Cardiology Procedures: Monitored Anesthesia Care or General Anesthetic (CSSU); Care of the Patient Following

Site Applicability

Practice Level

Specialized:

Restricted to registered nurses who have:

- Knowledge and skills related to cardiac monitoring, including identification and appropriate response to arrhythmias
- Adequate opportunity for practice of caring for patients after invasive cardiology procedures, i.e. 4 to 5 days/month.

Requirements

- Patients admitted to CSSU immediately following general anesthesia or monitored anesthesia care must be cared for by an RN with critical care qualifications. If a critical care CSSU RN is not immediately available, initial assessment and care will be temporarily provided by the RN accompanying the patient from the cardiac procedure room/EP/Cath Lab.
- Discharge criteria for obstructive sleep apnea monitoring power plan must be fulfilled, should there be one
- 1:1 nursing by a critical care RN must be provided to until Modified Aldrete Score of 8 is achieved AND:
    - Respiration score must be 2; AND
    - Oxygen Saturation must be 1 or greater
- If a patient has had general anesthesia, the anesthesiologist or delegate accompanies patients to CSSU

Need to Know

- A wide variety of invasive cardiology procedures are performed in cardiac catheterization lab (CL), electrophysiology lab (EP), cardiac procedure room (CPR) and cardiac short stay unit (CSSU), including percutaneous interventions, electrophysiology studies and ablation, transesophageal echo (TEE), implantation of pacemaker, implantable cardioverter defibrillator (ICD) and cardiac resynchronization therapy (CRT) devices,

- Many patients undergoing these procedures receive procedural sedation or general anesthetic.
- Procedural sedation is an adjunct to effective local &/or topical anesthesia, with a goal of facilitating the procedure while maintaining the patient's consciousness and responsiveness. It entails titration of medications to improve comfort and reduce anxiety.
- General anesthesia medications can cause lingering muscle paralysis, CVS depression, amnesia and emergence delirium. Other medications may be required to reverse these effects, prior to the patient leaving the labs.
- During monitored anesthesia care, an anesthetist continually monitors and supports the patients vital functions, administers sedative, anxiolytic, or analgesic medication if needed and converts to general anesthesia if required.

Equipment and Supplies

Safety Equipment – Required at the bedside:

Simple face mask and nasal prongs	BP cuff
Oral airways	Pulse oximeter
AMBU-bag	Cardiac monitor
Operational suction equipment	Naloxone and flumazenil (in Omnicell)
End-tidal CO_2 equipment	

Protocol Post-procedure

Arrival to CSSU:

The CPR/EP/Cath Lab RN will call CSSU to notify nurse of impending transfer.

For any patient accompanied by an anesthesiologist:

- CSSU receiving RN receives report from anesthesiologist or his/her delegate.
- Complete initial assessment, including the modified Aldrete Score (See Appendix A: Discharge Criteria) and inform anesthetist of VS.

Initial Assessment

Assessment	Criteria and Assessment
Airway **Intervene immediately if airway obstruction is present:** • Jaw thrust • Head tilt/chin lift • Oral airway	• Assess for airway patency: auscultate breath sounds over trachea • Observe for any airway obstruction (see Complications, below) • Assess ability to maintain an open airway. • If patient still has a laryngeal mask airway, provide continuous attendance at the bedside until patient able to maintain his/her own airway without LMA. • Notify anesthesiologist of any compromised airway.
Respiratory	Assess respiratory status: • Observe rate, pattern of breathing and use of accessory muscles. • Observe chest expansion. • Auscultate chest for bilateral breath sounds on admission and PRN • Assess SpO_2. • Assess patient for apneic episodes • Initiate end tidal CO_2 monitoring as per OSA monitoring Power Plan
Cardiovascular	Initiate bedside cardiac monitoring. Assess: • Rate, cardiac rhythm, blood pressure. • CWMS.
Neurological	Assess: • GCS
Pain	Assess patient's pain level.
Nausea and Vomiting	Assess nausea and vomiting. Refer to post-procedure orders for anti-emetics.
Bleeding	Assess procedural access site for bleeding and/or hematoma.

Modified Aldrete Scale	General Anesthesia:	Procedural Sedation:
The patient receives 1:1 nursing care by a critical care RN until criteria met. Refer to Appendix A	Assess **Q 5 mins x 3,** then Q 15 mins until score of 8 is achieved AND: • Respirations score of 2 • Oxygenation saturation 1 or greater. Then; Continue Q 15 mins until score of 10 maintained for 1 hour	Assess **Q15 mins**, until score of 8 is achieved AND: • Respirations score of 2 • Oxygenation saturation 1 or greater. Then; • Continue Q 15 mins until score of 10 maintained for 1 hour

Discharge from CSSU

- Patients transferring to a critical care unit may go directly to the critical care unit.
- Patient must score 10 on the Modified Aldrete Scale for 1 hour for discharge home or transfer to non-critical care area.
- Patient meets discharge criteria. (see Appendix A: Discharge Criteria)
- Patient recovers from procedure, as outlined in relevant protocols.
- Patient has met discharge requirements from Anesthesiologist ordered Power Plan, when applicable.

Complications and Interventions

Complication	Signs and Symptoms	Intervention/Management
Airway Obstruction (upper) **Tongue** - poor muscle tone, relaxed muscles of the tongue and oropharynx combined with limited motor strength due to anesthetic medications.	• Snoring respirations with partial obstruction • Decreased O_2 saturations. • Apnea, no breath sounds on auscultation (total obstruction) • Flat waveform on $EtCO_2$ tracing	• Perform jaw thrust or chin lift/ head tilt maneuver • Reposition patient on side or elevate HOB • Reassure • Insert oral airway as needed

Complication	Signs and Symptoms	Intervention/Management
Bronchospasm Abnormal contraction in the smooth muscle wall of the bronchi and bronchioles, edema of bronchial mucosa, obstruction of airway beyond edema	• Prolonged expiratory time • Wheezing • Cough • Accessory muscle use, labored breathing, increased work of breathing • Decreased O_2 saturation	• Elevate HOB • Provide O_2 • Call Anesthesiologist STAT •
Laryngospasm Involuntary muscle contraction of laryngeal cords, partial or complete, blocking inspiratory effort. Typically caused by secretions or stimulation which irritate larynx and create a reflective spasm. Can be partial or complete obstruction.	**Partial Obstruction:** • Stridor, high-pitched respirations • Increased respiratory effort • Accessory muscle use • Restlessness, agitation, anxiousness • Tachycardia **Complete Obstruction:** • Apnea – absence of stridor or air exchange • Tracheal tug • Worsening hypoxia, can lead to cardiac arrest if untreated	• Provide O_2 by facemask at 10 L/min • Notify Anesthesiologist STAT. • Elevate HOB or position of comfort, usually high fowlers position • Reassess SpO_2 and breath sounds over trachea • Stay with patient, provide reassurance • Prepare for re-intubation If complete obstruction: • Call a CODE BLUE • Begin bag-valve-mask ventilation • Prepare for re-intubation
Decreased Muscle Tone	• Patient unable to lift head off pillow for greater than 5 seconds • Weak hand grip • Unable to lift arms off bed	• Observe closely • Prepare to manually ventilate with BMV • Call Anesthesiologist

Complication	Signs and Symptoms	Intervention/Management
Impaired Respiratory Gas Exchange/ Ineffective Respiratory Effort Due to opioid induced respiratory depression, inadequate neuromuscular blocking agent reversal, pulmonary edema	• Diminished or absent breath sounds • Ineffective respiratory effort • Use of accessory muscle • Decreased O_2 saturation (SpO_2 less than 92%) • Increased $EtCO_2$ • Bradypnea (RR less than 8)	• Attempt to rouse patient • Provide supplemental O_2 • Airway support as needed • Notify anesthesiologist • Raise HOB, or reverse Trendelenburg • Reassess in 15 mins • Prepare for possible re-intubation • Consider non-GA/sedation-related complications. (i.e. pneumothorax, tamponade)
Hemodynamic Change	• Change in cardiac rhythm, heart rate or blood pressure	Notify Anesthesiologist and/or procedure physician if: • Any change in cardiac rhythm • heart rate or blood pressure +/- 20% from patients baseline
Neurological Change	• Deteriorating LOC • Deteriorating Modified Aldrete Score	• Notify Anesthesiologist and/or procedural physician.

Patient safety:

- Maintain close observation of patient, monitoring for disorientation, restlessness, agitation until modified Aldrete Score of 8 achieved.
- Brakes on bed at all times

Documentation

Document initial and ongoing assessments and interventions using Cerner Electronic Health Record. During downtime the Cardiac Short Stay Unit tri-fold (form no. NF232) must be used.

Patient and Family Education

- Review General Anesthesia/Conscious Sedation Discharge Guidelines with patient and family.
- Review discharge instructions specific to procedure with patient and family.

Related Documents

1. B-00-13-10018 – PACU: Post Anesthetic Patient in Phase 1
2. B-00-13-10046 –Procedural Sedation and Analgesia: Clinics and Procedure Room
3. B-00-13-10063 – Cardiac Cath Lab: Post Procedure Care
4. B-00-12-10106 – Extubation of Oral Endotracheal Tube of Non-Ventilated Patient in PACU

References

1. American Society of Anesthesiologists. (2018). *Distinguishing Monitored Anesthesia Care ("MAC") from Moderate Sedation/Analgesia (Conscious Sedation).*
2. AORN (2009) Recommended practices for managing the patient receiving moderate sedation/analgesia Perioperative Standards and Recommended Practices Association of Perioperative Registered Nurses. Denver.
3. American Society of Anesthesiologists. (2018). Practice Guideline for Moderate Procedural Sedation and Analgesia 2018: A Report by the American Society of Anesthesiologists Task Force on Moderate Procedural Sedation and Analgesia, the American Association of Oral and Maxillofacial Surgeons, American College of Radiology, American Dental Association, American Society of Dentist
4. Chambers, K.L. (2020) Postoperative Care: Immediate Recovery Period. Elsevier Clinical Skills. St. Louis, MO. Elsevier. Retrieved January 26 2021 from www.elsevierskills.com
5. Dobson, G., Chong, M., Chowe, L., et al. (2018). Appendix 6 Position Paper on Procedural Sedation: An Official Position Paper of the Canadian Anesthesiologists' Society in Guidelines to the Practice of Anesthesia – Revised Edition. *Can J Anesth, 65,* 76-104.
6. Drain, C. (2003). Perianesthesia nursing a critical care approach. 4th Ed.
7. Urdan, L.D., Stacy, K., & Lough, M. (2010). Perianesthesia Management. Critical Care Nursing. (6th Ed.). (pp. 260-284). St Louis, MO: Mosby.

Persons/Groups Consulted:

- Clinical Nurse Specialist, Cardiology
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First Released Date:	30-SEP-2006
Posted Date:	10-FEB-2020
Last Revised:	10-FEB-2020
Last Reviewed:	
Approved By:	PHC
	Professional Practice Standards Committee
Owners:	PHC
	Heart Centre

Appendix A Discharge Criteria

Criteria for Discontinuing from 1:1 monitoring

- Modified Aldrete score for **Respirations** must be **2**; AND
- Modified Aldrete score for **Oxygen Saturation** must be **1 or greater;** AND
- **Total** Modified Aldrete score must be **8 or greater.**

Criteria for Discharge or Transfer from Procedure Clinic / Area

- 30 minutes after the last dose of sedation or analgesia is given; AND
- 120 minutes after the last dose of IV reversal agent administered (if given); AND
- **Total** Modified Aldrete score of **10;** AND
- Nausea and Vomiting acceptable to patient; AND
- Pain severity acceptable to patient; AND
- Dressing/operative site dry or requires extra padding but marked and not increasing; hematoma, if present, is not growing. No signs of internal bleeding.

Modified Aldrete Scale

Category	Criteria	Point Value
Respirations	Able to deep breath and cough freely	2
	Dyspnea or limited breathing	1
	Apneic	0
Oxygenation	Able to maintain SpO_2 greater than 92% on room air	2
	Requires supplemental oxygen to maintain SpO_2 greater than 90%	1
	SpO_2 below 90% even with supplemental oxygen	0
Circulation	Blood pressure +/- 20mmHg pre-procedure value	2
	Blood pressure +/- 20mmHg to 50mmHg pre-procedure value	1
	Blood pressure +/- greater than 50mmHg of pre-procedure value	0
Level of Consciousness	Awake and oriented	2
	Wakens with stimulation	1
	Not responding	0
Movement	Moves 4 limbs on own	2
	Moves 2 limbs on own	1
	Moves 0 limbs on own	0

Appendix B **Patient Education Material**

PATIENT EDUCATION

How you want to be treated.

General Anesthetic / Conscious Sedation Discharge Guidelines

You have received medicine to sedate you (sedative) or to make you temporarily go to sleep (anesthetic). ***It is important that you follow these instructions.***

- You **MUST** go home with a responsible adult, even if you are traveling by taxi. A responsible adult should remain with you for the first 24 hours.

- **DO NOT** drink or eat anything until the numb feeling in your throat goes away. You may usually begin to drink and eat about 2 hours after the procedure.

- **DO NOT** drink any alcohol, or take any sleeping pills, recreational drugs or medicine that causes drowsiness, for 24 hours. Also, **DO NOT** take any herbal medicines or remedies for at least 48 hours. Dangerous side effects could result by mixing these with the sedative or anesthetic you have received. Ask the doctor or nurse if you have any questions about any medicine or herbal remedy.

- **DO NOT** do anything that requires coordination for the first 24 hours after your procedure (for example drive a motor vehicle, ride a bicycle, ride alone on public transit or operate machinery). You may feel drowsy. We recommend you go home and rest for the remainder of today.

- **DO NOT** sign any legal documents or make any important decisions for 24 hours.

- If you have nausea (feeling sick to your stomach), drink clear fluids only, and then progress to solids as you feel like it. Sips of ginger ale or dry soda crackers may help.

- Follow all of the other instructions given to you by your nurse or doctor. **DO NOT** take more of any medicine than what is prescribed.

- You may have a hoarse voice, sore throat or muscle aching in the first 24 hours after a general anesthetic. These symptoms will usually go away on their own.

- Notify the Doctor or go to the Emergency Department if any of these things happens:
    - fever
    - chills
    - the prescribed medicine does not relieve your pain
    - symptoms persist beyond 24 hours (for example, nausea and vomiting)

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