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| Question | | | |  |
| Should checking the cardiac rhythm immediately after defibrillation vs. immediate resumption of chest compressions with delayed check of the cardiac rhythm be used in cardiac arrest? | | | |
| Population: | Adults and children with presumed cardiac arrest receiving a defibrillation attempt during CPR | Background: | Interruptions in chest compressions have been associated with adverse outcomes. One of the determinants of chest compressions interruptions is the cardiac rhythm checking after defibrillation. The 2015 International Liaison Committee on Resuscitation (ILCOR) review, comparing patients receiving an immediate vs. a delayed rhythm check after a defibrillation attempt, found a very low quality evidence and concluded with a weak recommendation (“We suggest immediate resumption of chest compressions after shock delivery for adults in cardiac arrest in any setting (weak recommendation, very-low-quality evidence)") |
| Intervention: | checking the cardiac rhythm immediately after defibrillation |  |
| Comparison: | immediate resumption of chest compressions with delayed check of the cardiac rhythm |  |
| Main outcomes: | Critical: Survival with good neurological function (i.e. at hospital discharge, 1 month, 6 months, 1 year), survival (i.e. hospital discharge, 1 month, 6 months, 1 year survival).  Important: short term survival (return of spontaneous circulation – ROSC, hospital admission), rates of recurrence of fibrillation/re-fibrillation), CPR quality parameters (i.e. compression fraction). |  |
| Setting: | Cardiac arrest in any setting. Randomized controlled trials (RCTs) and non-randomized studies (non-randomized controlled trials, interrupted time series, controlled before-and-after studies, cohort studies) were eligible for inclusion. Animal/lab studies, mathematical models, simulation and manikin studies, algorithm studies for rhythm analysis recognition with no outcome data, unpublished studies (e.g., conference abstracts, trial protocols) and reviews were excluded |  |
| Perspective: | Patient perspective |  |

| Assessment | | | | |
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|  | **Criteria** | **Judgements** | **Research evidence** | **Additional considerations** |
| **Problem** | **Is there a problem priority?** | ○ No  ○ Probably no  ○ Uncertain  ○ Probably yes  ● Yes  ○ Varies | Interruptions in chest compressions have been associated with adverse outcomes, and one of the most common cause of these interruptions is checking cardiac rhythm after defibrillation. Any unnecessary pauses in chest compressions might have an impact on outcome of cardiac arrest |  |
| **Benefits & harms of the options** | **What is the overall certainty of this evidence?** | ○ No included studies  ● Very low  ○ Low  ○ Moderate  ○ High | **The relative importance or values of the main outcomes of interest:**   | **Outcome** | **Relative importance** | **Certainty of the evidence (GRADE)** | | --- | --- | --- | | Recurrence of VF | IMPORTANT | ⨁◯◯◯ VERY LOW | | ROSC | IMPORTANT | ⨁◯◯◯ VERY LOW | | Survival to hospital admission | IMPORTANT | ⨁⨁◯◯ LOW | | Survival to hospital discharge | CRITICAL | ⨁⨁◯◯ LOW | | Survival to hospital discharge | CRITICAL | ⨁◯◯◯ VERY LOW | | Survival to hospital discharge in VF patients only | CRITICAL | ⨁◯◯◯ VERY LOW | | Survival with favorable neurological outcome at hospital discharge | CRITICAL | ⨁◯◯◯ VERY LOW |   The overall certainty of effects across all of the critical outcomes is very low. While the randomized controlled trials fail to demonstrate any significant difference in critical outcomes between immediate rhythm check and immediate compressions after defibrillation, the point estimates for all critical outcomes falls slightly towards the immediate compression strategy. The observational studies all favor an immediate compression strategy - but the overall certainty of the observational evidence is very low due to serious risk of bias and indirectness of study designs. Balancing these possible beneficial and harmful effects, it seems reasonable to continue the weak suggestion of immediate resumption of chest compressions after shock delivery for adults in cardiac arrest in any setting. |  |
| **Is there important uncertainty about how much people value the main outcomes?** | ○ Important uncertainty or variability  ○ Possibly important uncertainty or variability  ○ Probably no important uncertainty or variability  ● No important uncertainty or variability  ○ No known undesirable outcomes |
| **Are the desirable anticipated effects large?** | ● No  ○ Probably no  ○ Uncertain  ○ Probably yes  ○ Yes  ○ Varies |
| **Are the undesirable anticipated effects small?** | ○ No  ● Probably no  ○ Uncertain  ○ Probably yes  ○ Yes  ○ Varies |
| **Are the desirable effects large relative to undesirable effects?** | ● No  ○ Probably no  ○ Uncertain  ○ Probably yes  ○ Yes  ○ Varies |
| **Resource use** | **Are the resources required small?** | ○ No  ● Probably no  ○ Uncertain  ○ Probably yes  ○ Yes  ○ Varies | Although immediate rhythm check after defibrillation is without cost,  changing the recommended treatment algorithm will lead to a need for new training materials and large scale re-training of CPR providers at considerable cost. |  |
| **Is the incremental cost small relative to the net benefits?** | ● No  ○ Probably no  ○ Uncertain  ○ Probably yes  ○ Yes  ○ Varies | Checking cardiac rhythm immediately after defibrillation is not associated with improved outcomes, there is therefore no reason to change practice. |  |
| **Equity** | **What would be the impact on health inequities?** | ○ Increased  ○ Probably increased  ● Uncertain  ○ Probably reduced  ○ Reduced  ○ Varies | There is no obvious impact on health inequities. |  |
| **Acceptability** | **Is the option acceptable to key stakeholders?** | ● No  ○ Probably no  ○ Uncertain  ○ Probably yes  ○ Yes  ○ Varies | Checking cardiac rhythm immediately after defibrillation is not associated with improved outcomes, there is therefore no reason to change practice. |  |
| **Feasibility** | **Is the option feasible to implement?** | ○ No  ● Probably no  ○ Uncertain  ○ Probably yes  ○ Yes  ○ Varies | Checking cardiac rhythm immediately after defibrillation is not associated with improved outcomes, there is therefore no reason to change practice. | Retraining programs for the rescuers are needed of the rhythm check timing is modified |

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| RecommendationShould checking the cardiac rhythm immediately after defibrillation vs. immediate resumption of chest compressions with delayed check of the cardiac rhythm be used in cardiac arrest? | | | | | |
| **Balance of consequences** | Undesirable consequences clearly outweigh desirable consequences in most settings | Undesirable consequences probably outweigh desirable consequences in most settings | The balance between desirable and undesirable consequences is closely balanced or uncertain | Desirable consequences probably outweigh undesirable consequences in most settings | Desirable consequences clearly outweigh undesirable consequences in most settings |
|  | ○ | ● | ○ | ○ | ○ |

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| **Type of recommendation** | We recommend against offering this option | We suggest not offering this option | We suggest offering this option | We recommend offering this option |
|  | ○ | ● | ○ | ○ |
| **Recommendation** | We suggest against the checking of cardiac rhythm immediately after defibrillation. Weak recommendation / very-low certainty evidence  If there is alternative physiologic evidence of ROSC (eg, arterial waveform or rapid rise in ETCO2), chest compressions can be paused briefly for rhythm analysis. | | | |
| **Justification** | Although there is only very low-certainty evidence addressing this question, there seems to be a signal for harm associated with immediate check for cardiac rhythm after defibrillation for both short-term and long term outcomes. The effect of immediate check on VF recurrence is unclear; an observational study exploring this specific issue did not find VF recurrence within 30 seconds of a defibrillatory shock to be dependent on timing of chest compressions resumption, (Conover 2014 633) and this may not be a major factor affecting outcomes. Protocols including immediate cardiac rhythm check after defibrillation are reported to have reduced chest compression fractions; these increased pauses could be a potential pathway for worse outcomes. | | | |
| **Subgroup considerations** | None | | | |
| **Implementation considerations** | None | | | |
| **Monitoring and evaluation** | Since we are suggesting against change in current practice, it would be reasonable to continue standard monitoring of CPR quality which includes pauses in chest compressions or chest compression fraction. | | | |
| **Research possibilities** | There are currently no randomized controlled trials that address the specific question of optimal timing for cardiac rhythm check during resuscitation for cardiac arrest. | | | |