



# A review of Helicopter Emergency Medical Service interventions in *reported* traumatic cardiac arrest patients

**Air Ambulance**  
Kent Surrey Sussex

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## BACKGROUND

The Kent-Surrey-Sussex Helicopter Emergency Medical Service (HEMS)(paramedic-physician) team provides care to the most critically injured patients by means of helicopter (primarily) or rapid response car. As well as the speed of reaching these patients, additional clinical interventions brought to the scene by the HEMS team include, but are not limited to, advanced airway management; including rapid sequence induction (RSI) of anaesthesia, simple and tube thoracostomy, clamshell thoracotomy, emergency hysterotomy, blood product transfusion, emergency reversal of anti-coagulation, maxilo-facial packing for torrential facial haemorrhage as well as a much broader range of therapeutic drugs compared to that of land based paramedics. The dispatch criteria of the HEMS team is well governed, with one immediate dispatch criteria being major trauma and/or traumatic cardiac arrest (TCA).

## THE STUDY

This study reviewed the Kent-Surrey-Sussex HEMS database of patients who were reported to have suffered pre-hospital TCA at the point of 999 call, who were subsequently found not to be in cardiac arrest on arrival of healthcare professionals. The purpose of this project was to provide an evidence base around this particular patient cohort and to aid justification for HEMS team dispatch to "reported TCA." It was envisaged that many patients who were reported during the 999 call to be in TCA, were not, but were in a critical condition requiring rapid HEMS advanced intervention. This report studied how injured this cohort of patients were and what interventions they received from the HEMS team.

## METHODOLOGY

A retrospective database analysis of practice and outcome was carried out. Patients reported to be in TCA between 01/07/2016 – 31/12/2016 were identified and studied from the trust's electronic patient database – The inclusion criteria was all cases of all ages and gender reported as TCA but were never actually in TCA. The exclusion criteria removed: –

- All true TCAs
- Medical cardiac arrests

Primary Outcome Measures  
How many patients were not in true TCA and what HEMS advanced intervention was implemented in this patient cohort.

Secondary Outcome Measures  
How many cases required a HEMS team escort versus those discharged from HEMS care.

## DISCUSSION

Patients who have suffered major trauma and/or injury require well practiced, experienced and expert treatment from the roadside to recovery. Trauma must be treated as a complex disease process that is often difficult to manage (Cole, 2015). A number of critically unwell patients who required one or more advanced HEMS interventions pre-hospitally have been identified, although initially dispatched as TCA. The care of the critically injured casualty will involve all, or a combination of the management interventions required in TCA, but have additional complexities. The drug-assisted RSI, formal chest decompression by thoracostomy and blood product administration are above the level of care provided by a standard paramedic. These advanced interventions are, in the main, delivered by HEMS teams that are physician led, hence the HEMS team is deployed to critically injured patients as well as those in TCA. Wilson et al (2015) published a paper suggesting that the face of prehospital care is changing and more senior hospital based doctors are bringing their expertise outside the hospital to work closely with the NHS ambulance services and Paramedics in order to save more lives at the roadside.

## CONCLUSIONS

In conclusion, it is evident that many of the patients reported to be in traumatic cardiac arrest, were actually not (46%). Many (66.7%) of the non-TCA patients, were critically unwell requiring one or more HEMS advanced intervention such as RSI, thoracostomy and/or blood product. It is concluded that HEMS teams should continue to respond to all TCA calls, because the patient even if not in true TCA, can often be critically unwell requiring HEMS intervention. It has been found that 88% of patients were deemed to have significant injury and therefore warranted a HEMS team escort, either by helicopter or by land ambulance.

## REFERENCES

Cole, E. (2015). 'How regional Trauma Systems improve outcomes'. *Emergency Nurse*. 23 (6)  
Lockey, D. Crewdson, K. & Davies, G. (2006). 'Traumatic Cardiac Arrest: Who are the survivors?'. *Annals of Emergency Medicine*. 48 (3)  
Wilson, M. Habig, K. Wright, C. Hughes, A. Davies, G. Imray, C. (2015). 'Prehospital Emergency Medicine'. *Lancet*. 386 (3)

## FIGURE 1

Table 1		Table 2	
Patient State	n Patients	Intervention	n Patients
Total Reported TCA	112	RSI	26 (51%)
True TCA	61 (54%)	Blood	16 (32%)
Non TCA	51 (46%)	Thoracostomy	14 (27%)
- Critical	34 (66.7%)	Thoracotomy	0 (0%)
- Non Critical	17 (33.3%)		

TABLE 3		TABLE 4	
n Advanced Interventions	n Patients	Patient Disposition	n Patients
0	17 (33%)	Ground Assist	5 (10%)
1	19 (37%)	Ground Escort	24 (47%)
2	8 (16%)	Carry	21 (41%)
3	7 (14%)	PLE	1 (2%)
4	0 (0%)	Survival to Hospital	50/51 (98%)

## DEFINITIONS

**Traumatic Cardiac Arrest** – this may be defined as patients who have received a traumatic injury resulting in absent or agonal breathing and a lack of central pulse (Lockey et al, 2006).

**Critically injured** – for the purpose of this study, which does not study Injury Severity Scores (ISS), the authors have defined the critically injured patient as a patient receiving one or more HEMS advanced intervention.

**HEMS advanced intervention** – Interventions that are undertaken only by a HEMS team. For the purpose of this study, these are RSI, thoracostomy, blood product administration and thoracotomy.

**Ground Assist** – Patients conveyed to the Emergency Department with ground Paramedics. It was deemed these patients did not require a HEMS team escort.

**Ground Escort** – Patient conveyed to the Emergency Department by road ambulance with a HEMS team escort. It was deemed these patients were unstable and/or received HEMS advanced interventions and therefore required a HEMS team escort.

**Carry** – Patient conveyed to the Emergency Department by Helicopter with a HEMS team escort. It was deemed these patients were unstable and/or received HEMS advanced interventions and required a HEMS team escort.

**Critical Care Escort** – The authors of this study define this as either a ground escort or carry, thus including both modalities of transport, emphasising the necessity of the HEMS team to provide enhanced care en-route to hospital.

**Pronounced Life Extinct (PLE)** – Patients who are pronounced life extinct at the scene of the incident.