



HEGAZY's Interactive CTG Application

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Background

Continuous electronic monitoring of the fetal heart rate (electronic fetal monitoring, or EFM) and uterine contractions (cardiotocography, or CTG) during labor was introduced in the 1960s and 1970s as an alternative to intermittent auscultation. The interpretation and management of fetal heart rate (FHR) patterns during labor remain among the most problematic issues in obstetrics. A study of adverse perinatal outcomes in the UK in 2015 reported that CTG interpretation was a factor in 62% of these cases. Legal claims for poor perinatal outcomes noted a significant abnormality of the FHR pattern that was either overlooked or ignored, while another concluded that "some junior doctors and midwives cannot recognize abnormal CTG traces." The high false-positive rate of CTG also necessitates further validation using fetal scalp pH measurements.

Objective

Developing a software application to improve inter- and intra-observer reproducibility, sensitivity, and specificity of CTG diagnosis.

Method and Result

We developed a novel and interactive CTG application - a software tool created with the Cairo-based company DIVOPTIC. Healthcare professionals will use the application on smartphones and other functional devices. We also aim to integrate it into CTG machines. The application combines digital software, NICE CTG guidelines, other international standards, an algorithm, a flowchart, and additional resources. The algorithm is an innovative CTG diagnostic tool based on evidence-based research and expert opinions. The software leverages the healthcare professional's experience, the flowchart, and the algorithm to provide a second opinion for CTG diagnoses.

The application aims to help healthcare professionals overcome challenges and human errors when making accurate diagnoses for CTGs by utilizing interactive software that suggests the most likely correct CTG diagnoses through various reading approaches. The first phase of the assessment involves the initial digital classification of fetal hypoxia and its management, which includes acute, subacute, chronic, and evolving fetal hypoxia. It offers a spot diagnosis to exclude serious emergency fetal conditions that necessitate immediate intervention, namely acute, subacute, and chronic fetal hypoxia, and practitioners should respond swiftly to save the fetus. This is followed by three additional diagnostic opinions using various interactive CTG reading approaches. A validity study will be necessary, and its audit and review will be mandatory to enhance its sensitivity and specificity. The application can be utilized internationally.

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