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Use of the PEPTEST™ 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 PEPTEST™ (RD BIOHIT HealthCare, 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 PEPTEST™ 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 PEPTEST™ tool and, after 10 min, the test result appeared on the device.

Inclusion criteria were: age $\geq$ 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 antiacid 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 PEPTEST™, 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 PEPTEST™-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%.

PEPTEST™ 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 PEPTEST™ 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 PEPTEST™ 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.

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Drone-related injuries treated at emergency departments

A personal or consumer drone is a remotely-controlled unmanned aircraft system (UAS) or unmanned aerial vehicle (UAV) designed for the mass market. Such devices have become increasingly popular. By early 2018, the total number of drones, including consumer drones, registered with the United States (US) Federal Aviation Administration (FAA) had exceeded one million [1].

Because drones can move quickly and have rapidly-rotating blades (rotors, propellers), injuries to the pilot and bystanders may occur. These injuries may be to the head (bloody nose, black eye, cuts to the face, bruises, concussion) and fingers or arms (cuts, fractures, amputation) [2,3]. Some reported injuries have been serious [4]. Published information on consumer drone-related injuries is limited.

The National Electronic Injury Surveillance System (NEISS) operated by the US Consumer Product Safety Commission (CPSC) collects data on consumer product-related injuries in the US from the emergency departments (EDs) of approximately 100 hospitals as a probabilistic sample of the more than 5000 hospitals with EDs in the nation [5]. Drone-related injuries in NEISS during 2001–2017 were identified by searching the Narrative_1 and Narrative_2 text fields for any mention of the terms "drone" or "unmanned." The resulting records were then reviewed to determine whether the product involved in the injury appeared to be a drone.

Forty-seven drone-related injuries were identified in the NEISS database during 2001–2017, for a national weighted estimate of 1911 injuries. (An additional 9 injuries occurred when the person was trying to retrieve or control the drone and were not directly related to the drone.) No injuries were reported during 2001–2014, 10 (21.3%) in 2015, 19 (40.4%) in 2016, and 18 (38.3%) in 2017. Twenty-two (46.8%) of the injuries occurred when the person was struck by the drone, 17 (36.2%) when the person was handling the drone, and 8 (17.0%) under unclear circumstances. Twenty-three (48.9%) of the injuries occurred during Saturday or Sunday. Nine (19.1%) of the patients were age 0–19 years, 28 (59.6%) 20–39 years, and 10 (21.3%) 40–79 years. Thirty-eight (80.9%) of the patients were male and 9 (19.1%) were female. Twenty-two (46.8%) of the injuries occurred at home, 2 (4.3%) in a public place, 2 (4.3%) in a sports facility, 1 (2.1%) on the street, and 20 (42.6%) at an unknown location. The reported injuries were laceration to the finger or hand (n = 23, 48.9%), laceration of the face (n = 7, 14.9%), laceration to other parts of the body (n = 10, 21.3%), contusions or abrasions (n = 4, 8.5%), internal injury (n = 2, 4.3%), and dermatitis or conjunctivitis (n = 1, 2.1%). Forty-six (97.9%) of the patients were treated or evaluated at the ED and released and 1 (2.1%) was hospitalized (patient was hit in the eye by a drone and there was concern of a corneal laceration).

In summary, drone-related injuries reported to the NEISS first appeared in 2015. Although relatively few such injuries have been reported, this may change if drone use increases in popularity. The injured patients most often were age 20–39 years and male. The injuries tended to occur on the weekends and at home. The most common injuries were laceration, particularly of the fingers or hand and the face. Almost all of the patients were treated and released from the ED. Various precautions have been suggested to avoid drone-related injuries, including taking care where the drone is flown, not flying a drone over a crowd, keeping fingers away from the blades, not launching or landing the drone from the hand, and using propeller guards [2,3].

Declaration of Competing Interest

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