

Emulating Cognitive Diagnostic Skills Without Clinical Experience: A Report of Medical Students Using Quick Medical Reference and Iliad in the Diagnosis of Difficult Clinical Cases.

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Diagnosing complex internal medicine cases has traditionally been the domain and hallmark of clinical expertise. However, the creation of a differential diagnosis list using abstracted case information can be seen as a database query function and has been emulated by software such as QMR and Iliad. To test this premise, twenty two sophomore medical students were taught how to abstract clinical data, and use QMR and Iliad to diagnose complex clinical cases from the New England Journal of Medicine. Half of the students were able to provide correct diagnoses within a list of ten. These preliminary results supports a notion that clinical diagnosis may be a skill independent of clinical experience.

INTRODUCTION.

The solution to complex clinical cases has been considered the result of years of clinical training. One clinical skill is developing an appropriate differential diagnoses, a process which may be seen as a database query. To test this premise, individuals with minimal clinical experience were asked to diagnose complex cases using software to provide expertise. [1]

METHODS/RESULTS:

Over ten, 1.5 hour, weekly sessions, 22 sophomore medical students were taught the concepts underlying the construction, philosophy and use of Quick Medical Reference (QMR) and Iliad [2]. The instructor had sophomores read the presentation of a difficult case from clinico-pathologic conferences (CPCs), taken from the New England Journal of Medicine. The medical students were told to select, at their discretion, all findings that needed analysis by a physician. The instructor offered no input into the validity of the student's selections. The student's expertise with computers varied, so students were formed into 6 groups, to minimize technical difficulties. Five complex cases were analyzed by students; these same cases were also analyzed by the instructor using Iliad and QMR. At the end of each five 1.5 hour laboratory sessions, the results of students and the instructor were compared with case discussants of the CPCs. The object of the exercise was to

have the students arrive at the CPC diagnosis within the first ten diagnoses listed by Iliad or QMR as demonstrated by the instructor. The definition of "correct diagnosis" was strictly defined by being within the first ten diagnosis in a list. Further, associated diseases and diagnoses that were mentioned in the CPC but were not the concluding diagnosis were not considered as part of the correct diagnosis.

RESULTS.

Students were able to generate lists that contained a all possible diagnoses from the CPC. However, accuracy for the principle diagnosis varied greatly. Using Iliad, the instructor could only arrive at the diagnosis of the CPCs in 3/5 cases. Comparing instructor performance to the students, *one* group was consistently able to arrive at similar diagnosis, 5/5, within the top ten differential diagnosis presented by Iliad. In this group, it was one individual who was responsible for this performance. Of the five remaining groups, two groups were able to achieve the diagnosis within the top ten in 3/5 cases. Two groups were able to provide a diagnosis within the top ten, compared to the instructor in 2/5 cases. One group could not provide a diagnosis within the top ten in all cases. The same cases were analyzed using QMR. Of 6 CPCs, QMR arrived at the diagnosis in 5/6 cases, all within the first ten diagnosis listed using the "case" mode. These results suggest that diagnosis may be a skill independent of clinical knowledge. However, the inability of the students to narrow the differential diagnosis allude to the importance of clinical skill.

References:

1. Miller, R. Medical diagnostic decision support systems - past, present and future: A threaded bibliography and commentary. JAMIA 1994;1;8.
2. Lincoln MJ, Turner C, Hesse B, Miller R. A comparison of clustered knowledge structures in Iliad and in Quick Medical Reference. Proceedings the 12th Annual Symposium of Computer Applications in Medical Care, 1988. p.131-6.