Smartphone based decision support systems in acid-base disturbances and diagnostic performance of medical students

Introduction: Evaluation of acid-base disturbances is commonly a crucial part of the assessment of critically ill patients. Experience and theoretical knowledge are both prerequisites for successfully identifying specific pathologies in an arterial blood gas analysis (ABG). We aimed to investigate whether medical students would complete ABG analysis quicker and more accurate with an android smartphone app.

Methods: We develop an application (app) for the operating system android. The mABHC, "mobile Acid Base Homeostasis Calculator". In a pilot phase six students were asked to complete the three tasks which consisted of commonly observed pathologies in an ABG.

Step by step approach of a ABG result (simplified):

1. Evaluate acidosis/alkalosis
2. Evaluate metabolic/respiratory compensation
3. Evaluate anion gap

Algorithm used in the mABHC app:

- pH
- [HCO3-] mmol/l
- pCO2 mmHg
- pO2 mmHg
- Temperature °C

Results: The median time to completion of a diagnostic task was 10.5 (IQR 6.75 – 17.25) minutes and 10 out of 18 pathologies were identified correctly. When using the mABHC app, median time to completion was 8.5 minutes (IQR 7.25 – 10.5) and all abnormalities (18/18) were classified correctly.

Conclusion: The preliminary results of the present pilot study suggest that the utilization of a smartphone app assists medical students in completion of diagnostic tasks. More data is needed to evaluate if the use of the app influences medical students’ comprehension of the topic.

References:
Poster 10

Smartphone based decision support systems in acid-base disturbances and diagnostic performance of medical students

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