INTERNAL TRANSPORT: VENTILATED CICU PATIENTS - SCH

PRACTICE GUIDELINE ©

DOCUMENT SUMMARY/KEY POINTS

- Critically ill patients may have absent or small physiological reserves. Ventilator-dependant and hemodynamically unstable patients are at particular risk. [1]
- The risk of transport must always be weighed against the potential benefit for the patient. [3]
- Patient safety during transportation outside the Children's Intensive Care Unit is imperative.
- The decision to transport includes attention to issues of preparation, monitoring, ventilation, oxygenation and patient care during the physical transfer to and from and time spent at the destination.
- The necessity and safety for transport is to be assessed by all members of the multidisciplinary team prior to a determination being made that transport is to occur.
- A patient must always be accompanied by a CICU nursing staff member and a medical officer who are competent in all aspects of care likely to be required by the patient.
- If any alteration in the patient's condition or adverse events occur during transport these must be documented in the patient's progress notes, resulting actions noted and a patient incident form completed.

Approved by:	SCHN Policy, Procedure and Guideline Committee	
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CHANGE SUMMARY

- Insertion of information associated with change to Servo-U ventilators within CICU
- Adjustment of information to correlate to utilisation of new gas cylinders across SCH

READ ACKNOWLEDGEMENT

- CICU staff are required to read and acknowledge they understand the contents of this document.

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Introduction

- "Critically ill patients may have absent or small physiological reserves. Ventilator-dependent and hemodynamically unstable patients are at particular risk." [1]
- Transport impacts on these patients, as their movement during transport, acceleration and deceleration, changes in posture and movement from one surface to another are all variables with potential hemodynamic, respiratory, neurological, psychological, and pain inducing repercussions.[2] These effects must be anticipated and managed at all costs both before and during transport in order to limit the onset of any physiological decline that may lead to an adverse event.[2]
- Consequently, the risk of transport must always be weighed against the potential benefit for the patient. [3]
- Patient safety during transportation outside the Children's Intensive Care Unit is imperative. This practice should be viewed as potentially hazardous and should not be undertaken unless absolutely necessary therefore the reason for doing the procedure and the implications for the patient must always be a consideration.
- CICU patients must be transported for diagnostic or therapeutic procedures after due consideration is given to all aspects of their care including careful evaluation of the risk-benefit ratio.[4] The decision includes attention to issues of preparation, monitoring, ventilation, oxygenation and patient care during the physical transfer to and from and time spent at the destination.
- The necessity and safety for transport is to be assessed by all members of the multidisciplinary team prior to a determination being made that transport is to occur.
- A patient must always be accompanied by a CICU nursing staff member and a medical officer who are competent in all aspects of care likely to be required by the patient.
- If any alteration in the patient's condition or adverse events occur during transport these must be documented in the patient's progress notes, resulting actions noted and a patient incident form completed.

General Guidelines

Equipment

- **Listed equipment is essential and MUST accompany patient <u>at all times</u>**
- Consult accompanying medical officer of further emergency supplies required for transfer beyond those listed below.
- RN must ensure emergency airway management supplies are available and checked for operation before transport including:

- A portable FULL 0.57m²(C) sized Oxygen cylinder with suction unit (Twin-o-Vac) with suction tubing attached[1]
- Appropriate sized self-inflating resuscitation bag with reservoir bag, PEEP valve and appropriate sized masks[1]
- A fully checked transport box with the following additions MUST accompany every patient:[1]
  - Laryngoscope handle and appropriate blade size with spare batteries – ask accompanying MO their preference.
  - Appropriate sized endotracheal tube plus x1 size above and below
  - Appropriate sized suction catheters
  - Appropriate sized Guedel oral airway
  - 2x ampoules of Suxamethonium 100mg/2mL
  - 2x ampoules of Rocuronium 50mg/5mL
  - Current individualised resuscitation chart comprising emergency drugs and infusions
  - Bolus fluid e.g. 4%NSA if unstable
- Chest drain clamps (*if patient has chest drain in situ*).[1]
- PPE including non-sterile gloves, apron (goggles should be available for suctioning).
- Remember to empty all drainage/reservoir bags to enable fluid balance to be accurately calculated on return to CICU.

Monitoring

- The Dräger M540 Transportable block already in use for the patient must be taken. Unclip the block from its holder and it can be attached to the bed using the Dräger brace.
- The view on the transport monitor may be changed to include the parameters you wish to observe for the duration of the trip.
- If possible, monitoring provided during transport should be similar to that during care within CICU. If this is not possible, the staff accompanying the patient during transport must make a decision regarding which parameters are to be monitored.
- The minimum standard of monitoring must include ECG, heart rate, pulse oximetry and BP (either invasive or non-invasive).
- **ETCO2 monitoring is required for all ventilated patients.** This is available on M540 transportable block.
- Appropriate sized NIBP cuff and cable should accompany patient - even when monitoring invasive BP
- On return to the unit, the M540 transportable block must be returned to its holder.

Infusions

- Appropriate and secure IV access is vital and this must be present prior to undertaking any transport.
- A decision should be made whether all infusions currently in progress are needed whilst transport is being undertaken e.g. TPN & lipids/maintenance. If these are not required they should be disconnected and their integrity maintained to allow for their re-connection on the patient's return to CICU.
- It is recommended that as many infusions as possible are stopped for the duration of the transport / procedure; consider bolus sedation +/- bolus muscle relaxant.
- Resuscitation drugs should be considered for transport. The medical officer escorting the patient should be consulted regarding any resuscitation drugs that may be required. These should be charted and prepared prior to transfer as part of your emergency equipment.
- Alternative infusion delivery systems should be considered for intravenous fluid administration during the transport procedure and transferring of solutions into syringes for administration via a syringe pump may be more appropriate than continuing to utilise a volumetric pump.
- Situations may arise in which additional infusion tubing length is required and staff should ensure all infusion tubing is of sufficient length to reduce the potential risk of disconnection / dislodgment.
- It is recommended that an additional 150cm extension line (lectro-cath) is added to all infusions that are to be continued during the transport/procedure including any invasive monitoring lines (arterial, CVP, LA, PA etc.). Hospital guidelines must be followed for the management of the relevant access device in place.
- **DO NOT STOP INVASIVE LINE FLUSHES.**
- The volume available for all infusions must be sufficient to continue until the procedure is complete and patient returned to CICU. If there is any uncertainty, new infusions should be reconstituted prior to leaving CICU.

Ventilation

- Prior to any transport from CICU the stability of the ETT must be assessed and resecured if deemed necessary.
- There are currently TWO options available for ventilating patients outside of CICU whilst on a transport:
    - **1.** Primary transport ventilator is the Servo-U (*the bedside ventilator*):
        - Requires connection to O2 cylinder that is 0.61m^3 (C sized) and Air cylinder that is 0.550m^3. **The cylinders MUST both be full before leaving CICU**. It is essential to take spare cylinders and to swap to wall gas supply on arrival at destination.

- Will run on batteries and **each battery will give an approximate time of 45 minute**s. Each ventilator always carries two batteries ***ie approx.90 minutes*** There are a number of additional batteries in other ventilators, which may be accessed for the transport. Check the life of the batteries, using the "Status" button on the upper right of the ventilator screen, and then going to the heading "Batteries". ***If the battery life is illustrated in red colour, they are still usable but will need changing soon***. If the life has decreased from the usual 40-45min, they will have to be replaced very soon (but they will last the time illustrated) – notify the Equipment Co-ordinator.
- It is vital that whenever possible, if a mechanical ventilator is utilised for transport that it is secured firmly to the patient's bed to reduce the potential risk of disconnection / extubation.
- With fixation at the head of the bed, the ventilator moves in synchrony with the bed and will need someone to guide it but not usually to push it.
- Patient does not need to be disconnected from the ventilator whilst gas sources are being exchanged. It is usual to change over the Medical Air (*from wall supply to cylinder supply*) first, and then change over the oxygen supply. **This will ensure the patient does not desaturate**. It would be wise to do this just before departure to ensure cylinder life.
- **ALWAYS CONNECT VENTILATORS TO MAINS POWER SUPPLY WHEN NOT IN TRANSIT**

- **2.** Self-inflating resuscitation bag with PEEP valve and reservoir. This requires connection to a 0.61m^3 (C) sized oxygen cylinder and limiting factors include the high concentrations of oxygen administered to the patient and the poor maintenance of PEEP. The higher the flow, the shorter the cylinder life - **take additional cylinders.**

Transfer using the Providock system

- Ensure the orange power box is plugged in to mains electricity when not on transfer. An orange LED light between both plug sockets will be highlighted when connected.
- Ensure both docking stations are plugged in to mains power and switched on. The ON/OFF switch has a green LED light; this will be highlighted when the switch is on.
- Ensure that the monitor is plugged in to mains power via the 4 lead extension and the green charging light is on when not on transfer. The charging light is located in the bottom right hand corner of the monitor.
- Ensure there is adequate levels of air and oxygen in the gas canisters on the back of the Providock *ie green zone (15,000-20,000kpa)*. Please note that the regulators at the base of the ventilator mean that the oxygen and air never have to be switched off unless you are exchanging for new canisters. Once the hoses are connected to the wall

outlet the wall gases will be in use and once the hoses are disconnected from the wall the gas canisters will be in use.

- Ensure that all equipment is securely attached to the Providock.
- Complete a full ventilator circuit check on the ventilator on the Providock prior to transfer if you are changing from the bedside ventilator to the Providock ventilator. **(See section 2.4 Ventilation for full ventilation checks)**
- Ensure all power cords, ventilation tubing and infusion lines are neatly secured to avoid dislodgement or damage during the transfer.
- It is recommended, where possible, that the whole Providock system is no wider than the patient's bed; this will assist a smooth transfer through doorways and into lifts.
- Ensure that the floating clamp bar on the front of the Providock system is securely hooked onto the head end of the patient's bed. **If using the HillRom bed, the Providock secures at the foot end of the bed only.**

NOTE: The floating clamp bar will move up and down with the bed during the transfer to accommodate uneven surfaces.

- Six of the unit beds will have a powered system for moving the bed. This is on the foot of the bed, so the ProviDoc will need to be fixed to the head of the bed.
- Ensure that the brakes are on whenever the Providock is stationary.

Documentation

- Essential documentation must accompany the patient and includes:
- Current medical records folder
- Observation chart
- Medication chart (is there space for bolus medications/fluids)
- Patient labels X-rays / scans and relevant request form if needed (EMR can negate the need)
- Pre-op check list and consent form (if going to OT)
- Emergency Resuscitation Chart.

Patient Observations

- Baseline observations should be documented prior to leaving CICU
- 1 x set of observations should be documented on arrival at destination for transfer to MRI or Radiology.
- 1 x set of observations should be documented prior to leaving destination for transfer back to CICU.

- 1 x set of observations should be documented immediately on arrival back to CICU and then hourly as per usual CICU practice
- **Any adverse incidents occurring at any time throughout the transfer should be clearly documented on the observation chart.**

Staffing

- The transport team should be accompanied by an RN and doctor who are experienced in transporting a ventilated patient.
- Each team must be familiar with the equipment and be sufficiently experienced with securing airways, ventilation, resuscitation and other anticipated emergency procedures.

During Transfer

- If at any time during transport process the patient becomes acutely unstable, staff should re-evaluate the need for continuation to the destination and consider returning to CICU.
- If patient movement from the CICU bed is necessary, staff must always consider manual handling risks and utilise appropriate aids. Pat slides and a hoist is located in radiology and the radiographer should be informed in advance if the hoist will be needed.

On Arrival At Destination

- If utilised, the Siemens Servo-U ventilator must be connected to mains power and wall outlet gas supply as soon as possible.
- Transport monitor should be connected to mains power as soon as possible.
- Establish location of resuscitation equipment and means of calling assistance/arrest.

Returning to CICU

- A porter should be sought as soon as the procedure is finished to reduce waiting time and assist with the transfer back to ICU. Only if an unreasonable delay is foreseen, which is clinically significant to the patient may staff transfer the patient without a porter.
- Prior to departing, collect all emergency and additional equipment that initially accompanied the patient.

- On return to CICU, the patient should be established on their original monitoring and ventilation parameters unless otherwise decided by the multidisciplinary team.
- On return to the unit, the M540 transportable block must be returned to its holder.
- **NB: Siemens Servo-U ventilator must be connected to mains power and wall outlet gas supply as soon as possible.**
- Any equipment that has been utilised should be cleaned, replaced or disposed of as required and any stock replaced.
- The content of any cylinders used must be checked and if remaining volume is less than half these must be changed to ensure an adequate supply. These cylinders are to be returned to the holding area.

Specific Destinations

Operating Theatres

- Refer to previous section General Guidelines for transport information
- In hours (0900 – 1800) CICU will arrange a porter. Out of hours, Operating Theatre will arrange a porter for transport. Under no circumstances is a nurse to act as a porter when transferring patients to CICU.
- Pre-operative check list to be completed (even when patient being collected by anaesthetist). On arrival to the Operating Theatre reception, the checklist will be reviewed by an operating theatre nurse and the escorting CICU nurse. Handover and the transfer of professional responsibility and accountability of the patient will be completed.
- Appropriate blood results should be available - FBC, Coags, UEC's, +/- X-match.
- To assist in the timely transfer of the patient back to CICU, operating theatre staff will notify CICU NUM on 0472879306 30 minutes prior to the completion of surgery (Call 1).
- After the final count, Call 2 will be made to inform CICU Team Leader that the operation is near completion (approx. 10 mins) If the patient is intubated, the size of the ET tube will be communicated to the CICU NUM/ Team Leader to assist in management.
- At the conclusion of the operation, the anaesthetic nurse will assist the anaesthetist in the transfer of the patient to CICU accompanied by the scrub nurse.
- Clinical handover is to be provided to CICU nursing staff which **MUST INCLUDE THE COMPLETION OF THE PAEDIATRIC CLINICAL BEDSIDE HANDOVER PATIENT CHECKLIST**. This checklist provides prompts of the information required in the transfer and accepting of professional responsibility and accountability of the patient and **must be signed by both theatre and CICU nursing staff.**
- After hours, if Operating Theatre believes they cannot facilitate the patients transfer to CICU, the CICU NUM/ Team Leader will be contacted and possibility of CICU RN collecting patient will be discussed.

- If this is possible, CICU nursing staff arrive at Holding Bay, don white gown and hat and are directed to the Operating Theatre where they receive a handover from the anaesthetic nurse and scrub nurse. Clinical handover is to be provided to CICU nursing staff **which MUST INCLUDE THE COMPLETION OF THE PAEDIATRIC CLINICAL BEDSIDE HANDOVER PATIENT CHECKLIST**. This checklist provides prompts of the information required in the transfer and accepting of professional responsibility and accountability of the patient and **must be signed by both theatre and CICU nursing staff.**
- During any transfer from operating suite the patient must receive ECG monitoring, pulse oximetry and BP as a minimum.

MRI

- Refer to previous section General Guidelines for transport information.
- MRI is located far away from CICU and the procedures performed typically are lengthier than other diagnostic modalities such as CT scans. Therefore, the intravenous pumps, monitors, ventilators etc. must be capable of operating on battery power for extended periods if needed.

Preparation of the Patient Pre MRI scan

- MRI safe equipment is the most desirable because it contains no ferrous material and can be used without regard for distance from the magnet or the equipment function being affected
- MRI staff will decide if the equipment is MRI safe, it must be checked by them first.
- Equipment needs to be considered MRI safe; this includes weighted NG tubes, soft PIVC arm boards, reinforced ETT, IDC, temperature probes. If any of these are present and ARE NOT MRI SAFE they should be removed and replaced with MRI safe equipment where appropriate. If a reinforced ETT in insitu medical staff are to attend to this.
- An MRI request via EMR will need to be sent when booking a scan
- Once the patient is booked in to go to MRI, a nurse in MRI will come to CICU and review the patient prior to transfer and they will complete the checklist form.

  NB: This will not happen on weekends but any areas queries regarding MRI compatible equipment can be raised by phone. Contact number 22389
- MRI nursing staff will advise whether post-operative patients must have any wound staples /clips removed and whether wound drains will create difficulties with scanning *e.g. Haemovacs, EVD's etc.*
- On arrival to MRI, the patient will need to be transferred to an MRI compatible trolley prior to entering the magnet room.
- Where needed there is an MRI safe Jordan frame for transferring spinal injury patients

- If a ventilated patients is escorted to and from MRI by the MRI anaesthetist, the anaesthetist may choose to hand ventilate the patient and place them directly onto MRI anaesthetic machine**. In this setting the CICU ventilator does not need to be taken to MRI with the patient.**
- Conversely, if patient is escorted by CICU medical staff to and from MRI then the CICU ventilator must be used to transfer the patient to and from MRI.
- Mechanical infusion pumps cannot be taken into the MRI magnet room
- Where possible stop any infusions that can be safely stopped prior to leaving CICU
- If any infusion is deemed necessary then 1 x 600cm extension line must be used on each syringe infusion pump. Hospital guidelines must be followed for the relevant access device in place.
- **INVASIVE MONITORING LINES MUST CONTINUE TO BE FLUSHED WHILST SCAN IN PROGRESS**
- Monitoring that is available in the MRI magnet room includes
    - Pulse Oximetry
    - Invasive BP (if in place pre-scan) /non-invasive BP
    - End Tidal CO2

  NOTE: MRI staff will disconnect CICU monitoring and Invasive BP set and will connect to their own monitoring once in MRI.
- Oxygen, air and suction are available in the MRI magnet room
- If a patient deteriorates they must be removed from the MRI magnet room and taken to the anaesthetic bay before resuscitation measures can be undertaken
- All staff and relatives who will enter the magnet room are required to complete an MRI surveillance form prior to entering. Once completed this form is kept by MRI and does not need to be completed at each visit.
- The magnet will remove all the information from any form of magnetic storage
    - *Hospital ID badge*
    - *Credit/bank cards*
    - *Hand held organisers*
    - *Mobile phones/sim cards/pagers*

Radiology

- Refer to previous section General Guidelines for transport information.
- If the patient has spinal injuries place them on a Jordan frame prior to leaving the unit.
- CT scan room is very cold: ensure adequate covers are taken to maintain body temperature.

- Angiography- patient should have a X-match/group and hold as the patient can bleed during this procedure (pre-check COAGS).
- Take appropriate sized NJ tube if going to have radiographic placement.

Outcomes

- The decision is made to transport a ventilated CICU patient after collective multidisciplinary discussion.
- Patient safety during transportation outside the Children's Intensive Care Unit is maintained.
- Ventilated CICU patients are transported to their destination and return to CICU without adverse incident.
- Any alterations in the patient's condition or adverse events that do occur during transport are documented in the patient's progress notes, resulting actions noted and a patient incident form completed.

References

1. Australian and New Zealand College of Anaesthetists (2010) PS39 Minimum Standards for Intrahospital Transport of Critically Ill Patients
2. Australasian College for Emergency Medicine and Australian and New Zealand College of Anaesthetists and College of Intensive Care Medicine of Australia and New Zealand (2015) P03 Guidelines for Transport of Critically Ill Patients:1-13
3. Blakeman, T. and Branson, R.D. (2013) Inter – and Intra-hospital Transport of the Critically Ill. Respiratory Care 58(6):1008 –1021
4. Fanara, B., Manzon, C., Barbot, O., Desmettre, T. and Capellier, G. (2010) Recommendations for the intra-hospital transport of critically ill patients. Critical Care, 14(3):R87 .