Policies and Procedures

Title: ADVANCED CARDIOVASCULAR LIFE SUPPORT (ACLS) – INITIATION AND MANAGEMENT OF


- Cardiac Arrest
- Bradycardia
- Tachycardia
- Immediate Post-Cardiac Arrest Care
- Opioid-Associated Life-Threatening Emergency (Adult)

I.D. Number: 1194

Authorization:
[X] Code Blue Committee
[X] Former SKtnHR Nursing Practice Committee

Source: Nursing

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Scope: Acute Care: Urban and Rural

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DEFINITIONS

ACLS - Advanced Cardiovascular Life Support certification through Heart and Stroke Foundation (HSF) of Canada

ACP - Advanced Care Paramedic

BLS - Basic Life Support certification through Heart and Stroke Foundation of Canada. Refer to Cardiopulmonary Resuscitation Policy (CPR) for Basic Life Support #1123

Code Blue - Sudden Cardio/Respiratory arrest that requires immediate recognition and resuscitation (See Code Blue – Adult, Pediatric policy #1012)

Code Blue Team - Resuscitation team is composed of Physician(s), Registered Nurse (Nurse Practitioners) (RN [NP]), Registered Nurses (RNs), Registered Respiratory Therapists (RRTs), Paramedics, and other members of the health care team. In Saskatoon Urban Acute Care, RNs assigned to the Code Blue team must hold current ACLS Provider Certification. In former SktnHR rural hospitals, the Code Blue Team is comprised of nursing staff on shift, physician/RN/RN (NP) on call and EMS providers as available. All RNs in
rural acute care must hold current ACLS Provider Certification or be supported by an RN that is currently certified in ACLS.

**Code Team Leader** - Member of the Code Blue Team that is responsible for directing the members of the code blue team in the resuscitation effort. The Code Leader is most often a Physician who is certified in ACLS.

**Most Responsible Health Practitioner (MRHP)** - means the Health Practitioner who has the responsibility and accountability for the specific treatment/procedure(s) provided and prescribed to a patient and who is authorized by the former Saskatoon Health Region (SktnHR) to perform the duties required to fulfill the delivery of such a treatment/procedure(s) within the scope of their practice.

**ROLES**

**Registered Nurses (RNs)** - identified by the manager in targeted practice settings, will be certified in the RN Specialty Practice: RN Clinical Protocol: Health Condition in an Emergency: ACLS, including: Cardiac Arrest, Bradycardia, Tachycardia, Immediate Post-Cardiac Arrest Care, Opioid-Associated Life-Threatening Emergency (Adult).

1. **PURPOSE**

   1.1 To ensure the immediate provision of Basic Life Support (BLS) and Advanced Cardiovascular Life Support (ACLS) using recognized guidelines/algorithms as per the Heart and Stroke Foundation of Canada by certified RNs in targeted areas.

2. **POLICY**

   2.1 RNs certified in this RNSP will have successfully completed the following prior to providing care:

      2.1.1 **Certification in Cardiac (ECG) Monitoring and Rhythm Interpretation**

      2.1.2 Current certification in BLS

      2.1.3 Current certification in ACLS

      2.1.4 Review of the defibrillator that is used at your site is required biennially (i.e. every two years), in the year that ACLS is not taken. Refer to the defibrillator manual/operator instructions as needed.

   2.2 A Code Blue will be initiated on all patients, visitors and staff suffering a cardiac/respiratory arrest. If the arrest is unwitnessed, health care providers may use their discretion to call a code if the unwitnessed period is clinically assessed to be brief; exceptions are those patients who have an advance care directive or resuscitation care plan directing otherwise (see Resuscitation Policy #7311-60-016). Nurses and other health care workers not trained in ACLS, as well as members of the public should initiate BLS as per HSF standards when indicated and call a Code Blue as appropriate. Rural hospitals utilize local processes to call the MRHP.
2.3 In the absence of an MRHP, the most suitable RN certified in this RNSP will assume the role of code team leader to manage patient care following current Heart and Stroke algorithms as identified by this policy until the MRHP arrives. The MRHP will then assume management of the code.

*NOTE: When another team member arrives (e.g. ACP) the role of code team leader will be reassessed and may be reassigned to the most suitable member of the health care team.*

The code team leader’s role includes the following:

2.3.1 Ensuring provision of high quality BLS (compressions and ventilation) per HSF guidelines.

2.3.2 Ensuring adequate oxygenation and ventilation. Refer to the following policies for more information:
- Oxygen Administration #1115
- Ventilation Assistance – Manual Ventilation Device #1027
- Airway – Oropharyngeal: Insertion; Maintenance; Suction; Removal #1159
- Airway – Nasopharyngeal: Insertion of: Maintenance, Suction, Removal #1064
- Laryngeal Tube – Insertion, Care of and Removal - Adult #1193

2.3.3 Establishing vascular access. Refer to the following policies for more information.
- Intravenous and/or Peripheral Saline Lock Insertion and Maintenance #1118
- Intraosseous Access and Removal by Non-Physician Health Care Providers #1185
- Intraosseous Infusion – Assisting with Insertion and Removal #1186

2.3.4 Ordering appropriate medications, fluid boluses and actions as outlined by Heart and Stroke in the ACLS algorithms.

2.3.4.1 **Cardiac Arrest** (refer to Appendix A)

2.3.4.1.1 In the absence of an MRHP, the RN may perform the following skills independently:
- Manual defibrillation
- Administration of epinephrine and amiodarone according to the ACLS algorithm

2.3.4.2 **Bradycardia** (refer to Appendix B)

2.3.4.2.1 In the absence of an MRHP, the RN may perform the following skill with consultation from MRHP.
- Initiation of transcutaneous pacing according to the ACLS algorithm for highly unstable patients who have an imminent risk of impending cardiac arrest.
2.3.4.3 **Tachycardia** (refer to Appendix C)

2.3.4.3.1 In the absence of an MRHP, the RN may perform the following skill independently:

- Perform cardioversion per ACLS Guidelines/Algorithms for highly unstable patients who have an imminent risk of impending cardiac arrest where persistent tachyarrhythmia is causing:
  - hypotension and/or
  - acutely altered mental status and/or
  - signs of shock and/or
  - ischemic chest discomfort and/or
  - acute heart failure

2.3.4.4 **Immediate Post-Cardiac Arrest Care** (refer to Appendix D)

2.3.4.4.1 In the absence of an MRHP, the RN may perform the following skill independently:

- Initiation of fluid boluses to a maximum of 500 mL to treat hypotension. Additional fluids should only be administered with a practitioner’s order.

2.3.4.5 **Opioid-Associated Life-Threatening Emergency (Adult)** (refer to Appendix E)

2.3.4.5.1 In the absence of an MRHP, the RN may perform the following skill independently:

- Administration of naloxone according to the ACLS algorithm

3. REFERENCES


[Highlights of the 2015 American Heart Association Guidelines for CPR and ECC](https://www.heartandstroke.ca/resources/education-and-training/就算你ee)
Appendix A

Adult Cardiac Arrest Algorithm—2015 Update

1. Start CPR
   - Give oxygen
   - Attach monitor/defibrillator

2. Rhythm shockable?
   - Yes
   - VF/pVT
   - Shock
   - CPR 2 min
     - IV/IO access
     - Rhythm shockable?
     - Yes
     - Shock
     - CPR 2 min
       - Epinephrine every 3-5 min
       - Consider advanced airway, capnography
       - Rhythm shockable?
       - Yes
       - Shock
       - CPR 2 min
         - Amiodarone
         - Treat reversible causes
     - No
     - CPR 2 min
       - IV/IO access
       - Epinephrine every 3-5 min
       - Consider advanced airway, capnography
       - Rhythm shockable?
       - Yes
       - Shock
       - CPR 2 min
         - Amiodarone
         - Treat reversible causes
   - No
   - Asystole/PEA

3. CPR 2 min
   - IV/IO access

4. Rhythm shockable?
   - Yes
   - Shock
   - CPR 2 min
     - Epinephrine every 3-5 min
     - Consider advanced airway, capnography
     - Rhythm shockable?
     - Yes
     - Shock
     - CPR 2 min
       - Amiodarone
       - Treat reversible causes
   - No
   - CPR 2 min
     - IV/IO access
     - Epinephrine every 3-5 min
     - Consider advanced airway, capnography
     - Rhythm shockable?
     - Yes
     - Shock
     - CPR 2 min
       - Amiodarone
       - Treat reversible causes

5. CPR 2 min
   - Amiodarone
   - Treat reversible causes

6. CPR 2 min
   - IV/IO access
   - Epinephrine every 3-5 min
   - Consider advanced airway, capnography

7. Shock

8. CPR 2 min
   - Amiodarone
   - Treat reversible causes

9. Asystole/PEA

10. CPR 2 min
    - IV/IO access

11. CPR 2 min
    - Treat reversible causes

12. CPR 2 min
    - If no signs of return of spontaneous circulation (ROSC), go to 10 or 11
    - If ROSC, go to Post-Cardiac Arrest Care

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CPR Quality
- Push hard (at least 2 inches [5 cm]) and fast (100-120/min) and allow complete chest recoil.
- Minimize interruptions in compressions.
- Avoid excessive ventilation.
- Rotate rescuer every 2 minutes, or sooner if fatigued.
- If no advanced airway, 30:2 compression-ventilation ratio.
- Quantitative waveform capnography
  - If PETCO2 < 10 mm Hg, attempt to improve CPR quality.
  - Intra-arterial pressure
    - If relaxation phase (diastolic) pressure <20 mm Hg, attempt to improve CPR quality.

Shock Energy for Defibrillation
- Biphasic: Manufacturer recommendation (eg, initial dose of 120-200 J); if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered.
- Monophasic: 360 J

Drug Therapy
- Epinephrine IV/IO dose: 1 mg every 3-5 minutes
- Amiodarone IV/IO dose: First dose: 300 mg bolus. Second dose: 150 mg.

Advanced Airway
- Endotracheal intubation or supraglottic advanced airway
- Waveform capnography or capnometry to confirm and monitor ET tube placement
- Once advanced airway in place, give 1 breath every 8 seconds (10 breaths/min) with continuous chest compressions

Return of Spontaneous Circulation (ROSC)
- Pulse and blood pressure
- Abrupt sustained increase in PaCO2 (typically ≥60 mm Hg)
- Spontaneous arterial pressure waves with intra-arterial monitoring

Reversible Causes
- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis) (Hypoxia)
- Hypo-hyperkalemia
- Hypothermia
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary

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**Adult Bradycardia With a Pulse Algorithm**

1. Assess appropriateness for clinical condition. Heart rate typically <50/min if bradyarrhythmia.

2. Identify and treat underlying cause
   - Maintain patent airway; assist breathing as necessary
   - Oxygen (if hypoxemic)
   - Cardiac monitor to identify rhythm; monitor blood pressure and oximetry
   - IV access
   - 12-Lead ECG if available; don’t delay therapy

3. **Persistent bradyarrhythmia causing:**
   - Hypotension?
   - Acutely altered mental status?
   - Signs of shock?
   - Ischemic chest discomfort?
   - Acute heart failure?

4. Monitor and observe
   - **No**

5. **Yes**
   - **Atropine**
     - If atropine ineffective:
       - Transcutaneous pacing
       - **Dopamine infusion**
       - **Epinephrine infusion**

6. Consider:
   - Expert consultation
   - Transvenous pacing

**Doses/Details**

- **Atropine IV dose:**
  - First dose: 0.5 mg bolus.
  - Repeat every 3-5 minutes.
  - Maximum: 3 mg.

- **Dopamine IV infusion:**
  - Usual infusion rate is 2-20 mcg/kg per minute.
  - Titrate to patient response; taper slowly.

- **Epinephrine IV infusion:**
  - 2-10 mcg per minute infusion. Titrate to patient response.

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Appendix C

Adult Tachycardia With a Pulse Algorithm

1. Assess appropriateness for clinical condition. Heart rate typically ≥150/min if tachyarrhythmia.

2. Identify and treat underlying cause
   - Maintain patent airway; assist breathing as necessary
   - Oxygen (if hypoxemic)
   - Cardiac monitor to identify rhythm; monitor blood pressure and oximetry

3. Persistent tachyarrhythmia causing:
   - Hypotension?
   - Acutely altered mental status?
   - Signs of shock?
   - Ischemic chest discomfort?
   - Acute heart failure?

4. Synchronized cardioversion
   - Consider sedation
   - If regular narrow complex, consider adenosine

5. Wide QRS? ≥0.12 second
   - Yes: Proceed with synchronized cardioversion
   - No: Consider antiarrhythmic infusion

6. IV access and 12-lead ECG if available
   - Consider adenosine only if regular and monomorphic
   - Consider antiarrhythmic infusion
   - Consider expert consultation

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Doses/Details

Synchronized cardioversion:
- Initial recommended doses:
  - Narrow regular: 50-100 J
  - Narrow irregular: 120-200 J bi-phasic or 200 J monophasic
  - Wide regular: 100 J
  - Wide irregular: defibrillation dose (not synchronized)

Adenosine IV dose:
- First dose: 6 mg rapid IV push; follow with NS flush.
- Second dose: 12 mg if required.

Antiarrhythmic Infusions for Stable Wide-QRS Tachycardia

Procainamide IV dose:
- 20-50 mg/min until arrhythmia suppressed, hypotension ensues, QRS duration increases >60%, or maximum dose 17 mg/kg given.
- Maintenance infusion: 1-4 mg/min. Avoid if prolonged QT or CHF.

Amiodarone IV dose:
- First dose: 150 mg over 10 minutes.
- Repeat as needed if VT recurs.
- Follow by maintenance infusion of 1 mg/min for first 6 hours.

Sotalol IV dose:
- 100 mg (1.5 mg/kg) over 5 minutes. Avoid if prolonged QT.

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Appendix D

Adult Immediate Post-Cardiac Arrest Care Algorithm—2015 Update

1. Return of spontaneous circulation (ROSC)
   - Optimize ventilation and oxygenation
     - Maintain oxygen saturation ≥94%
     - Consider advanced airway and waveform capnography
     - Do not hyperventilate

2. Optimize ventilation and oxygenation

3. Treat hypotension (SBP <90 mm Hg)
   - IV/IO bolus
   - Vasopressor infusion
   - Consider treatable causes

4. 12-Lead ECG: STEMI OR high suspicion of AMI
   - Yes
     - Coronary reperfusion
   - No
     - Follow commands?
       - Yes
         - Advanced critical care
       - No
         - Initiate targeted temperature management

5. Coronary reperfusion

6. Follow commands?
   - Yes
     - Advanced critical care
   - No

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Doses/Details

Ventilation/oxygenation:
Avoid excessive ventilation. Start at 10 breaths/min and titrate to target PECO₂ of 35-40 mm Hg. When feasible, titrate FIO₂ to minimum necessary to achieve SPO₂ ≥94%.

IV bolus:
Approximately 1-2 L normal saline or lactated Ringer’s

Epinephrine IV infusion:
0.1-0.5 mcg/kg per minute (in 70-kg adult: 7-35 mcg per minute)

Dopamine IV infusion:
5-10 mcg/kg per minute

Norepinephrine
IV infusion:
0.1-0.5 mcg/kg per minute (in 70-kg adult: 7-35 mcg per minute)

Reversible Causes
- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypo-/Hyperkalemia
- Hypothermia
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary

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Opioid-Associated Life-Threatening Emergency (Adult) Algorithm—New 2015

Assess and activate.
Check for unresponsiveness and call for nearby help. Send someone to call 9-1-1 and get AED and naloxone. Observe for breathing vs no breathing or only gasping.

Begin CPR.
If victim is unresponsive with no breathing or only gasping, begin CPR.* If alone, perform CPR for about 2 minutes before leaving to phone 9-1-1 and get naloxone and AED.

Administer naloxone.
Give naloxone as soon as it is available. 2 mg intranasal or 0.4 mg intramuscular. May repeat after 4 minutes.

Does the person respond? 
At any time, does the person move purposefully, breathe regularly, moan, or otherwise respond?

Yes
Stimulate and reassess.
Continue to check responsiveness and breathing until advanced help arrives. If the person stops responding, begin CPR and repeat naloxone.

No
Continue CPR and use AED as soon as it is available.
Continue until the person responds or until advanced help arrives.

* CPR technique based on rescuer’s level of training.
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