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R2 Block 6 CAT 2016-2017

**Reference:**

Sharp, A. L., MD, MS, Nagaraj, G., MD, Rippberger, E. J., MPH, Shen, E., PhD, Swap, C. J., MD, Silver, M. A., MD, . . . Griffey, R. T., MD, MPH. (2017). Computed Tomography Use for Adults With Head Injury: Describing Likely Avoidable Emergency Department Imaging Based on the Canadian CT Head Rule. *Academic Emergency Medicine*, 24(1), 22-30. doi:10.1111/ACEM.13061

**Question:**

Determine the prevalence of avoidable head CT for head injury adults.

**Introduction:**

One third of CT head orders are through the ED in the U.S. One of the number one goals for the Choosing Wisely campaign is minimizing the use of head CTs. There are numerous potential problems with over-ordering this study. This includes radiation exposure, false positive findings, and incidentalomas that lead to further unnecessary intervention. The Canadian Head CT Rule is a validated and widely accepted set of rule out criteria for adults with head injury.

**Methods:**

This is an observational study from January 2008 to June 2013 through the Kaiser Health System. All patients with trauma that received a non-contrast head CT were included. Patients excluded were those that had anticoagulation medication in their home medication list. Patients were deemed appropriate for use of head CT based on Canadian Head CT rules, or discordant (inappropriate) use of head CT based on Canadian Head CT rules. 27,240 encounters were reviewed. Of these patients, they identified individuals that were discordant with Canadian Head CT rules and/or on anticoagulation. They then randomly sampled 100 of these discordant patients and thoroughly chart reviewed them to determine the true discordance. The primary outcome was to evaluate the true discordance, or inappropriateness, of ordered head CTs.

**Results:**

27,240 ED pts included in the sample. 11,432 were avoidable based purely on documented Canadian Head CT Rules. In depth chart review of 100 pts revealed that 87.8% of these discordant pts were truly discordant. So, this percentage was applied to the 11,432 pts, and it was determined that 10,037 were truly discordant.

**Discussion:**

There are several limitations to this study. The main one being that it's an observational chart review. The electronic health record is not reliable at capturing/coding all pertinent criteria. Their way of justifying this was by performing an in depth chart review on 100 patients, which had a confidence interval of 79-92 percent, which is quite variable and questionable. They then applied this percentage to all 11 thousand patients, which is again questionable. This study also does not account for the moderate risk patients with concerning mechanism of injury or amnesia after the head injury. This is a bigger limitation than they lead us to believe. There are many trauma patients that the Canadian Head CT Rule can't be applied to because of the mechanism of injury. They also did not look into the outcomes/results of these discordant head CT patients. How many actually had clinically significant injuries? The deep dive chart review on the 100 patients did not actually look at clinical outcome. It just more thoroughly identified criteria to apply the Canadian Head CT rule.

**Conclusion:**

Rather than titling this "likely avoidable emergency department imaging," this study should be titled "utilization of validated decision rules." Without knowing the mechanism of injury and the clinical

outcome of these injuries, it is difficult to make the statement that all of these discordant head CTs are avoidable. If there was more data on the clinical outcome of these patients, I think this study would have more powerful message. While this study fell short in a few areas, it will definitely make me think more critically about appropriately applying validated decision rules to my patients.

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