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Letter to the Editor

In-hospital cardiac arrest in middle-income settings: A comprehensive analysis of clinical profiles and outcomes of both adults and pediatrics

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Dear Editor,

We appreciate the insightful comments on our study, *"In-hospital cardiac arrest in middle-income settings: A comprehensive analysis of clinical profiles and outcomes of both adults and pediatrics,"*[1] and thank the authors for their interest in our work.

We agree on the importance of differentiating coarse and fine ventricular fibrillation (VF) as initial rhythms though the management algorhythm is unchanged. However, ineffective defibrillations, as noted, cause unnecessary interruptions in chest compressions, exacerbate cardiac ischemia, and induce electrical injury to the myocardium.[2]

The reviewers give us a chance to revisit our cardiopulmonary resuscitation record (CPR) form including rhythm strips that are attached to the CPR recording form in the patient's file. We reviewed all 09 patients who underwent shockable rhythm, and the results are mentioned in Table 1.

The table summarizes rhythm data and outcomes, showing inconsistencies in recording VF subtypes. Pulseless VT was observed in 7 of the 9 cases where ROSC was achieved, highlighting a lack of specific waveform data and its effect on customizing resuscitation approaches. In our records, none of the ECGs displayed fine fibrillation. In one instance, the ECG strip had faded, making it hard to read, and our CPR record form only distinguishes VF and pulseless VT, without differentiating between coarse and fine fibrillation. We use the Lifepak 20e defibrillator/monitor (Stryker) and vendor setting of ECG strip wave is used. This differentiation is clinically crucial, as coarse VF typically has a better response rate to defibrillation compared to fine VF, which still presents diagnostic difficulties for clinicians.[3]

The 2015 European Resuscitation Council guidelines, which were applicable during our study, advised against shocking cases of diagnostic uncertainty between asystole and very fine VF. This underscores the critical importance of accurate waveform analysis. Historically, an amplitude threshold of 0.2 mV was used to distinguish between fine and coarse VF, with higher amplitudes associated with better defibrillation outcomes. Over the past four decades, additional waveform features, such as amplitude spectrum area (AMSA), median frequency, and dominant frequency, have emerged as predictors of defibrillation success.[4]

Advances in technology, such as the "Analysis During Compressions with Fast Reconfirmation" (ADC-FC) algorithm, have improved rhythm analysis during ongoing chest compressions, achieving shock/no-shock decisions within 3 s in over 80% of cases.[5] Similarly, artificial intelligence (AI)-based algorithms, including convolutional neural networks, show promise in enhancing shock advisory decision-making accuracy.[6]

Despite these advancements, challenges remain, particularly in resource-constrained settings. In our study, VF subtyping was not performed, limiting the ability to assess the prognostic implications of waveform differences. Incorporating waveform-specific data could deepen our understanding of shockable rhythms and guide tailored resuscitation strategies.

Our findings highlight the urgent need to improve early recognition, timely defibrillation, and overall resuscitation quality in middle-income settings. Efforts to integrate advanced algorithms and improve clinician training in VF subtype recognition are essential steps toward addressing these challenges. We agree that future research incorporating waveform-specific data and leveraging

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Table 1 – Data on shockable rhythms and their outcomes.

Patient Number	Rhythm	Coarse/Fine.	ROSC Achieved	Alive/Dead
1	VF	Strip faded	Yes	Yes
2	VT	–	No	No
3	VF	Coarse	Yes	Yes
4	VT	–	Yes	No
5	VT	–	Yes	Yes
6	VT	–	Yes	Yes
7	VT	–	Yes	Yes
8	VT	–	Yes	Yes
9	VT	–	Yes	Yes
10	VF	Coarse VF	No	No

innovative technologies could further elucidate the clinical significance of VF subtypes and improve outcomes globally. In line with this, we have also initiated a quality improvement project at our hospital to enhance the overall Code Blue process. This initiative focuses on improving early recognition of cardiac arrest, reducing response times, and standardizing practices to optimize outcomes.

Thank you again for your thoughtful comments and for highlighting this important area of research. We look forward to continued dialogue and collaboration to advance the field of cardiac arrest management.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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