**WORKSHEET for Evidence-Based Review of Science for Emergency Cardiac Care**

**Worksheet author(s)**

| Assoc/Prof. Darren Walters  
MBBS M Phil (UQ) Grad. Cert Mang. (Health)  
FRACP FCSANZ FSCAI Interventional Cardiologist, Clinical Director Cardiac Catheterization & Director of Cardiology.  
The Prince Charles Hospital.  
Rode Rd . Brisbane .  
Qld. 4032. Australia. |
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| **Date Submitted for review:**  
30/9/2009 |

**Clinical question.**

In patients with ROSC after cardiac arrest (P), does the routine use of PCI (I), compared with standard management (without PCI) (C), improve outcomes (eg. TBD survival/re-arrest/etc) (O)? WS#11

Is this question addressing an intervention/therapy, prognosis or diagnosis? intervention/therapy

State if this is a proposed new topic or revision of existing worksheet: New

**Conflict of interest specific to this question**

Do any of the authors listed above have conflict of interest disclosures relevant to this worksheet? Industry Sponsored Research and/or Speaker for Merck, CSL, Sanofi-Aventis, Bristol Meyers, J & J, Bayer. Clinical trials Medtronic, Abbott, Boston Scientific, GSK, Astra Zenica. Master of Philosophy Thesis in Optimal Anticoagulation in PCI.

**Search strategy (including electronic databases searched).**

Pubmed MEDLINE: CARDIAC ARREST (12572) AND angiography (596) and angioplasty (104) : all viewed Limits adult only (19+), human.  
Eliminated case reports and reviews.  
Related articles searched. (total 19 articles)  
Google scholar, cardiac arrest and angioplasty 15,000; 500 most correct match reviewed  
Related articles searched (5 additional)  
Cochrane data base and reviews: search cardiac arrest; reviewed: nil reviews related to angioplasty  
ILCOR statement on Acute Coronary Syndromes

**State inclusion and exclusion criteria**

Includes only ; Human Subjects, 19+  
Excludes case reports and reviews

**Number of articles/sources meeting criteria for further review:**

26 articles for detailed review.  
10 subsequently removed ; 1 was case series of two patients, 9 were not sufficiently related to the question posed.  
17 articles found relevant to the question.  
14 were LOE 4 and 3 LOE 3
# Summary of evidence

## Evidence Supporting Clinical Question

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| Spaulding 1997,1629 C  
Reynolds 2009,179CD | Bendz 2004,49 C  
Engdahl 2000,201 C  
Garot 2007,1354 CD  
Lettieri 2009,569CD  
Markusohn 2007,257 CD  
McCullough 2002,257 C  
Merchant 2008,398CD  
Nagao 2000,776 CD  
Nielsen 2009,CD  
Peels 2008 CD  
Pleskot 2008,147 CD  
Quintero-Moran 2006,269C  
Wolfrum 2008,1780 E | Kahn 1995,1069 CD |

### Level of evidence

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**A** = Return of spontaneous circulation  
**B** = Survival of event  
**C** = Survival to hospital discharge  
**D** = Intact neurological survival  
**E** = Other endpoint  
*Italics = Animal studies*
### Evidence Neutral to Clinical question

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**Level of evidence**

A = Return of spontaneous circulation  
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### Evidence Opposing Clinical Question

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<td>Richling, 2007, 545</td>
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A = Return of spontaneous circulation  
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*Italics = Animal studies*
There is significant evidence that supports the conclusion that patients with ST elevation myocardial infarction (STEMI) are best managed with a strategy that includes primary percutaneous coronary intervention (PCI) when it can be provided in a timely manner by an experienced clinician. Application of this form of reperfusion has been limited by access to catheter laboratory facilities and appropriately skilled clinicians.

There are no prospective randomized studies comparing a strategy of immediate angiography and percutaneous intervention in patients with return of spontaneous circulation (ROSC) following out of hospital cardiac arrest (OHCA) versus usual care including thrombolysis or PCI where clinically indicated. There is one small retrospective study that examined patients after ventricular fibrillation cardiac arrests to assess the effect of thrombolysis (101 patients) and PCI (46) on outcome (Richling, Herkner et al. 2007) (LOE3). It showed no difference in functional neurologic recovery (cerebral performance category 1 and 2) and survival to 6 months. There are several case series demonstrating that acute coronary-artery occlusion is frequent in survivors of out-of-hospital cardiac arrest (approximately 30-50%) (Kahn, Glazier et al. 1995; Engdahl, Abrahamsson et al. 2000; Nagao, Hayashi et al. 2000; McCullough, Prakash et al. 2002; Bendz, Eritsland et al. 2004; Quintero-Moran, Moreno et al. 2006; Garot, Lefevre et al. 2007; Gorjup, Radsel et al. 2007; Knafelj, Radsel et al. 2007; Marcusohn, Roguin et al. 2007; Peels, Jessurun et al. 2008; Pleskot, Babu et al. 2008) (LOE4). There is one non randomized study of immediate coronary angiography and angioplasty when indicated in survivors of out-of-hospital cardiac arrest (Spaulding, Joly et al. 1997) (LOE4). This study showed that in 84 consecutive patients successful angioplasty was an independent predictor of survival. The study also suggested clinical and electrocardiographic findings, such as the occurrence of chest pain and the presence of ST-segment elevation, were poor predictors of acute coronary-artery occlusion.

There is also evidence from case series and registries of OHCA that in-hospital and long-term prognosis is favorable in selected patients after successful out-of-hospital CPR and STEMI treated with primary PCI (Kahn, Glazier et al. 1995; Spaulding, Joly et al. 1997; Engdahl, Abrahamsson et al. 2000; Nagao, Hayashi et al. 2000; McCullough, Prakash et al. 2002; Bendz, Eritsland et al. 2004; Quintero-Moran, Moreno et al. 2006; Garot, Lefevre et al. 2007; Gorjup, Radsel et al. 2007; Knafelj, Radsel et al. 2007; Marcusohn, Roguin et al. 2007; Richling, Herkner et al. 2007; Peels, Jessurun et al. 2008; Pleskot, Babu et al. 2008; Lettieri, Savonitto et al. 2009). Patients who regain consciousness prior to PCI after ROSC and undergo primary PCI achieve comparable outcomes to patients without cardiac arrest (Gorjup, Radsel et al. 2007). In all-comers with suspected acute infarction and OHCA with ROSC survival to hospital discharge was approximately 50-60%. The strategies used to select patients for angiography and intervention were clinical suspicion of an acute coronary syndrome, age 30-75 and ST elevation on the electrocardiograph.

One study of patients with ROSC after OHCA demonstrated that a standardised post resuscitation protocol that included PCI where clinically indicated, was associated with a significantly better discharge rate from hospital, neurological outcome and 1-year survival when compared with historical controls (Sunde, Pytte et al. 2007) (LOE4).

Assessment of risk / benefit:
Immediate angiography and percutaneous intervention should be considered in patients with ROSC following OHCA when it can be provided in a timely manner by an experienced clinician. The therapy should be considered where there is a clinical suspicion of an acute coronary syndrome and/or ST elevation on the
electrocardiograph. The clinician should recognize that clinical and electrocardiographic findings, such as the occurrence of chest pain and the presence of ST-segment elevation may be poor predictors of acute coronary-artery occlusion in this patient group. Standardized post resuscitation protocols should include PCI where available and where clinically indicated as part of the strategy to improve survival and neurological outcomes in this patient group.

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Citation List

Fair; LOE 4; Neutral

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