



Sophistication of ECG for Detection of Acute Coronary Syndromes

Take Home Point: Cardiac electrical biomarker (CEB), a finding detectable on ECG, may hold potential for identifying patients with acute myocardial ischemia; this may have significant implications for urgent care (UC) based chest pain risk stratification.

Citation: Chattopadhyay S, Adjei F, Kardos A. Changes in Cardiac Electrical Biomarker in Response to Coronary Arterial Occlusion: An Experimental Observation. *J Cardiovasc Transl Res.* 2024 Aug;17(4):870-878. doi: 10.1007/s12265-024-10487-w.

Relevance: Evaluation of chest pain is particularly challenging in UC where immediately available troponin blood testing is rarely available. Prior studies have shown that CEB has utility in identification of patients with non-ST elevation myocardial infarction (NSTEMI). CEB relates to alterations in polarization cardiac myocytes in the setting of ischemia which can be detected on ECG.

Study Summary: This was a clinical trial designed to evaluate the role of CEB in assessment of suspected myocardial ischemia and included consecutive adults undergoing elective angiography for chronic stable angina. CEB was acquired using the Vectraplex ECG System (VectraCor, Inc., Totowa, New Jersey), which derives a 12-lead ECG (dECG). Control patients were individuals without any modifiable risk factors for coronary artery disease (CAD), previous history of ischemic heart disease (IHD), or ECG or hematological or biochemical abnormalities, and with normal vitals (CEBc). Subjects in the experimental group had CEB recorded during acute ischemia induced by balloon occlusion of coronary arteries during angiography.

The authors recruited 100 patients into the study (75 required stenting, 25 no stenting) who were compared to 49 controls. They found evidence that reduction in coronary blood flow, without resultant myonecrosis induced either

by transient arterial occlusion or adenosine stress, increased CEB. CEB retained “memory” of the ischemic episode and remained elevated for about 3.5 hours. Baseline CEB in patients with asymptomatic obstructed CAD was higher than controls but not in patients with non-obstructive CAD.

“Evaluation of chest pain is particularly challenging in UC where immediately available troponin blood testing is rarely available.”

Editor’s Comments: This study was limited to findings using a specific device (Vectraplex ECG system). However, the results of this study support findings of prior studies showing potential for CEB as an additional ECG feature suggestive of ischemia. Given the ubiquity of troponin testing in emergency departments (EDs), the potential value of such a biomarker would be most noteworthy in outpatient settings, such as UC, where serum biomarkers cannot be routinely assessed. ■

Confirming Elevated Suicide Risk Among Physicians

Take Home Point: Suicide risk, particularly among female physicians, was found to be elevated compared to the general population in this large meta-analysis.

Citation: Zimmermann C, Strohmaier S, Herkner H, et. al. Suicide rates among physicians compared with the general population in studies from 20 countries: gender stratified systematic review and meta-analysis. *BMJ.* 2024;386:e078964

Relevance: The work of clinicians is particularly demanding and various real and perceived barriers exist for clinicians to seek mental health care. Prior studies have generally shown increased risk of suicide among doctors. This study aimed at verifying these findings.



Ivan Koay MBChB, MRCS, FRNZCUC, MD, is an Urgent Care Physician and Medical Lead for Kings College Hospital Urgent Treatment Centre, London, United Kingdom. He is also the Convenor for the Ireland and UK Faculty of the Royal New Zealand College of Urgent Care.

Study Summary: This meta-analysis was conducted based on recommendations of the Cochrane Collaboration and reported in accordance with the preferred reporting items for systematic review and meta-analyses (PRISMA) statement. Observational studies with data on suicide rates among physicians compared with the general population were reviewed on Medline, PsycINFO, and Embase. Other databases reviewed included the U.S. National Institute for Occupational Safety and Health, the UK Office for National Statistics, Switzerland’s Federal Statistical Office, and Statistics Denmark.

The authors used 42 datasets for male physicians and 27 datasets for female physicians. They found the suicide rate ratio for female physicians to be significantly higher than non-physician women (1.76, 95% confidence interval [CI] 1.40-2.21), however, not for male physicians (1.05, 95% CI 0.90-1.22). There was a high level of heterogeneity in results from different studies suggesting that suicide risk for male and female physicians was not consistent across various physician populations. Additionally, this suicide risk for physicians seems to have declined in recent years, with lower risk of suicide among male and female doctors in the 10 most recent data sets compared to the 32 older data sets.

Editor’s Comments: The authors acknowledged prior evidence points to the possibility that suicides in physicians may be underreported compared to the general population. Since the COVID-19 pandemic, increasing numbers of doctors have left clinical practice, which may have implications on suicide rates. While reassuring that suicide rates among physicians seem to be declining, this meta-analysis still suggests that rates remain elevated among female physicians in particular. It remains imperative for healthcare organizations to foster work environments that allow doctors and other providers to feel safe seeking mental health support. Clinicians should also be sensitive to warning signs of poor mental health among their colleagues and proactive about expressing concerns. ■

Changes in ‘Safety Netting’ Advice Documentation

Take Home Point: In this United Kingdom (UK) study, the frequency of safety netting advice (SNA) (ie, counseling about return precautions) documented in after-hours primary care increased over time.

Citation: Edwards P, Finnikin S, Wilson F, et. al. Safety-netting advice documentation out-of-hours: a retrospective

cohort from 2013 to 2020. *BJGP*. 2024.0057. DOI: <https://doi.org/10.3399/BJGP.2024.0057>

“Clinicians should also be sensitive to warning signs of poor mental health among their colleagues.”

Relevance: SNA is a patient safety and risk management technique used within a healthcare encounter meant to advise patients of diagnostic uncertainty and in what circumstances and where to seek further medical attention for changes in their condition.

Study Summary: This was a retrospective cohort review of the electronic health record (EHR) using the Birmingham Out of hours general practice Research Database (BORD), UK. Stratified samples of 30 consultations per month (ie, 10 home visits, 10 telephone consultations, and 10 clinic encounters) occurring from 2013-2020 were reviewed. Two researchers independently screened consultations for the presence of SNA and follow-up with agreement scores of 98% (Cohen’s kappa (κ)=0.93) and 91% (κ =0.82), respectively.

The authors reviewed 1,886 consultations/visits with 1,862 unique patients. They found overall frequency of documentation of SNA was 78.0% (1,472/1,886) with the frequency increasing from 75% in 2014 to 81% in 2020. Respiratory presentations had the highest frequency of SNA documentation (85.6%), and behavioral health cases had the lowest (51.9%). SNA more commonly was in the form of generic advice (52.7%) (eg, “call back if worsens”), rather than specific advice (47.3%) (eg, “if no better in 2 days, then see your own doctor”). There was no significant difference between the frequency of SNA documented for patients seen by nurses (87.9%) compared to doctors (84.4%).

Editor’s Comments: This study was limited to the Birmingham, UK metro area potentially limiting its generalizability. Additionally, SNA might be expected to be affected by many factors including clinicians’ perceptions of liability and healthcare accessibility—two factors that differ significantly between the U.S. and UK. Perhaps the most interesting finding is that SNA documentation is common, and increasingly so, in a single payer healthcare system where clinicians tend to have relatively lower risk of malpractice liability. ■

Assessing Trustworthiness of Medical Content in the Era of Artificial Intelligence

Take Home Point: In the advent of artificial intelligence (AI), the veracity of audio and video content is increasingly difficult to verify. This article reviews cautionary tales of “deep fakes” (ie, AI creation of fake content intended to be indistinguishable from actual recordings) that fooled patients in the UK.

Citation: Stokel-Walker C. Deepfakes and doctors: How people are being fooled by social media scams. *BMJ*. 2024 Jul 17;386: q1319. doi: 10.1136/bmj. q1319.

Relevance: Medical influencers on social media are increasingly seen as sources of credible information by the public. False likenesses created by generative AI (ie, deep fakes) are likely to become more common. As legislation regulating this practice is limited, being able to distinguish deep fakes and how to respond when encountered is an area of uncertainty for most clinicians and laypersons.

Study Summary: This was a commentary published in the *British Medical Journal* discussing the increasing incidence of medical deep fake content on social media platforms and the potential impact on patient behaviors. The author summarizes the story of a well-known physician personality who was emulated in a deep fake to promote a non-evidence based “cure” for hypertension. A recent study of deep fakes, specifically examining scientific subjects, suggested that 25-50% of people cannot distinguish them from authentic videos.

Identifying deep fakes is increasingly a challenge, however, the author cites several examples of how consumers can be alerted to the questionable authenticity of content. For example, viewers may notice anatomically incorrect hands or awkward movement patterns. While propagation of content on social media mimicking celebrities, including clinicians, is a likely inevitability of increasingly powerful AI, heightened consumer vigilance can mitigate the effects of this trend.

The author suggests the following verification strategies:

- Look carefully at the video or image for non-human features
- Contact the person endorsing the product to ascertain its legitimacy
- Leave comments on the content questioning its veracity

- Use the platform’s built-in reporting tools if available

Editor’s Comments: This was an opinion piece and not research. Further studies on the incidence of deep fakes and the outcomes will be important for informing legislation restricting the practice. ■

Fighting Disparities in Cardiovascular Disease Management Among Women

Take Home Point: Women suffer significant morbidity and mortality related to cardiovascular disease (CVD). Considerations of “classic” CVD risk factors and presentations may bias clinicians toward missed or delayed diagnosis of cardiovascular events in women.

Citation: Tayal U, Pompei G, Wilkinson I, et. al. Advancing the access to cardiovascular diagnosis and treatment among women with cardiovascular disease: a joint British Cardiovascular Societies’ consensus document. *Heart*. 2024 Sep 24; heartjnl-2024-324625. doi: 10.1136/heartjnl-2024-324625.

Relevance: Despite progress in pharmacotherapy to mitigate the morbidity associated with CVD, it remains the leading cause of death in men and women. The strategies that have been successful in men have not proven equally effective in women suggesting the need for more gender specific guidance to mitigate gender disparities and inequities in outcomes.

Study Summary: This was a consensus document created by CVD experts from the UK outlining important, sex-specific differences in CVD presentations between genders. The group used existing evidence to offer evidence informed recommendations for addressing inequities as it pertains to cardiovascular health among women. The authors used the World Health Organization (WHO) gender definitions, which relies upon the sex assigned at birth as the influences of hormones play an important role in determining the timing and patterns of CVD and atherosclerosis.

Additionally, with the changes in the hormonal milieu of postmenopausal women, there is increased incidence of coronary vasomotor disorders thought to be related to higher levels of systemic inflammation. For example, the authors note that lower estrogen levels increase the susceptibility to Takotsubo (stress) cardiomyopathy in women, with 90% of cases occurring in women and 80% of these cases being in women over age 50. Further support for

the influence of hormones on CVD risk, early and late menarche are both associated with an increased long-term risk of cardiovascular events. Women presenting with obstructive CAD tend to be older than their male counterparts and have more comorbidities. The authors also outline the important implications of women having more microvascular coronary disease than men and how this can lead to relatively high rates of false negative coronary angiography. Additionally, the presence of breast tissue and differences in electrical signaling in the heart can influence the test characteristics of electrocardiograph and nuclear medicine stress testing.

Editor’s Comments: This consensus article covers coronary disease, valvular disorders, and dysrhythmias among other categories of CVD as well as the gender differences in work-up and treatment strategies. It would be impossible to summarize all their findings and recommendations based on a review of the existing literature. However, it is an important document for acute care providers to become familiar with given the frequency with which women present with chest pain or other potentially cardiac symptoms in UC. The authors do a formidable job of collating and presenting the evidence supporting the importance of gender specific approaches to patients with potential CVD.

Predicting Concussion Recovery in Children

Take Home Point: Prognostic prediction models (PPM) were found to slightly outperform clinicians’ abilities to predict recovery after concussion for children with minor head injuries (mTBI).

Citation: Wyrwa J, Hoffberg A, Stearns-Yoder K, et al. Predicting Recovery After Concussion in Pediatric Patients: A Meta-Analysis. *Pediatrics*. 2024;154(3): e2023065431

Relevance: Concussion is among the most common pediatric injuries. Among the most pressing questions on patients and parents’ minds at the time of concussion is how long their symptoms will last. Many prediction models have been put forth attempting to predict which patients are likely to have prolonged post-concussion syndrome (PPCS).

Study Summary: This was a systematic review to examine all peer-reviewed PPMs estimating the risk of delayed recovery in pediatric patients after sustaining a concussion. The authors followed the recommendations of the Co-

chrane Prognosis Methods Group. Literature searches of Ovid Medline, Embase, Ovid PsycInfo, Web of Science Core Collection, Cumulative Index to Nursing and Allied Health Literature, Cochrane Library, and Google Scholar were run. Modification of the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) approach for prognostic factor studies was used to assess quality of evidence.

“Among the most pressing questions on patients’ and parents’ minds at the time of concussion is how long their symptoms will last.”

The authors screened over 17,000 studies and identified 78 that were reviewed; ultimately 6 studies were included in their review. Thirteen PPMs were examined including the Predicting and Preventing Post concussive Problems in Pediatrics (5P) clinical risk, the Buffalo Concussion Physical Examination risk for delayed recovery scores, and 11 other unnamed models. They found overall GRADE quality of evidence was low, but strongest for 5P which was the only externally validated model. A meta-analysis of the 5P PPM revealed low heterogeneity, but all six studies were deemed to have a high risk of bias due to the inclusion of symptoms both as predictors and outcomes.

The problem of the use of various definitions of concussion further complicates systematically reviewing these PPM. Four studies used the Concussion in Sports Group definition. Thankfully, PPCS was similarly defined based on the ICD-10 description. The 5P model, like other models included, predicts which patients will have PPCS based on a number of variables as a binary (ie, yes/no) outcome and performed slightly better than physician gestalt.

Editor’s Comments: Concussion science continues to evolve as there is a large and growing body of evidence about this potentially highly life-altering condition. Given the large number of studies examining outcomes in children after concussion, synthesizing the results presents a challenge as various definitions of concussion are employed. The 5P currently appears to be the best available predictive tool for PPCS in children after mTBI. Further external validation of other PPM is needed to determine which other tools may have clinical value. ■