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Letter to the Editor: Interpretation of Traumatic Lumbar Puncture in the Setting of Possible Subarachnoid Hemorrhage: Who Can Be Safely Discharged?

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### Interpretation of Traumatic Lumbar Puncture in the Setting of Possible Subarachnoid Hemorrhage: Who Can Be Safely Discharged?

Gorchynski J, Oman J, Newton T. Interpretation of traumatic puncture in the setting of possible subarachnoid hemorrhage: who can be safely discharged? *WestJEM*. 2007; 8:3-7.

*To the Editor:*

When I first saw the title of the study by Julie Gorchynski et al in the February 2007 issue of the *Western Journal of Emergency Medicine*, I thought, "Eureka!" We surely have to reason our way through a great many decisions for which we have no highly reliable evidence to guide us. But the question of how to proceed with the patient with a history suspicious for subarachnoid hemorrhage (SAH), but with a negative CT and with CSF that has several hundred or more red cells, has always been one of the most vexing to me and my colleagues. What a minefield - a disease with very low prevalence, affecting patients usually in the primes of their lives, with potentially catastrophic outcomes for a missed diagnosis, and with even the potential for some harm if we over-diagnose. While an evaluation by LP with or without CT has become the standard, a strategy for interpreting abnormal CSF with high sensitivity and specificity has been lacking.

The paper represents a landmark for finally supplying some data and analysis. Unfortunately, as reported, it's hard to determine exactly how reassuringly the study answers the question, "How do you distinguish a patient with traumatic tap from one with CT-negative SAH?" Ideally we would need to know the answer to this question to know whom we can safely discharge. The authors are careful to explain the limitations of the study, and, indeed, it is impossible to know for sure that all of the patients whom the authors have to call negative (at times, referred to as "radiographically normal") are truly negative for SAH. The lack of clinical follow-up (this could be enough to answer the question more completely, but admittedly would be difficult to obtain) and/or definitive evaluation for aneurysm in all patients could significantly affect the conclusions of the study. Of course, even an angiogram can be a false-negative, if there is vascular spasm, or a false-positive, in someone with an asymptomatic aneurysm and a headache for another reason, but the fact that some of the subjects only had a negative CT to define them as being negative for SAH brings us back to "square one" for those patients - probably over 200 of them in this study - in terms of the method many of us use to evaluate them. It is still unclear how confident we can be that a negative CT and an RBC count below 500 rules out SAH.

It seems very likely that there is a spectrum of presentations, CT findings, and CSF RBC counts that correlate with different degrees of SAH at different times

after the event. Considering all of these variables, our ultimate goal would be to determine the difference between the RBC count (and particularly the lowest limit of this) and RBC clearance for those who are truly SAH-positive vs. SAH-negative. Though I sense that we'll probably never know the complete answer, the work of Gorchynski et al gives us a better understanding than we had before. I applaud and thank the authors for their efforts and analysis. And while a larger sample size, as they suggest, would be nice, as it is with most observational studies, the devil is in the denominator, and defining what we don't know is as important as determining what we do know. We'll just have to look forward to a well-designed prospective study and, in the meantime, at least understand that a negative CT does NOT finish the evaluation in someone with a suspicious history for SAH. And if there are RBCs in the CSF.....well, as they say, that's why they pay us the big bucks!

*J. Toscano, MD  
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*In reply:*

The comments by J. Toscano are applicable to this difficult question that emergency medicine physicians continue to face: Who can we safely send home with a normal head CT and red blood cells in the CSF? Dr. Toscano's appraisal of the paper is valid and well articulated. His suggestion for future studies in defining with certainty what patients truly have a subarachnoid hemorrhage (SAH) with a reported "radiographically normal CT" and red blood cells in the CSF are defensible. I question if an exact cutoff value or specific range of CSF red blood cells are required to diagnose a SAH that is clinically insignificant.

While future prospective studies may be able to define exactly what constitutes a traumatic tap versus one consistent with a SAH as supported by MRI/MRA or angiography the next critical question would be the clinical significance of the SAH. A prospective observational study in those patients who have a radiographically normal CT with CSF red blood cells who are discharged home or admitted for observation with six month follow up may answer this question. If those patients who truly had a SAH were sent home with a radiographically normal CT and red blood cells in the CSF, was the SAH of clinical significance? And is there a need to utilize expensive and invasive imaging modalities to find evidence of a SAH that is of no clinical importance?

*Julie Gorchynski, MD, MSc  
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