



# Pre-hospital blood transfusions on a UK Air Ambulance service:

## Air Ambulance The first ten months Kent Surrey Sussex

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### AIMS

- To evaluate the first ten months of a new capability at Kent, Surrey & Sussex Air Ambulance Trust (KSSAAT) of delivering blood to patients in the pre-hospital environment.
- To examine the effects of pre-hospital blood transfusions on the patients' haemodynamics.

### BACKGROUND

- Haemorrhagic shock is responsible for a high proportion of all trauma deaths and it is a leading cause of preventable mortality.<sup>1,2</sup>
- Haemorrhagic shock occurs due to inadequate organ perfusion as a result of blood losses.<sup>3</sup>
- Indications of shock include changes to the patients' haemodynamics, such as a low blood pressure and an increased heart rate.<sup>3</sup>
- There have been many changes in recent practice of trauma resuscitation. Work by the military supports the early aggressive use of blood products for resuscitation.<sup>2,3</sup> This is in preference to fluids such as crystalloids and colloids which have a haemodilutory effect with no oxygen carrying capacity.<sup>2</sup>
- Alongside the use of blood, tranexamic acid has been shown to have an important role in treating bleeding trauma patients.<sup>4</sup> Tranexamic acid helps prevent the breakdown of clots which form to stop the bleeding.
- KSSAAT is a registered charity that provides a Helicopter Emergency Medical Service (HEMS) to sick and injured people in South East England.
- In February 2013 KSSAAT started to routinely carry emergency 'O negative' blood to potentially transfuse patients.

### METHOD

Retrospective data was collected for all patients who had received a pre-hospital blood transfusion at KSSAAT between 06/02/2013 and 24/11/2013.

Patient paper and electronic records were reviewed for:

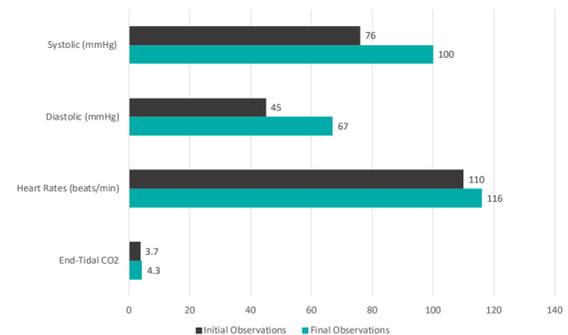
- Demographic data and blood units received.
- Nature of the incident, including road traffic collision (RTC) sub-types and ratio of male to female patients. (Table 1 & Table 2)
- Indications cited for giving blood and the changes in haemodynamics (initial and final patient observations). (Figure 1)
- Use of tranexamic acid.
- Response time (from 999 call to arrival on scene) and total time (from 999 call to delivery to A&E).
- Blood traceability.

### RESULTS

- 54 patients were given blood over the 10 month period, each receiving an average of 2.35 units (range 1 – 4 units)
- 10 of the cases were during the night shift (19:00 – 07:00hours).
- 12 patients died on scene. All other patients were taken to a Major Trauma Centre (MTC) except 2 medical patients who were not in a traumatic incident and were taken to local Emergency Departments.

INCIDENT	PATIENTS	RATIO M:F	INCIDENT	PATIENTS	RATIO M:F
RTC	40	32:8	RTC	40	32:8
OTHER/ACCIDENTAL	5	4:1	OTHER/ACCIDENTAL	5	4:1
SELF-HARM	4	4:0	SELF-HARM	4	4:0
ASSAULT	3	3:0	ASSAULT	3	3:0
MEDICAL	2	2:0	MEDICAL	2	2:0

Figure 1: Mean change in patients' haemodynamics.



- The most common indication cited for administering blood was a low systolic blood pressure (below 90mmHg).
- The mean response time (999 call to arrival on scene) was 37 minutes (range 9-104 minutes). The mean time from the 999 call to A&E was 122 minutes (range 62-215 minutes).
- Tranexamic acid was given to all patients taken to hospital.
- 100% blood traceability was achieved.

### DISCUSSION

- The results support the need for this service as 54 patients, mostly male involved in RTCs, received pre-hospital blood transfusions from KSSAAT in 10 months.
- The 10 night cases highlights the importance of this service also being available during the night.
- Based on worldwide data, there is an increase in patient survival through rapid resuscitation with blood.<sup>3</sup> The mean change in patient haemodynamics, the best indicator available from the data, agrees with the literature and shows that patients are being delivered to hospital with improved haemodynamics.

KSSAAT has been able to safely deliver blood to patients on average 85 minutes earlier than would be if the service were not available. This early availability of blood to patients in haemorrhagic shock may have a significant impact on their survival.

**Limitations:** This was not a randomised controlled trial and there was no comparison against a control group. Data was only analysed up to hospital delivery.

Details such as patient outcome and length of stay in hospital were not examined.

**Future work:** As more data is required to assess the effects of blood transfusions on patient outcome, it may be beneficial at KSSAAT to document the

### CONCLUSIONS

- There is a need for pre-hospital blood, which KSSAAT can deliver to patients safely and quickly.**
- Patients who receive pre-hospital blood are being delivered to hospital with improved haemodynamics, however further studies are required to assess if there is any effect on patient outcome.**

### REFERENCES

1Sisak et al. Acute transfusion practice during trauma resuscitation: Who, when, where and why? Injury 2012; 44: 581-586.  
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 4CRASH-2 Collaborators. Effects of tranexamic acid on death, vascular occlusive events, and blood transfusion in trauma patients with significant haemorrhage (CRASH-2): a randomised, placebo-controlled trial. Lancet 2010;376:23-32.