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## AIR AMBULANCE

Viktorii Ivannikova<sup>1</sup>, Oleksandra Liashenko<sup>2</sup>

<sup>1,2</sup>National Aviation University, Kyiv, Ukraine

E-mails: <sup>1</sup>vicg@bigmir.net, <sup>2</sup>gevell@ukr.net

**Abstract.** Air ambulance services have proved to be beneficial to a large number of people. In the past, they were largely used for military purposes but currently, they are also widely used for civilians. Benefits and negatives of using air ambulance are presented in the article.

**Keywords:** Air ambulance, treatment centers, fixed wing and rotary wing aircraft, bed-to-bed service, FAA-certified, burn patient, aircraft crash.

### Overview

As a rule when people hear the word “ambulance” they associate it with an emergency vehicle that comes to your location and transports a sick person to the nearest hospital. Well air ambulance does the same thing, except the one difference. Air ambulance does not just transport the sick or injured person to the nearest hospital; personnel aboard the air ambulance also perform emergency medical assistance. Under most situations, air ambulances are equipped with the materials and equipment to allow the crew to provide the proper first aid or medical treatment required. An example of such equipment would be a respirator, medicines, an ECG and monitoring unit, CPR equipment, a stretcher etc. [1].

In general it is a specially equipped aircraft that transports injured or sick people over distances or terrains impractical for usage of conventional ground ambulance.

If you get assistance from air ambulance, normally you will find two or three paramedics, with a flight nurse or physician to take care of the medical condition. Personnel aboard the air ambulance is properly trained and certified to handle the different type of treatment. There are also pilots on the board whose duty is to navigate the aircraft or helicopter. Usually medical staff works every day, that is why pilots should have extensive experience

to be ready to be faced with unstable or hazardous conditions in the air.



Fig. 1. Medical staff of air ambulance

There are two types of air ambulances in use: private sector and publicly-owned air ambulances. Also we can divide all air ambulances into two parts due to aircraft type: fixed wing (airplane) and rotary wing (helicopter) aircraft. Both of these types of aircraft are furnished when the beneficiary’s medical condition is such that transport by ground ambulance, in whole or in part, is not appropriate. Generally, it may be necessary because the beneficiary’s condition requires rapid transport to a treatment facility, and either great distances or other ob-

stacles, e.g., heavy traffic, preclude such rapid delivery to the nearest appropriate facility. Air ambulance may also be necessary because the beneficiary is inaccessible by a ground or water ambulance vehicle [2].

In contrast to the private air ambulances the publicly-owned air ambulances should have one or several binding medical reasons for flight. Following is an advisory list of examples of cases for which air ambulance could be justified (the list is not inclusive of all situations that justify air transportation).

- intracranial bleeding - requiring neurosurgical intervention;
- cardiogenic shock;
- burns requiring treatment in a burn center;
- conditions requiring treatment in a hyperbaric oxygen unit;
- multiple severe injuries; or
- life-threatening trauma.

Private air ambulances offer a wide range of services [3]. Commonly there are three main services:

1. Air Ambulance:

- Comprehensive bed-to-bed medical air service;
- Includes ground transportation for the patient to and from the aircraft;
- At least two of medical team members will accompany the patient;
- Assistance in locating a receiving facility when necessary;
- A variety of different planes available for medical transfer. Some of the aircraft can carry up to three passengers, three large suitcases, a wheelchair, and includes a closed lavatory on board.

2. Commercial Stretcher Medical Flight (it involves retrofitting a standard commercial plane with a stretcher, allowing a patient with serious medical needs to take a commercial flight to another destination. This service can be more cost-effective than a bed-to-bed private air ambulance service):

- for transfer is used stretcher-bound patients on international commercial flights in unique circumstances;
- includes all needed arrangements and negotiations with airline;
- a highly trained medical team member accompanies the patient to his or her final destination;
- assistance in locating a receiving facility when necessary.

3. Medical Escort (it involves assistance during an international flight for a patient with a wheelchair or oxygen supply, the medical escort service is a safe and cost-effective option. This service is designed for medically stable patients traveling on commercial flights, who may require assistance with oxygen administration, basic monitoring, medication, and more):

- comprehensive medical bed-to-bed service;
- a member of medical staff accompanies a patient traveling on a commercial flight to assist with basic hygiene needs, oxygen and medication administration;
- also includes assistance with flight booking, as well as ground transportation, as needed;
- assistance in locating a receiving facility when necessary.

The private air ambulance services are very expensive and unaffordable for everyone.

Air ambulance transport is may transfer the patient from one hospital to another if the medical appropriateness criteria are met, that is, transportation by ground ambulance would endanger the patient's health and the transferring hospital does not have adequate facilities to provide the medical services needed by the patient [3]. Examples of such specialized medical services that are generally not available at all type of facilities may include: burn care, cardiac care, trauma care, critical care etc.

## History

The earliest reported use of air transport to move trauma victims for medical treatment appears to be during the Franco-Prussian war and siege of Paris in 1870. 160 injured soldiers were moved from the battlefield to army hospitals via hot air balloons. The soldiers were moved to trauma centers for stabilization and then transported to the nearest available hospital.

The Wright brothers were the first who attempts (albeit unsuccessful) to employ planes as air ambulances debuted in the US in 1910.

Before the First World War the Chief of Dutch Medical Services, named deMooy, realized that surface transport of casualties was a major cause of death among combatants. He devised a large stretcher to be suspended beneath a balloon and pulled along by horses. First World War efforts produced much progress but results were spotty and the merits of the endeavor received mixed reviews.

A fixed wing aircraft was first officially used as an air ambulance in 1917 in Turkey, when an injured British soldier was transported from the battlefield to the nearest medical facility. French records at the time indicated that, if casualties could be evacuated by air within six hours of injury, the mortality rate among the wounded would fall from 60 percent to less than 10 percent.



**Fig. 2.** Air ambulance unit #1

1936 saw the first organized governmental air ambulance service during the Spanish Civil War. The Korean War saw the first dedicated use of helicopters by the US in 1950.

The civilian use of air ambulances continued to grow after Second World War. The provincial government of Saskatchewan established the first civil air ambulance in North America in 1946, based in Regina, and is still in operation. A year later Schaefer Air Service became the US's first air ambulance service based in Los Angeles, and was the first FAA-certified air ambulance service [4].

### **The advantages and disadvantages of using air ambulances**

In the past air ambulances were largely used for military purposes but currently, they are also widely used for civilians. In most instances, they have all the necessary equipment required to treat patients on board and as such, a large number of patients don't require extra care upon landing at the hospital.

Air ambulances are ideal for picking up patients from remote areas and at the same time, they are known to drop off paramedics and doctors to some of the remote areas that cannot be easily accessed. Also they widely

used for transportation of soldiers who are at war. In most cases, this is a matter of life or death and as such, the high tech equipment found on board is known to come in handy in delivering quality medical attention long before the patient gets to the hospital [5]. What is more, air ambulances have communication links which ensure that the hospital is on the ready to receive patients.

Air ambulances are not always used on all medical incidents but rather used in cases of serious injuries. For example, patients who are in serious medical condition and who need emergency medical attention or who need to be transferred to hospitals or trauma centers. Usage of air ambulances also includes transportation of medical equipment and doctors.

The advantages of using air ambulances include patients are able to be transferred from one location to maybe a more advanced medical location more quickly as compared to use of other means of transportation. Second, more lives are saved as even in the aircraft medical attention is given to support the patients until they get to the hospital.

The bright example is transportation of burn patients. The third and fourth degree burns are wounds that can be caused by heat from a fire or they may be results of chemical, electricity or electromagnetic radiation. In critical cases such burns can cause death of the skin and muscle tissue and permanent loss of feeling.



**Fig. 3.** Equipment in specialized burn treatment center

Not all hospitals and even cities have specialized burn treatment centers, doctors with the knowledge necessary to help the burn patient. These are situations where air ambulance might be required. The staff of the air ambulance can help the patient en route.

The staff of burn treatment centers focuses on the latest treatment methods. These centers equipped with latest technologies offer patients the best chance for re-

covery. Patients can experience reduced scarring and potentially even the return of sensation in the affected areas. Scarring and severe damage to the skin can sometimes require reconstructive techniques in order to restore a person to a stable state. Skin grafts, hyperbaric chambers and other procedures can be used to repair the damage that was done to the skin of a burn victim. These are very specific types of medical procedures and are only available in large hospitals in certain areas [6].

Despite all the advantages air ambulance service has its minuses. The disadvantages of using air ambulances include the risk of the aircraft crashing. In the case of aircraft crash not only the patients but also the medical staff and plane operators are dead. This is because many of the aircraft have little or no maintenance services.



Fig. 4. Aircraft crash

Another disadvantage is that aircraft have limited space to accommodate all the essentials and personnel for treatment of the patient. Everyone on board should be certified and accredited.

### Situation in Ukraine

Recently in Vinnitsa region, Ukraine started to work publicly-owned air ambulances (helicopter Mi-2 and aircraft An-2). Physicians say using such kind of ambulance expand the area of medical assistance and help to save large number of people. Ukrainian air ambulance equipped with everything necessary in order to provide emergency assistance.

Before long 16 plots of land will be rigged as helipads in the capital of Ukraine.

### Conclusion

Nowadays in our modern fleeting world the using of air ambulance becomes increasingly important and actual. In most cases using air ambulance is a matter of life or death thus air ambulance is properly equipped aircraft specifically used for the treatment of a patient who has been seriously injured or is critically ill. Air ambulance is primarily used in emergency situations where transport of the patient by standard land ambulance would not be timely or safe. Another instance where an air ambulance may be used is when a patient must be transported from one location to another.

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