

Online educational module for paramedics on prehospital 15-lead ECG recording – results of the educational part of the “Finding LCX AMI With posterior ECG leads” (FLAWLESS) trial

Y. Fakhri¹, F.P. Pedersen¹, F.F. Folke², C.B. Barfod³, O.M.H. Hendriksen⁴, C.H.R. Rasmussen⁵, E.J. Joergensen¹, J.K. Kastrup¹, P.C. Clemmensen⁶

¹Heart Centre, Dept of Cardiology, Rigshospitalet, University Hospital, Copenhagen, Denmark; ²Copenhagen University Hospital, Department of Cardiology, Gentofte, Denmark; ³Copenhagen University Hospital, Emergency Medical Services Copenhagen, Copenhagen, Denmark;

⁴Prehospital Emergency Medical Services, Region Zealand, Slagelse, Denmark; ⁵Medical Office, Falck Danmark A/S, Ringsted, Denmark;

⁶University Heart Center Hamburg, Department of General and Interventional Cardiology, Hamburg, Germany

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Background: The diagnosis of ST elevation myocardial infarction (STEMI) is challenging when the culprit is in the left circumflex coronary artery (CX) territory because ST elevations are often not captured by the standard 12-lead electrocardiogram (ECG). Although, guidelines recommend the acquisition of the additional posterior leads V7-V9 (pECG) when the suspicion of acute coronary syndrome (ACS) is high and the ECG non-diagnostic, this is not routinely done.

Purpose: The purpose of the FLAWLESS trial, was to improve the prehospital CX STEMI diagnostic. The study consisted of 2 parts: a) a training and implementation study, and b) an outcomes study after implementation. In the implementation study we evaluated the FLAWLESS process from the paramedic's point of view on experiences, implementation of pECG lead recordings and its barriers.

Methods: Before initiating the trial, all active paramedics in 2 health care regions were educated via a specifically designed and mandatory online 30 min course and all 250 ambulances equipped with a SMART-CARD (instructing how to record pECG leads) and FAQ-sheet. All paramedics were invited by email to anonymously answer an online questionnaire (OQ) designed in REDCap[®] and interviewed. Utility-score and difficulty-score, ranging from 0 (not useful at all/very easy) to 100 (very useful/very difficult), were introduced for quantitative assessments.

Results: A total of 1268 paramedics were invited to answer the OQ. The response rate was intermediate at 35%. Among responders, 89% had completed the OEP. On duty 80% had used FAQ-sheet and 74% SMART-CARD in the field. The median utility scores were 80 (25th and 75th quartiles 67–90) for OEP, 79 (61–90) for FAQ-sheet and 85 (75–97) for SMART-CARD, respectively. The implementation of pECG leads recordings was fairly high – 54% reported always recording V7-V9 in ACS patients and 36% reported doing it frequently. Difficulty-score for recording V7-V9 leads in the prehospital setting was 50 (19–70). Finally, 43% reported difficulties that were related to technicalities i.e. defibrillators not having dedicated V7, V8 and V9 cables, hence ambulance staff is forced to record and transmit a second ECG after moving the V4, V5 and V6 cables to the V7-V9 positioned electrodes.

Conclusion: We demonstrated that large-scale online training of paramedics in the recording of prehospital 15-lead ECG is feasible. The evaluation was positive regarding training and support tools in the ambulances but almost 50% of paramedics found the recording very difficult in the field. Future ECG machines used in emergency settings should be constructed with 13 instead of 10 cables to allow simultaneously recording of 15 leads (standard, precordial and the V7-V9 posterior). This would ease acquisition, facilitate implementation of guideline recommendation.