



Letter to the Editor

Cardiac arrest and breathing, why bother?



Dear sir,

Riou et al. [1] have recently published a study where they retrospectively examined the strategy used by dispatchers to diagnose an out-of-hospital cardiac arrest (OHCA) – later confirmed by paramedics – based on the breathing pattern described by bystanders.

They found that whenever the answer to the question “is the patient breathing?” was a plain “yes” or a “qualified yes”, e.g. gasping, battling, snoring, the dispatcher would often reject the diagnosis of cardiac arrest (CA) and delay CPR. The authors are suggesting that this frequent error is due to the lack of proper recognition of “agonal breathing” and its meaning by call-takers. They propose that a specific training aimed at identifying “qualified” breathing as agonal breathing should improve early identification of OHCA.

I would like to present the view that since no breathing pattern is specific of a circulatory arrest [2,3], using breathing in an algorithm aimed at initiating CPR during a phone call has no warranty.

First, the use of the term “agonal” breathing by the authors when describing any type of breathing activity witnessed during a OHCA is confusing [4]. Indeed, a normal, regular eupneic breathing has been observed at the onset of ventricular fibrillation both in humans and in sheep [2,3]. Such a breathing pattern can persist for up to 2 min following OHCA and is *undistinguishable* from any normal breathing activity. Whether this phenomenon could account for the observation that bystanders would respond a “plain yes” to the question “is the patient breathing?” at the time of an emergency call in one third of the patients with paramedic-confirmed OHCA (Table 1 of the paper by Riou et al.) [1]. Second, a central apnea typically follows this phase, being interrupted after several minutes by gasps – large breaths produced at low frequency – a marker of significant brainstem ischemia [2,3]. However, these gasps are impossible to distinguish from sighs, which occur during the early phase of normal breathing. Contrary to gasps, sighs are not pre-agonal breaths; they typically result from a stimulation of the arterial chemoreceptors [5]. Importantly, none of these large breaths, being sighs or gasps, are specific of a cardiac arrest, they can be produced by other conditions associated with medullary hypoxia (hypoxemia, intoxication) *during which cardiac contractions can still be present*. Of note, post-ictal conditions can produce a gasping-like breathing pattern with no medullary hypoxia and no CA. Finally, the question of primary central apneas during opioid overdose must be briefly mentioned here, as ventilation ceases while circulation can still be maintained for several minutes. The relevance of using apnea as a criterion of CA in a young population wherein the pre-test probability of cardiac arrest is low and not different from that of an opioid overdose should be acknowledged.

In conclusion, breathing status is such a poor a surrogate of CA that trying to identify its pattern, even if it were possible, may not have a significant impact on the early diagnosis of OHCA and CPR implementation.

Conflicts of interest

None.

References

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