ORIGINAL ARTICLE

TRANSPORTATION OF INJURED FORCE PERSONNEL BY AIR – MERIT & DEMERITS

Dinesh Thakur[1], B K Mehta[2]

Author's Affiliations: [1]Associate Professor, Dept. of Anaesthesia, GMERS, Medical College Sola, Ahmedabad, [2]DIG (M)/ Consultant Orthopaedic, Composite Hospital, CRPF, Gandhinagar, Gujarat
Correspondence: Dr Dinesh Thakur Email: dineshgnr@rediffmail.com

ABSTRACT

Introduction: Air medical transportation has greatly evolved undertaken by the Indian forces in Kashmir. Many more patients are transported daily in need of advanced medical attention to higher centers like Srinagar M.H & AIIMS & M.H Delhi. The condition of some injured patients necessitates specially modified aircraft, and monitoring and interventions during transport by trained medical personnel.

Methodology: Hospital records of all air medical transportation undertaken to the composite hospital, CRPF, Bentalab, J&K during the period and were analyzed for demographics, primary etiology, and events during transport. The causes were grouped together under the organ system for ease of interpretation. Derived data are presented as mean ± standard deviation and percentage.

Results: 100 patients (100% male) of ages 30 to 45 yrs transported to the station hospital Srinagar and Delhi. The study was conducted after obtaining the proper permission from the Chief Medical Officer incharge (NFSG) of the Composite Hospital, CRPF. Cardiac and central nervous system ailments are the most common indication for air medical transportation like intubation, monitoring of vitals (pulse, BP, Sa, O_2 etc.) followed by CPR required. The overall complication rate was 5.3% There was no transport related mortality. Thus having more merits than demerits.

Conclusion: Patients who are transported with a medical escort may need invasive and advanced monitoring and interventions. Cardiovascular diseases remain the most common reason for interhospital air medical transport. Complication rate during interhospital air transportation of critical patients is similar to ground transportation.

Keywords: Air ambulance, air medical transportation, critical care, Cardio Pulmonary Resuscitation (CPR)

INTRODUCTION

Air medical transportation has greatly evolved undertaken by the Indian forces in Kashmir. Many more patients are transported daily in need of advanced medical attention to higher centers like Srinagar M.H & AIIMS & M.H Delhi. These are interhospital transfers of critical patients using the available air infrastructure.

Most individuals with mild to moderate medical or surgical conditions are able to travel safely in a normal cabin seat with some assistance from the airline in the form of wheelchair and oxygen in case of emergency [1] Some patients need either a stretcher in a commercial scheduled flight or a smaller dedicated chartered flight with all medical equipment and medical staff experienced to handle the situation. This may include continuous oxygen supply, airway management, cardiac monitoring, and interventions.

On case basis, the cost of air medical transportation may seem expensive when compared to ground transportation and even in comparison to the actual cost of treatment. On the contrary, studies show it is cost effective due to the decrease in time to treatment[2] survival benefits[3] and quality of life years added[4]. Over the past decade, wide availability of air ambulance services has brought a reduction in mortality and morbidity in India[5]. Some of these patients are in serious medical condition and require urgent transportation and life-saving intervention by our dedicated air transportation team. We present our experience based on 2 years of activity with the domestic air transfer.

METHODOLOGY

This is a retrospective analysis of all air medical transportations undertaken by the hospital 1998 to 2000. Predetermined demographic and variable parameters were accessed from medical records of all air medical transportation undertaken to the composite hospital,

CRPF, Bentalab, J&K after due clearance from hospital authorities and fed into an Excel sheet for analysis. The primary underlying cause identified was recorded as the underlying indication for transportation. The causes were grouped together under the organ system for ease of interpretation. Derived data are presented as mean ± standard deviation and percentage. Evacuation time was defined as time from actual possession of the patient at the transferee hospital to handing over to primary admitting team at the transferred hospital.

It is important to note that all transportations were carried out by our team and subsequently admitted to our hospital, after a request for the same was received from the next of kin or legal guardian. Fixed wing aircraft were used in all transportations.

Aircraft: The aircraft can accommodate 2 doctors, 1 nurse, 1 accompanying person and the patient on a stretcher (figure 1). These small unscheduled flights can be arranged on short notice, and can land and take off from small airstrips.

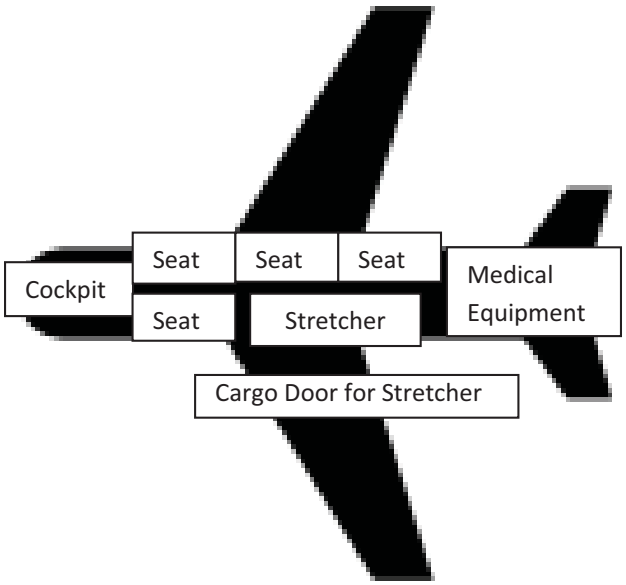

Figure 1: 6 Seater Medical Aircraft

Commercial flights are the routine scheduled operations of the airlines between airports. Most aircrafts can have seats customized to accommodate a stretcher on a prior request and approval by the airlines.

Equipment: Standard equipment for all medical transport includes airway management devices (laryngoscope, endotracheal tubes, tracheostomy tubes etc.), patient monitors, vascular access devices, and adequate number of oxygen cylinders.

Staffs: Medical staff included 1 to 2 doctors and a nurse depending on the criticality of the case. Thus selection of highly motivated staff is very important.

Procedure: All medical transports are under direct supervision of the Chairman, critical care and trauma of our institute. Request for transport of patients to the hospital is usually received by the hospital call center which is directed to the operations manager who acts as the coordinator between all concerned. He takes situation from the doctor where the patient is admitted, alerts the admitting specialty of our hospital, checks for availability of aircraft, applies for clearances from airport authorities and assembles the team of flight medical staff for preparations accordingly. The team is dispatched to the airport after affirmation from all concerned.

The accompanying staff is usually one doctor and one nurse. All equipment and patient responsibility have to be borne by the accompanying doctor. The transport team, the patient's family and the operations manager remain in constant touch and appraise each other of the patient's condition and his/her further requirement all the time till the patient is handed over to the admitting team.

RESULTS

Within 2 years of study period, 100 patients were air transported to the hospital, Srinagar & Delhi (MH & AIIMS). Patient demographics and mission details are presented in Table 1. Central nervous system disease including head injury and stroke in 100 patients was the most common indication [Table 2].

Table 1: Demographic profile of patients

Variable	Value
Total Patients	100
Mean age of males	35 to 45 yrs
Average Evacuation time	1-2 hrs

Table 2: Etiology (n=100)

Etiology	No.
Central nervous disease with head injury	80
Trauma other than head injury	20

Five patients were intubated on board by the anesthetist/ critical care physician. The indication for tracheal intubation was cardiorespiratory arrest in 2 and inability to maintain oxygen saturation with noninvasive ventilation in 4 patients. Oneendotracheal tubechangeforcuff malfunction and 5 tube depth change were needed for optimalventilation. Four patients needed cardio pulmonary resuscitation (CPR) during transportation out of which 2 died.

Inotropic and vasopressor infusion was used. This included 50 (45.8%) patients on a single drug. Most commonly used single agent was noradrenaline infusion in 32 patients. 59 (54.2%) patients were on more

than 2 inotropes. The most common inotropic combination used at the receiving hospital was dopamine and noradrenaline in 25 patients.

DISCUSSION

Prehospital and transportation data analysis has been done earlier, and it gives an insight into the demographics and travel patterns of the particular countries.[6,7] There are a few commentaries on the uniqueness of air medical transport scenario in India.[8]

The main patient-related concerns when air transporting a critical patient are the low atmospheric pressure and gas expansion effects of altitude, patient and family anxiety; and movement related complications. Fixed wing propeller aircrafts fly at an altitude of 15,000-30,000 feet. Barometric pressure decreases from 760 mm Hg at sea level to 226 mm Hg at 30,000 feet. The aircraft cabin is pressurized to an equivalent pressures of 5000-8000 feet which corresponds to a PO2 (inspired) of 107 mm Hg.[9] This PiO2 is easily tolerated by normal individuals but in critical patients with limited reserves, it causes hyperventilation and tachycardia with an increase in cardiac output. This may also alter the need of vasopressors and inotropes and can be particularly detrimental to patients with underlying respiratory or cardiac diseases.[10]

Ground transportation may seem cheaper than air transportation. Some emergencies are potentially life or limb threatening and require urgent care and speedy transport to an advanced care center. This has been made possible only by air medical transportation with proven benefits in survival.[2-4] Bruhn et al. created an economical model to compare the cost of air ambulance services and ground ambulance services.

Almost all districts in India have access to either a civilian or military airstrip which can be used for air ambulance services on request to competent authorities.[11] There is an inequitable distribution of tertiary care hospitals in India.[12] Further, access to internet has made it easy to locate and communicate with specialty centers worldwide.

The condition of the air transported patients is the same as in any other critical area of the hospital and thus necessitates the same monitoring and interventions in a totally different environment.[13] This requires specialized equipment and trained staff. At present, there is no air medical training facility for civilians in India.[14] Norton pointed that there is a need for air medical transport curriculum for emergency medical residents.[15] We feel there is a need of a structured accreditation policy and training program to bring accountability to the mushrooming air ambulance business in India. There is a need for trained medical staff, equipment, and dedicated aircraft to fill in the gap created by the inequitable distribution of hospitals in India.

CONCLUSION

Patients who are transported with a medical escort may need invasive and advanced monitoring and interventions as in any critical care area of the hospital. Cardiovascular diseases remain the most common reason for interhospital air medical transport. Complication rate during interhospital air transportation of critical patients is similar to ground transportation.

REFERENCE

1. International Air Transport Association. [www.iata.org] Medical Manual; c2013. Available from: http://www.iata.org/whatwedo/safety/health/Documents/medical-manual-2013.pdf. [Last accessed on 2014 Feb 02].
2. Phillips M, Arthur AO, Chandwaney R, Hatfield J, Brown B, Pogue K, et al. Helicopter transport effectiveness of patients for primary percutaneous coronary intervention. Air Med J 2013;32:144-52.
3. 4. Gearhart PA, Wuerz R, Localio AR. Cost-effectiveness analysis of helicopter EMS for trauma patients. Ann Emerg Med 1997;30:500-6.
4. Silbergleit R, Scott PA, Lowell MJ, Silbergleit R. Cost-effectiveness of helicopter transport of stroke patients for thrombolysis. Acad Emerg Med 2003;10:966-72.
5. Mehra A. Air ambulance services in India. J Postgrad Med 2000;46:314-7.
6. Judi C, Frank T. A 10-year analysis of 214 HEMS backcountry hoist rescues. Air Med J 2012;32:64-5.
7. Wegmann F, Kromann-Andersen B, Staehr Johansen T, Jessen K. Sixteen years with the Danish search and rescue helicopter service. Aviat Space Environ Med 1990;61:436-9.
8. Chawla NP, Chawla K. Against all odds: Air medical transport in India. Air Med J 1998;17:146-8.
9. Khera R, Jain S, Lodha R, Ramakrishnan S. Gender bias in child care and child health: Global patterns. Arch Dis Child 2014;99:369-74.
10. American Medical Association. Medical aspects of transportation aboard commertial aircraft. J Am Med Assoc 1982; 247:1007-11.
11. Cong H. Air travel and oxygen therapy in cardiopulmonary disorders. Chest 1992;101:463-76.
12. Airports Authority of India [www.aai.aero]. New Delhi List of Airports. Available from: http://www.aai.aero/public_ notices/aaisite_test/policy.jsp#4.[Accessed on 2014 Feb 02].
13. Lackner CK, Stolpe E. New order of things: An international overview of air medical transport. Air Med J 1998;17:142-5. 20. Fromm RE Jr, Varon J. Critical care transport. Crit Care Clin 2000;16:695-705.
14. Aggarwal NN, Aggarwal S. Transfer of sick children by air. Indian Pediatr 2000;37:853-71.