
“Doctors in the Air”; do we need them, and if so, how should we train them?

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Abstract

Despite the accumulation of years of experience with helicopter emergency medical services (HEMS) transport, the question of whether physicians are needed in flight remains an unresolved issue. Less than 5% of helicopter programs have a flight physician and the majority of flight physicians are residents-in-training. A Medline search reveals often poor study designs and a limited amount of good studies, but indicate that physician’s judgment and skills are needed in about 25% of flights and that the flight physicians perform more procedures without altering the scene time compare to nurses or paramedics. These factors have shown to improve trauma patients’ outcome and mortality. Residency training does not provide adequate preparation for physicians practicing as flight physicians and EM residents need special HEMS training before flying. The flight physician is an important, but small part of the air medical service, and will hopefully function as a valuable resource in the future development of the medical air transport in United States.

INTRODUCTION

As an emergency medicine (EM) resident with previous experience from EMS and HEMS in Norway, I decided to apply to a residency program that offered air medical education and experience. My background is from the Norwegian EMS and the HEMS system, which is based on a combination of the Swiss and German models where the crew consists of a pilot, a rescue professional, and an anesthesiologist. It was eye opening to learn that the majority of the helicopter programs in United States use non-physician crewmembers with a nurse/paramedic mix as the most common team configuration (71%)¹. There are a variety of medical crew configurations and the crew composition may be selected and limited by several factors, including patient type, finances, local resources, and physician demand for specialty use¹. A flight physician is only present in about 5 % of the programs. This has decreased from 13% in 1984. In 2005 there were 272 services operating 753 helicopters. That means that only 13-14 programs has a flight physician or if you calculate it from the amount of helicopters, not programs, only 37-38 helicopters are staffed with a physician. United States and Europe seem to go in different directions on this topic. I decided to investigate the literature and try to answer if the air medical crew or the patient would benefit from having a physician on board and what qualifications a flight physician

should have and how he or she should be trained. An extensive Medline/Ovid search was performed and a summary is presented here. This article is based on Grand Rounds at University of Wisconsin Emergency Medicine Program in March 20, 2009. I am focusing on the possible benefits of having a flight physician and will not discuss cost, appropriate use of HEMS and benefits of air medical service in general. A review of recommended preflight training and educational air medical program for EM residents are also briefly presented.

FLIGHT PHYSICIANS

Despite the accumulation of years of experience with helicopter emergency medical services (HEMS) transport, the question of whether physicians are needed in flight remains an unresolved issue. It has been stated that the flight physicians are an essential part of HEMS operations and allow earlier live-saving medical intervention in the prehospital setting², but is the flight physician really needed for helicopter emergency medical services?

In Europe most countries use the Swiss and German model of small helicopters staffed with physicians, commonly anesthesiologists³, but HEMS in the United States may on the other hand be served by a variety of medical and paramedical crew mixes. Some HEMS providers have chosen to use routinely only non-physician personnel in the

flight crew, most commonly two nurses or one paramedic and one nurse^{4, 5}. Other programs have included a physician in the crew^{6, 7, 8}. In a study performed in Michigan by Rhee and colleagues in 1986 the flight physician's contribution to patient care and the benefits of physician staffing in relation to system cost were studied⁶. A questionnaire that was completed by the flight physician and the flight nurse after each flight and the study concluded that flight physician made a unique and important contribution to the care of the patient in 22% flights. Judgment was exercised most frequently in making diagnoses, initiating critical medical treatments, and determining destination. It was also concluded that the benefits of this contribution far outweighed the program cost. It can be argued that the flight physician does not need the extensive training in prehospital care and procedures that an emergency physician in United States and an anesthesiologist in Europe have. A study by Hotvedt, where an expert panel evaluated medical interventions carried out by the flight anesthesiologist, concluded that in 38 % of the time a general practitioner would not have the advanced skills, equipment or drugs needed⁹. The role of the anesthesiologist was crucial for health benefits¹⁰. Retrospective analysis of flights performed by Metro Life Flight in Cleveland, OH indicated that a physician is necessary 25% of the time, is not necessary 39.7% of the time, and may be necessary 34.7% of the time¹¹. According to this study the flight physician's presence was necessary for judgment, skill, or both. A study from United Kingdom showed that 68 % of trauma patients required treatments or procedures that were beyond the current training of the ambulance paramedic. It was concluded that flight physicians were an essential part of HEMS operations and allow earlier life-saving medical intervention in the prehospital phase of care².

In a randomized study with blunt trauma patients treated and transported by a medical helicopter staffed either by a flight nurse and flight paramedic or by a flight nurse and flight physician, the flight physician had a positive impact on mortality^{12, 13}. The mortality of the patients treated by the flight nurse/flight physician team was significantly lower than that of the flight nurse/flight paramedic-staffed helicopter. Physicians perform a greater number of procedures at accident scenes without increasing scene time and this results in significantly lower mortality^{14, 15}. Flight physicians performed more intubations, more aggressive fluid resuscitation, and decompressed thorax more often. It was suggested that the flight physician staffed helicopter caused 8-19 extra survivors per 100 patients treated

compared with the non-physician staffed helicopter¹⁴. In addition to adult trauma, HEMS physicians has shown to play an important role in pediatric prehospital care, but only in selected instances^{16, 17, 18}. Areas in which prehospital interventions seem to influence pediatric patient outcome are airway control and ventilator support.

On the other hand two studies have failed to demonstrate that physician participation in flights had an impact on patient outcome. No difference was found in the number of procedures performed at the scene, en route, or on arrival at the hospital¹⁹. Two years of detailed prospective measurement of air medical patient characteristics and outcomes by Burney and colleagues confirmed this initial finding. No significant differences in clinical outcomes of patients could be identified when a flight physician was added to the crew²⁰. These studies concluded that experienced nurses and paramedics, operating with well-established protocols, could provide aggressive care that yields equal outcome results compared with those of a flight team that includes a physician.

Despite often poor study design and a limited amount of good studies on the pros and cons of having a flight physician I believe that the papers gives us sufficient evidence to state that the flight physician is an important, but small part of the air medical service.

TRAINING RESIDENTS TO BECOME FLIGHT PHYSICIANS

The above mention studies do not indicate the flight physician's level of training and it could be argued that a resident would no do as well as an attending. As mentioned, less than 5% of all medical helicopter programs fly with physicians and while some of these programs fly with attending level physicians, the majority of flight physicians are residents-in-training. Zanker and colleagues looked into what kind of problems that may occur when resident starts flying. A survey consisting of multiple choice and open ended questions was distributed to flight crew members showed that 79% of the RN were concern that the residents would disrupt teamwork, 36% thought there would be conflict of medical judgment, only 14 % thought that it would enhance flight crew education and functioning as procedural backup, and there were concerns that it would delay liftoff and scene times²¹. There are no studies addressing if the level of training has an impact on patient outcome or teamwork, but studies have shown that an emergency medicine resident can be incorporated into a

flight crew without adversely affecting scene time^{22, 22}. The core content of emergency medicine mentions very little regarding the practice of medicine in the field or in an aircraft^{23,24} and routine residency training do not provide adequate preparation for physicians practicing as flight physicians¹. The air medical transport is playing an increasingly important role in the quality of emergency care and emergency medicine residents must have a thorough understanding of the capabilities and indications for helicopter transport²¹. Flight experience is not mandatory, but about twenty EM residencies describe HEMS as “optional”, “elective”, or “available”²⁵. Hoyle and colleagues contacted EM residency programs that offered HEMS and questioned how often the resident flew and what role they had in the helicopter²⁶. Among the 20 residency programs (9% of programs in 2000) that offered HEMS, 89% of the programs had the resident working as the flight physician and about 45% flew during all rotations. Majority of programs had the residents start at the PGY2 level (61%) and the mean number of flights completed during residency was 78. Resident readiness to serve as a flight physician depends on the curriculum and training²⁶. Guidelines from the National Association of Emergency Medical Services Physicians and the Society of Academic Emergency Medicine are helpful in training of EM residents, but only suggest HEMS experience as part of the curriculum in EMS²⁷. An extensive preflight curriculum has been established in the literature and should be followed at both residency programs and helicopter programs that educate flight physicians to best prepare the residents before flying solo^{28, 29} and³⁰. The preflight training should contain an extensive flight physician course and a minimum 5 orientation flights in addition to proficiency testing throughout residency. When the resident function as the flight physician it should be focused on daily checklist, checklist for specific situations, daily briefing with other crew, feedback, and a system for picking up resident issues and concerns. The key to an effective air medical team, despite the configuration, is adequate training and ongoing flight experience. Unless future studies define the role of physicians on the medical team, the air medical crew configuration will be determined by each flight program based on their perception of individual needs and available resources³¹.

SUMMARY

The Air Medical Service professional crews should have physician-level skills even though most of the helicopter programs in United States are provided by nurse/paramedic

teams³². Less than 5% of helicopter programs have a flight physician and the majority of flight physicians are residents-in-training. The physician’s judgment and skills are needed in 25% of flights and the flight physicians perform more procedures without altering the scene time compare to other crewmembers. These factors have shown to improve trauma patients’ outcome and mortality. Residency training does not provide adequate preparation for physicians practicing as flight physicians¹ and EM residents need special HEMS training before flying. The flight physician is an important, but small part of the air medical service, and will hopefully function as a valuable resource in the future development of the medical air transport in United States.

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