EN ROUTE CARE RESEARCH CENTER
EVIDENCE TO GUIDE PRACTICE

Advancing prehospital combat casualty evacuation: patients amenable to aeromedical evacuation via unmanned aerial vehicles

Gaps Addressed:

- 2017 AFMS CBA
  - ACC/AFMS 96 - Operating in Contested, Degraded, Operationally-limited (CDO) Environment
  - AMC/AFMS 174 - Patient Movement To Support Non- validated/non-regulated Patient Movement
- JCM-2-8: Inadequate casualty evacuation (CASEVAC) by non-standard platforms

Modified Abstract

Background: The United States military currently utilizes unmanned aerial vehicles (UAVs) for reconnaissance and attack missions; however, as combat environment technology advances, there is the increasing likelihood of UAV utilization in prehospital aeromedical evacuation. UAVs may provide a viable means to reduce transport time to trauma capable medical facilities. Identification of patients unlikely to require life-saving interventions (LSIs) during transport may aid prehospital medical personnel in identifying those patients who can be rapidly evacuated in UAVs without medical personnel onboard. We sought to describe patients transported from the POI to the first level of care between January 2011 and March 2014 and to characterize any differences between those patients who received LSIs en route and those who did not to inform military planning on the value of UAV for casualty transports out of the battlefield.

Methods: We conducted a retrospective review of MEDEVAC patient care records for United States (US) military personnel who were injured in the Operation Enduring Freedom (OEF) theater of operations between January 2011 and March 2014. We abstracted the current study dataset (n=1267) from our prior study that examined MEDEVAC patient records from the POI to arrival at the first military treatment facility (MTF). Patients were categorized as receiving an LSI en route if they received at least one of the following during the flight to the first MTF: oxygen administration, airway access, cardiopulmonary resuscitation (CPR), defibrillation, chest needle decompression, chest tube, chest seal, tourniquet(s), non-hemostatic pressure packing, hemostatic agents, blood products, and medications delivered via intravenous (IV) or intraosseous (IO) access. We placed the patients who did not receive at least one LSI en route in the “No LSI” group.

Results:

- We examined the records of 1267 patients transported from the point of injury (POI) to the first level of care between January 2011 and March 2014.
- Casualties were 98.5% male with a median age of 24 (IQR 22-27).

- The majority sustained a blast injury (72.2%) and the most common injury locations were the lower extremities (60.7%), upper extremities (36.6%), head (15.5%), and face (15.5%).
- The most common interventions were non-hemostatic pressure packing (20.0% of sample), intravenous medications (18.0%), airway access (8.9%), oxygen administration (8.3%), tourniquets (6.6%), cardiopulmonary resuscitation (4.4%) and blood products (4.3%).
- Over 78% of all patients experienced at least one en route complication with the most frequent being moderate to severe pain (51.1% of sample), abnormal heart rate (32.0%), abnormal systolic blood pressure (26.9%), and low SpO2 (14.0%).
- 676 (53%) did not receive any en route LSI.
- Certain factors, such as having a blunt injury or the highest abbreviated injury scale (AIS) severity score in the head/neck region, are significant independent predictors of having an uneventful flight with either no LSIs, no complications, or a combination of both.
- Receiving an amputation and having injuries to the chest, back, groin, or lower extremities significantly lower the odds of having an uneventful flight.

Conclusions: Approximately half of casualties evaluated in our study did not receive an LSI during transport and may have been transported safely by UAV. Having a blunt injury or the highest AIS severity score in the head/neck region significantly predicted an uneventful flight.

Evidence Based Recommendations:

- Continue research efforts to identify those patients unlikely to require interventions during transport and who may benefit from rapid UAV evacuation.
- Conduct research evaluating the use of decision support tools to assist medics in triaging casualties in a prolonged field care environment where UAV MEDEVAC may provide benefit.

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