Management of a Fractured Tunnelled Cuffed Central Venous Catheter

**Purpose**

Children requiring long term central venous access frequently have a tunnelled cuffed central venous catheter (tc-CVC) in situ. Some children will require lifelong central venous access and it is imperative that preservation of the existing catheter is optimised through rapid assessment, escalation and management of any presenting threat to the current catheter. This procedure describes the immediate management for repair of a tunnelled cuffed central venous catheter in the event that it becomes fractured.

**Scope**

This procedure relates to all Children’s Health Queensland (CHQ) staff. Any attempt to repair a fractured tc-CVC should only be performed by nursing staff that have completed the required training and are able to safely perform catheter repair within their scope of practice.

**Procedure**

ALERT - If catheter fracture occurs during standard business hours notify:

- NP – Vascular Assessment and Management when available, or
- Nurse Manager Patient Flow and Staffing Unit (NM PFSU) and
- On call medical officer for home team
**Alert**

If catheter fracture occurs out of hours notify:
- Nurse Manager Patient Flow and Staffing Unit (NM PFSU) and On call medical officer for home team

**Alert**

- Early intervention for a fractured tunnelled cuffed central venous catheter results in the greatest chance of catheter salvage with minimal clinical disruption to the patient.

**Immediate medical and nursing management of a fractured tunnelled cuffed central venous catheter**

- Clamp the portion of the catheter still attached to the patient - if the catheter clamp is not able to be used an alternative clamp such as gauze and artery forceps should be used
- If fluids are running, stop administration and disconnect line
- Using aseptic non-touch technique (ANTT) clean the portion of catheter that is still attached to the patient with 2% Chlorhexidine & 70% alcohol and secure with an occlusive, transparent, sterile dressing
- As per alerts above, notify the NP – Vascular Assessment and Management or the Nurse Manager Patient Flow and Staffing Unit (NM PFSU), and the on call Medical Officer for the home team
- Establish peripheral intravenous access
- Take peripheral blood for
  - Blood cultures
  - FBC, CRP, ELFT’s
  - Blood glucose level (BGL) if at risk of hypoglycaemia
- If afebrile: prescribe empiric single dose prophylactic antibiotic via peripheral cannula
  - Vancomycin IV 15mg/kg (to a maximum of 500mg) once only
- If febrile (T>38°C): change antibiotic prophylaxis to empiric treatment
  - Vancomycin IV 15mg/kg (to a maximum of 500mg) q6h with Piperacillin/Tazobactam (Tazocin ®) IV 100mg/kg (piperacillin component, to a maximum of 4g q6h tazocin)
- Prescribe intravenous fluid if clinically indicated

**Alert**

NB – this antibiotic regimen is correct as of 01/09/2013, and is subject to change.

**Repair of a fractured tunnelled cuffed central venous catheter**

- Identify a nursing staff member who has completed the required training either within the immediate clinical area or via the NM PFSU
- Immediately obtain a repair kit from NM PFSU. Note: Oncology services hold a supply of repair kits for oncology patients
  - If a repair kit is accessed from PFSU, please document in the record of repairs located with the repair kits in PFSU, please include cost centre of the clinical area using the repair kit
• If a repair kit is accessed in Oncology, please document in the record of repairs located with the repair kits in Oncology

• Ensure that a medical officer for the home team has been notified to
  • Provide interim peripheral intravenous access
  • Prescribe prophylactic intravenous antibiotics

• Ensure the parents are notified

• Repair the line as per the repair procedure

• Once the repair has been undertaken the catheter MUST NOT be flushed or used for 24 hours

• Complete documentation:
  • Document the repair procedure in the patient’s medical notes
  • Complete PRIME to ensure adequate tracking of product faults

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**ALERT**

Notify a medical officer immediately if the patient develops a fever or if their clinical condition deteriorates

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**ALERT**

Attempt to access the repaired line MUST be made at 24 hours as detailed below

If the patient is discharged prior to this time:
• an outpatient appointment must be secured to ensure the line is accessed at 24 hours
• carer/parent education must be provided regarding representation if the child develops a temperature or further catheter fracture occurs

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**Ongoing management of a fractured tunnelled cuffed central venous catheter – refer Appendix 1**

• 24 hours after catheter repair the catheter should be accessed using ANTT to determine whether the repair has been successful:
  • Attempt to withdraw from and flush down the catheter
  • Assess repair for fluid leaks and integrity of catheter
  • Document outcome in the patient medical notes

If repair has been successful:
• Collect blood cultures from CVC (prior to the administration of antibiotics via that route)
• If afebrile: the patient may be discharged
• If febrile (T>38°C): Commence administration of Piperacillin/Tazobactam (Tazocin ®) IV 100mg/kg (piperacillin component, to a maximum of 4g q6h tazocin) through CVC (instead of peripheral cannula)
• Where a Vancomycin lock for the device is possible this should be prescribed and the Vancomycin IV should be ceased. Pharmacy should be contacted for prescription and administration guidelines.
• Where a Vancomycin lock is not possible, Vancomycin IV should continue through the CVC
• Patients should be assessed individually and consideration to maintaining peripheral access to make Vancomycin lock possible should be given.
• Stop antibiotics at 48 hours if patient is afebrile and blood cultures are negative, otherwise discuss with Infection Management Prevention Service (IMPS) for ongoing management
• If repair has been unsuccessful:
  • Contact NP Vascular Assessment and Management to determine appropriate action. If NP not available, contact home team
  • If leaking:
    • NP or home team will determine if another repair can be attempted or if the CVC will be removed and replaced
    • Document outcome in the patient’s medical notes and complete a PRIME.

• If leaking:
  • NP or home team will determine if another repair can be attempted or if the CVC will be removed and replaced
  • Document outcome in the patient’s medical notes and complete a PRIME.

Process for attaining proficiency in repair of fractured tunnelled cuffed central venous catheter

• All clinical areas should maintain a minimum of 5% trained staff who are able to safely perform catheter repair within their scope of practice
• Individual staff member should express interest to nurse unit manager (NUM) and Nurse Educator of willingness to undertake training
• NUM to liaise with NP Vascular Access and Management and Nurse Educator to access training opportunities
• Training will be conducted by the NP Vascular Access and Management or Nurse Educator and will involve:
  • Completion of a pre-reading package (available from NP Vascular assessment and Management)
  • Completion of practical simulation and review of technique by trainer
• Visual learning aids will be made available in PFSU and Oncology where the repair kits are located for staff to review prior to attempting a repair
• Completion of at least one repair per year should be achieved by each trained staff member and incorporated in their PAD. If this has not occurred, a simulated repair will need to be completed and technique reviewed – please contact NP Vascular Access and Management and Nurse Educator
• A database of CVAD heroes and additional trained repairers is to be held locally and forwarded to NP Vascular Assessment and Management on a quarterly basis for registering in PFSU database
• It is the responsibility of the NUM and the individual to ensure that the trained staff perform at least one real or simulated repair per year.
Supporting documents

Professional Bodies

- National evidence-based guidelines for preventing healthcare-associated infection (EPIC)
- Cancer Nurses Society of Australia (CNSA)
- Registered Nurses’ Association of Ontario (RNAO)

Authorising policy and standard(s)

- CHQ Procedure 03450 Intravascular device management
- CHQ NS_03453: IVAD - Central venous catheters: Nursing Care and Management of Tunnelled (cuffed and uncuffed) CVC in Paediatric Patients

Consultation

Key stakeholders who reviewed this version:

- DDNS
- NP Vascular Assessment and Management Service
- Nurse Manager Evidence Based Practice
- Nurse Educators, RCH
- Nursing Directors
- Nursing Advisory Group
- NUMs Oncology wards, RCH
- Clinical Practice Facilitators, Oncology, RCH
- Patient Flow and Staffing Nurse Manager
- Director of Pharmacy
- Infectious Disease Physician
Definition of terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
<th>Source</th>
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<tbody>
<tr>
<td>Tunneled Cuffed Central Venous Catheter</td>
<td>A tunnelled central venous catheter (T-CVC) has both an entry (where the catheter enters the vein) and an exit site (where the catheter exits the body). The catheter tip terminates within a large central vessel such as Superior Vena Cava (SVC), Inferior Vena Cava (IVC) or Brachiocephalic vein (BcV). T-CVC may be cuffed or uncuffed, have single or multiple lumens and are designed for use when long-term, frequent or continuous access is planned. In some circumstances, a damaged or split catheter can be repaired.</td>
<td>Intravenous Nurses Society. (2006) Infusion nursing standards of practice, Cambridge, MA:INS and Becton Dickinson</td>
</tr>
<tr>
<td>ANTT Aseptic Non Touch Technique</td>
<td>ANTT is a technique used to prevent contamination of key parts and key sites by microorganisms that could cause infection. In ANTT, asepsis is ensured by identifying and then protecting key parts and key sites by hand hygiene, non-touch technique, using new sterilised equipment and/or cleaning existing key parts to a standard that renders them aseptic prior to use.</td>
<td>Rowley S, Clare S, Macqueen A et al (2010) ANTTv2 An updated practice framework for aseptic technique. Brit J Nursing 19(5)</td>
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References and suggested reading

- I-Care (CHRISP Guidelines)
- Guidelines for the Prevention of Intravascular Catheter-Related Infections 2011 (CDC)
- National evidence-based guidelines for preventing healthcare-associated infection (EPIC)
- Cancer Nurses Society of Australia (CNSA)
- Registered Nurses’ Association of Ontario (RNAO)
Audit/evaluation strategy

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<thead>
<tr>
<th>Level of risk</th>
<th>Medium</th>
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| **Strategy**  | • Incidents regarding fractured CVC lines will be reported via PRIME and managed by Ward NUM in conjunction with NP Vascular Assessment and Management Service  
  • NUMs to monitor staff trained and maintain trained staff numbers  
  • PFSU NM to monitor difficulties with availability of staff to repair fractured CVC and report to NP Vascular Assessment and Management Service and Nursing Directors |
| Audit/review tool(s) attached | Nil |
| Audit/Review date | Ongoing |
| Review responsibility | NP Vascular Assessment and Management Service, PFSU NMs, NUMs and Nursing Directors |
| Key elements / Indicators / Outcomes | • 100% of the time, a trained staff member is available to repair a fractured CVC  
  • 100% of fractured CVCs are repaired within the shortest possible time frame with no resultant CVC line infection |

Procedure revision and approval history

<table>
<thead>
<tr>
<th>Version No.</th>
<th>Modified by</th>
<th>Amendments authorised by</th>
<th>Approved by</th>
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<tbody>
<tr>
<td>1.0</td>
<td>NP Vascular Assessment and Management Service</td>
<td>Nursing Advisory Group &amp; DDNS</td>
<td>General Manager Operations</td>
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<tr>
<td>1.1</td>
<td>Nurse Practitioner Vascular Assessment &amp; Management</td>
<td>Nursing Director Division of Surgery &amp; Critical Care</td>
<td>General Manager Operations</td>
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**Keywords**
Catheter fracture, tunnelled cuffed central venous catheter, tunnelled cuffed CVC, central venous access device, catheter repair, 03455

**Accreditation references**
EQuIP National Standards: Standard 3 - Preventing and Controlling Healthcare Associated Infections

Appendix 1 – Flowchart to Assess Repaired Tunnelled Cuffed Central Venous Catheter
Appendix 1

Flowchart to assess repaired tunnelled cuffed central venous catheter (tc-CVC)

24 hours post repair
Assess patency of tc-CVC
- Use sterile non-touch technique (ANTT)
  - Gently attempt to aspirate and flush the catheter
  - Assess for fluid leaks and integrity

Repair successful
- Able to flush and aspirate without leaking, or resistance
  - Document outcome in:
    - Patient progress notes
  - Collect blood cultures from tc-CVC
  - Assess patient vital signs (temperature)
    - Afebrile
    - Febrile
  - Administration antibiotics via CVC
    - Tazocin® (pipercillin/tazobactam IV 100mg/kg (pipercillin component), to a maximum of 4g q6h)
  - Decision regarding Vancomycin lock to be made by Home Team, Infection Management & Prevention Service (IMPS) and NP-VAMS
    - Possible
    - Not-possible
      - Continue to administer antibiotics via tc-CVC
        - Vancomycin and Tazocin® (pipercillin/tazobactam IV 100mg/kg (pipercillin component), to a maximum of 4g q6h)
      - Re-assess patient vital signs (temperature) after 48 hours of antibiotic therapy
        - Afebrile and -ve blood cultures
          - Stop antibiotics
        - Febrile +/- positive blood cultures
          - Contact IMPS

Repair unsuccessful - leaking
- Contact NP Vascular Assessment and Management Service (NP-VAMS) and/or home team
  - Document outcome in:
    - Patient progress notes
    - PRIME
  - Consideration by home team and NP (VAMS) as to appropriate action
    - Administer urokinase
      - Refer to drug use guideline
      - Allow urokinase to dwell as long as possible up to 24 hours (minimum 1 hour)

Repair unsuccessful – blocked
- Notify NP-VAMS
  - Document outcome in:
    - Patient progress notes
    - PRIME
  - Surgical removal and replacement of tc-CVC
  - Further attempt at repair of tc-CVC