|  |  |
| --- | --- |
| Question | |
| **Should does pausing chest compressions at another interval vs. pausing chest compressions every two minutes to assess the cardiac rhythm be used for adults who are in cardiac arrest ?** | |
| **Population:** | Adults and children in any setting (in-hospital or out-of-hospital) with cardiac arrest and a shockable rhythm at any time during cardiopulmonary resuscitation (CPR) |
| **Intervention:** | does pausing chest compressions at another interval |
| **Comparison:** | pausing chest compressions every two minutes to assess the cardiac rhythm |
| **Main outcomes:** | Survival with favourable neurological outcome, Survival, ROSC, Coronary perfusion pressure, Cardiac output. |
| **Setting:** | in any setting |
| **Perspective:** |  |
| **Background:** | The ideal time interval to assess cardiac rhythm should balance the interruptions in chest compressions with rescuer fatigue and the ability to detect a change in clinical state. |
| **Conflict of interests:** | none |

# Assessment

|  |  |  |
| --- | --- | --- |
| Problem Is the problem a priority? | | |
| Judgement | Research evidence | Additional considerations |
| ○ No ○ Probably no ● Probably yes ○ Yes ○ Varies ○ Don't know | ROSC is associated with achieving and sustaining adequate coronary perfusion pressure1. Longer duration CPR cycles may help to generate increased coronary perfusion pressure2 and improve the likelihood of successful defibrillation3. Conversely, longer duration CPR cycles may also be associated with increased rescuer fatigue that adversely impacts the likelihood of achieving ROSC4. Furthermore, shorter CPR cycles may be associated with more frequent pauses leading to increased no-flow time adversely impacting the likelihood of achieving ROSC5. |  |
| Desirable Effects How substantial are the desirable anticipated effects? | | |
| Judgement | Research evidence | Additional considerations |
| ○ Trivial ○ Small ● Moderate ○ Large ○ Varies ○ Don't know | Longer duration CPR cycles may help to generate increased coronary perfusion pressure2 and improve the likelihood of successful defibrillation3 |  |
| Undesirable Effects How substantial are the undesirable anticipated effects? | | |
| Judgement | Research evidence | Additional considerations |
| ○ Large ● Moderate ○ Small ○ Trivial ○ Varies ○ Don't know | Longer duration CPR cycles are associated with increased rescuer fatigue adversely impacting the likelihood of achieving ROSC4. Shorter CPR cycles may be associated with more frequent pauses leading to increased no-flow time adversely impacting the likelihood of achieving ROSC5. |  |
| Certainty of evidence What is the overall certainty of the evidence of effects? | | |
| Judgement | Research evidence | Additional considerations |
| ● Very low ○ Low ○ Moderate ○ High ○ No included studies | There were few studies directly addressing the topic of the timing of pausing chest compression for rhythm analysis. The two studies examined not only the timing of pausing chest compressions but also whether shock should be given before CPR.     | **Outcomes** | **Importance** | **Certainty of the evidence (GRADE)** | | --- | --- | --- | | [3 min vs 1 min] Survival to hospital discharge with favorable neurological outcome follow up: range 30 days to 1 years | CRITICAL | ⨁◯◯◯ VERY LOWa,b,c | | [3 min vs 1 min] Survival to hospital discharge follow up: range 30 days to 1 years | CRITICAL | ⨁◯◯◯ VERY LOWa,b,c | | [3 min vs 1 min] ROSC | IMPORTANT | ⨁◯◯◯ VERY LOWa,b,c | | [1 min vs 2 min] Survival to discharge | CRITICAL | ⨁◯◯◯ VERY LOWa,b,c | | [1 min vs 2 min] ROSC | IMPORTANT | ⨁◯◯◯ VERY LOWa,b,c |  1. Not blinded 2. Small sample size 3. Trial originally addressed different question; a guideline change partway through this trial resulted in different pause intervals for rhythm analysis |  |
| Values Is there important uncertainty about or variability in how much people value the main outcomes? | | |
| Judgement | Research evidence | Additional considerations |
| ○ Important uncertainty or variability ○ Possibly important uncertainty or variability ○ Probably no important uncertainty or variability ● No important uncertainty or variability | The outcomes of interest are: Survival to hospital discharge with good neurological outcome and survival to hospital discharge were ranked as critical outcomes. Return of spontaneous circulation (ROSC) was ranked as an important outcome |  |
| Balance of effects Does the balance between desirable and undesirable effects favor the intervention or the comparison? | | |
| Judgement | Research evidence | Additional considerations |
| ○ Favors the comparison ○ Probably favors the comparison ● Does not favor either the intervention or the comparison ○ Probably favors the intervention ○ Favors the intervention ○ Varies ○ Don't know | There was no significant outcome associated with the intervention from the 2 RCTs.   | **Outcomes** | **With pausing chest compressions every two minutes to assess the cardiac rhythm** | **With does pausing chest compressions at another interval** | **Difference** | **Relative effect (95% CI)** | | --- | --- | --- | --- | --- | | [3 min vs 1 min] Survival to hospital discharge with favorable neurological outcome follow up: range 30 days to 1 years | 115 per 1,000 | **192 per 1,000** (97 to 345) | **78 more per 1,000** (18 fewer to 230 more) | **OR 1.84** (0.83 to 4.07) | | [3 min vs 1 min] Survival to hospital discharge follow up: range 30 days to 1 years | 146 per 1,000 | **221 per 1,000** (120 to 371) | **75 more per 1,000** (26 fewer to 226 more) | **OR 1.66** (0.80 to 3.46) | | [3 min vs 1 min] ROSC | 458 per 1,000 | **558 per 1,000** (418 to 688) | **99 more per 1,000** (40 fewer to 229 more) | **OR 1.49** (0.85 to 2.60) | | [1 min vs 2 min] Survival to discharge | 180 per 1,000 | **88 per 1,000** (38 to 188) | **92 fewer per 1,000** (142 fewer to 7 more) | **OR 0.44** (0.18 to 1.05) | | [1 min vs 2 min] ROSC | 532 per 1,000 | **505 per 1,000** (371 to 640) | **26 fewer per 1,000** (160 fewer to 109 more) | **OR 0.90** (0.52 to 1.57) | |  |
| Resources required How large are the resource requirements (costs)? | | |
| Judgement | Research evidence | Additional considerations |
| ○ Large costs ○ Moderate costs ○ Negligible costs and savings ○ Moderate savings ○ Large savings ○ Varies ● Don't know | Modifying the timing of the cardiac rhythm check has no direct cost. However, it will require considerable investment in re-training, changes to training materials and changes to device software, all of which present considerable indirect costs. |  |
| Certainty of evidence of required resources What is the certainty of the evidence of resource requirements (costs)? | | |
| Judgement | Research evidence | Additional considerations |
| ○ Very low ○ Low ○ Moderate ○ High ● No included studies | No published data available. |  |
| Cost effectiveness Does the cost-effectiveness of the intervention favor the intervention or the comparison? | | |
| Judgement | Research evidence | Additional considerations |
| ○ Favors the comparison ○ Probably favors the comparison ○ Does not favor either the intervention or the comparison ○ Probably favors the intervention ○ Favors the intervention ○ Varies ● No included studies | No published data available. |  |
| Equity What would be the impact on health equity? | | |
| Judgement | Research evidence | Additional considerations |
| ○ Reduced ○ Probably reduced ○ Probably no impact ○ Probably increased ○ Increased ○ Varies ● Don't know | No published data available. |  |
| Acceptability Is the intervention acceptable to key stakeholders? | | |
| Judgement | Research evidence | Additional considerations |
| ○ No ○ Probably no ● Probably yes ○ Yes ○ Varies ○ Don't know | Previous guidelines have used different time periods (e.g. 1 min, 3 min) for rhythm analysis, and were successfully implemented. |  |
| Feasibility Is the intervention feasible to implement? | | |
| Judgement | Research evidence | Additional considerations |
| ○ No ○ Probably no ● Probably yes ○ Yes ○ Varies ○ Don't know | Retraining rescuers using the new approach will be necessary. |  |

# Summary of judgements

|  | **Judgement** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Problem** | No | Probably no | **Probably yes** | Yes |  | Varies | Don't know |
| **Desirable Effects** | Trivial | Small | **Moderate** | Large |  | Varies | Don't know |
| **Undesirable Effects** | Large | **Moderate** | **Small** | Trivial |  | Varies | Don't know |
| **Certainty of evidence** | **Very low** | **Low** | Moderate | High |  |  | No included studies |
| **Values** | Important uncertainty or variability | Possibly important uncertainty or variability | Probably no important uncertainty or variability | **No important uncertainty or variability** |  |  |  |
| **Balance of effects** | Favors the comparison | Probably favors the comparison | **Does not favor either the intervention or the comparison** | Probably favors the intervention | Favors the intervention | Varies | Don't know |
| **Resources required** | Large costs | Moderate costs | **Negligible costs and savings** | Moderate savings | Large savings | Varies | Don't know |
| **Certainty of evidence of required resources** | Very low | Low | Moderate | High |  |  | **No included studies** |
| **Cost effectiveness** | Favors the comparison | Probably favors the comparison | Does not favor either the intervention or the comparison | Probably favors the intervention | Favors the intervention | Varies | **No included studies** |
| **Equity** | Reduced | Probably reduced | **Probably no impact** | Probably increased | Increased | Varies | Don't know |
| **Acceptability** | No | Probably no | **Probably yes** | Yes |  | Varies | Don't know |
| **Feasibility** | No | Probably no | **Probably yes** | Yes |  | Varies | Don't know |

# Type of recommendation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Strong recommendation against the intervention | Conditional recommendation against the intervention | Conditional recommendation for either the intervention or the comparison | Conditional recommendation for the intervention | Strong recommendation for the intervention |
| ○ | ● | ○ | ○ | ○ |

# Conclusions

|  |
| --- |
| Recommendation |
| We suggest rescuers should assess the cardiac rhythm every two minutes (weak recommendation, very-low certainty of evidence). |
|  |

|  |
| --- |
| Justification |
| There is not enough evidence to recommend for or against pausing chest compressions at another interval compared to pausing chest compressions every two minutes to assess the cardiac rhythm in adults who are in cardiac arrest in any setting. |

|  |
| --- |
| Subgroup considerations |
| Prehospital response intervals longer than five minutes have been shown to have more favourable outcomes (ROSC, survival to discharge and survival with good neurological outcome) from three minutes of CPR before the first defibrillation followed by chest compression every three minutes to check the cardiac rhythm. |

|  |
| --- |
| Implementation considerations |
|  |

|  |
| --- |
| Monitoring and evaluation |
|  |

|  |
| --- |
| Research priorities |
| 1. Does the optimal interval differ for patients with different initial cardiac rhythms?  2. Does the duration between collapse and EMS arrival affect the optimal interval?  3. Do different intervals interfere with the overriding goal of minimising interruptions in chest compressions?  4. Does the newer ECG machines reliably remove artefact during CPR and enable the analysis of cardiac rhythm without pausing?  5. What is the relationship between rescuer fatigue, chest compression quality, and the optimal interval? |