CT exams for head trauma

Collecting baseline data

To monitor and potentially change the appropriateness of head CT referrals for minor head injury/trauma, the institution must formally subscribe to a set of decision rules. Two sets of these rules are provided in the resources cited above. Hospitals should choose one of these criteria sets or bring together emergency medicine physicians and radiologists to adapt them as they see fit for their institution. Once a decision set has been adopted, it will become the basis for characterizing individuals studies as appropriate (consistent with the decision rules) or inappropriate (not consistent).

Select a strategy for data collection. From among the head CT studies done on trauma patients, you may choose to use 50 consecutive cases; every second, third or fourth case until 50 have

been selected; all of the cases done on a specific day or set of days; or any other strategy that will result in a set of 50 or more cases identified at random.

Assign one or more individuals to review the cases and categorize them as appropriate (consistent with the decision rules) or inappropriate (not consistent).

Baseline Data Analysis

Begin by calculating the % of cases from among your sample that were categorized as inappropriate. This becomes your baseline.

Factors that Can Influence Performance

After analyzing the baseline data, determine whether there is room for improvement. Examine the inappropriate cases to determine, if possible, why an inappropriate referral was made. Reflect on your setting and practice, and identify factors that may have influenced your results. Design an intervention to address these factors.

Possible contributors may include:

- Lack of agreement with the decision criteria adopted. Here, an intervention might be convening the referring physicians to educate them about and obtain buy-in for the guidelines, or to negotiate revisions to the guidelines to which they would be willing to adhere.

- Lack of awareness of the guidelines. Here, an intervention might be to have an in-service training program.

- Failure to remember the guidelines. Consider posting the guidelines on-line for easy reference, creating visual aids to remind physicians, or implementing on-line or paper order entry processes and materials to prompt them.

- Failure to document appropriate clinical criteria. In-service training and/or providing individual feedback to ordering physicians on their performance might be used.

In selecting an intervention, pick one to implement that you think has the best likelihood of positive effect. Do not perform multiple interventions at once; if you do you will not be able to determine which one had an effect.

Post-Intervention Data Collection and Analysis

Plan to collect data again at a set interval—three to six months after baseline—and then at specified intervals thereafter for the duration of the project (one to three years is typical).

Make sure that cases are collected, tallies are performed and metrics are analyzed the same way as at baseline. The only exceptions to this would be to adjust the number of cases collected if more cases are needed for analysis or to correct a problem identified with the baseline data collection procedure. If so, once the procedure has been corrected use it consistently going forward.

Data should continue to be collected over time. If improvement is continuing, the same intervals for data collection should be recommended. As improvement plateaus the interval for measuring and the number of exams that are measured can be reduced—as long as the metrics are stable. If a significant decrease in performance is seen (5 or more consecutive measures), the project should start anew with analysis as to cause and potential fix.

You may want to make a chart or graph of your performance over time to identify trends and patterns. Review the data with your project team after every data collection period.

If you are meeting your goals, no further changes may be necessary. However, you should plan to take steps to institutionalize whatever changes contributed to successful performance. If additional improvement is possible, look at your processes again and design additional interventions. It is likely that more than one technique will be needed in order to provide the highest level of artifact reduction in most patients. It is generally best to only make one intervention per study cycle so that conclusions can be drawn about what caused the observed effect.