The Resurrection of the Pulse Check

Not using more accurate methods of detection misses identifying a subpulse

BY CHRISTOPHER VETTER, MD

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The American Heart Association has advocated for minimizing the importance of pulse checks by health care professionals since 2010 because "detection of a pulse can be difficult." (*Circulation.* 2010;122[18 Suppl 3]:S640; https://bit.ly/43YwAH8.)

Justifiably so.

Studies demonstrate a disappointing 78 percent accuracy in pulse detection among medical providers (*Resuscitation*. 2010;81[6]:671), and an abysmal two percent of first responders fail to recognize pulselessness. (*Crit Care Med.* 2000;28[11 Suppl]:N183.) A coin flip would seemingly be as reasonable as trusting our palpation competency and much more efficient.

We have extensive training in rapidly identifying cardiac rhythms and point-of-care ultrasound, but have failed to practice the fundamental skill of palpating a pulse. Hippocrates was able to describe and palpate a pulse (*Heart Views*. 2018;19[1]:36; https://bit.ly/43Rj8EG), so we presume pulse detection to be simple and routine. Overconfidence has demoted this vital skill to a mundane and passive chore. The pulse check is frequently delegated to a nurse or technician, and the physician has no active participation in the most vital decision in a resuscitation: Is the patient alive or dead?

RIP Pulse Check?

The easiest solution, as many have suggested, is to declare the pulse check dead. Instead, we need to treat it as a procedure, not a routine step in an algorithm. Pulse checks, as with any emergency medicine procedure, need a more formalized approach with clearly identified endpoints and nomenclature. Pulse checks should be undertaken with the same thoughtfulness and dedication as the most critical procedures.

Simultaneous pulse and rhythm checks should work in seamless tandem to understand if the electromechanical signal is significant enough to generate a true pulse. Every second of diagnostic confusion around the presence or absence of a pulse dissipates the kinetic energy that sustains life. A patient with pulseless electrical activity is not always pulseless. There may, in fact, be a weak pulse that the physician is unable to palpate due to profound hypotension, body habitus, or lack of skill.

A non-palpable pulse caused by low perfusion or a hypocontractile state has interchangeable and confusing nomenclature, such as true and pseudo-PEA, true and pseudo-electromechanical dissociation, pulseless rhythm with echocardiographic standstill, and pulseless rhythm with echocardiographic motion. Introducing an intuitive and unambiguous designation, such as the term "subpulse," can convey simplicity and create a natural and predictable response from the resuscitation team.

A patient with a subpulse could be understood to have vascular flow without a manually palpable pulse, but it could be detected by a more sensitive modality, such as Doppler ultrasound. Patients with the proposed definition of a subpulse have higher rates of ROSC and survival to discharge than true PEA. (*Resuscitation.* 2017;120:103; *PLoS One*. 2018;13[1]:e0191636; https://bit.ly/45Z3SHL.)

They also require independent resuscitation measures for their poorly perfused state. The resuscitation team inherently understands the next steps with a call of "ventricular fibrillation," "asystole," or "we have a pulse." Hearing a familiar cue of "subpulse" would clarify critical care treatment and direct the team to emergently augment cardiac output.

Treating the etiologies of subpulse, such as blood transfusion for hemorrhagic shock, vasopressors, and intravenous fluids for septic shock or extracorporeal cardiopulmonary resuscitation for profound cardiogenic shock, would lead to more appropriate resuscitations.

EPs must continue using pulse checks, but need more training to identify subpulses

Currently, the default pathway is resumption of CPR or termination of efforts if no pulse is palpated. Opportunities are missed, however, by relying exclusively on palpating a pulse and ignoring the potential for an underlying subpulse.

Using Ultrasound

Studies suggest that withholding additional CPR or boluses of epinephrine and treating the poorly perfused state with fluids, vasopressors, or blood transfusion can improve patient outcome. (*Resuscitation.* 2017;120:103.) Thirty-five to 40 percent of all cardiac arrests present within the variable spectrum of PEA. (*PLoS One*. 2018;13[1]:e0191636; https://bit.ly/45Z3SHL.) Assuming the entirety of this cohort is truly pulseless without utilizing more accurate methods of pulse detection misses the opportunity for appropriate resuscitation by identifying a subpulse.

Studies have already shown that ultrasound can increase the accuracy of pulse detection to 95 percent. (*Resuscitation*. 2022;173:156.) Preparing for a pulse and rhythm check with ultrasound at the bedside and premarked pulse locations could rapidly identify the presence or absence of a pulse during predetermined rhythm checks. This higher level of detection can guide the resuscitation down the appropriate pathway.

We are missing the mark on pulse checks. The nature of PEA demands that we continue using pulse checks, but data suggest that we must commit more training to pulse identification. The assumption that accurate pulse detection is a basic and inherent skill has been proven to be a fallacy. Promoting training in manual and ultrasound-assisted pulse detection will benefit providers and patients by maximizing accuracy and improving patient outcome.

Utilizing clear terminology and accurately identifying a subpulse can optimize appropriate resuscitative measures. The medical field requires better and more specific training and methods for pulse detection. With something as vital to our most critical patients, we are neglecting one of the most basic medical skills—checking for a pulse. **EMN**

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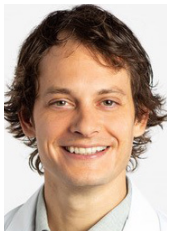

DR. VETTER *is an emergency physician with a physician-owned group in Columbus, OH. He attended Loyola Stritch School of Medicine in Chicago and completed his residency at the University of Connecticut.*

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