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Reference: Academic Emergency Medicine. Volume 23, Issue 10 October 2016. **Determination of a Testing Threshold for Lumbar Puncture in the Diagnosis of Subarachnoid Hemorrhage after a Negative Head Computed Tomography: A Decision Analysis** Richard Andrew Taylor MD, MHS, Harman Singh Gill MD, Evie G. Marcolini MD, H. Pendell Meyers BS, Jeremy Samuel Faust MD, MS, David H. Newman MD,

Question: What is the testing threshold for performing lumbar puncture for SAH after a negative CT?

Objective

The objective was to determine the testing threshold for lumbar puncture (LP) in the evaluation of aneurysmal subarachnoid hemorrhage (SAH) after a negative head computed tomography (CT). As a secondary aim they sought to identify clinical variables that have the greatest impact on this threshold.

Methods

A decision analytic model was developed to estimate the testing threshold for patients with normal neurologic findings, being evaluated for SAH, after a negative CT of the head. The testing threshold was calculated as the pretest probability of disease where the two strategies (LP or no LP) are balanced in terms of quality-adjusted life-years. Two-way and probabilistic sensitivity analyses (PSAs) were performed.

Results

For the base-case scenario the testing threshold for performing an LP after negative head CT was 4.3%. Results for the two-way sensitivity analyses demonstrated that the test threshold ranged from 1.9% to 15.6%, dominated by the uncertainty in the probability of death from initial missed SAH. In the PSA the mean testing threshold was 4.3% (95% confidence interval = 1.4% to 9.3%). Other significant variables in the model included probability of aneurysmal versus nonaneurysmal SAH after negative head CT, probability of long-term morbidity from initial missed SAH, and probability of renal failure from contrast-induced nephropathy.

Conclusions

Their decision analysis results suggest a testing threshold for LP after negative CT to be approximately 4.3%, with a range of 1.4% to 9.3% on robust PSA. In light of these data, and considering the low probability of aneurysmal SAH after a negative CT, they believe classical teaching and current guidelines addressing testing for SAH should be revisited.

Limitations: It is a decision analysis so all data were obtained from reading studies done on CT and LP for SAH. There is no original data in the study, therefore, it is difficult to know if all data were accurate in the original studies or even how the data for the original studies were obtained. Also the legitimacy of each original study came down to the opinions of two of the authors. Also the confidence interval of 95% ranged from 1.4% to 9.3% which is a significant difference. Missing up to 9.3% of SAH's would not suffice for healthcare in the US. In my opinion, the chance of significant morbidity or mortality in doing a lumbar puncture is not significant in comparison to a possible missed SAH.
