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CAT Block 13

Reference: Sayer, David et al. "An Observational Study of 2,248 Patients Presenting with Headache, Suggestive of Subarachnoid Hemorrhage, Who Received Lumbar Punctures Following Normal Computed Tomography of the Head." *Academic Emergency Medicine* November 2015, Vol. 22, No. 11.

Question: What is the incidence of SAH diagnosed by LP if normal head CT?

Introduction: Noncontrast head CT has sensitivity for SAH of 98% if performed within 12 hours of maximum pain, but falls to 50% by the end of the first week. When CT is negative and suspicion is high, diagnosis is based on CSF analysis for RBCs, xanthochromia, and bilirubin. LPs are associated with risks including pain, headaches, meningitis, epidural hematoma, nerve root damage, and local site infection. LPs can also be nondiagnostic if the procedure is unsuccessful or inadequate samples. This study looks at the rate of diagnosis of SAH by LP after negative head CT.

Methods: This was a retrospective chart review of patients from six EDs in the UK over 5 years. Patients presented with acute headache, negative CT, LP performed for CSF analysis were included. CSF was analyzed by spectrophotometry. Patients were excluded if LP was done for meningitis workup. If LP is indicative of SAH, CTA or MRA is then performed.

Results: 2,248 patients met inclusion criteria. 92 of the LP samples were positive, 1,507 were negative, 299 were inconclusive, and 350 were uninterpretable. 9 out of 92 (0.45%) patients with positive LP results had vascular abnormalities on subsequent neuroimaging. No vascular abnormalities were found in the 299 inconclusive samples and 2 out of 350 of the uninterpretable samples had aneurysms found on further testing.

Conclusions: Only 4.1% of patients in the study had positive LPs. Out of the patients with positive LPs, 9 had vascular pathology, which is a rate of 0.47% of all LPs with analyzable CSF in the study. There were a large amount of LPs performed in the ED that were performed and were negative or inconclusive. In patients with acute severe headache in ED, LPs have a low diagnostic yield to diagnose or exclude SAH if head CT is negative. Also, LPs can yield uninterpretable or inconclusive results. Clinical decision may be a better way to select patient that may need an LP for further evaluation or a CTA following a normal head CT. Diagnosis rates from LP with negative CT scans vary from 1% to 7.7%. The prevalence of aneurysms in the general population is approximately 2%. The low prevalence of aneurysms could potentially affect the diagnostic utility of LPs. Given that LPs have a risks and false positive findings with low prevalence of aneurysms, CTA or MRA is a more efficient screening tool with a normal head CT if suspicion of SAH is still high.

Limitations: This study did not analyze the population of patients studied, thus specific factors that may have prompted physicians to do a CTA if suspicion was high for SAH was not studied. There was also variation in procedures based on the sites studied. Each facility also had different radiology protocols and capabilities based on slice thickness and training of radiologists. There was no protocol to determine if a patient would receive an MRA or CTA for further imaging if indicated. There was also no follow up to review any possible missed SAH in patients discharged home without an LP or negative LP with no further imaging.
