

An Analysis of Air Ambulance Utilization for Out-of-Hospital Trauma Patients in Arizona

Background

Transporting critically injured trauma patients via air ambulance may improve outcomes. However, this method of transporting prehospital patients has associated risks to patient and crew. State departments of health have the role of overseeing the appropriateness of air ambulance utilization to maximize the benefit and minimize risk.

Objective

The Arizona Department of Health Services (ADHS), Bureau of EMS & Trauma System (BEMSTS) sought to determine the appropriateness of prehospital air ambulance utilization for trauma victims in Arizona.

Methods

A retrospective cohort analysis was performed on all trauma patients in Arizona that were transported by ground or air ambulance from the scene of injury during January 2005 through December 2008 as reported by fourteen designated trauma centers. Appropriateness of air ambulance utilization was determined by using standard trauma scoring methodology to quantify the severity of the trauma injury. An Injury Severity Score (ISS) of ≤ 15 , weighted Revised Trauma Score (RTS) ≥ 4 , Probability of Survival (Ps) > 0.90 as well as same day or 24 hour home discharge were considered non-life threatening and represent inappropriate air ambulance utilization.

Results

The results seen in Table 1 show the regional and statewide distribution of ground and air ambulance transports from the scene of injury. Of all patients transported by air ambulance, 52% had an ISS < 9 , 43% were discharged home from the ED or within 24 hours and 88% had a Ps of > 0.90 .

Table 1

	Transport	Statewide (67,120)	Central (39,517)	Western (3,679)	Northern (4,790)	Southeastern (11,906)
		% (p-value)				
ISS						
0-8	A	52.1 ***	54.2 ****	45.1 ****	45.3 ***	45.9 ****
	G	65.4	62.8	79.2	57.2	70.5
9-15	A	24.0	24.2	27.2	27.0	21.3
	G	19.9	20.9	15.5	26.4	16.0
16-24	A	12.4	12.1	12.5	14.1	13.8
	G	7.7	8.6	3.1	9.4	6.2
>24	A	11.5	9.6	15.2	13.6	19.0
	G	7.0	7.7	2.3	6.9	7.3
RTS Scene >=4						
	A	96.4 *	96.2	94.3 ****	97.9	95.7 ****
	G	96.9	96.3	98.4	98.2	97.6
RTS ED >=4						
	A	94.4 ****	94.5 ****	91.2 ****	92.2 ****	95.0 ****
	G	96.7	96.1	98.6	96.8	97.7
PS >0.90						
	A	88.1 ****	89.7 ****	81.1 ****	85.0 ****	83.1 ****
	G	92.9	92.2	97.1	90.5	93.7
Discharged from ED or Hospital within 24 hrs (alive)						
	A	43.2 ****	44.5 ****	33.1 ****	35.4****	40.5 ****
	G	56.8	52.2	73.0	50.3	66.8

* p<0.05 ** p <0.01 *** p<0.0001

A= Air transport G= Ground transport

RTS= Revised trauma score= .9368(GCS) +.7326(SBP)+.2908(RR)

PS= TRISS derived probability of survival

LOS= Length of stay

Missing data were excluded from analysis

Table 2 illustrates a decrease in mortality associated with air ambulance transportation if a patient has an ISS >8, an RTS <=4 and a Ps <0.90.

Table 2

	Air	Ground	p-value
	Mortality Rate %		
ISS Groups (n)			
0-8 (40,196)	0.6%	0.4%	>0.05
9-15 (13,492)	0.9%	1.6%	<0.01
16-24 (5,732)	3.0%	5.3%	<0.0001
>24 (5,200)	28.1%	39.0%	<0.0001
RTS Scene			
>=4 (55,144)	1.9%	1.3%	<0.0001
<4 (1,816)	56.7%	74.3%	<0.0001
RTS ED			
>=4 (62,889)	1.4%	1.1%	<0.05
<4 (2,503)	45.6%	73.5%	<0.0001
PS			
>0.90 (58,281)	0.3%	0.3%	>0.005
<=0.90 (5,232)	29.4%	45.1%	<0.0001
LOS			
<=24 hours/ED discharge home (39,356)	6.4%	4.8%	<0.0001
>24 hours (27,632)	2.1%	1.9%	>0.005

Conclusion

The data suggests that air ambulance utilization may be associated with increased survival for the severely injured trauma victim in Arizona. However, numerous factors contribute to the outcome of trauma patients. There also appears to be considerable over use of air ambulance for trauma victims with non-life threatening injuries. The decision to request an air ambulance is also multi-factorial. This analysis demonstrates the need for accurate data and on-going analysis, in order to optimize the benefits associated with air ambulance transport.