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Identifying a Rare Mortal Risk Factor Using Full Text Search of an EMR

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Abstract objective

Hippus, a rare physical exam finding, is a prominent, repetitive oscillation of the pupils. Through a full-text search of our electronic medical record, we identified hippus cases and matched controls. Hippus was associated with a 3-fold increase risk of 30-day mortality.

Keywords:

electronic medical records, text searching, clinical research, mortality

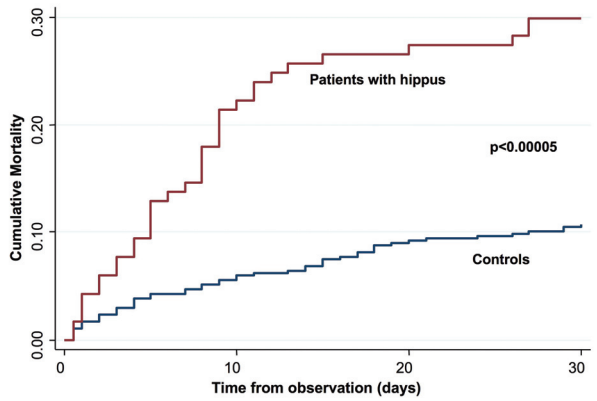

Figure 1 - Cumulative mortality of patients with hippus versus

We conducted a retrospective cohort study of hospitalized patients demonstrating hippus prominent enough to be noted in their electronic medical record (EMR). To identify cases of hippus, we did a full text search of greater than 60 million electronic records representing 1.3 million patients between 1995 and 2005 at one academic medical center. To mitigate observer bias, we used hospital billing records to select four controls for each case: two adjacent admissions by the same attending physician before and after each index case. We compared patients by past medical history, medications, and mental status. Chart abstraction was performed by two physicians, using a concept identifier to assist mapping this free text to standard terms[3]. Cases and controls were assessed for risk and mortality by univariable and multivariable logistic regression and Kaplan-Meier survival analysis.

Results

We found 147 cases of hippus in our search; 117 of these were inpatients. We identified 468 controls. There were no demographic differences between cases and controls. Patients with hippus were more likely to die within 30 days of observation ($p<0.00005$, see Figure). Independent risk factors for death by 30 days were altered mental status (OR 4.11; 95% CI 2.05 – 8.25, $p<0.001$), hippus (OR 2.99; 95% CI 1.46 – 6.11, $p=0.003$), renal disease ($p=0.054$), and cirrhosis ($p=0.029$); angiotensin-system inhibitors were protective ($p=0.012$). The presence of hippus on exam was associated with altered mental status (OR 11.23; 95% CI 6.27 – 20.09, $p<0.001$), a history of trauma (OR 3.76; 95% CI 1.65 – 8.59, $p=0.002$), cirrhosis ($p=0.038$), renal disease ($p=0.051$), and the use of iron ($p=0.016$).

Conclusions

Recognition of hippus in hospitalized patients is a clinically important predictor of early mortality. Hippus is associated with altered mental status, trauma, and cirrhosis. Full-text searching of a comprehensive EMR allowed fast identification of a large cohort demonstrating a rare finding and discovery of new clinical knowledge.

References

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