A Population-Based Time Determinant for Termination of Resuscitation

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To the Editor:

In a recent issue of *World Journal of Surgery*, Moriwaki et al. [1] present data regarding patients in cardiopulmonary arrest from blunt trauma. As discussed by the authors, resuscitation of a patient in cardiopulmonary arrest has significant cost [2, 3], and presents considerable risk to both prehospital providers and the public [4, 5]. While not specifically discussed by the authors, survival without functional neurological outcome incurs additional costs, with prolonged admissions to acute care and rehabilitation facilities and a lifetime of required supportive care. Therefore, prehospital termination of resuscitation (TOR) protocols have the potential to contribute to public health through conservation of limited financial healthcare resources and prevention of further injuries by reducing the unnecessary use of warning lights and sirens.

Moriwaki et al. [1] recommend 20 min of resuscitation prior to TOR. While we appreciate that in this study of 477 patients in cardiopulmonary arrest from blunt trauma there were 13 survivors with a 2.7% survival rate, in analysis of the data presented in the authors' Table 1, it is evident that only 3 of these patients survived in a non-vegetative state, for a survival rate with good neurological outcome of 0.6%. Additionally, and perhaps more importantly, from

the authors' Fig. 8, it is clear that a cluster of 12 survivors achieved return of spontaneous circulation (ROSC) in under 10 min, and a single isolated survivor achieved ROSC after 17 min. No information is provided for this outlier. The initial rhythm, vital signs, and mechanism of injury are not described. Furthermore, it is unclear if this outlier was one of the three patients listed in the authors' Table 1 with a good neurological outcome.

In the development of a healthcare system, it is crucial to make decisions based on population-based data and not on individual outcomes. Moriwaki et al. [1] recommend TOR after 20 min of resuscitation based on the survival of one patient who had 17 min of resuscitation before achieving ROSC. However, their data plainly demonstrate that 10 min of resuscitation will capture the population of patients in cardiopulmonary arrest from blunt trauma.

Therefore, in analysis of the Moriwaki et al. [1] data, we recommend a population-based resuscitation time of 10 min prior to TOR.

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