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Acute Headache Diagnosis in the Emergency Department: Accuracy and Safety of an Artificial Intelligence System (P5.10-002)

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Abstract

Objective: Evaluate the accuracy and safety of an artificial intelligent (AI) system for acute headache diagnosis in the emergency department.

Background: Headache is the main cause of neurologic consultation in emergency departments, entailing high costs in healthcare systems. Moreover, the access to qualified special... ...ropriate detection of potentially dangerous causes is not ensured, especially in areas with low number of neurologist per capita.

We hypothesize that and AI-system could assist in the diagnosis of headaches with high accuracy and safety.

Design/Methods: We retrieved 16,000 clinical records from patients consulting for headache at the emergency department. 7,972 patients were finally included after removing non-headache consults, incomplete, empty and duplicate entries. Clinical records were processed with Latent Semantic Analysis (LSA) and a Support Vector Machine (SVM) model was trained. We analyzed the performance of different models at classifying the headache as primary versus secondary. All the development and analysis was done using Python.

Results: 7,098 patients had a primary headache diagnosis and 874 a secondary headache diagnosis. We divided the database into a training (70%) and a testing (30%) set. A SVM model was trained with the former one, and we evaluated the performance of the model in the detection of probable secondary headaches in the test set. The sensitivity of the model for probable secondary headaches was 89% with a specificity of 73%, and a negative predictive value of 98.2%.

Conclusions: AI has a great potential for its application in acute headache diagnosis. Advancements in this field would both improve the accessibility to quality healthcare and optimize the time spent by health professionals at emergency departments.

Disclosure: Dr. Acosta has nothing to disclose. Dr. Dorr has nothing to disclose. Dr. Goicochea has nothing to disclose. Dr. Fernández Slezak has nothing to disclose. Dr. Farez has received personal compensation for consulting, serving on a scientific advisory board, speaking, or other activities with TEVA, Merck-Serono, Biogen-Idec, and Novartis.

Disputes & Debates: Rapid online correspondence

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