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Changing U.S. guidelines on lidocaine for stable monomorphic ventricular tachycardia: Have emergency medical services kept pace?



Dear Editor,

U.S. guidelines for the treatment of stable monomorphic wide-complex tachycardia (WCT)/ventricular tachycardia (VT) have evolved over the years to reflect accumulating evidence. Dynamic recommendations for lidocaine are illustrative. In the 1985 Standards and Guidelines for Emergency Cardiac Care, the consensus of multidisciplinary experts stated: “In hemodynamically stable patients with ventricular tachycardia, the first approach is antiarrhythmic therapy such as lidocaine” [1]. In the ensuing 20 years, the indication for lidocaine for stable monomorphic VT was limited and the recommendation weakened. The 2006 Advanced Cardiac Life Support guidelines suggested that lidocaine “might be reasonable for the initial treatment of patients with stable sustained monomorphic VT specifically associated with acute myocardial ischemia or infarction” (Class IIb; Level of Evidence C) [2]. The 2010 update additionally downgraded lidocaine on the list of recommendations because lidocaine “is less effective in terminating VT than procainamide, sotalol, and amiodarone...” [3]. The revision of 2015 carried forward the 2010 recommendation without change. The 2017 guideline, however, further demoted lidocaine by removing it altogether from the recommendations [4].

Guidelines are written to summarize the evidence in a concise, accessible way for straightforward translation into clinical practice. The extent to which U.S. guidelines have affected patient care in the pre-hospital setting is only beginning to be explored [5]. To help address this gap in knowledge, we undertook a descriptive study of two temporally-separated cross-sectional surveys of emergency medicine services (EMS) dysrhythmia protocols across the U.S. This allowed us to evaluate the prevalence of lidocaine as a recommended agent in the treatment of stable monomorphic WCT/VT when two different U.S. guidelines (2010/2015 and 2017) were in effect.

Table 1

Temporal change in EMS protocols in the use of lidocaine in the treatment of stable monomorphic wide-complex or ventricular tachycardia

Lidocaine recommendation	Date of cross-sectional survey	
	April 2017	January 2019
Recommendation from the then-current American Heart Association Guideline	Lidocaine “is less effective in terminating VT than procainamide, sotalol, and amiodarone...”.	Lidocaine was not mentioned as a recommended treatment.
EMS Protocols (n = 62)		
First-line intervention, n (%) [n states]	9 (15) [3 states]	15 (24) [5 states]
Exclusive recommendation	7 (11) [2 states]	6 (10) [2 states]
One of several alternative recommendations	2 (3) [1 state]	9 (15) [5 states]

EMS = Emergency medicine services.

We selected EMS protocols from 16 states, four from each of the four U.S. Census regions, based on protocol availability from www.emsprotocols.org. We used statewide protocols when available (n = 11); otherwise, we used protocols from all jurisdictions within the state (n = 3 with 51 total protocols). We identified the first-line recommendation of adenosine, but do not include it in our reporting of VT-directed interventions. We distinguish exclusive recommendations (e.g., “Consider lidocaine”) from one of several alternative recommendations (e.g., “Consider lidocaine or amiodarone”). The relevant protocols were reviewed independently by three investigators to increase accuracy. Differences of interpretation were arbitrated by consensus.

We report the results of our two surveys in [Table 1](#). Sixty-one protocols (98%) underwent revision between the two surveys. Recommendations of lidocaine as a first-line agent were prevalent in both 2017 and 2019, increasing over time (13% and 24%, respectively). The EMS protocols recommending lidocaine in early 2019 included 5 states (31%), representing all 4 U.S. Census regions. We had hypothesized that the prevalence of lidocaine recommendations would decrease following the publication of the 2017 U.S. guideline, but this was disconfirmed by our results. Our findings are tempered by the limited number of included states (16 of 50). Nevertheless, they expose the disconnect between U.S. society guidelines on the treatment of stable monomorphic VT and some EMS protocols, which govern on-the-ground patient care. Further research should explore the reasons for this divergence.

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Declaration of Competing Interest

None.

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Use of the PEPTTEST™ tool for the diagnosis of GERD in the Emergency Department



To the Editor,

Gastroesophageal reflux disease (GERD) is one of the most common gastrointestinal disorders in the general population, with a prevalence of 8.8%–25.9% in Europe [1].

Many patients affected by GERD refer to the Emergency Department (ED) reporting an angina-like retrosternal chest pain [2–5].

For an optimal initial management of chest pain [6] in ED, the Italian Society of Emergency Medicine recommend to perform a 12 lead ECG, serial blood troponin levels, chest X-ray and eventually a cardiac stress test to exclude acute coronary syndrome (ACS) [7].

However, only a minority [8] of these patients (15%) does have an ACS [9], while 85% has a non-cardiac chest pain (NCCP) [9,10], in which GERD ranks first [9].

A recently developed tool, the PEPTTEST™ (RD BIOHIT Health-Care, Milan, Italy), turns out to be useful, safe and cheap for the diagnosis of GERD, through the detection of pepsin [11] in saliva samples.

The PEPTTEST™ is a medical device that works using two monoclonal anti-pepsin antibodies for detecting this enzyme, and if included into the diagnostic protocol for acute chest pain in the ED, with its rapidity and simplicity, it can guide the physician in the differential diagnosis.

The test is performed collecting saliva in a vial, added specific reagents and the obtained liquid is placed on an immunochromatographic test, showing a positive or negative result for pepsin. The kit is then put in an electronic device that shows the quantitative value of pepsin in the saliva.

We analyzed 82 consecutive patients (46F/36M, mean age 60 ± 15 years) admitted to the ED of *Fondazione Policlinico Universitario A. Gemelli IRCCS* for chest pain within 2 h, from February 2019 to March 2019.

The patients presenting with chest pain within the previous 2 h underwent the regular diagnostic protocol for ACS [7] and were subsequently asked to collect a minimal amount of saliva in a specific vial, included in the kit.

The sample was analyzed by the PEPTTEST™ tool and, after 10 min, the test result appeared on the device.

Inclusion criteria were: age ≥ 18 years and chest pain within the last 2 h from the evaluation. Exclusion criteria were: age < 18 - years, severe comorbidities hindering saliva sampling, use of anti-acid medications within the previous 12 h and food intake within the previous 6 h. All patients gave written informed consent.

61 out of 82 (74%) resulted positive to PEPTTEST™, while 21/82 (26%) resulted negative.

Among positive patients, 50/61 (82%) were negative to all the other diagnostic exams and were discharged with a therapy for GERD, while 11/61 (18%) were hospitalized: 5/11 (46%) were diagnosed with ACS and GERD, 3/11 (27%) were diagnosed with pneumothorax (PNX) and GERD and 3/11 (27%) were diagnosed with heart failure and GERD.

Concerning the 21 PEPTTEST™-negative patients, 8/21 (37.5%) were discharged with a likely diagnosis of musculoskeletal pain, while 13/21 (62.5%) were hospitalized. Among these patients, 8/13 (61%) were diagnosed with ACS and 5/13 (39%) were diagnosed with pericarditis.

The test has given a result either positive or negative in all the patients examined. Positive tests had a mean pepsin concentration value of 135 ± 73 ng/mL, meanwhile the mean pepsin concentration value detected in negative tests was 29 ± 8 ng/mL.

Setting the cut-off at 46 ng/mL (the value in which the kit gave a positive result) the sensitivity of the test resulted 88% and the specificity of 87%.

PEPTTEST™ has a positive predictive value in the exclusion of ACS of 90%, meanwhile the negative predictive value in the exclusion of ACS was of 62%, avoiding referring patients for further cardiological exams and being confident to rule out potentially life-threatening diseases like ACS. We registered that among discharged patients, nobody was back to the ED for the same symptoms or pathology within the next 30 days.

With this background and considering its simplicity, quickness, cost-effectiveness (the cost of the kit is approximatively €20 per patient) and qualitative validity, we regard PEPTTEST™ as an optimal diagnostic test to be applied in the ED.

However, considering the need for a further quantitative validation, the scientific community should reach a consensus for a standardized cut-off level for the diagnosis of GERD with PEPTTEST™ and further studies are necessary to compare this test with others (PPI trial, esophageal pH monitoring, upper endoscopy or a combination of these tests etc.) for the diagnosis of such frequent disease.

Declaration of Competing Interest

The study was approved by the independent Ethics Committee of the Catholic University of Rome (ID2301) and conducted in accordance with the Declaration of Helsinki. Subjects did not receive any payment for their participation in the study. The authors have nothing to disclose.