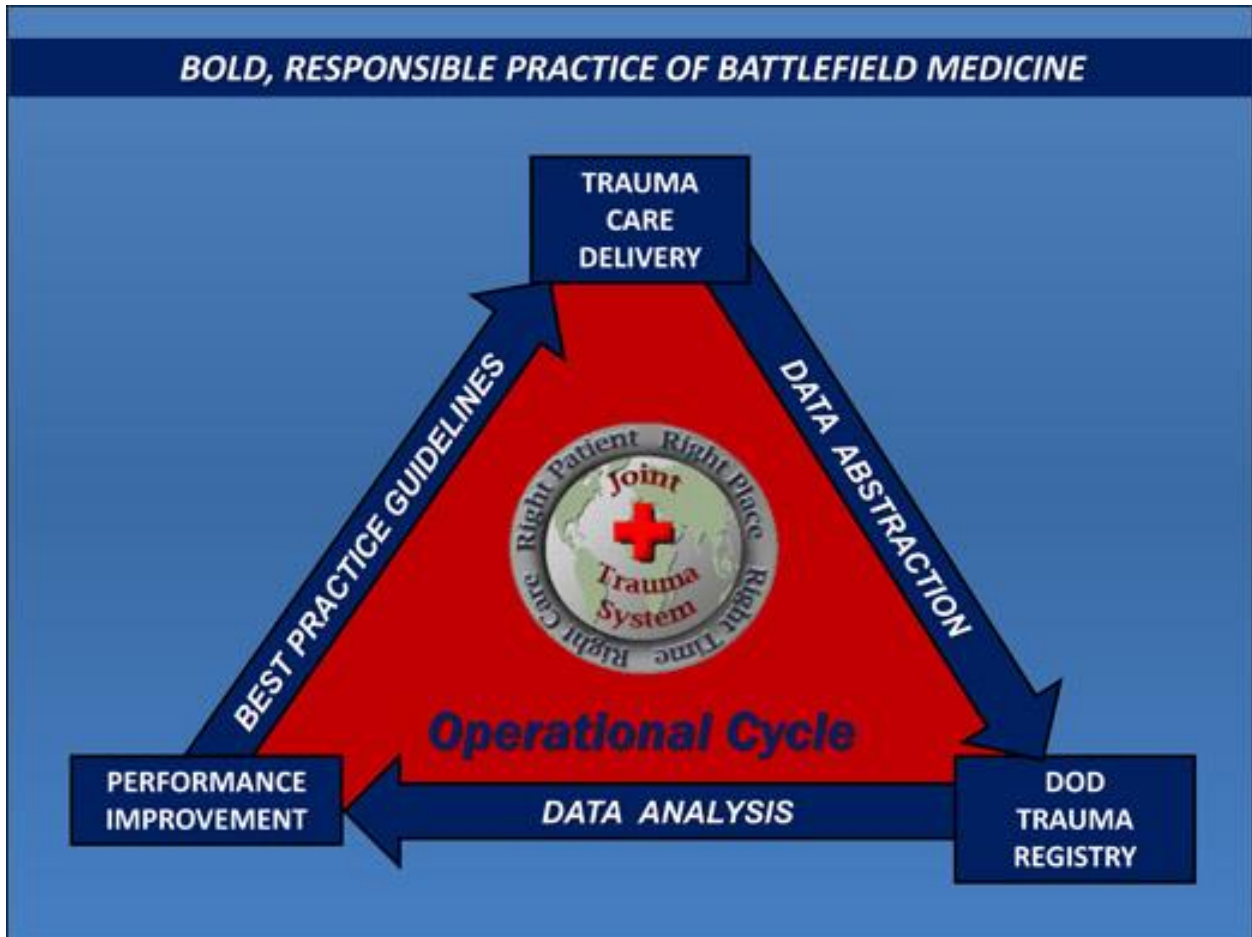


Committee on En Route Combat Casualty Care
(CoERCCC)



Journal Watch

1st Quarter

2017

DECEMBER

Journal Watch Key Terminology Searched:

Emergency medical services	Resuscitation	Treatment efficacy
Acute coronary syndrome	Myocardial infarction	Pre-hospital
Emergency care	Telemedicine	Hypobaric
Aeromedical evacuation	Inflammation	Neuronal cell death
Traumatic brain injury	Air traffic	Disinfection of aircraft
Substances for disinfection	Highly infectious diseases	
Standardized operating procedures		

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Treatment of Acute Coronary Syndrome by Telemedically Supported Paramedics Compared With Physician-Based Treatment: A Prospective, Interventional, Multicenter Trial.

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Abstract

BACKGROUND: Prehospital treatment of acute coronary syndrome (ACS) in German emergency medical services (EMSs) is reserved for EMS physicians due to legal issues.

OBJECTIVE: The objective of this prospective, interventional, multicenter trial was to evaluate the quality of telemedically-delegated therapy and the possible complications in patients with ACS.

METHODS: After approval by the ethics committee and trial registration, a one-year study phase was started in August 2012 with 5 ambulances, telemedically equipped and staffed with paramedics, in 4 German EMS districts. The paramedics could contact an EMS-physician-staffed telemedicine center. After initiation of an audio connection, real-time data transmission was automatically established. If required, 12-lead electrocardiogram (ECG) and still pictures could be sent. Video was streamed from inside each ambulance. All drugs, including opioids, were delegated to the paramedics based on standardized, predefined algorithms. To compare telemedically-delegated medication and treatment in ACS cases with regular EMS missions, a matched pair analysis with historical controls was performed.

RESULTS: Teleconsultation was performed on 150 patients having a cardiovascular emergency. In 39 cases, teleconsultation was started due to suspected ACS. No case had a medical complication. Correct handling of 12-lead ECG was performed equally between the groups (study group, n=38 vs control group, n=39, P>.99). There were no differences in correct handling of intravenous administration of acetylsalicylic acid, heparin, or morphine between both the groups (study group vs control group): acetylsalicylic acid, n=31 vs n=33, P=.73; unfractionated heparin, n=34 vs n=33, P>.99; morphine, n=29 vs n=27, P=.50. The correct handling of oxygen administration was significantly higher in the study group (n=29 vs n=18, P=.007).

CONCLUSIONS: Telemedical delegation of guideline conform medication and therapy by paramedics in patients with ACS and was found to be feasible and safe. The quality of guideline-adherent therapy was not significantly different in both the groups except for the correct administration of oxygen, which was significantly higher in the study group.

TRIAL REGISTRATION: [Clinicaltrials.gov NCT01644006](http://clinicaltrials.gov/NCT01644006); <http://clinicaltrials.gov/ct2/show/NCT01644006> (Archived by WebCite at <http://www.webcitation.org/6mPam3eDy>).

PMID:27908843 PMCID:[PMC5159613](#) DOI:[10.2196/jmir.6358](#)

Disinfection of aircraft: Appropriate disinfectants and standard operating procedures for highly infectious diseases.

[Klaus J](#)¹, [Gnirs P](#)², [Hölterhoff S](#)², [Wirtz A](#)³, [Jeglitzka M](#)⁴, [Gaber W](#)⁵, [Gottschalk R](#)⁶.

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Abstract For infectious diseases caused by highly pathogenic agents (e. g., Ebola/Lassa fever virus, SARS-/MERS-CoV, pandemic influenza virus) which have the potential to spread over several continents within only a few days, international Health Protection Authorities have taken appropriate measures to limit the consequences of a possible spread. A crucial point in this context is the disinfection of an aircraft that had a passenger on board who is suspected of being infected with one of the mentioned diseases. Although, basic advice on hygiene and sanitation on board an aircraft is given by the World Health Organization, these guidelines lack details on available and effective substances as well as standardized operating procedures (SOP). The purpose of this paper is to give guidance on the choice of substances that were tested by a laboratory of Lufthansa Technik and found compatible with aircraft components, as well as to describe procedures which ensure a safe and efficient disinfection of civil aircrafts. This guidance and the additional SOPs are made public and are available as mentioned in this paper.

PMID:27785522 PMCID:[PMC5122611](#) DOI:[10.1007/s00103-016-2460-2](#)

Emergency medical system response time does not effect on incidence of return of spontaneous circulation after pre-hospital resuscitation in one million central European agglomeration.

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Abstract

BACKGROUND: The survival of out-of-hospital sudden cardiac arrest (OHSCA) in Europe still remains low. The State Medical Rescue System is composed of several elements. Efficacy of each of them may have influence on victim's survival. Until now, the incidence of return of spontaneous circulation (ROSC) and its correlation with rescue services time in city of Poznan has not been determined.

AIM: The main purpose of this study was to assess incidents of OHSCA and prehospital frequency of ROSC after OHSCA in Poznan city and district. We also wanted to analyze, if ROSC depends on Emergency medical system (EMS) reaction time.

METHODS: Retrospective analysis based on medical documentation conducted in 2015 in the Poznan EMS.

RESULTS: ROSC was achieved in 68.88% cases. It was most frequent when OHSCA occurred in public places ($p = 0.000$, contingency factor = 0.233) and victims were younger ($p = 0.042$, contingency factor = 0.129). 63.17% of patients were male, but sex did not affect the incidents of ROSC. The median time of system response was 8.53 min, while time from ambulance departure to arrival 5.42 min. We did not found statistically significant difference between number of deaths and those parameters ($p = 0.723$, $p = 0.891$). However there longer team response time was correlated with highest mortality ($p = 0.042$, contingency factor = 0.126). In the group where ROSC was achieved the median time of EMS response was 8.18 min, while among the group of deceased - median 8.63 min.

CONCLUSIONS: The incidents of OHSCA in our region is similar to other polish and european cities. Emergency medical system response time does not affect on frequency of ROSC. ROSC was achieved more often if OHSCA occurred in public and victim was younger.

Cell cycle inhibition reduces inflammatory responses, neuronal loss, and cognitive deficits induced by hypobaric exposure following traumatic brain injury.

[Skovira JW](#)^{1,2}, [Wu J](#)³, [Matyas JJ](#)¹, [Kumar A](#)¹, [Hanscom M](#)¹, [Kabadi SV](#)¹, [Fang R](#)⁴, [Faden AI](#)⁵.

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Abstract

BACKGROUND: Traumatic brain injury (TBI) patients in military settings can be exposed to prolonged periods of hypobaric (HB) during aeromedical evacuation. Hypobaric exposure, even with supplemental oxygen to prevent hypoxia, worsens outcome after experimental TBI, in part by increasing neuroinflammation. Cell cycle activation (CCA) after TBI has been implicated as a mechanism contributing to both post-traumatic cell death and neuroinflammation. Here, we examined whether hypobaric exposure in rats subjected to TBI increases CCA and microglial activation in the brain, as compared to TBI alone, and to evaluate the ability of a cyclin-dependent kinase (CDK) inhibitor (CR8) to reduce such changes and improve behavioral outcomes.

METHODS: Adult male Sprague Dawley rats were subjected to fluid percussion-induced injury, and HB exposure was performed at 6 h after TBI. Western blot and immunohistochemistry (IHC) were used to assess cell cycle-related protein expression and inflammation at 1 and 30 days after injury. CR8 was administered intraperitoneally at 3 h post-injury; chronic functional recovery and histological changes were assessed.

RESULTS: Post-traumatic hypobaric exposure increased upregulation of cell cycle-related proteins (cyclin D1, proliferating cell nuclear antigen, and CDK4) and microglial/macrophage activation in the ipsilateral cortex at day 1 post-injury as compared to TBI alone. Increased immunoreactivity of cell cycle proteins, as well as numbers of Iba-1⁺ and GFAP⁺ cells in both the ipsilateral cortex and hippocampus were found at day 30 post-injury. TBI/HB significantly increased the numbers of NADPH oxidase 2 (gp91^{phox}) enzyme-expressing cells that were co-localized with Iba-1⁺. Each of these changes was significantly reduced by the administration of CR8. Unbiased stereological assessment showed significantly decreased numbers of microglia displaying the highly activated phenotype in the ipsilateral cortex of TBI/HB/CR8 rats compared with TBI/HB/Veh rats. Moreover, treatment with this CDK inhibitor also significantly improved spatial and retention memory and reduced lesion volume and hippocampal neuronal cell loss.

CONCLUSIONS: HB exposure following TBI increases CCA, neuroinflammation, and associated neuronal cell loss. These changes and post-traumatic cognitive deficits are reduced by CDK inhibition; such drugs may therefore serve to protect TBI patients requiring aeromedical evacuation.

PMID:27903275 PMCID:[PMC5131508](#) DOI:[10.1186/s12974-016-0769-2](#)

JANUARY

Journal Watch Key Terminology Searched:

Combat	FLYP	Forward MEDEVAC	French military
Joint trauma system	PECC	Trauma	MRAP
SCI	Helicopter	Porcine model	Shock
Transportation	Vibration	Airway management	Guideline
Pre-hospital	Emergency care	Spinal cord injury	Stabilization

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Forward medevac during Serval and Barkhane operations in Sahel: A registry study.

[Carfantan C](#)¹, [Goudard Y](#)², [Butin C](#)³, [Duron-Martinaud S](#)⁴, [Even JP](#)⁵, [Anselme A](#)⁶, [Dulaurent E](#)⁷, [Géchant M](#)⁸, [Vitalis V](#)⁹, [Bay C](#)¹⁰, [Bancarel J](#)¹¹, [Bordes J](#)¹².

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Abstract

INTRODUCTION: The French army has been deployed in Mali since January 2013 with the Serval Operation and since July 2014 in the Sahel-Saharan Strip (SSS) with the Barkhane Operation where the distances (up to 1100km) can be very long. French Military Medical Service deploys an inclusive chain from the point of injury (POI) to hospital in France. A patient evacuation coordination cell (PECC) has been deployed since February 2013 to organise forward medical evacuation (MEDEVAC) in the area between the POI and three forward surgical units. The purpose of this work was to study the medical evacuation length and duration between the call for Medevac location accidents and forward surgical units (role 2) throughout the five million square kilometers French joint operation area.

MATERIALS AND METHODS: Our retrospective study concerns the French patients evacuated by MEDEVAC from February 2013 to July 2016. The PECC register was analysed for patients' characteristics, NATO categorisation of gravity (Alpha, Bravo or Charlie who must be respectively at hospital facility within 90min, 4h or 24h), medical motive for MEDEVAC and the time line of each MEDEVAC (from operational commander request to entrance in role 2).

RESULTS: A total of 1273 French military were evacuated from February to 2013 to July 2016; 533 forward MEDEVAC were analysed. 12,4% were Alpha, 28,1% Bravo, 59,5% Charlie. War-related injury represented 18,2% of MEDEVAC. The median time for Alpha category MEDEVAC patients was 145min [100-251], for Bravo category patients 205min [125-273] and 310min [156-669] for Charlie. The median distance from the point of injury to role 2 was 126km [90-285] for Alpha patients, 290km [120-455] km for Bravo and 290km [105-455] for Charlie.

CONCLUSIONS: Patient evacuation in such a large area is a logistic and human challenge. Despite this, Bravo and Charlie patients were evacuated in NATO recommended time frame. However, due to distance, Alpha patients time frame was longer than this recommended by NATO organisation. That's where French doctrine with forward medical teams embedded in the platoons is relevant to mitigate this distance and time frame challenge.

Clinical Experience and Learning Style of Flight Nurse and Aeromedical Evacuation Technician Students.

[De Jong MJ](#), [Dukes SF](#), [Dufour KM](#), [Mortimer DL](#).

Abstract

BACKGROUND: The clinical experience and preferred learning style of U.S. Air Force flight nurses and aeromedical evacuation technicians are unknown.

METHODS: Using a cross-sectional survey design, we gathered data regarding the clinical experience, level of comfort providing clinical care, and preferred learning style of 77 active duty (AD), Air Force Reserve (AFR), and Air National Guard (ANG) nurses enrolled in the U.S. Air Force School of Aerospace Medicine Flight Nurse course, and 121 AD, AFR, and ANG medical technicians enrolled in the Aeromedical Evacuation Technician course.

RESULTS: Nurses and medical technicians reported 7.6 ± 5.5 and 3.9 ± 4.5 yr of experience, respectively. AD, AFR, and ANG nurses had comparable years of experience: 5.8 ± 3.2 , 8.3 ± 6.6 , and 7.9 ± 4.2 yr, respectively; however, AD medical technicians had more years of experience (5.6 ± 4.4 yr) than AFR (3.1 ± 4.8 yr) and ANG (1.9 ± 2.8 yr) medical technicians. Both nurses and medical technicians reported infrequently caring for patients with various disease processes and managing equipment or devices that they will routinely encounter when transporting patients as an aeromedical evacuation clinician. Nurses and medical technicians preferred a kinesthetic learning style or a multimodal learning style that included kinesthetic learning. Nearly all (99%) nurses and 97% of medical technicians identified simulation as their preferred teaching method.

DISCUSSION: These findings confirm faculty concerns regarding the clinical experience of flight nurse and aerospace evacuation technician students. De Jong MJ, Dukes SF, Dufour KM, Mortimer DL. Clinical experience and learning style of flight nurse and aeromedical evacuation technician students. *Aerosp Med Hum Perform.* 2017; 88(1):23-29.

PMID:28061918 DOI:[10.3357/AMHP.4697.2017](https://doi.org/10.3357/AMHP.4697.2017)

The Norwegian guidelines for the prehospital management of adult trauma patients with potential spinal injury.

[Kornhall DK](#)^{1,2,3}, [Jørgensen JJ](#)^{4,5}, [Brommeland T](#)⁶, [Hyldmo PK](#)^{7,8}, [Asbjørnsen H](#)^{9,10}, [Dolven T](#)⁹, [Hansen T](#)¹¹, [Jeppesen E](#)^{12,13}.

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Abstract

The traditional pre-hospital management of trauma victims with potential spinal injury has become increasingly questioned as authors and clinicians have raised concerns about over-triage and harm. In order to address these concerns, the Norwegian National Competence Service for Traumatology commissioned a faculty to provide a national guideline for pre-hospital spinal stabilization. This work is based on a systematic review of available literature and a standardized consensus process. The faculty recommends a selective approach to spinal stabilization as well as the implementation of triaging tools based on clinical findings. A strategy of minimal handling should be observed.

PMID:28057029 PMCID: [PMC5217292](#) DOI:[10.1186/s13049-016-0345-x](#)

Ultraportable Oxygen Concentrator Use in U.S. Army Special Operations Forward Area Surgery: A Proof of Concept in Multiple Environments.

[Rybak M](#)¹, [Huffman LC](#)¹, [Nahouraii R](#)¹, [Loden J](#)¹, [Gonzalez M](#)¹, [Wilson R](#)², [Danielson PD](#)¹.

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Abstract

INTRODUCTION: A limitation to surgical care in an austere environment is the supply of oxygen to support mechanical ventilation and general anesthesia. Portable oxygen concentrators (OCs) offer an alternative to traditional compressed oxygen tanks.

OBJECTIVES: We set out to demonstrate that a low-pressure OC system could supply the mechanical ventilation needs in an austere operating environment.

METHODS: An ultraportable OC (SAROS Model 3000, SeQual Technologies, Ball Ground, Georgia) was paired with an Impact 754 ventilator (Impact Instrumentation, West Caldwell, New Jersey) to evaluate the delivered fraction of inspired oxygen (FiO₂) to a test lung across a range of minute ventilations and at altitudes of 1,200 and 6,500 feet above sea level.

RESULTS: The compressor-driven Impact ventilator was able to deliver FiO₂ at close to 0.9 for minute ventilations equal to oxygen flow. Pairing two OCs expanded the range of minute ventilations supported. OCs were less effective at concentrating oxygen at higher altitudes.

CONCLUSIONS: These results demonstrate that low-pressure, ultraportable OCs are capable of delivering high FiO₂ during mechanical ventilation in austere locations at both low and high altitudes. Ultraportable OCs could therefore be sufficient to support forward area surgical procedures and positively impact logistics.

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PMID:28051988 DOI:[10.7205/MILMED-D-16-00100](#)

Responses of the Acutely Injured Spinal Cord to Vibration that Simulates Transport in Helicopters or Mine-Resistant Ambush-Protected Vehicles.

[Streijger F](#)¹, [Lee JH](#)¹, [Manouchehri N](#)¹, [Melnyk AD](#)^{1,2}, [Chak J](#)^{1,2}, [Tigchelaar S](#)¹, [So K](#)¹, [Okon EB](#)¹, [Jiang S](#)¹, [Kinsler R](#)³, [Barazanji K](#)³, [Cripton PA](#)^{1,2}, [Kwon BK](#)^{1,4}.

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Abstract

In the military environment, injured soldiers undergoing medical evacuation via helicopter or mine-resistant ambush-protected vehicle (MRAP) are subjected to vibration and shock inherent to the transport vehicle. We conducted the present study to assess the consequences of such vibration on the acutely injured spinal cord. We used a porcine model of spinal cord injury (SCI). After a T10 contusion-compression injury, animals were subjected to 1) no vibration (n = 7-8), 2) whole body vibration at frequencies and amplitudes simulating helicopter transport (n = 8), or 3) whole body vibration simulating ground transportation in an MRAP ambulance (n = 7). Hindlimb locomotor function (using Porcine Thoracic Injury Behavior Scale [PTIBS]), Eriochrome Cyanine histochemistry and biochemical analysis of inflammatory and neural damage markers were analyzed. Cerebrospinal fluid (CSF) expression levels for monocyte chemoattractant protein-1 (MCP-1), interleukin (IL)-6, IL-8, and glial fibrillary acidic protein (GFAP) were similar between the helicopter or MRAP group and the unvibrated controls. Spared white/gray matter tended to be lower in the MRAP-vibrated animals than in the unvibrated controls, especially rostral to the epicenter. However, spared white/gray matter in the helicopter-vibrated group appeared normal. Although there was a relationship between the extent of sparing and the extent of locomotor recovery, no significant differences were found in PTIBS scores between the groups. In summary, exposures to vibration in the context of ground (MRAP) or aeromedical (helicopter) transportation did not significantly impair functional outcome in our large animal model of SCI. However, MRAP vibration was associated with increased tissue damage around the injury site, warranting caution around exposure to vehicle vibration acutely after SCI.

Minute Ventilation Limitations of Two Field Transport Ventilators.

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Abstract

Knowledge of transport ventilator performance impacts patient safety. This study compared minute ventilation (V_E) of the MOVES and Uni-Vent 731 when ventilating the VentAid Training Test Lung with compliance (C) ranging from 0.02 to 0.10 L/cm H₂O and three different airway resistances (R) (none, Rp5, or Rp20). Tidal volume (V_T) was 800 ± 25 mL. Respiratory rate was increased to ventilator's maximum or until auto-PEEP > 5 cm H₂O. Respiratory parameters were recorded with the RSS 100HR Research Pneumotach. Data were reported as median (interquartile range). Peak inspiratory pressure (PIP) of the Uni-Vent and MOVES ranged from 22.3 (22.2-22.5) to 82.6 (82.2-83.2) and 20.8 (20.6-20.9) to 50.6 (50.2-50.9) cm H₂O, respectively. V_E of the Uni-Vent and MOVES ranged from 17.7 (17.7-17.7) to 31.5 (31.5-31.5) and 11.3 (10.5-11.3) to 20.2 (19.7-20.5) L/min, respectively. Linear regression demonstrated strong, negative correlation of V_E with PIP for the MOVES (V_E [L/min] = 26 - 0.31 × PIP [cm H₂O]), $r = -0.97$) but weak, positive correlation for the Uni-Vent ($r = 0.05$). Uni-Vent V_E exceeded MOVES V_E under each test condition ($p = 0.0002$). If patient V_E requirements exceed those predicted by the MOVES regression equation, then using the Uni-Vent should be considered.

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PMID:28051989 DOI:[10.7205/MILMED-D-16-00069](#)

FEBRUARY

Journal Watch Key Terminology Searched:

Acute myocardial infarction	Combat	FLYP	Forward MEDEVAC
French military	Joint trauma system	PECC	Trauma
MRAP	SCI	Helicopter	Porcine model
Shock	Transportation	Vibration	Pre-hospital
Airway management Guideline	Emergency care	Spinal cord injury	Stabilization
ST-segment elevation			

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Yeo, H. J. (Feb 2017). Interhospital Transport System for Critically Ill Patients: Mobile Extracorporeal Membrane Oxygenation without a Ventilator. *The Korean journal of thoracic and cardiovascular surgery*, 8-13.

Outcomes of Physician-Staffed Versus Non-Physician-Staffed Helicopter Transport for ST-Elevation Myocardial Infarction.

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Abstract

BACKGROUND: The effect of physician-staffed helicopter emergency medical service (HEMS) on ST-elevation myocardial infarction (STEMI) patient transfer is unknown. The purpose of this study was to evaluate the characteristics and outcomes of physician-staffed HEMS (Physician-HEMS) versus non-physician-staffed (Standard-HEMS) in patients with STEMI.

METHODS AND RESULTS: We studied 398 STEMI patients transferred by either Physician-HEMS (n=327) or Standard-HEMS (n=71) for primary or rescue percutaneous coronary intervention at 2 hospitals between 2006 and 2014. Data were collected from electronic medical records and each institution's contribution to the National Cardiovascular Data Registry. Baseline characteristics were similar between groups. Median electrocardiogram-to-balloon time was longer for the Standard-HEMS group than for the Physician-HEMS group (118 vs 107 minutes; P=0.002). The Standard-HEMS group was more likely than the Physician-HEMS group to receive nitroglycerin (37% vs 15%; P<0.001) and opioid analgesics (42.3% vs 21.7%; P<0.001) during transport. In-hospital adverse outcomes, including cardiac arrest, cardiogenic shock, and serious arrhythmias, were more common in the Standard-HEMS group (25.4% vs 11.3%; P=0.002). After adjusting for age, sex, Killip class, and transport time, patients transferred by Standard-HEMS had increased risk of any serious in-hospital adverse event (odds ratio=2.91; 95% CI=1.39-6.06; P=0.004). In-hospital mortality was not statistically different between the 2 groups (9.9% in the Standard-HEMS group vs 4.9% in the Physician-HEMS group; P=0.104).

CONCLUSIONS: Patients with STEMI transported by Standard-HEMS had longer transport times, higher rates of nitroglycerin and opioid administration, and higher rates of adjusted in-hospital events. Efforts to better understand optimal transport strategies in STEMI patients are needed.

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En route intraosseous access performed in the combat setting.

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Abstract

OBJECTIVE: To describe and compare vascular access practices used by en route care providers during medical evacuation (MEDEVAC).

DESIGN: This was a retrospective cohort study. Medical records of US military personnel injured in combat and transported by MEDEVAC teams were queried.

PATIENTS: The subjects were transported by military en route care providers, in the combat theater during Operation Enduring Freedom (OEF) between January 2011 and March 2014. The authors reviewed 1,267 MEDEVAC records of US casualties and included 832 subjects that had vascular access attempts.

MAIN OUTCOME MEASURES: The outcome measures for this study were vascular access success rates, including intravenous (IV) and intraosseous (IO) attempts. Subjects were grouped by type of vascular access: None, peripheral intravenous (PIV), IO, and PIV + IO (combination of PIV and IO) and by vascular access (PIV or IO) success (No versus Yes). Survival rate, in-flight events, ventilator, intensive care and in hospital days, and 30-day outcomes were compared among groups.

STATISTICAL ANALYSIS: The authors used chisquare or Fisher's exact tests to evaluate categorical variables. Analysis of variance (ANOVA) or Kruskal-Wallis tests were used for continuous variables.

RESULTS: Vascular access was attempted in 832 (66 percent) of the 1,267 subjects transported by MEDEVAC during this study period. The majority (n = 758) of the access attempts were PIV of which 93 percent (706/758) were successful. In 74 subjects, IO was the only access attempted with an 85 percent (n = 63) success rate. The overall success rate with IO placement was 88 percent.

CONCLUSIONS: Intraosseous access has been used successfully in the combat setting and accounts for approximately 12 percent of vascular access in the MEDEVAC population the authors studied.

Interhospital Transport System for Critically Ill Patients: Mobile Extracorporeal Membrane Oxygenation without a Ventilator.

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Abstract

BACKGROUND: Extracorporeal membrane oxygenation (ECMO) has been successfully used as a method for the interhospital transportation of critically ill patients. In South Korea, a well-established ECMO interhospital transport system is lacking due to limited resources. We developed a simplified ECMO transport system without mechanical ventilation for use by public emergency medical services.

METHODS: Eighteen patients utilized our ECMO transport system from December 2011 to September 2015. We retrospectively analyzed the indications for ECMO, the patient status during transport, and the patient outcomes.

RESULTS: All transport was conducted on the ground by ambulance. The distances covered ranged from 26 to 408 km (mean, 65.9±88.1 km) and the average transport time was 56.1±57.3 minutes (range, 30 to 280 minutes). All patients were transported without adverse events. After transport, 4 patients (22.2%) underwent lung transplantation because of interstitial lung disease. Eight patients who had severe acute respiratory distress syndrome showed recovery of heart and lung function after ECMO therapy. A total of 13 patients (70.6%) were successfully taken off ECMO, and 11 patients (61.1%) survived.

CONCLUSION: Our ECMO transport system without mechanical ventilation can be considered a safe and useful method for interhospital transport and could be a good alternative option for ECMO transport in Korean hospitals with limited resources.

KEYWORDS: Acute respiratory distress syndrome (ARDS); Emergency medical system; Extracorporeal membrane oxygenation; Patient transfer

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MARCH

Journal Watch Key Terminology Searched:

Acute myocardial infarction	Combat	FLYP	Forward MEDEVAC
French military	Joint trauma system	PECC	Trauma
MRAP	SCI	Helicopter	Porcine model
Shock	Transportation	Vibration	Pre-hospital
Airway management Guideline	Emergency care	Spinal cord injury	Stabilization
ST-segment elevation	Employment standards	Physically demanding occupation	
Task analysis			

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Swearingen, J. M. (March 2017). Post-Traumatic Stress Symptoms in United States Air Force Aeromedical Evacuation Nurses and Technicians . *Military Medecine*, 258-265.

Ten Years of En Route Critical Care Training.

[Boutonnet M](#)¹, [Pasquier P](#)², [Raynaud L](#)³, [Vitiello L](#)⁴, [Bancarel J](#)⁵, [Coste S](#)⁶, [de Saint Maurice GP](#)⁷, [Ausset S](#)⁷.

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Abstract

OBJECTIVE: The French Military Health Service (FMHS) has developed a training program for medical evacuation (MEDEVAC) of critical care patients on fixed wing aircraft.

METHODS: We conducted a 10-year retrospective analysis (2006-2015) of the data from the FMHS Academy. The number of trainees was listed according to the different courses and medical specialties. The number of MEDEVACs recorded during the period was described.

RESULTS: Since 2006, the FMHS has developed training courses designed for MEDEVAC of critical care patients. Forty-five collective strategic MEDEVAC courses were delivered to 91 intensivists, 130 anesthetic nurses, 79 flight surgeons, 55 flight nurses, and 89 nurses. Five sessions of tactical MEDEVAC courses were performed for 14 flight surgeons, 6 flight nurses, and 17 other nurses. Ten sessions of individual strategic MEDEVAC courses were delivered to 17 intensivists, 10 flight surgeons, 21 flight nurses, and 7 other nurses. Between 2006 and 2015, 818 (\pm 68) individual strategic MEDEVACs were performed per year. Thirty-three (\pm 19) concerned critical care patients. Five missions of collective strategic MEDEVAC were performed for 56 patients.

CONCLUSION: The FMHS has developed specific courses for the MEDEVAC of critical care patients, allowing the training of numerous MEDEVAC teams.

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A Retrospective Cohort Analysis of Battle Injury Versus Disease, Non-Battle Injury-Two Validating Flight Surgeons' Experience.

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Abstract

Today, military combat medical care is the best it has ever been. Regulated U.S. Air Force aeromedical evacuation (AE) is one important reason. The Theater Validating Flight Surgeon (TVFS) validates that a patient is ready for flight. Two TVFSs' experiences, successively deployed in 2007, are the focus of this study. A unique operational worksheet used to manage the AE queue was used for approximately 5 months. A descriptive analysis of the worksheet's 1,389 patients found the majority male (94%), median age 30 years, and mostly Army enlisted soldiers (63%). U.S. civilians made up 9%. Battle Injury (55%) surpassed Disease, Non-Battle Injury (45%); most frequently seen were extremity injuries (73%) and cardiac illness (31%), respectively. Common to both Battle Injury and Disease, Nonbattle Injury were several TVFS prescriptions including no "remain overnights" (79%), head of bed elevation (78%), cabin altitude restriction (57%), no stops (44%), Critical Care Air Transport Team (27%), and supplemental oxygen (22%). This study is a first look at the TVFS experience and it offers up an initial accounting of the TVFS clinical and prescriptive practices. It is also a jumping point for future TVFS investigations using the available AE databases.

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Prehospital Blood Transfusion During Aeromedical Evacuation of Trauma Patients in Israel: The IDF CSAR Experience.

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Abstract

BACKGROUND: Data regarding the effect of prehospital blood administration to trauma patients during short-to-moderate time evacuations is scarce. The Israel Air Force Airborne Combat Search and Rescue is the only organization that deals with aeromedical evacuation for both military and civilian casualties in Israel and the only one with the ability to give blood in the prehospital setting.

METHODS: Data on packed red blood cells (PRBCs) administration in the evacuation missions from January 2003 to June 2010 were analyzed and actual transfusion practice was compared to clinical practice guidelines (CPGs).

RESULTS: Over the studied 101 months, a total of 1,721 patients were evacuated by Combat Search and Rescue. Of these, 87 (5.1%) trauma patients were transfused with PRBC. Demographics included 83% male and 17% female with a median age of 23 years. Main mechanisms of injury included gunshot wounds (36%), motor vehicle accidents (28%), and blast injuries (24%) with an average of 2.6 injured regions per casualty. The most commonly injured body regions included lower extremities (52%), chest (45%), and abdomen (38%). Overall, 10 (11%) casualties died. Lifesaving intervention included tourniquets (27%), endotracheal intubation (24%), tube thoracostomy (24%), and needle thoracostomy (21%) times. For 98% of the patients, clinical judgment led to administration of red blood cells before indicated by the CPG. The heart rate tended to decrease during the evacuation, whereas there was no clear trend in systolic or diastolic blood pressure or shock index.

CONCLUSIONS: In our aeromedical experience, transfusion of PRBCs for trauma patients was safe, feasible, and most likely beneficial. PRBCs were administered according to the flight surgeons' clinical judgment and not in complete adherence to CPGs in most cases. Data collected from this and similar studies worldwide have led to change in CPGs with the shift from hypertensive resuscitation to hypotensive-hemostatic Remote Damage Control Resuscitation.

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[Appl Ergon.](#) 2017 Mar;59(Pt A):27-33. doi: 10.1016/j.apergo.2016.08.014. Epub 2016 Sep 8.

The identification of combat survivability tasks associated with naval vessel damage in maritime environments.

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Abstract

Effective Navy personnel have the physical ability to perform combat survivability tasks commensurate with their unique physical requirements due to the distinctive characteristics of naval platforms. The aim of this investigation was to identify the physically demanding whole-of-ship tasks that are performed by Navy personnel while at sea. A mixed method design was used to identify tasks, inclusive of focus groups and field observations. From a series of ten focus groups, nine tasks were deemed to be physically demanding whole-of-ship tasks. A subsequent field observation of a combat survivability training course resulted in a refined and expanded 33-item list of physically demanding whole-of-ship tasks across six categories, including; replenishment at sea, emergency response, firefighting, leak stop and repair, toxic hazard and casualty evacuation. The findings from this study provide the basis for the development of physical employment standards for whole-of-ship tasks within the Royal Australian Navy.

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Post-Traumatic Stress Symptoms in United States Air Force Aeromedical Evacuation Nurses and Technicians.

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Abstract

Critical Care Air Transport Teams (CCATT) are specialized military medical personnel who provide high-acuity care in an aeromedical environment. The rate of post-traumatic stress disorder (PTSD) symptoms was assessed in CCATT personnel and their rates were compared to general aeromedical evacuation (AE) personnel. As part of a computer-based occupational stress survey, 188 crew members (138 AE nurses and technicians, 50 CCATT nurses and respiratory therapists) completed the PTSD Checklist - Military Version. A categorical MEET/DOES NOT MEET CRITERIA variable was created, and a Fisher's exact test was computed to identify differences between groups. Contingency table analyses were used to assess associations between demographic and occupational variables with meeting criteria. χ^2 or Fisher's exact test results, relative risks, and 95% confidence intervals were obtained, with 4.35% of AE and 14.00% of CCATT crew members meeting PTSD symptom criteria. The CCATT crew members were 3.22 times (95% confidence interval = 1.14-9.12) more likely to meet symptom criteria than AE, and for CCATT meeting criteria, the most commonly endorsed symptoms were arousal and avoidance. The demographic and occupational factors assessed in this study were not associated with meeting PTSD symptom criteria. Current findings are discussed in relation to current research on post-traumatic stress in ground-based critical care personnel.

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