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Experience and Training are not Associated with the Ordering Propensity of Advanced Radiographic Imaging in the Emergency Department

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at a Northern California private hospital from January 1 to January 16, 2006. All consecutive CT scans performed between 5 pm and 8 am were reviewed; scans were eligible if they were interpreted primarily by a teleradiologist and subsequently by a staff radiologist.

**Results:** A total of 240 CT scans were reviewed, of which 207 were eligible. Overall discordance rate was 4.4% (95% Confidence Interval [CI], 2.3-12.4%); the overall clinically significant discordance rate was 3.9% (95% CI, 2.2-11.3%). Both the total and clinically significant discordance rates for CT abdomen/pelvis were 3.6% (95% CI, 2.6-12.6%); for CT chest were 5.3% (95% CI, 5.1-3.1%). The total discordance rate for CT head was 5.9% (95% CI, 4.3-20.3%), with a clinically significant discordance rate of 4.4% (95% CI, 3.5-16.8%).

**Conclusion:** The overall clinically significant discordance rate between teleradiologists and hospital-based radiologists on CT scan interpretation was higher than expected. The highest significant discordance rate was for CT chest, although the total numbers of scans and misses were small. The second highest significant discordance rate was for CT head, followed by CT abdomen/pelvis.

### 3 Experience and Training Are not Associated with the Ordering Propensity of Advanced Radiographic Imaging in the Emergency Department

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**Objectives:** The use of computed tomography (CT) and magnetic resonance (MR) imaging in the emergency department (ED) has increased over time. The purpose of this retrospective observational study was to explore the CT and MR ordering habits of a group of faculty emergency medicine (EM) physicians over a 15-month period of time at the University of California San Francisco.

**Methods:** Spreadsheets from Radiology containing information on every CT and MR scan ordered by EM physicians from June 2005 to August 2006 were obtained. This dataset included patient demographics, visit number, and study type. A second dataset was extracted from the electronic charting system used in the ED. The ordering physician for each scan was identified by matching visit numbers. Physicians that rarely worked and hand-offs between physicians were accounted for. The "ordering propensity" for each physician (number of imaging studies ordered per 100 patients seen) was thus calculated. Reliability of results was examined by looking at variability in six-month blocks. Acuity was determined by review of billing reports and admission rates. Physician characteristics were obtained from ED administrative records. Analysis of variance and regression were utilized to determine associations between variables.

**Results:** Twenty-two faculty physicians were evaluated. CT or

MR imaging was ordered for approximately 20% of all patients seen during the study period by these physicians. The ordering propensity ranged from approximately 12% to 24% and was not explained by differences in patient acuity. Years since MD completion, residency training in EM, ABEM certification, gender, and work status were not associated with the ordering propensity of the individual physicians.

**Conclusions:** The CT and MR ordering propensity of a group of faculty EM physicians is variable and is not associated with experience and training in EM. There may be other variables not studied that are associated with ordering propensity.

### 4 Describing Cerebrospinal Fluid Red Blood Cell Counts in Patients with Subarachnoid Hemorrhage

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**Objectives:** It has been postulated that a decreasing red blood cell (RBC) count between the first and last tubes collected during lumbar puncture can be used to differentiate a traumatic tap from a true spontaneous subarachnoid hemorrhage (SAH). We sought to describe cerebrospinal fluid (CSF) RBC variation between tubes one and four in patients with known SAH.

**Methods:** We retrospectively identified all ED patients with a discharge diagnosis of SAH from June 1993 to November 2005. A structured chart review was performed on all patients with the additional billed procedure of "lumbar puncture," "lumbar drain," or "spinal tap." Data collected included: CSF RBC count in the first tube, CSF RBC count in the fourth tube, and an imaging study confirming the diagnosis. Patients were excluded if any of these three data points was absent.

**Results:** 1,323 patients seen in the ED were diagnosed with SAH, and 102 (7.7%) of these patients also had CSF collected. Of this group, 81 charts were located and reviewed. Thirty-five were then excluded for lack of documented RBC count in both tubes one and tube four, and 26 were excluded because of lack of documentation of an advanced imaging study. Of the remaining 20, seven (35%) were found to have an increase in RBC count between tubes one and four and 13 (65%) were found to have a decrease. Of the 13 patients who had an observed decrease in RBC counts between tubes, eight had a drop of >25%. The most dramatic case was a patient with xanthochromic CSF in whom the RBC count dropped from 453 in tube one to 0 in tube four.

**Conclusion:** In our sample of confirmed SAH cases, a drop in CSF RBC count was observed in 65% of cases, with a range spanning from 1% clearing to 100% clearing. These findings suggest that CSF RBC clearing between tube one and tube four is common in patients with SAH and thus cannot be used to rule out the diagnosis.