

**GUIDELINES FOR
TRANSPORT OF ADULT CRITICAL CARE PATIENT
IN SRI LANKA**



Developed by:

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Date of Publication : November 2013

Date of Review : November 2015

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CONTENTS

Introduction	4
Design of an Ambulance for Transport of Critical Care Patient	5
Standards for Equipment for Transport	6
Accompanying Personnel	7
Preparation for Transfer	8
Monitoring	10
Safety During Transport	11
Documentation & Hand-over	12
References	13
Appendices	
1. Contents of a Transfer Bag	14
2. Transfer Bags - Examples	15
3. Level of Dependency of Critical Care Patient & Suggested Escort	17
4. Writing the Medical Summary - A Guide	18
5. Pre Departure Check list 1 & 2	19
6. Transfer Record	21

INTRODUCTION

These guidelines apply to the transport of adult critically ill/ critical care patient in Sri Lanka, transferred outside of a normal critical care environment. This includes both intra-hospital transport and inter-hospital transport and the level of preparation & care needed in both situations is the same. Inter-hospital transfer would be by road as air ambulances are not available in Sri Lanka at the time of publication of these guidelines.

The decision to transfer a patient from the intensive care unit to another hospital must be made by the consultant responsible for the unit in consultation with the consultant under whom the patient has been admitted.

The decision to accept a transferred patient too must be made by a consultant responsible for intensive care unit and the relevant consultant of the receiving hospital.

Once the decision is made to transfer a patient, inform the patient/ family regarding the decision to transfer, but that should not delay an urgent transfer.

DESIGN CONSIDERATIONS FOR AN AMBULANCE TO BE USED IN CRITICAL CARE TRANSFER

An effort should be taken to upgrade available ambulances to the below mentioned standards.

Vehicle

- Driven by suitably trained personnel
- Able to carry up to 4 members of the hospital staff in addition to the crew
- Seats for staff should ideally be rear facing or forward facing (not side facing)
- Seats - ideally with head restraints & three point seat belts
- Patient trolley - ideally centrally mounted; well secured
- Should have air bags
- Should ideally be insured comprehensively

Services

- Standard 12 volt DC supply.
- In addition 240 volt 50 Hz AC power supply from an inverter (this can be fitted by the hospital maintenance unit/local electrician), AC/DC converter or generator.

Recommended minimum output 750 W. This is generally sufficient to power a portable ventilator, monitor and infusion pumps.

Minimum of two standard three pin 13 ampere outlet sockets in the patient cabin.

- Housing for oxygen cylinders
- Adequate lighting, air conditioning
- Custom made trolley to house the ventilator & monitor which can be placed securely in the patient cabin. This is not required if a transfer trolley is available which has slots to stow the equipment.

Equipment

- Defibrillator
- Suction equipment
- Adequate storage & stowage for ancillary equipment

As much of the equipment as possible should be mounted at or below the level of the patient.

Avoid large arrays of vertical drip stands.

THE STANDARDS FOR EQUIPMENT TO BE USED FOR PATIENT TRANSFER:

- All equipment should be robust, durable and lightweight.
- Electrical equipment should function on battery when not plugged to mains. Additional batteries should be carried.
- Battery life should be maximised by exercising batteries in compliance with manufacturer's recommendations.
- Portable monitors should have a clear illuminated display and be capable of displaying ECG, SpO₂, ETCO₂, NIBP, two invasive pressures and temperature. Alarms should be visible as well as audible.
- Portable mechanical ventilators - should have as a minimum
 - disconnection & high pressure alarms
 - ability to set PEEP, FiO₂, I/E ratio, Respiratory Rate (RR) and tidal volume
 - in addition; Pressure Controlled Ventilation(PCV), Pressure Support (PS) and CPAP is desirable
- Gravity feed drips are unreliable in moving vehicles. Use syringe or infusion pumps to deliver essential fluids & drugs.
- Pumps should preferably be mounted at or below the level of the patient. Ideally infusion sets should be fitted with anti-siphon devices (not available in Sri Lanka at the time of publishing this guideline).
- Additional equipment for maintaining and securing the airway, intravenous access etc should also be available (Contents of a transfer bag - Appendix 1)
- A mobile telephone, contact telephone numbers to liaise with the base & receiving units and money etc should be available.

Minimum standards of monitoring during transport

- Continuous presence of appropriately trained staff
- ECG
- NIBP
- SpO₂
- ETCO₂ (especially in intubated patients)
- Temperature
- In mechanically ventilated patients –
 - (a) O₂ supply
 - (b) F_iO₂
 - (c) Ventilator settings
 - (d) Airway pressure

ACCOMPANYING PERSONNEL:

- A critically ill patient should be accompanied by a minimum of two medical personnel. One should be a medical officer, who would be the team leader. Others should be, nursing officer/s & an orderly (supportive staff member).
- The precise requirement of expertise of accompanying personnel will depend upon the clinical circumstances in each case.
- They should all be familiar with the transport equipment.
- Medical officer should ideally be with appropriate training in intensive care medicine, anaesthesia or other acute specialty. They should be competent in resuscitation, airway care, ventilation & other organ support.

When the patient is less unwell - Based on the nature of the underlying illness, co-morbidity, level of dependency and risk of deterioration during transfer, the competencies of staff required to accompany the patient can be determined.(1)

- Most level 1 patients and some level 2 patients, will only need to be accompanied by an ambulance technician / paramedic/minor staff personnel and/or a nurse.
- Some level 2 patients will require both a nurse and a medical escort, although the medical officer may be from the patient's parent team.
- The remainder of the level 2 patients and all level 3 patients will require a nurse/s and medical escort, with the medical officer ideally being from an anaesthetic or critical care background.

Though this is the ideal situation, the consultant anaesthetist responsible of the respective unit/ hospital will have to decide on the expertise of the accompanying medical officer, depending on the availability of anaesthetic/intensive care medical officers at that particular time.

(Levels of patients' critical care needs as a guide to transfer requirements & the suggested accompanying staff expertise – Appendix 3)

PREPARATION FOR TRANSFER

- Meticulous resuscitation and stabilisation of the patient before transport is the key to avoiding complications during the journey, although the time taken to achieve this has to be balanced against the need for immediate transfer for specialist life saving intervention.
- Prior to departure, transport attendants who have not been involved in the initial care of the patient should take time to familiarise themselves with the patient's history and the treatment and investigations already undertaken. A full clinical assessment including a physical examination should be performed.

- The airway should be assessed and if necessary secured and protected. Tracheal intubation and ventilation prior to transport are mandatory if there are concerns about the integrity of the airway or adequacy of ventilation.
- Intubated patients should be sedated, paralysed, and mechanically ventilated. Inspired oxygen should be guided by oxygen saturation (SaO₂) and ventilation by end tidal carbon dioxide (ETCO₂). Following stabilisation on the transport ventilator, at least one arterial blood gas analysis should normally be performed prior to departure to ensure adequate gas exchange.
- Inspired gases should be humidified using a disposable heat and moisture exchanging (HME) filter.
- If a pneumothorax is present or likely, chest drains should be inserted prior to departure. Underwater seal drains may be used provided they are kept upright and below the level of the patient. They may ideally be replaced by leaflet valve (Heimlich type) drainage system. Chest drains should not be clamped during transfer.
- Secure venous access is mandatory and at least two intravenous cannulae (central or peripheral) are required during transfer. A suitably secured indwelling arterial cannula is ideal for blood pressure monitoring.

Central venous catheterisation is not essential but may be required for the administration of inotropes and vasopressors.

- Rationalise intravenous infusions and lines to take only what is necessary on the journey.
- Hypovolaemic patients tolerate moving poorly. Continuing sources of blood loss should be identified and controlled. In the absence of contraindications (e.g. penetrating trauma, ruptured aortic aneurysm or active bleeding), efforts should be made to restore the circulating volume to near normal prior to transport. If inotropes or other vasoactive agents are required to optimise haemodynamic status, patients should be stabilised on these before leaving the referring unit.
- Fractures should be splinted prior to transport. Eyes protected & cervical spine stabilised with a hard cervical collar.

A patient with a suspected spine fracture should be transported on a spine board, well packaged.

- A nasogastric / orogastric tube and urinary catheter should be passed and free drainage allowed into collection bags.
- Conscious patients should be kept informed of the transfer and all other relevant details. Relatives should similarly be kept informed of travel arrangements but should not normally travel with the patient.
- Summary of the management upto the time of transfer should be prepared. This could be in the form of a diagnosis card. (Appendix 4 – A guide to write the summary)
- Radiological investigation films/reports & summary of other investigations should be taken along.
- Prepare drugs & infusions that are required for the particular patient, taking into consideration the expected length of journey.
- Prior to departure, named medical and/or nursing personnel at the receiving unit should be contacted, to update them on the patient's condition and to provide an estimated time of arrival.
- Pre departure check list will help to ensure all necessary preparations have been completed. (Appendix 5)
- All vital parameters should be documented on the transfer record, before departure.

MONITORING DURING TRANSPORT

- The standard of care and monitoring during transport should be at least as good as that at the referring hospital or base unit. The minimum standards of monitoring required are
 1. Continuous cardiac rhythm (ECG) monitoring
 2. Non-invasive blood pressure
 3. Oxygen saturation (SaO₂)
 4. End tidal carbon dioxide (in ventilated patients)

- Intermittent non-invasive blood pressure measurement is sensitive to motion artefact and is unreliable in a moving vehicle. It is also a significant drain on the battery supply of monitors. As it is likely to be the only blood pressure measurement method available, it should be used in clinically appropriate intervals bearing in mind the battery supply. Continuous, invasive blood pressure measurement, through an indwelling arterial cannula should ideally be used.
- Monitoring must be continuous throughout the transfer. All monitors including ventilator displays and syringe drivers should be visible to accompanying staff.
- A written record of observations and events should be maintained. (Transfer Record – Appendix 6)
- Indwelling lines and tubes should be secure, visible and accessible.

SAFETY DURING TRANSFER

- Patient should be secured in the transport trolley by means of a harness, and all equipment fastened (ideally to the trolley or securely stowed).
- Staff should remain seated at all times & wear seat belts.
- All equipment (including transfer bags) must be securely stowed. Equipment should be either fastened to the transport trolley or securely stored in appropriate lockers in the ambulance. When this is not possible, equipment should be placed on the floor. Under no circumstances should equipment (e.g. syringe pumps) be left on top of the patient trolley. This may become a dangerous projectile in the event of a sudden deceleration. Gas cylinders must be held in secure housings.
- Adequately resuscitated and stabilised patients should not normally require any significant changes to treatment during transport. If, however, despite meticulous preparation, unforeseen clinical emergencies arise and the patient requires intervention, this should not be attempted in a moving ambulance. The vehicle should be stopped appropriately in a safe place before administering treatment.

- For the majority of cases high speed travel is not necessary. Lights and sirens can be used to aid the progress of the ambulance through areas of high traffic density, e.g. junctions, without requiring the ambulance to be driven at high speed. This approach delivers a smooth journey with a minimum of delay. Where a high speed journey is undertaken, staff could be required to justify the decision.

DOCUMENTATION AND HAND-OVER

- Transfer form should be filled & signed by the consultant in charge or an authorised personnel.
- The summary of management up to the time of transfer / diagnosis card should be attached to the transfer form.
- Transfer record to be maintained in duplicate (with a carbon copy).
- Clear notes must be maintained at all stages.
- At the receiving unit, there should be verbal & written handover to the receiving medical & nursing team.
- Documents to be handed over:
 1. Transfer form
 2. Clinical summary/ Diagnosis card
 3. Copy of the transfer record
 4. Investigation reports including radiological films

REFERENCES

1. Guidelines for the transport of the critically ill adult (3rd edition 2011); The Intensive Care Society
2. AAGBI safety guideline- Interhospital Transfer – Feb 2009
3. Minimum Standards for transport of Critically Ill Patients by College of Intensive care medicine of Australia & New Zealand and Australian & New Zealand College of Anaesthetists and Australian College of Emergency Medicine (PS 52- 2010)
4. Mackenzie PA, Smith EA, Wallace PGM. Transfer of adults between intensive care units in the United Kingdom: postal survey. *BMJ* 1997; 14:1455-6
5. Fried MJ, Bruce J, Colquhoun R, Smith G. Inter-hospital transfers of acutely ill adults in Scotland. *Anaesthesia* 2010; 65(2):136-44.
6. Ahmed I, Majeed A. Risk management during inter-hospital transfer of critically ill patients: making the journey safe *Emerg Med J* 2008;25; 502-505

APPENDIX 1

Suggested Contents for a Transfer Bag

<p><u>Airway</u></p> <ul style="list-style-type: none">• Face masks (size 3,4,5)• Oropharyngeal airways (sizes 3,4,5)• Laryngeal masks (size 3,4,5)• Tracheal tubes (sizes 6-9)• Laryngoscopes (Mac 3, 4; spare bulbs and battery)• Treacheostomy tubes (size 6,7,8)• Tape/ tie for securing tracheal tube• Intubating stylet / Bougie• Lubricating gel• Magill's forceps• Sterile scissors• Stethoscope	<p><u>Drugs</u></p> <ul style="list-style-type: none">• Adrenaline• Atropine• Ephedrine• Metaraminol• Dopamine• Dobutamine• Noradrenaline• Propofol• Thiopentone sodium• Midazolam• Suxamethonium• Atracurium, Vecuronium• 20% mannitol• Amiodorone• 25%, 50% Dextrose• Calcium gluconate• GTN• Salbutamol respirator soution• Any other drug that is thought necessary <p><i>* Drugs should be appropriately diluted & spare infusions prepared</i></p>
<p><u>Ventilation</u></p> <ul style="list-style-type: none">• Self-inflating bag/valve (Ambu) with tubing• Non-rebreathing mask• Nebuliser mask & T-piece• Spare Bodock seals (for oxygen cylinders)• Chest drain (Seldinger type)- optional• Airway filters / HME	<p><u>Miscellaneous</u></p> <ul style="list-style-type: none">• Sucker handles• Suction catheters (or closed tracheal suction system)• Nasogastric tubes (assorted sizes) & drainage bags• Torch
<p><u>Circulation</u></p> <ul style="list-style-type: none">• Syringes (assorted sizes)• Needles (assorted sizes)• Skin prep swabs/solution• IV cannulae (assorted sizes)• Arterial cannulae (optional)• Central venous cannulae (optional)• Intravenous fluids• Infusion sets / extensions• 3 way taps• Dressings• Tape• Minor instrument/cut down set	

APPENDIX 2

Transfer Bags



A commercially available transfer bag



An example of an improvised transfer bag with a cool container for refrigerator drugs

Transfer Bags



An example of a transfer bag with it's contents

APPENDIX 3

Levels of patients' critical care needs as a guide to transfer requirements & the suggested accompanying staff expertise

Level of Dependency	Accompanying Personnel
Level 0: Patients whose needs can be met through normal ward care.	Usually need not be accompanied by a doctor, nurse or paramedic
Level 1: At risk of condition deteriorating, or recently relocated from a higher level of care, and whose needs can be met on an acute ward with additional advice and support from the critical care team.	May require a nurse, operating department assistant, paramedic or critical care paramedic. Occasionally, a medical escort may be necessary
Level 2: Requiring more detailed observation or intervention, including support for a single failing organ system, or postoperative care, and those stepping down from higher levels of care.	Doctor and nurse/ critical care paramedic/ paramedic.
Level 3: Patients requiring advanced respiratory support alone or basic respiratory support plus support of at least 2 organ systems.	Doctor/s and nurse/s and/or critical care paramedic.

Reference –

Guidelines for the transport of the critically ill adult (3rd edition 2011); The Intensive Care Society

APPENDIX 4

Writing the Medical Summary - A Guide

- Primary reason for admission to the referring unit
- Medical history & past medical history
- Dates of operations & procedures
- Number of days in the referring intensive care unit
- Intubation history, ventilator support & blood gases
- Cardiovascular status including inotrope & vasopressor requirements
- Other medications & fluids
- Types of lines inserted & dates of insertion
- Recent results & MRSA status
- Nutrition

A brief nursing summary

- Communication methods
- Contact details of relatives/next of kin
- State of the skin - especially at pressure points

APPENDIX 5 (Pre Transfer Check List 1 & 2 to be printed on either side of the paper)

-----HOSPITAL

-----ICU

Name (full):	
BHT:	M/F

Age/DOB:
Transfer to:

Pre transfer Check list 1

1. Is patient stable for transport?

Airway

- Airway safe or secured by intubation
- Tracheal tube position confirmed on chest Xray

Breathing

- Adequate spontaneous respiration or ventilation established on transport ventilator
- Arterial blood gas done (if available)
- Sedated and paralysed as appropriate

Circulation

- Heart rate, BP optimised
- Tissue & organ perfusion adequate
- Any obvious blood loss controlled
- Circulating blood volume optimised.
- Haemoglobin adequate
- Adequate routes of venous access (Minimum of two)
- Arterial line and central venous access if appropriate

Disability

Neurology

- Seizures- appropriate control obtained, metabolic causes excluded
- Raised intracranial pressure appropriately controlled

Trauma

- Cervical spine protected
- Pneumothoraces identified & optimally managed
- Intra-thoracic & intra-abdominal bleeding controlled
- Intra-abdominal injuries adequately investigated and appropriately managed
- Long bone / pelvic fractures stabilised

Metabolic

- Blood glucose > 80 mg/dl
- Potassium < 6 mmol/l
- Ionised Calcium > 1 mmol/l
- Acid – base balance acceptable
- Temperature maintained

Monitoring

- ECG
- Blood pressure
- Oxygen saturation
- End tidal carbon dioxide

APPENDIX 5 (Pre Transfer Check List 1 & 2 to be printed on either side of the paper)

Pre transfer Check list 2.

Are you ready for departure?

Patient

- Stable on transport trolley
- Appropriately monitored
- All infusions running and lines adequately secured and labelled?
- Adequately sedated and paralysed
- Adequately secured to trolley
- Adequately wrapped to prevent heat loss

Staff

- Appropriate staff available
 - Doctor
 - Nurse 1/2
 - Orderly/Minor staff
- Received appropriate handover

Equipment

- Appropriately equipped ambulance (refer guideline)
- Appropriate equipment and drugs
- Pre-drawn up medication syringes appropriately labelled and capped.
- Batteries checked (spare batteries available)
- Spare syringe pump
- Sufficient oxygen supplies for anticipated journey.
- Portable phone/personal phone available

Organisation

- Case notes, X-rays, results, blood collected
- Transfer documentation prepared
- Location of bed/ receiving unit consultant
- Receiving unit advised of departure time and estimated time of arrival
- Telephone numbers of

Referring unit - _____

receiving units - _____

- Relatives informed

Departure

- Patient trolley secured
- Electrical equipment plugged into ambulance power supply where available
- Ventilator transferred to ambulance oxygen supply
- All equipment safely mounted or stowed
- Staff seated and wearing seat belts

Name of Medical Officer/Nursing Officer	
Signature	
Date	
Time	

