

between heat index and PPR; PPR increases by 3% for every 10-degree increase in the heat index [Perron AD et al. *Prehosp Emerg Care*. 2005].

Dr Ossmann outlined 4 echelons of care that need to be addressed at any mass gathering: frontline staff (eg, ushers and security officers), mobile treatment teams, on-site medical facilities, and transfer arrangements with local hospitals.

A 25-year review of mass gathering events characterized them by size, number of off-site medical transports, and sudden cardiac deaths. Variables that best predicted medical usage, specific injury patterns, and levels of care included event type and ambient temperature [Milsten AM et al. *Prehosp Disaster Med*. 2003].

Dr Ossmann concluded by highlighting some key features of a robust event plan: accessible and functional first aid equipment, a large network of cardiopulmonary resuscitation-trained personnel, a dedicated event control center, a published communication plan, on-site physicians with experience and training, and internal and external surveillance and coordination.

## Minimizing Compression Interruptions Key to Good Outcomes

Written by Muriel Cunningham

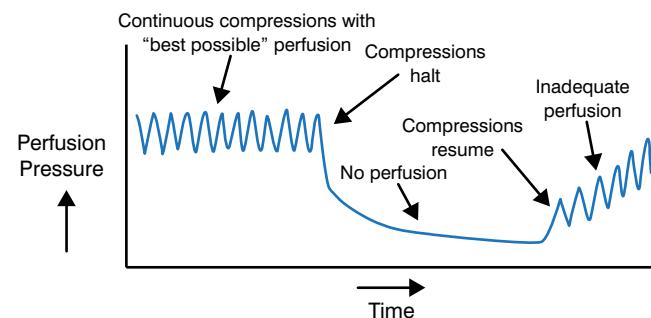
J. Scott Wieters, MD, Texas A&M University, Temple, Texas, USA, reviewed data confirming the importance of minimizing compression pauses during defibrillation of patients in cardiac arrest.

Although the 2010 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care recommend stopping compressions during defibrillation, Dr Wieters stated that there is no convincing evidence in the literature to support this practice. From 1986 to 1990, 13 injuries were reported with "hands-on" defibrillation, most consisting of mild shocks or burns. In experimental models of hands-on defibrillation, current leakage (mean,  $283 \pm 140 \mu\text{A}$ ; range, 18.9 to 907  $\mu\text{A}$ ) was within the acceptable safety limits [Lloyd MS et al. *Circulation*. 2008].

At the same time, there is substantial evidence indicating that interruptions in chest compression pauses should be avoided at all costs. Cardiac perfusion drops off dramatically when chest compressions stop, and perfusion takes time to rise when compressions resume (Figure 1). In one study, if the preshock pause was >10 seconds, return of spontaneous circulation (ROSC) decreased by 50% [Eftestøl T et al. *Circulation*. 2002].

In another study, when preshock pauses were <3 seconds, the ROSC was 6 times higher. Keeping postshock

Figure 1. Effect of Compression Pauses on Cardiac Perfusion



Adapted from *American Journal of Emergency Medicine*, 30, Cunningham LM et al, Cardiopulmonary resuscitation for cardiac arrest: the importance of uninterrupted chest compressions in cardiac arrest resuscitation, 1630-1638. Copyright (2012), with permission from Elsevier.

pauses to <6 seconds led to 18 times more ROSC [Edelson DP et al. *Resuscitation*. 2006]. In a large multicenter trial of 815 patients with out-of-hospital (OOH) cardiac arrest, patients with a preshock pause of <10 seconds had 50% less mortality when compared with patients with a preshock pause >20 seconds [Cheskes S et al. *Circulation*. 2011]. Every 5-second delay led to 18% mortality.

Dr Wieters emphasized that compressions should certainly continue during preshock charging and that, after defibrillation, end tidal carbon dioxide should be employed in place of pulse checks to monitor perfusion.

In a prospective observational cohort study of 506 cases of OOH cardiac arrest, the best survival (28.7%) was seen when the compressions were performed 60% to 80% of the total resuscitation time [Christensen J et al. *Circulation*. 2009]. Physicians should therefore aim for a chest compression fraction >80%. Dr Wieters concluded by stating that a shock delivered with perfusion pressure at its peak will more likely result in ROSC.

## Latest Drugs and Guidelines for Treating Hemostasis

Written by Toni Rizzo

Nilesh Patel, DO, St Joseph's Regional Medical Center, Paterson, New Jersey, USA, presented the latest drug developments and guidelines regarding hemostasis. He discussed tranexamic acid (TXA) for the reversal of bleeding in target-specific oral anticoagulants (TSOAs) and the use of thromboelastography (TEG) for monitoring hemostasis in trauma and critically ill patients.