NOT CHARGING THE DEFIBRILLATOR PRIOR TO STOPPING COMPRESSIONS FOR A RHYTHM & OUTPUT CHECK DURING CPR: COMMON, LENGTHY AND DANGEROUS

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Figure 1: Example of per protocol workflow

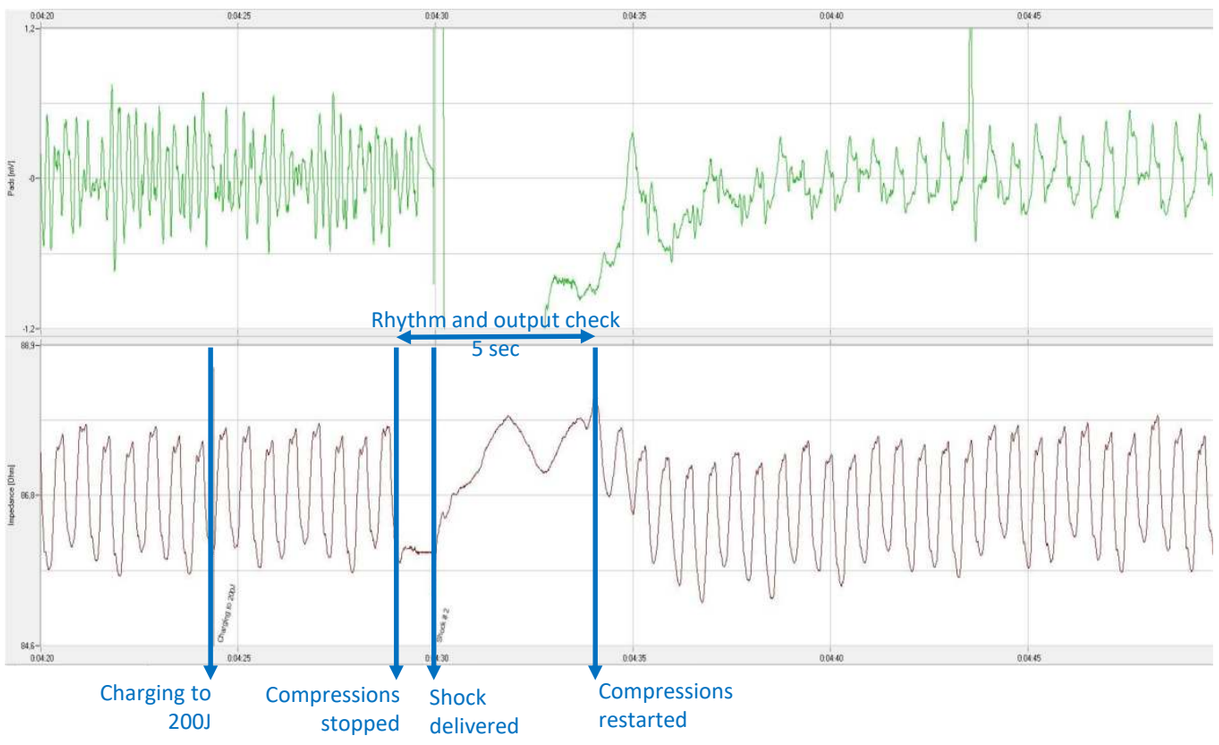
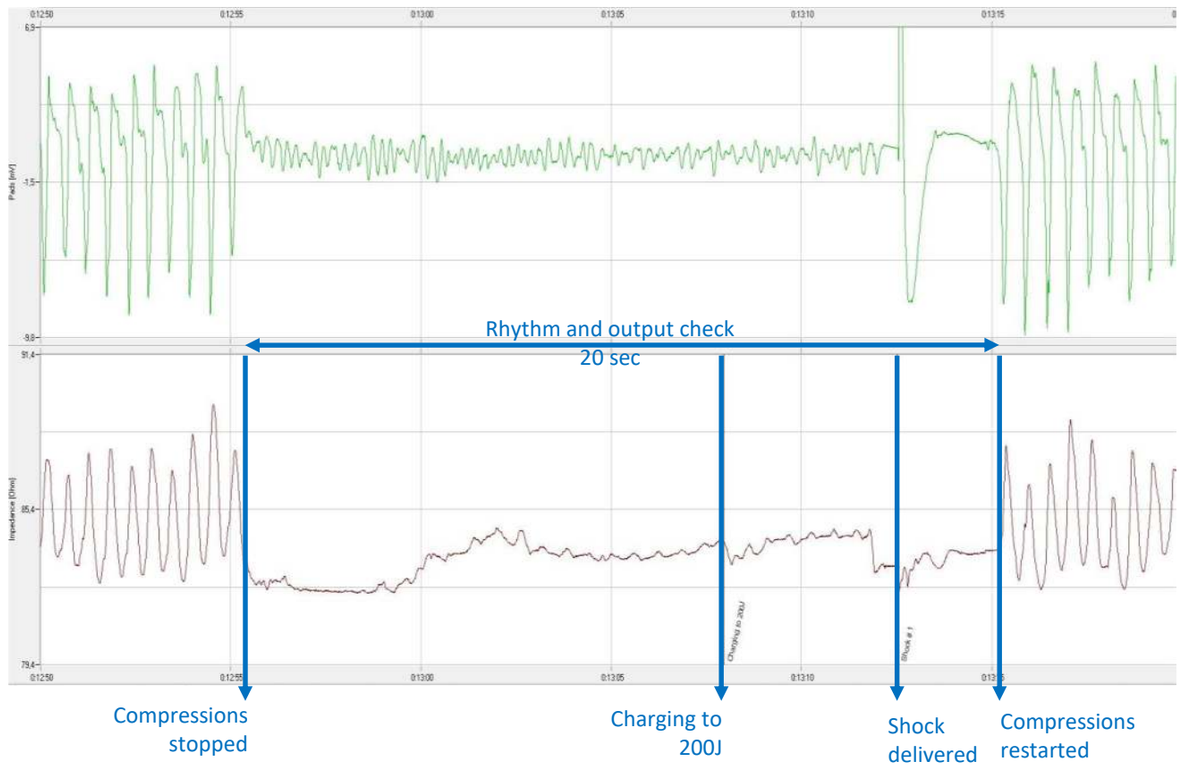


Figure 2: Example of the effect of delayed charging



BACKGROUND

There is good evidence that limiting hands-off time, and more specifically the time between stopping compressions and actual defibrillation, directly affects the chance of succes.[1,2]

Thus, a shorter rhythm and output check and earlier defibrillation have a positive effect on outcome.

In addition to patient outcome, team safety is an important aspect in defibrillation. When are stopped, a structured approach with a charged defibrillator allows focus on rhythm and output and a yes/no defibrillation choice, followed by rapid reinitiating of compressions. Since the caregiver, responsible for compressions, is at risk for electrical injury, these steps need to be clear to all team members and consistently used.

PURPOSE

Review of our database, collected on the Philips MRx defibrillator-monitor, of in-hospital resuscitation attempts, to confirm that in 90% of the rhythm analysis pauses, the defibrillator was charged before compressions were halted.

METHODS

Using our prospectively collected database of in-hospital resuscitation attempts, we reviewed all cases back to 2015. Each was assessed for rhythm pauses and defibrillation status. The timing of defibrillator charging was noted in QCPRReviewPro2.1, as well as the relationship to the pause moment for the rhythm & output check. The rhythm was evaluated as ‘shockable’ or ‘non-shockable’.

FINDINGS & CONCLUSIONS

During this study, overall 725 pauses were analysed.

- 327 instances: Charging done before compressions stopped (Figure 1)
- 398 instances: Charging was ongoing or had not been performed before compressions were stopped (Figure 2)

Notably, teams failing to charge early did not correct this during successive pauses during the case. Late defibrillator charging increased the pause by at least 5 sec, (median 10 sec) charging time and often seemed to disrupt workflow with late reinstallation of compressions. The delayed charging seems to lead to the danger that the caregiver for compressions may want to reposition their hands on the chest.

Our results suggest that delayed charging may be an undesirable training effect.[3] During training low energy creating very brief charging times.

TAKE HOME MESSAGE

1. In a mature in-hospital system a charged defibrillator should be available before the CPR pause, but the failure rate is very high.

2. Training-aspect shows two errors in training:
   - For safety reasons, low energy is used during training, which gives a false image of the real time needed to charge to high energy in real situations.
   - An uncharged defibrillator when compressions are stopped for a rhythm check should become a “STOP” criterium in training.

There is need for increased focus on the quality and organization of rhythm & output check

References:
[1] Hansen, L.K., et al. AM J Emerg Care 2013; 31:395-400
[2] Cheskes, S., et al. Resuscitation 2014; 85:1007-11
[3] Hunziker, S., et al. BMC Emergency Medicine 2009; 9:3

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