

CLINICAL PRACTICE GUIDELINE

Practice Guideline:

Esophageal and Rectal Temperature Probe for Continuous Monitoring – Insertion and Removal (Adult)

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Pages:

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Supersedes:

N/A

1.0 PURPOSE AND INTENT

- 1.1 To monitor core temperature when inducing Targeted Temperature Management in post cardiac arrest patients or implementing warming/cooling protocols.
- 1.2 To provide guidance and support in the correct placement and/or removal of indwelling temperature probes, either esophageal or rectal placement.

2.0 DEFINITIONS

- 2.1 **Esophageal stethoscope temperature probe:** A medical device inserted into the esophagus allowing both routine monitoring of core body temperature and auscultation of heart and lung sounds using a specialty stethoscope meant for that purpose. This device is available in a range of diameters. Once inserted, the probe is connected to an interfacing cable and then to an ECG monitor or Temperature Management system for display of core temperature.
- 2.2 **Temperature probe:** A medical device available in a variety of diameters, used for the continuous measurement of core body temperature. This probe may have either an esophageal placement, with nasopharyngeal or oral site of insertion, or a rectal placement. Once inserted, the probe is connected to an interfacing cable and then to an ECG monitor or Temperature Management system for display of core temperature.
- 2.3 **Temperature Management System:** Equipment used to achieve increases or decreases in core body temperature by the circulation of air or water through specialized blankets or body wraps. Many systems have the ability to connect to a temperature probe using an interfacing cable and display continuous temperature measurement readings.
- 2.4 **Targeted Temperature Management (TTM):** The process of achieving and maintaining body temperature at a set-point or pre-defined range for a set period of time.

3.0 GUIDELINES

- 3.1 Nurses who have received site-specific orientation to equipment and upon a written order from a physician/delegate, may insert, maintain, and remove a temperature probe for esophageal or rectal placement.
- 3.2 Critical Care units may use different manufacturers' products for the continuous monitoring of temperature. Please consult your unit to be aware of the products available for use at your site. They may include: a multipurpose probe for esophageal or rectal use, a nasopharyngeal probe for nares insertion and esophageal placement, or an esophageal stethoscope with temperature monitoring capabilities.

- 3.3 When utilizing a Temperature Management System, a consistent site and method of temperature measurement should be used throughout in order to more accurately track changes and trends.
- 3.4 Patients' coagulation status must be assessed. Consideration must be given to Partial thromboplastin time (PTT), International normalized ratio (INR), platelet count, and all medications affecting bleeding time. Discuss and document all concerns or potential bleeding issues with the physician/delegate prior to insertion of the temperature probe.
- 3.5 Use caution in nasopharyngeal insertion of patients taking anticoagulants or when manipulation of the mucosa is undesirable.
- 3.6 Oral insertion of an Esophageal temperature probe is for intubated patients only.
- 3.7 Contraindications to temperature probe insertion into the esophagus shall be discussed with the physician prior to initiating procedure to facilitate risk benefit determination. This includes patients who have a history of:
- Core temperatures below 28°C
 - Esophageal varices; End stage liver disease
 - History of esophageal perforation, stenosis, strictures, cancer, or surgery (including full or partial esophagectomy)
 - Suspected esophageal perforation (traumatic, corrosive and/or burn)
 - Base of tongue resection with or without free flap reconstruction; Complex oropharyngeal resections with or without free flap reconstruction
 - Laryngeal surgery (examples: supraglottic laryngectomy, partial laryngectomy) that preserves the larynx (does not include total laryngectomy with permanent tracheostomy)
 - Tracheal resection
- 3.8 In patients displaying contraindications to nursing insertion (as outlined in 3.7), the physician/delegate shall be responsible for insertion of the esophageal temperature probe.
- 3.9 Esophageal temperature probe placement shall be verified by chest x-ray post insertion. The Esophageal stethoscope temperature probe does not require x-ray confirmation as placement is confirmed by auscultation.
- 3.10 Esophageal stethoscope temperature probes are used for **Temperature Monitoring Only. Medications or feedings may not be instilled** through the esophageal stethoscope temperature probe.

- 3.11 Contraindications to temperature probe insertion into the rectum shall be discussed with the physician prior to initiating procedure to facilitate a risk benefit determination. This includes patients who have a history of:
- Rectal bleeding or rectal surgery
 - Internal or external hemorrhoids
 - Recent prostate surgery
 - Fecal impaction
 - Diarrhea
 - Colostomy
- 3.12 Removal of the temperature probe is required for Magnetic Resonance Imaging (MRI) testing, as the probe is not MRI compatible. Please refer to specific manufacturers' recommendations.
- 3.13 The temperature probes are radiopaque and protected against the effects of electrosurgery and defibrillation.

4.0 EQUIPMENT

- 4.1
- Clean gloves
 - Disposable general purpose temperature probe or Esophageal stethoscope temperature probe (ex. DeRoyal Fr #18 tube)
 - Esophageal stethoscope (if using Esophageal stethoscope temperature probe)
 - Regular stethoscope (if using Esophageal stethoscope temperature probe)
 - Tape measure
 - Water soluble lubricant
 - Interfacing cable (to bedside monitor or Temperature management system/Cooling machine)
 - If required, Temperature monitoring module (for bedside monitor)
 - White cloth tape (or appropriate securement device)
 - Disposable pad (if desired)

5.0 PROCEDURE

- 5.1 Part A: Insertion of an Esophageal or Rectal Temperature Probe
 Part B: Insertion of an Esophageal Stethoscope Temperature Probe
 Part C: Removal of an Esophageal or Rectal Temperature Probe

<u>Part A: Insertion of an Esophageal or Rectal Temperature Probe:</u>	
<u>PROCEDURE:</u>	<u>SPECIAL CONSIDERATIONS:</u>
1. Verify physician/delegate order.	
2. Perform Hand hygiene before direct patient contact and subsequently as clinically indicated.	
3. Don clean gloves.	

4. Verify the correct patient using two patient identifiers.	
5. Select appropriate site for temperature probe insertion.	<p>Each body region has its own temperature, which varies as cellular metabolism, tissue friction, and circulation affect heat content.</p> <p>The core temperature provides the best reflection of body temperature as it is more stable and the least affected by environmental factors. Esophageal placement of the temperature probe best approximates core temperature when compared to the rectal placement.</p> <p>Decisions on placement location of the temperature probe is dependent on a review of patient condition, indications for monitoring, and a review of contraindications.</p>
6. Position patient: <ul style="list-style-type: none"> a. If inserting into the esophagus, position patient in semi-fowlers. b. If inserting into the rectum, assist the patient to left side lying position with right knee and thigh flexed, unless contraindicated. 	
7. Remove the temperature probe from its sterile package.	
8. Measure distance for insertion and mark the measurement on the probe. <ul style="list-style-type: none"> a. If inserting the probe nasally: measure from the nares to the earlobe to the upper half of the sternum. b. If inserting the probe orally: measure from the mouth to the earlobe to the upper half of the sternum. c. If inserting to the rectum: the probe should be inserted 15cm. 	<p>The most accurate core temperature measurement is obtained when temperature probe is inserted to the level of the left atrium which corresponds to placement within the lower third of the esophagus.</p> <p>The Rectal depth to which the probe is inserted affects accuracy of temperature measurement. Insertion to a depth of 15cm into the rectum is the most valid depth.</p>
9. Lubricate the probe tip with a water-soluble lubricant	Lubrication eases insertion of the probe and minimizes trauma to the mucosa during insertion.

<p>10. Gently insert and advance to the measured distance. If resistance is met, gently withdraw the probe and gently advance it again.</p>	<p>If inserting the probe orally or nasally, the technique is the same as with an orogastric or nasogastric tube insertion.</p> <p>If inserted for esophageal placement:</p> <p>Never force the probe as resistance may indicate tracheal intubation of the probe against the endotracheal tube cuff.</p> <p>Air leaks may indicate that the probe has been inserted into the trachea and has come in contact with the endotracheal tube (ETT) cuff. If probe is auscultated in the trachea, pull out probe and attempt reinsertion into the esophagus.</p> <p>If the patient exhibits signs of respiratory distress, such as coughing, gasping, decreased oxygen saturations, or air leak from the ETT, immediately withdraw the temperature probe, and contact the medical team.</p>
<p>11. Secure the probe using white cloth tape or other appropriate securement device.</p>	<p>Reduces the risk of inadvertent displacement.</p> <p>If inserted orally, the temperature probe should be secured to the endotracheal tube (ETT).</p>
<p>12. Connect probe to the interfacing cable.</p> <p>Connect interfacing cable to the temperature module, on either bedside monitor or temperature management system.</p>	<p>There are two different interfacing cables, one for the bedside monitor, and one for the Altrix or equivalent temperature management system.</p> <p>If Targeted Temperature Management guideline is being implemented, it is preferable to attach the esophageal temperature probe to the temperature management system, as the esophageal route is the most accurate and sensitive to core temperature changes.</p>
<p>13. Confirm temperature readings are being obtained on either the bedside monitor or temperature management system.</p>	<p>Temperature probes will require between 30 seconds and 3 minutes of time to achieve equilibrium and begin to display accurate readings. See specific manufacturers' recommendations.</p> <p>Unusual temperature readings should be evaluated.</p>
<p>14. Obtain Chest x-ray for verification of correct placement of esophageal temperature probes, and ensure the physician/delegate documents same.</p>	<p>Most probes have a radiopaque tip that is visible on a radiograph.</p> <p>Tracheal or bronchial insertion of the probe may cause airway obstruction and may be fatal if uncorrected.</p>

<p>15. Measure the external length in centimeters and document on the Integrated Progress Note (IPN) or approved site documentation.</p> <p>Confirm external length to verify depth of probe placement each shift and when trouble shooting temperature discrepancies.</p>	
<p>16. Document the procedure in the patient's record.</p>	<p>While adverse reactions are rare, the following have been associated with the insertion or use of esophageal/rectal temperature probes: airway obstruction, aspiration pneumonitis, bronchial insertion, electrical burns and shock, epistaxis, esophageal abrasion, esophageal/colon perforation, rectal bleeding, stool insertion, tracheal insertion, and trauma to the pharynx.</p> <p>In patients with clotting disorders, incidence of epistaxis is high with nasopharyngeal insertion.</p>
<p>17. If using an orally inserted temperature probe, assess oral cavity and perform oral care every 2-4 hours and as needed.</p>	<p>Tube presence may predispose the patient to mucosal breakdown, ulceration, and oral infections.</p>

Part B: Insertion of an Esophageal Stethoscope Temperature Probe:

<u>PROCEDURE:</u>	<u>SPECIAL CONSIDERATIONS:</u>
1. Verify physician/delegate order.	
2. Perform Hand hygiene before direct patient contact and subsequently as clinically indicated.	
3. Don clean gloves.	
4. Verify the correct patient using two patient identifiers.	
5. Position patient in semi-fowlers position for esophageal insertion.	
6. Remove the temperature probe from its sterile package.	

<p>7. Measure the distance for insertion and mark the measurement on the probe. Measure from the mouth to the earlobe to the upper half of the sternum.</p>	<p>The most accurate core temperature measurement is obtained when temperature probe is inserted to the level of the left atrium which corresponds to placement within the lower third of the esophagus.</p>
<p>8. Lubricate the probe tip with a water-soluble lubricant.</p>	<p>Lubrication eases insertion of the probe and minimizes trauma to the mucosa during insertion.</p>
<p>9. Gently insert the probe into the mouth and advance the probe to the predetermined length to place it in the upper esophagus.</p> <p>Auscultate over the neck area with a regular stethoscope, listening for an air leak, to ensure correct placement.</p>	<p>Technique is the same as with an orogastric tube insertion.</p> <p>The Esophageal stethoscope temperature probe is too large and rigid to place through the nose without causing trauma nasally. The nasopharyngeal approach can cause perforation of the nasal septum or esophagus, and epistaxis, and is contraindicated in basal skull fractures. Oropharyngeal approach is the preferred choice for insertion due to ease of application.</p> <p>Never force the probe. Resistance may indicate tracheal intubation of the probe against the endotracheal tube cuff.</p> <p>Air leaks may indicate that the probe has been inserted into the trachea and has come in contact with the endotracheal tube (ETT) cuff. If probe is auscultated in the trachea, pull out probe and attempt reinsertion into the esophagus.</p> <p>If the patient exhibits signs of respiratory distress, such as coughing, gasping, decreased oxygen saturations, or air leak from the ETT, immediately withdraw the temperature probe, and contact the medical team.</p>
<p>10. Attach the esophageal stethoscope to the Esophageal stethoscope temperature probe.</p> <p>a. Auscultate to adjust placement of the distal tip of the esophageal temperature probe.</p> <ul style="list-style-type: none"> - Continue advancing probe until heart sounds become distant and gastric sounds are loudest. 	<p>The Esophageal stethoscope temperature probe is encased in a hollow tube which transmits sound amplified by the esophageal stethoscope attachment.</p> <p>The location of the distal tip is identified by sounds of surrounding anatomical structures.</p> <p>To achieve the most accurate core temperature, the probe should be located as closely as possible to the left ventricle and aorta.</p>

<ul style="list-style-type: none"> - Pull back on probe until the intensity of the heart sounds are once again heard loudest over the lower half of the sternum. - Disconnect the esophageal stethoscope. 	
11. Secure the probe using white cloth tape or other appropriate securement device directly to the endotracheal tube (ETT).	
12. Connect probe to the interfacing cable. Connect interfacing cable to the temperature module, on either the bedside monitor or temperature management system.	<p>There are two different interfacing cables, one for the bedside monitor, and one temperature management system.</p> <p>If the Targeted Temperature Management guideline is being implemented, it is preferable to attach the esophageal temperature probe to the temperature management system, as the esophageal route is the most accurate and sensitive to core temperature changes.</p>
13. Confirm temperature readings are being obtained on either the ECG monitor or temperature management system.	<p>Temperature probes will require between 30 seconds and 3 minutes of time to achieve equilibrium and begin to display accurate readings.</p> <p>Usual temperature reading should be evaluated.</p>
14. Measure the external length in centimeters and document the procedure on the Integrated Progress Note (IPN) or approved site documentation.	
15. Follow step 10 above to verify correct placement of esophageal temperature probe with esophageal auscultation each shift or when trouble shooting temperature discrepancies.	
16. Assess oral cavity and perform oral care every 2-4 hours and as needed.	Tube presence may predispose the patient to mucosal breakdown, ulceration, and oral infections.

<u>Part C: Removal of an Esophageal or Rectal Temperature Probe</u>	
<u>PROCEDURE:</u>	<u>SPECIAL CONSIDERATIONS:</u>
1. Perform hand hygiene before direct patient contact and subsequently as clinically indicated.	
2. Don clean gloves.	
3. Disconnect probe from interfacing cable.	There are two different interfacing cables, one for the bedside monitor, and one for the Altrix or equivalent temperature management system.
4. If the temperature probe being removed is placed in the rectum, assist the patient to left side lying position with right knee and thigh flexed, unless contraindicated.	
5. Remove the probe and dispose.	If placed orally, remove the probe prior to extubation of the tracheal tube. The probe is not reusable.
6. Document the procedure in the patient's record.	

6.0 DOCUMENTATION

6.1 Document the following information and times in the Integrated Progress Notes, Flow Sheet or Electronic Patient Care Record, as applicable:

- Date/time temperature probe inserted/removed and by whom.
- Site of temperature probe placement (nasal, oral, rectal).
- External length
- Any complications with temperature probe insertion/removal and patient tolerance of procedure.
- Patient's temperature from the temperature probe.

7.0 REFERENCES (American Psychological Association format)

Care Fusion®. (2016). General purpose temperature probe, disposable, 400 series. Instructions for use. Revised: May, 2016.

DeRoyal®. (2020). Esophageal stethoscope with temperature sensor. Instructions for use. Revised: November, 2020.

DeRoyal® (2020). General purpose temperature probe. Instructions for use. Revised: February, 2021.

Elsevier Mosby Nursing Skills Online. *Hypothermic and Hyperthermic External and Intravascular Devices*. Retrieved on July 23rd, 2021 from: [Skills: Hypothermic and Hyperthermic External and Intravascular Devices - CE \(elsevierperformancemanager.com\)](https://www.elsevier.com/health/clinicalperformance/Skills/Hypothermic%20and%20Hyperthermic%20External%20and%20Intravascular%20Devices-CE)

Lee, J. Y., Wakabayashi, H., Wijayanto, T. *et al.* (2010). Differences in rectal temperatures measured at depths of 4–19 cm from the anal sphincter during exercise and rest. *European Journal of Applied Physiology*, **109**, 73–80. <https://doi.org/10.1007/s00421-009-1217-0>

Makic M. B., Lovett K, & Azam M. F. (2012). Placement of an esophageal temperature probe by nurses, *AACN Advanced Critical Care*, 23(1), 24-31. <https://doi.org/10.1097/NCI.0b013e31823324f3>.

Miller K. C., Hughes L. E., Long B. C., Adams W. M., & Casa D. J. (2017). Validity of core temperature measurements at 3 rectal depths during rest, exercise, cold-water immersion, and recovery, *Journal of Athletic Training*, 52(4), 332-338. <https://doi.org/10.4085/1062-6050-52.2.10>

Pasquier, M., Paal, P., Kosinski, S., Brown, D., Podsiadlo, P., & Darocha, T. (2020). Esophageal temperature measurement, *The New England Journal of Medicine*, 383(16), e93(1-3).

Shared Health. (2013). Critical Care Nursing Procedure 350.215.106. HSC – Critical Care: Esophageal Temperature Probe Insertion: Oropharyngeal Placement (Adults). Retrieved from <https://policies.sharedhealthmb.ca/document/68/critical-care/435/350-215-106-cpg-hsc-critical-care-esophageal-temperature-probe-insertion-oropharyngeal-placement-adults.pdf>

St.Boniface Hospital. (2016). Critical Care Nursing Procedure 100.410.D.01.05. Insertion or Removal of an Esophageal or Rectal Temperature Probe for Continuous Monitoring. Retrieved from <http://intranet.sbggh.mb.ca/ManualsNursing/files/100.410.D.01.05.pdf>

Stryker®. (2016). Stryker Esophageal/Rectal Temperature Probe (8001 Series). Instructions for use. Revised: May, 2016.

Wiegand, D. J. L.-M, (2017), *AACN procedure for high-acuity, progressive, and critical care* (7th Edition.). Elsevier.