Los Angeles Motor Scale (LAMS) for Determining Possible Large Vessel Occlusion

LAMS is a simple and validated assessment of stroke

severity. **A score of "≥4"** could indicate a severe stroke and suggests the need for Endovascular Therapy (EVT). When updating ER report if patient is LAMS positive or negative.

Paramedic Prompt Card for Acute Stroke Bypass Protocol

This prompt card provides a quick reference of the Acute Stroke Protocol contained in the Basic Life Support Patient Care Standards (BLSPCS). Please refer to the BLS PCS for the full protocol.

INDICATIONS UNDER THE ACUTE STROKE PROTOCOL

Redirect or transport to the closest or most appropriate Designated Stroke Centre* will be considered for patients who meet ALL of the following:

1. Present with a new onset of at least one of the following symptoms suggestive of the onset of an acute stroke:
    1. Unilateral arm/leg weakness or drift.
    2. Slurred speech or inappropriate words or mute.
    3. Unilateral facial droop.
2. Can be transported to arrive at a Designated Stroke Centre within 6 hours of a clearly determined time of symptom onset or the time the patient was last seen in a usual state of health.
3. Perform a secondary screen for a Large Vessel Occlusion (LVO) stroke using the Los Angeles Motor Scale
    (LAMS) and inform the CACC/ACS to aid in the determination of the most appropriate destination.

- Report LAMS score when notifying the receiving facility.
- See reference page **Error! Bookmark not defined.** for detailed LAMS score reference.

*A Designated Stroke Center is a Regional Stroke Centre, District Stroke Centre or, a Telestroke Centre regardless of EVT capability.

CONTRAINDICATION UNDER THE ACUTE STROKE PROTOCOL

ANY of the following exclude a patient from being transported under the Acute Stroke Protocol:

1. CTAS Level 1 and/or uncorrected airway, breathing or circulatory problem.
2. Symptoms of the stroke resolved prior to paramedic arrival or assessment**.
3. Blood sugar <3 mmol/L***.
4. Seizure at onset of symptoms or observed by paramedics.
5. Glasgow Coma Scale <10.
6. Terminally ill or palliative care patient.
7. Duration of out of hospital transport will exceed two hours.

**Patients whose symptoms improve significantly or resolve during transport will continue to be transported to a Designated Stroke Centre.

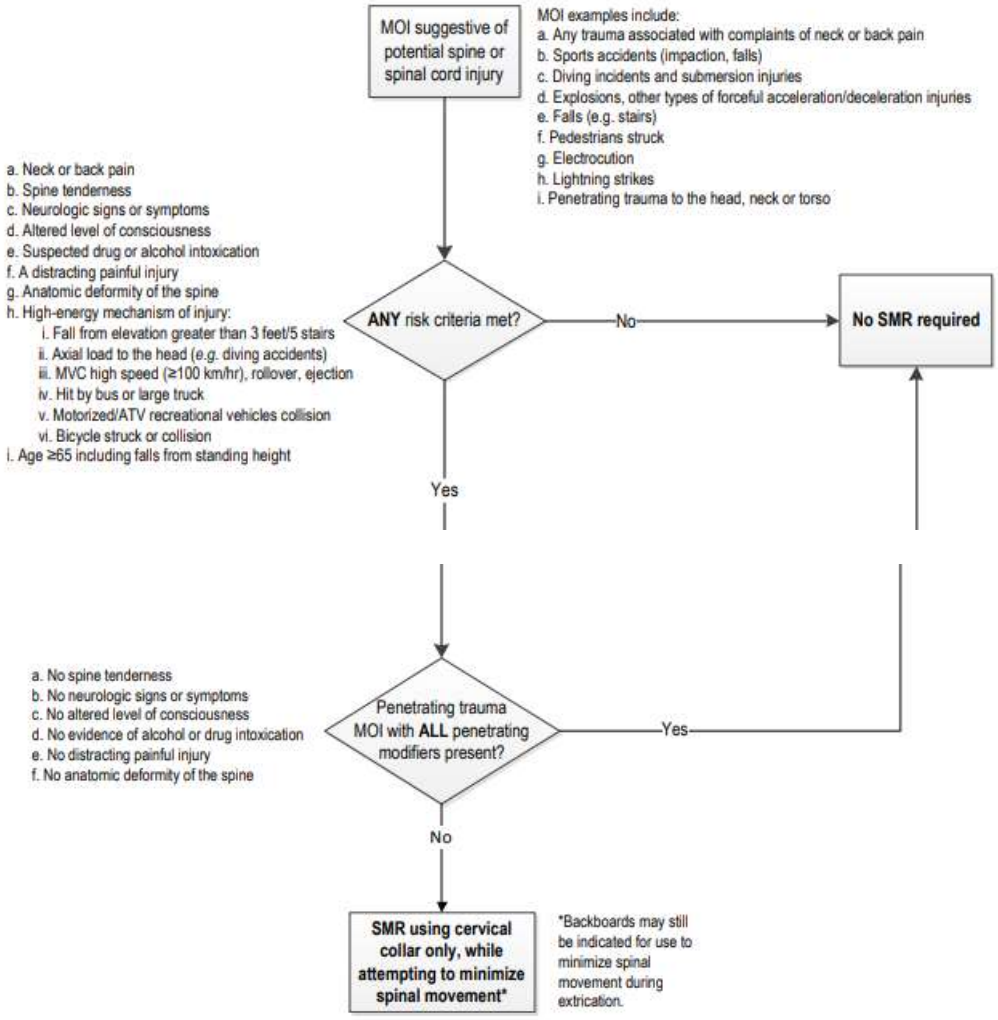
*** If symptoms persist after correction of blood glucose level, the patient is not contraindicated.

CACC/ACS will authorize the transport once notified of the patient's need for redirect or transport under the Acute Stroke Protocol.

Paramedic Prompt Card for

Spinal Motion Restriction (SMR) Standard

This prompt card provides a quick reference of the Spinal Motion Restriction (SMR) Standard contained in the Basic Life Support Patient Care Standards (BLS PCS). Please refer to the current BLS PCS for the full standard.



Paramedic Prompt Card for STEMI Hospital Bypass Protocol

This prompt card provides a quick reference of the STEMI Hospital Bypass Protocol contained in the Basic Life Support Patient Care Standards (BLS PCS). Please refer to the BLS PCS for the full protocol.

INDICATIONS UNDER THE STEMI HOSPITAL BYPASS PROTOCOL

Transport to a PCI centre will be considered for patients who meet ALL of the following:

1. ≥18 years of age.
2. Chest pain or equivalent consistent with cardiac ischemia/myocardial infarction.
3. Time from onset of current episode of pain <12 hours.
4. Manual interpretation of the 12-lead ECG indicates an acute AMI/STEMI*:
   a. At least 2 mm ST-elevation in leads V1-V3 in at least two contiguous leads; AND/OR
   b. At least 1 mm ST-elevation in at least two other anatomically contiguous leads.

*Once activated, continue to follow the STEMI Hospital Bypass Protocol even if the ECG normalizes.

NOTE – For a period of time during COVID, the chest pain

equivalents were suspended to minimize false positives and reduce the strain on the cath labs,

CONTRAINDICATIONS UNDER THE STEMI HOSPITAL BYPASS PROTOCOL

ANY of the following exclude a patient from being transported under the STEMI Hospital Bypass Protocol:

1. CTAS 1 and the paramedic is unable to secure patient's airway or ventilate.
2. 12-lead ECG is consistent with a LBBB, ventricular paced rhythm, or any other STEMI imitator.
3. Transport to a PCI centre ≥60 minutes from patient contact.**
4. Patient is experiencing a complication requiring PCP diversion:**
    a. Moderate to severe respiratory distress or use of CPAP.

    b. Hemodynamic instability or symptomatic SBP <90 mmHg at any point.
    c. VSA without ROSC.
5. Patient is experiencing a complication requiring ACP diversion:**
    a. Ventilation inadequate despite assistance.
    b. Hemodynamic instability unresponsive/not amenable to ACP treatment/management.
    c. VSA without ROSC.

**The interventional cardiology program may still permit the transport to the PCI centre.

CACC/ACS will authorize the transport once notified of the patient's need for bypass under the STEMI Hospital Bypass Protocol.

Apgar score

	Score 2	Score 1	Score 0
Appearance	 Pink	 Extremities blue	 Pale or blue
Pulse	> 100 bpm	< 100 bpm	No pulse
Grimace	Cries and pulls away	Grimaces or weak cry	No response to stimulation
Activity	 Active movement	 Arms, legs flexed	 No movement
Respiration	Strong cry	Slow, irregular	No breathing

GLASGOW COMA SCALE

Pediatric Vital Signs Reference Chart

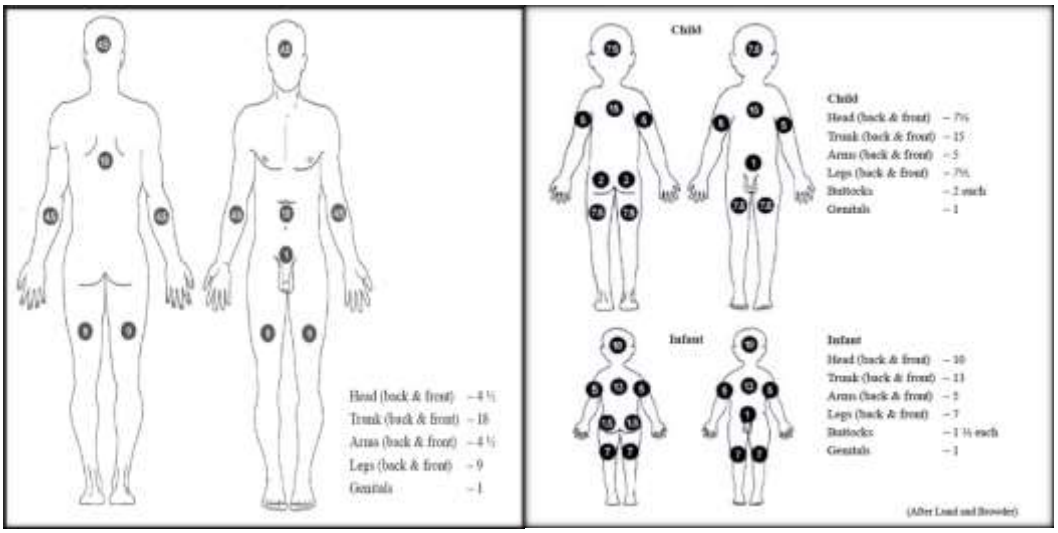
Heart Rate (beats/min)			Respiratory Rate (breaths/min)	
Age	**Awake**	**Asleep**	**Age**	**Normal**
Neonate (<28 d)	100-205	90-160	Infant (<1 y)	30-53
Infant (1-12 mos)	100-190			
Toddler (1-2 y)	98-140	80-120	Toddler (1-2 y)	22-37
Preschool (3-5 y)	80-120	65-100	Preschool (3-5 y)	20-28
School-age (6-11 y)	75-118	58-90	School-age (6-11 y)	18-25
Adolescent (12-15 y)	60-100	50-90	Adolescent (12-15 y)	12-20

Reference: PALS Guidelines, 2015

Blood Pressure (mmHg)				
Age		**Systolic**	**Diastolic**	**Systolic Hypotension**
Birth (12 h)	<1 kg	39-59	16-36	<40-50
	3 kg	60-76	31-45	<50
Neonate (96 h)		67-84	35-53	<60
Infant (1-12 mos)		72-104	37-56	<70
Toddler (1-2 y)		86-106	42-63	<70 + (age in years × 2)
Preschool (3-5 y)		89-112	46-72	
School-age (6-9 y)		97-115	57-76	
Preadolescent (10-11 y)		102-120	61-80	<90
Adolescent (12-15 y)		110-131	64-83	

Reference: PALS Guidelines, 2015
For diagnosis of hypertension, refer to the 2017 AAP guidelines Table 4 & 5:
http://pediatrics.aappublications.org/content/early/2017/08/21/peds.2017-1904

BURN CHART – “RULE OF NINES”



ALS-PCS Medication Reference Guide

Medication (P=pending)	Routes	Onset	Duration	Single Dose	Max Single Dose	Repeats	Max # of Doses
Acetaminophen	PO	<60 min	4-6hrs	≥12-<18yrs = 500-650mg	650mg	N/A	1
				≥18yrs = 960-100mg	1000mg	N/A	1
Adenosine	IV	Immediate	<30sec	**6mg**	12mg	Q 2min	2

ASA	PO	<20 min	~10days	**160-162mg**	162mg	N/A	1
Atropine	IV	Immediate	4min	1mg	1 mg	1	2
Calcium Gluconate	IV/IO/CVAD	1-2min	30-60min	**1g over 2-3min**	1g	Q 5min Q 30min	2 Dose 3
Dexamethasone(P)							
Dextrose	IV	Immediate	40min	**D50W** = 0.5g/kg **D10W** = 0.2g/kg	**D50W** = 25g/50ml **D10W** = 25g/250ml	Q 10min	2
DimenhyDRINATE	IV	Immediate	4-6hrs	**25 or 50mg Dilute NS**	50mg	N/A	1
	IM	20-30min	4-6hrs	**25 or 50mg**	50mg	N/A	1
DiphenhydrAMINE	IV	1-5 min	<10-12hrs	**25 or 50mg**	50mg	N/A	1
	IM	30-60min	<10-12hrs	**25 or 50mg**	50mg	N/A	1

Medication	Routes	Onset	Duration	Single Dose	Max Single Dose	Repeats	Max # of Doses
DOPamine	ROSC = IV	<5min	<10 min	**5mcg/kg/min**	N/A	Q 5min +5mcg/kg/min	20mcg/kg/min
	Bradycardia = IV	<5min	<10 min	**5mcg/kg/min**	N/A	Q 5min +5mcg/kg/min	20mcg/kg/min
	Cardiogenic Shock = IV	<5min	<10 min	**5mcg/kg/min**	N/A	Q 5 min +5mcg/kg/min	20mcg/kg/min
EPINEPHrine 1mg/ml	IM	5-10min	20-30min	**0.01mg/kg**	0.5mg	N/A	1
	ETT	<2min	<5min	**0.1mg/kg Min 1mg**	Max 2mg	Q 4min	3 = BHP
	NEB	10-30min	2-4hrs	**<1y/o & <5kg = 0.5mg**	0.5mg	N/A	1

				+ 2ml NS			
				<1y/o & ≥5kg = 2.5mg	2.5mg	N/A	1
				≥1-8y/o = 5.0mg	5.0mg	N/A	1
EPINEPHrine 0.1mg/ml	IV/IO/ CVAD	<2min	<5min	**0.01mg/kg** **Min 0.1mg**	1mg	Q 4min	3 = BHP
	ETT	<2min	<5min	**0.01mg/kg** **Min 0.1mg**	1mg	Q 4min	3 = BHP

Medication	**Routes**	**Onset**	**Duration**	**Single Dose**	**Max Single Dose**	**Repeats**	**Max # of Doses**
FentaNYL	IV	Immediate	30-60min	**≥1 - <18yrs up to 0.1mcg/kg**	0.1mcg/kg	Q5min	N/A (cumulative

							200mcg)
				≥18yrs = 25-75mcg	75mcg	Q5min	N/A (cumulative 200mcg)
	IN	5-15min	30-60min	**≥1 - <18yrs up to 0.1mcg/kg**	0.1mcg/kg	Q 5min	N/A (cumulative 200mcg)
				≥18yrs = 25-75mcg	75mcg	Q 5min	N/A (cumulative 200mcg)
Glucagon	IM	10min	60-90min	**0.5mg or 1.0mg**	1.0mg	Q 20min	2
Hydrocortisone	IM/IV/IO/ CVAD	60min	2hrs +/- 0.3hrs	**2mg/kg**	100mg	N/A	1
Ibuprofen	PO	30-60min	6-8hrs	**400mg**	400mg	N/A	1

Ketamine	IM	3-4min	12-25min	**≥18 - <65yrs = 5mg/kg**	500mg	N/A	1
				≥65yrs = 3mg/kg	300mg	N/A	1
Ketorolac	IV/IM	~30min	≤2 – 3hrs	**10-15mg**	15mg	N/A	1

Medication	**Routes**	**Onset**	**Duration**	**Single Dose**	**Max Single Dose**	**Repeats**	**Max # of Doses**
Lidocaine	IV/IO/ CVAD	45-90sec	10-20min	**Adult = 1.5mg/kg** **Ped = 1.0mg/kg**	N/A	Q 4min	2
	ETT	45-90sec	10-20min	**Adult = 3mg/kg**	N/A	Q 4min	2

				Ped = 2mg/kg			
	Topical	3-5min	1.5-2hrs	**5mg/kg**	N/A	20 sprays@ 10mg spray	1
Midazolam	IV/IO	1-5min	<2hrs	**Seizure = 0.1mg/kg**	Seizure = 5mg	Q 5min	2
				Sedation = 2.5 - 5mg	Sedation = 5mg	Q 5min	2
	IM or BU	~15min	2hrs	**Seizure = 0.2mg/kg**	Seizure = 10mg	Q 5min	2
				Combative = 2.5 - 5mg	Combative = 5mg	Q 5min	2 or 10mg
	IN	<5min	23.1 min	**Seizure = 0.2mg/kg + 0.12ml NS**	Seizure = 10mg = 0.12 ml NS	Q 5min	2

Medication	Routes	Onset	Duration	Single Dose	Max Single Dose	Repeats	Max # of Doses
Morphine	IV/SC (pain only)	5-10min	3-5hrs	**≥1 - <18yrs = up to 1mcg/kg**	5mg	Q 15min	N/A (cumulative 20 mg)
				≥18yrs = 2-10mg	10mg	Q 15min	N/A (cumulative 20 mg)
				Cardiac = 2mg	2mg	Q 5min	5
Naloxone	IV/IO	~2min	30-90min	**0.4mg**	0.4mg	Q 5min	3
	IM	2-3min	15min	**0.4mg**	0.4mg	Q 5min	3

	IN	2-3min	19-30min	**2-4mg**	2-4mg	Q 5min	3
	SC	2-3min	15min	**0.8mg**	0.8mg	Q 5min	3
Nitroglycerin	SL	1-3min	25min	**Ischemia = 0.4mg**	0.4mg	Q 5min	STEMI = 3 NSTEMI = 6
				CHF = 0.4mg or 0.8mg	0.8mg IV/ HX/SBP dependent	Q 5min	6
Ondansetron (P)							
Oral Glucose	PO	10min	40min	**Up to 31g**	31g	PRN for BG <3.0 or 4mmol/L	PRN
Oxytocin (P)							

Medication	**Routes**	**Onset**	**Duration**	**Single Dose**	**Max Single Dose**	**Repeats**	**Max # of Doses**
Salbutamol	MDI	5.4-8.2min	~4-6hrs	**<25kg = 600mcg**	600mcg	5-15min PRN	3
				≥25kg = 800mcg	800mcg	5-15min PRN	3
	Neb	≤5min	3-6hrs	**<25kg = 2.5mg**	2.5mg	5-15min PRN	3
				≥25kg = 5.0mg	5.0mg	5-15min PRN	3
	MDI	Immediate	unknown	**Hyper k^+ = 1600mcg**	1600 mcg	Immediate	2
	NEB	Immediate	unknown	**Hyper k^+ = 10mg**	10mg	Immediate	2

Xylometa zoline	TOP	Imme diate	10-20mi n	**2 sprays /nare**	2 spray s	N/A	1

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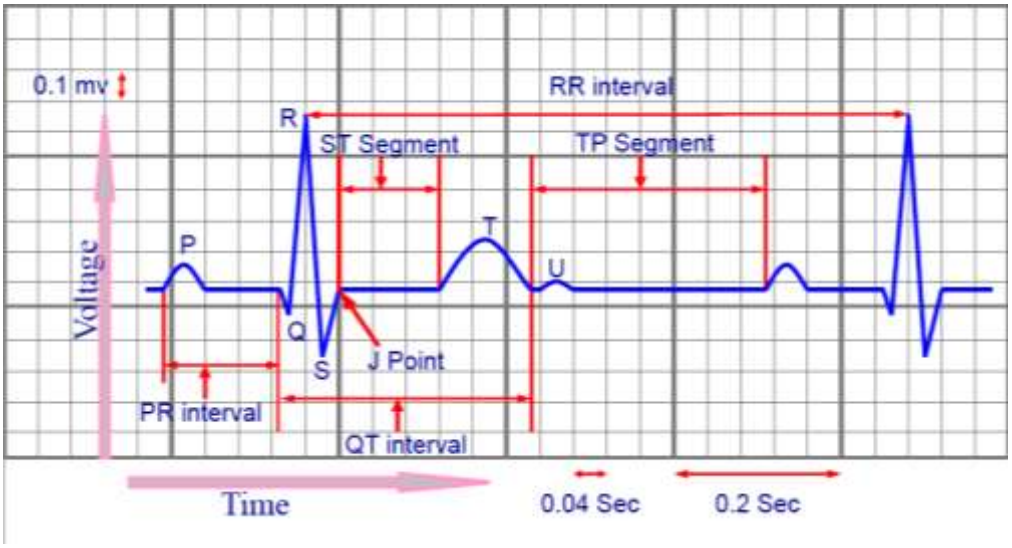
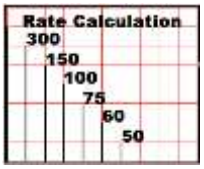
ECG WAVE IDENTIFICATION





6 Step Approach to Lead II Interpretation

Interpretation Parameter	"Normal" Reference Values
Heart Rate	60-100bpm
Rhythm	Regular R-R interval
P-Wave	Duration = <0.12s (3 small boxes), Amplitude = <0.25mV, relation to QRS, upright, consistent
P-R Interval	Duration = 0.12 - 0.2s
QRS Complex	Duration = 0.04 – 0.12s, Amplitude = 0.5 – 1mV, consistent morphology
Q-T Interval	Duration = 0.39 – 0.42s (<1/2 the R-R interval)

Defibrillation Rhythm Interpretation Sequence

1. Locate Carotid Pulse while compressions are ongoing
2. Pause chest compressions and confirm the patient is pulseless while performing step 3.
3. Visualize the monitor screen – Minimum of 2 paramedics
4. Make initial rhythm interpretation

a. If confident in interpretation and agreement between paramedics, capture a print of the rhythm and deliver the appropriate treatment.
b. If unsure of rhythm interpretation or disagreement between paramedics, capture a print of the rhythm and **return to CPR**, then make a visual rhythm interpretation from the diagnostic ECG strip:
    i. If rhythm is “shockable” continue CPR during charging, pause CPR and provide defibrillation
    ii. If rhythm is “non-shockable” continue CPR for 2 minutes of active treatment
    iii. If unable to make a definitive rhythm interpretation, consider either of the following:
        - Perform defibrillation (better to shock someone who doesn’t need it then NOT shock someone who does)
        - Pause CPR and conduct SAED rhythm interpretation (ensure you return the monitor to “Manual Mode” following the analysis).

12 Lead Interpretation Basics

Lead I = 1mm Lateral View Circumflex/ LAD	**aVR**	**V1 = 2mm** Septal View LAD	**V4 = 1mm** Anterior View LAD	**V4R = 1mm** Right Sided View RCA
Lead II = 1mm Inferior View RCA	**aVL = 1mm** Lateral View Circumflex/ LAD	**V2 = 2mm** Septal View LAD	**V5 = 1mm** Lateral View Circumflex/ LAD	**V8 = 1mm** Posterior View RCA/Circumflex
Lead III = 1mm Inferior View RCA	**aVF = 1mm** Inferior View RCA	**V3 = 2mm** Anterior View LAD	**V6 = 1mm** Lateral View Circumflex/ LAD	**V9 = 1mm** Posterior View RCA/Circumflex

MI Location	ST Elevation	Reciprocal Changes (ST Depression)
Anterior	V3, V4	inferior
Inferior	II, III, aVF	anterior
Lateral	I, aVL, V5, V6	inferior
Right Ventricular	II, III, aVF + V4R	N/A
*Posterior	V8 and V9	V1-V4

*Cannot STEMI Bypass on ST findings in these leads only d/t low specificity and diagnostic accuracy. *

STEMI Bypass Criteria

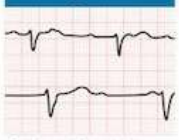
- ✓ ≥18 years of age.
- ✓ Chest pain or equivalent consistent with cardiac ischemia/myocardial infarction.
- ✓ Time from onset of current episode of pain <12 hours.
- ✓ 12-lead ECG indicates an acute AMI/STEMI*:
  - ***At least 2 mm ST-elevation in leads V1-V3 in at least two contiguous leads; AND/OR***
  - ***At least 1 mm ST-elevation in at least two other anatomically contiguous leads.***

Can't Miss ECG Findings

Christian Rose, MD; Robert Goodnough, MD

P

Third Degree AV Block

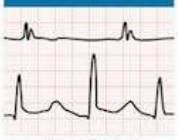


Complete AV dissociation

Common causes
- Ischemia
- Electrolyte abnormality
- Toxins

QRS/QTc

Pericardial Effusion



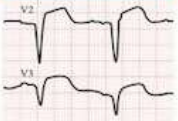
Low voltage ECG criteria
- Precordial QRS: <5 mm
- Limb QRS: <10 mm

Electrical alternans
- Alternating tall-short QRS

Complication
- Pericardial tamponade

ST

ST Elevation MI



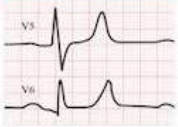
ACCF/AHA 2013 definition: STE in 2 contiguous leads

STE height in lead V2 or V3
- Men ≥2 mm
- Women ≥1.5 mm

STE height in all other leads
- Everyone ≥1 mm

T

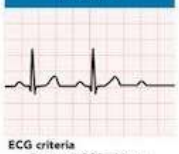
Peaked T Wave



High risk causes
- Ischemia (early sign)
- Hyperkalemia (does not predict K value)

Other hyperkalemia findings
- PR/QRS interval prolongation
- AV block

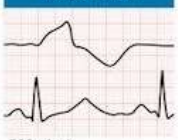
Mobitz II



ECG criteria
- Dropped QRS **without** progressive PR prolongation

Complication
- High grade AV block

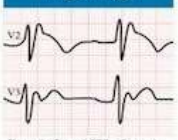
Wide Interval



ECG criteria
- QRS width ≥120 msec

Common causes
- Hyperkalemia (assume until proven otherwise)
- Ischemia
- Conduction disease
- Medication and toxins

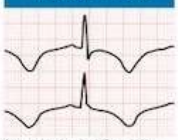
Brugada Sign



Type 1: Coved STE >2 mm in ≥1 lead of V1-V3, followed by negative T wave
- This ECG finding + clinical criteria needed to diagnose Brugada syndrome, which is high risk for sudden death

Type 2: Saddleback shaped STE >2 mm; less specific

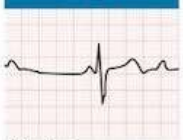
Inverted T Wave



Normal in leads aVR and V1

Causes for precordial inverted Ts
- Acute ischemia
- Cardiomyopathy (CMP)
- Conduction disease
- RV strain (e.g. PE, ARVD)
- CNS catastrophe

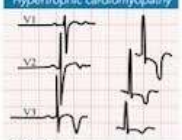
Mobitz I



ECG criteria
- Dropped QRS with progressive PR prolongation

Less risk than Mobitz II

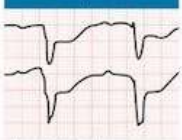
HCM
Hypertrophic cardiomyopathy



ECG criteria
- Left ventricular hypertrophy
- Narrow "dagger" Q waves in lateral / inferior leads
- Deep T wave inversions

High risk for syncope, atrial fibrillation (CVA risk), progressive heart failure, VT / VF arrest

ST Depression

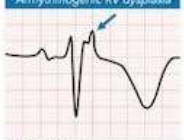


If in anterior leads:
- Consider posterior MI

If in lateral leads:
- Likely LVH with strain, if with high QRS voltage

Consider ACS if ST depression in any lead with chest pain or shortness of breath

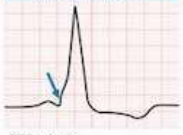
ARVD
Arrhythmogenic RV dysplasia



ECG criteria
- Variable
- May see epsilon wave, a small positive deflction at QRS end (arrow)

High risk for syncope, arrhythmia, heart failure, sudden cardiac death

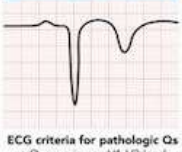
WPW
Wolff-Parkinson-White



ECG criteria
- Short PR <120 msec
- Delta wave (arrow)
- Wide QRS ≥ 120 msec
- Secondary ST repolarization

High risk for arrhythmia and mimicking/masking ischemia

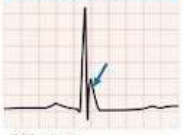
Q Wave



ECG criteria for pathologic Qs
- Q wave in any V1-V3 lead
- Any other lead when width ≥30 msec or depth ≥1 mm

Common causes
- Acute MI
- Cardiomyopathy
- WPW

J Wave
Osborn Wave

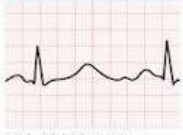


ECG criteria
- Positive deflection at J point most often seen in precordial leads

May be seen in hypothermia

Associated with higher risk for arrhythmia (bradycardia, VF) and STEMI

QTc Prolongation



High risk ECG criteria
- QTc >500 msec

Normal QTc interval
- Men <440 msec
- Women <460 msec

Common causes
- Electrolyte abnormality
- Medication and toxins
- Familial

ECG Progression with STEMI

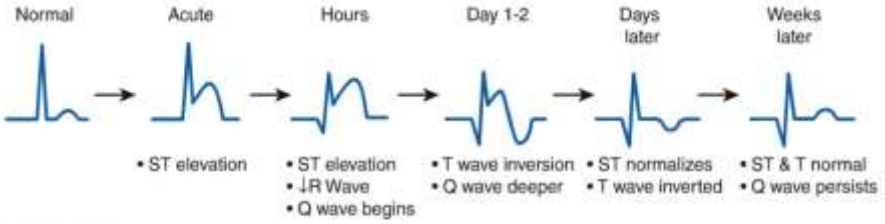


Figure 4.24. ECG evolution during acute ST elevation myocardial infarction (also termed "acute Q wave myocardial infarction"). However, as described in Chapter 7, if successful early reperfusion of the coronary occlusion is achieved, the elevated ST segments return to baseline without subsequent T wave inversion or Q wave development.

Shrestha SK. Acute STEMI Management – Mnemonic based approach [Internet]. Epomedicine; 2017 Oct 17 [cited 2021 Jan 12]. Available from: https://epomedicine.com/emergency-medicine/acute-stemi-management-mnemonic-based-approach/.

Modified Valsalva Maneuver Reference

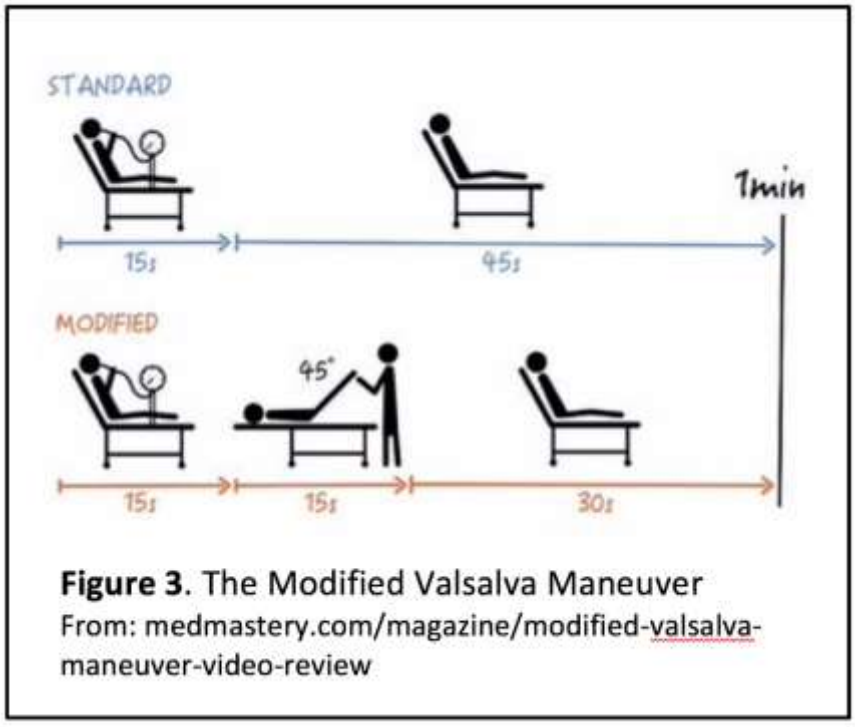


Figure 3. The Modified Valsalva Maneuver
From: medmastery.com/magazine/modified-valsalva-maneuver-video-review

OVERDOSE LEVELS

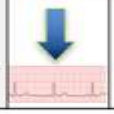
THIS CHART IS INTENDED ONLY AS A GUIDE.
NUMEROUS VARIABLES INFLUENCE TOXIC / LETHAL LEVELS.

ASA	Adults & children: 300 – 500 mg/kg is a severe ingestion - >500 mg/kg may be fatal
Acetaminophen	Adults: - 70 – 140 mg /kg may be toxic - 140 mg/kg can be fatal Children:

	- <5 yrs old - 100 -200 mg/kg may be toxic - >200 mg/kg may be fatal
Amphetamines	- 100 mg (40 mg in children)
Atropine	- 100 mg
Benadryl *(DiphenhydrAMINE)*	- 20-40 mg/kg may be fatal
Barbiturates	- 1 – 3 mg
Benzodiazepines	- Toxicity ranges from 500 – 1500 mg's
Cocaine *(As with most street drugs, impurities, etc. make predicting toxic levels difficult)*	- A rock is usually 100 – 200 mg - A typical 'line' is usually 20 – 30 mg - A spoon is usually 5 – 10 mg
Codeine	- 2 – 25 mg/kg can cause toxic effects - 500 – 1000 mg can be fatal
Demerol	- 1 gm may be fatal
Digitalis Glycosides	- Digitalis: 2 mg may be fatal - Digitoxin: 3 mg may be fatal - Digoxin: 10 mg may be fatal

Dilantin	- 20 mg/kg may be toxic
GHB	- 30 – 60 mg may be toxic
Ibuprofen	Adults: - 6- 54 mg may be toxic Children: - 200 – 400 mg/kg may be severe ingestion - >400 mg/kg may be fatal
Methadone	- 50 mg can be fatal
Methamphetamine	- 1 mg/kg may be fatal
Morphine	- 200 – 250 mg ingestion can be fatal
Methanol	- 30 – 240 ml may be fatal
Monoamine Oxidase Inhibitors *(MAOI's)*	- 2 – 3 mg/kg is life threatening - 4 – 6 mg/kg is typically fatal
Tricyclic Anti-depressants (T*CA's)*	- 20 – 35 mg/kg may be severe - 35 – 40 mg/kg may be fatal
Valium *(Diazepam)*	- 1 gm may be fatal

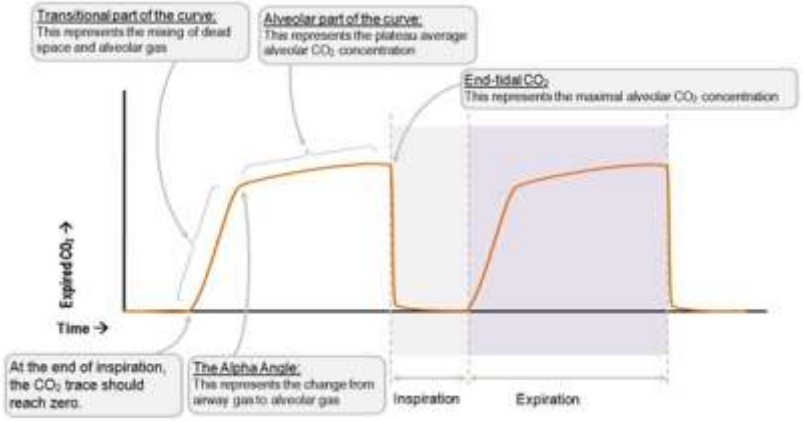
Toxidromes

	HR & BP	Resp.	Temperature	Pupils	Bowel Sounds	Diaphoresis
Anticholinergic **Anticholinergics** –Atropine, scopolamine, glycopyrrolate benztropine, trihexyphenidyl **Antihistamines** – Chlorpheniramine, Cyproheptadine, Doxylamine, Hydroxyzine, Dimenhydrinate, Diphenhydramine, Meclizine Promethazine		No change		Dilated		
Cholinergic Organic Phosphorous Compounds: Carbamates • Arecholine, Pilocarpine, Urecholine (Betanechol), Carbachol, Choline, Metacholine, Mushrooms	No change	No change	No change	Pinpoint		
Opioid Morphine • Codeine • Tramadol • Heroin • Meperidine • Diphenoxylate • Hydromorphone • Fentanyl • Methadone • Propoxyphene • Pentazocine • DXM • Oxycodone • Hydrocodone				Pinpoint		
Sympathomimetic Caffeine, cocaine, amphetamines, methamphetamines, Ritalin, LSD, Theophylline, MDMA				Dilated		
Sedative-Hypnotic anti-anxiety agents, muscle relaxants, antiepileptics and preanesthetic medications –Barbituates –Benzodiazepines				No change		

$ETCO_2$ Interpretation

- "Normal" $ETCO_2$ values range between 35-45mmHg
- The value can be effected by ventilation, tissue perfusion and cellular respiration.
  - ✓ **<35mmHg** suggest possible hyperventilation, metabolic alkolosis, decreased end organ perfusion (IE. Shock state)
  - ✓ **>45mmHg** suggest possible hypoventilation, metabolic acidosis
  - ✓ **<10mmHg** typical with cardiac arrest, sudden and dramatic increase suggest possible ROSC
  - ✓ **Progressive trend toward 0mmHg** suggest a failure to ventilate and possible tube misplacement

>70mmHg suggest respiratory failure, **50-70mmHg** suggest possible respiratory depression



$ETCO_2$ Changes

Sudden loss of waveform

- ET tube disconnected, dislodged, kinked or obstructed
- Loss of circulatory function

Decreasing $EtCO_2$

- ET tube cuff leak
- ET tube in hypopharynx
- Partial obstruction

CPR Assessment

- Attempt to maintain minimum of 10mmHg

Sudden increase in $EtCO_2$

- Return of spontaneous circulation (ROSC)

Bronchospasm ("Shark-fin" appearance)

- Asthma
- COPD

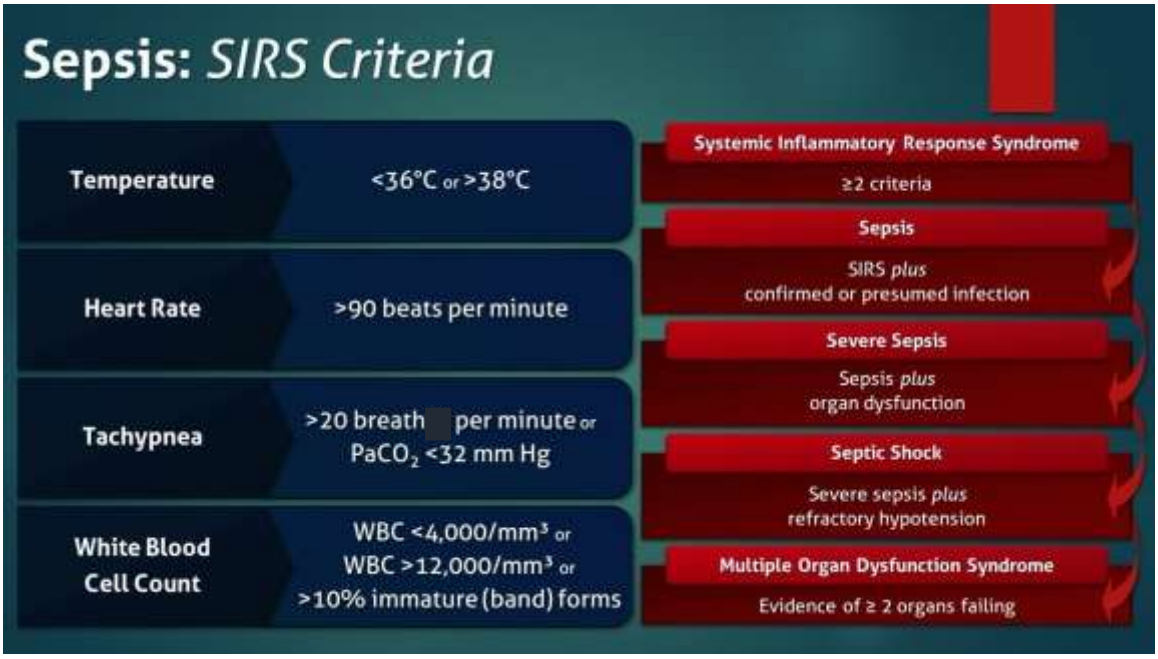
Hypoventilation

Hyperventilation

Decreased $EtCO_2$

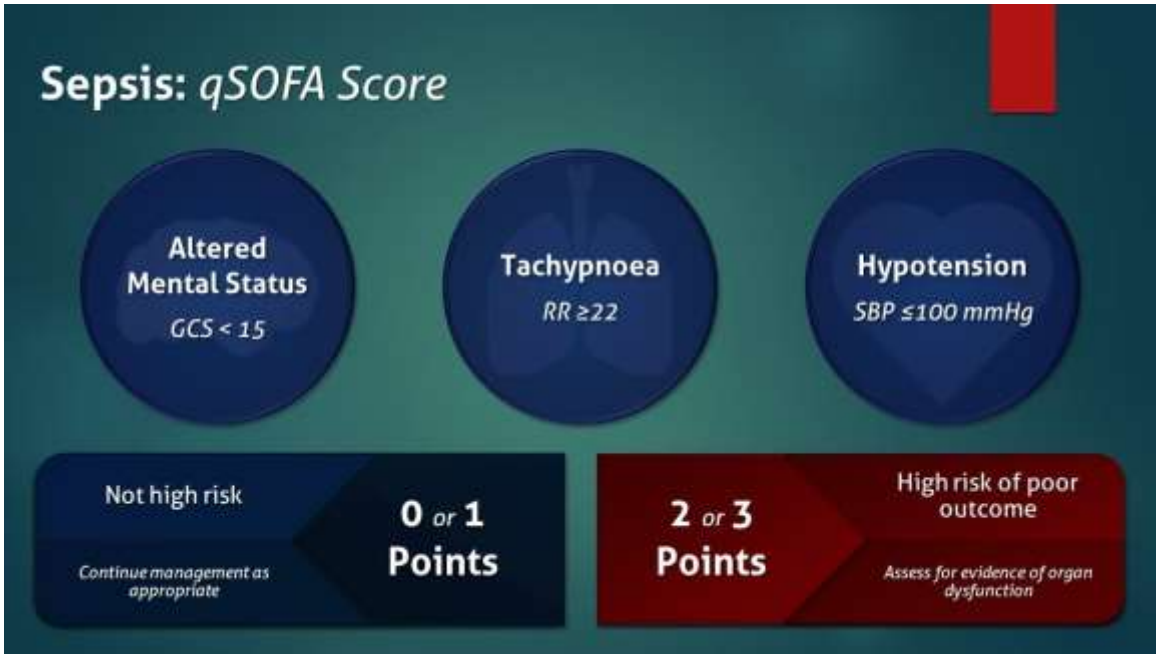
- Apnea
- Sedation

SYSTEMIC INFLAMMATORY RESPONSE SYNDROME CRITERIA
Assessment of Potential Sepsis



*Organ Dysfunction can be inferred in a prehospital setting with $ETCO_2$ values below 35mmHg.

QUICK SEPSIS RELATED ORGAN FAILURE ASSESSMENT – ICU Mortality Prediction Score Estimation of Sepsis Severity



https://www.youtube.com/channel/UC95TzSH1B_2EjaZMgDBNmvA

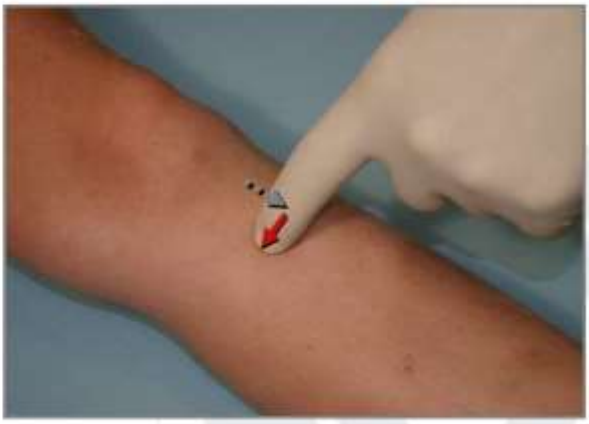
Tibial IO Landmark

EZ-IO® by vidacare

Immediate Vascular Access... When You Need It.SM

Identifying the pediatric EZ-IO insertion site

If the Tibial Tuberosity **CAN** be palpated the insertion site is one finger width below the Tuberosity (and then) medial along the flat aspect of the Tibia



As patients mature the Tibial Tuberosity becomes easier to identify

Proximal Humerus IO Landmark

Proximal Humerus

Arm Positioning

Using either method below, adduct elbow, rotate humerus internally.

Place the patient's hand over the abdomen with arm tight to the body.

Place the arm tight against the body, rotate the hand so the palm is facing outward, thumb pointing down.

Landmarking

Place your palm on the patient's shoulder anteriorly.

- The area that feels like a "ball" under your palm is the general target area
- You should be able to feel this ball, even on obese patients, by pushing deeply

Place the ulnar aspect of one hand vertically over the axilla. Place the ulnar aspect of the opposite hand along the midline of the upper arm laterally.

Place your thumbs together over the arm.

- This identifies the vertical line of insertion on the proximal humerus

Palpate deeply as you climb up the humerus to the surgical neck.

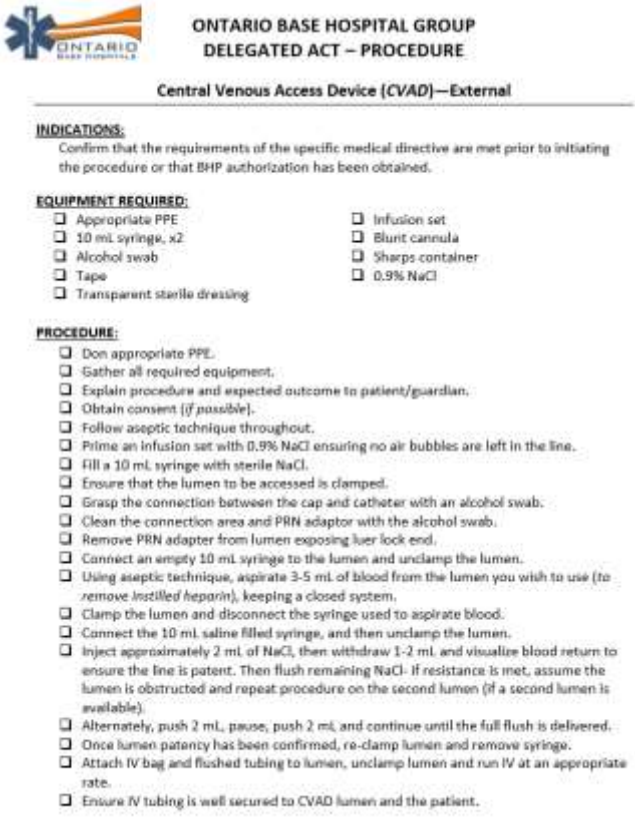
- It will feel like a golf ball on a tee – the spot where the "ball" meets the "tee" is the surgical neck

The insertion site is on the most prominent aspect of the greater tubercle, 1 to 2 cm above the surgical neck.

Point the needle tip at a 45-degree angle to the anterior plane and posteromedial.

Teleflex Arrow EZ-IO Intraosseous Vascular Access System

04



ONTARIO BASE HOSPITAL GROUP
DELEGATED ACT – PROCEDURE

Central Venous Access Device (*CVAD*)—External

INDICATIONS:
Confirm that the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization has been obtained.

EQUIPMENT REQUIRED:
- ❑ Appropriate PPE
- ❑ 10 mL syringe, x2
- ❑ Alcohol swab
- ❑ Tape
- ❑ Transparent sterile dressing
- ❑ Infusion set
- ❑ Blunt cannula
- ❑ Sharps container
- ❑ 0.9% NaCl

PROCEDURE:
- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Explain procedure and expected outcome to patient/guardian.
- ❑ Obtain consent (*if possible*).
- ❑ Follow aseptic technique throughout.
- ❑ Prime an infusion set with 0.9% NaCl ensuring no air bubbles are left in the line.
- ❑ Fill a 10 mL syringe with sterile NaCl.
- ❑ Ensure that the lumen to be accessed is clamped.
- ❑ Grasp the connection between the cap and catheter with an alcohol swab.
- ❑ Clean the connection area and PRN adaptor with the alcohol swab.
- ❑ Remove PRN adapter from lumen exposing luer lock end.
- ❑ Connect an empty 10 mL syringe to the lumen and unclamp the lumen.
- ❑ Using aseptic technique, aspirate 3-5 mL of blood from the lumen you wish to use (*to remove instilled heparin*), keeping a closed system.
- ❑ Clamp the lumen and disconnect the syringe used to aspirate blood.
- ❑ Connect the 10 mL saline filled syringe, and then unclamp the lumen.
- ❑ Inject approximately 2 mL of NaCl, then withdraw 1-2 mL and visualize blood return to ensure the line is patent. Then flush remaining NaCl- If resistance is met, assume the lumen is obstructed and repeat procedure on the second lumen (if a second lumen is available).
- ❑ Alternately, push 2 mL, pause, push 2 mL and continue until the full flush is delivered.
- ❑ Once lumen patency has been confirmed, re-clamp lumen and remove syringe.
- ❑ Attach IV bag and flushed tubing to lumen, unclamp lumen and run IV at an appropriate rate.
- ❑ Ensure IV tubing is well secured to CVAD lumen and the patient.

Medical Math Review

Drip Rate Calculation: Drip Rate = Volume to be infused X drip factor
Time

Example: Drip Rate = 15ml X 10gtts/ml
60min

Drip Rate = 150gtts
60min

Drip Rate = 2.5gtts/min or 1 drop every 24s

Calculating Volume (dose) to be Administered: Dose (Give) = Medication Ordered (Want)
Medication Concentration (Have)

Example: Lidocaine 1.5mg/kg for 80kg patient

Dose = $\frac{120mg}{20mg/ml}$

Dose = 6ml of Lidocaine

DOPamine Drip Rate Calculation: Drip Rate = $\frac{(5mcg/kg/min \times Weight\ (Kg)) \times 60gtts/ml\ Drip\ Set}{800mcg/ml}$

Example: Female Patient 80kg, receiving an initial dose of 5mcg/kg/min, DOPamine Concentration 800mcg/ml

Drip Rate = $\frac{(5mcg/kg/min \times 80kg) \times 60gtts/ml}{800mcg/ml} \div 60sec/min$

Drip Rate = $\frac{400mcg/min \times 60gtts/ml}{800mcg/ml} \div 60sec/min$

Drip Rate = 30gtts/min

Drip Rate = 0.5 gtts/sec or 1 Drop every 2 sec.

King LT Airway Sizing

Colour/Size		Weight / Height
○	0	<5 kg
○	1	5 – 12 kg
●	2	12 – 25 kg
●	2.5	25 – 35 kg
●	3	4 – 5 ft
●	4	5 – 6 ft
●	5	>6 ft

i-Gel Airway Sizing

Colour/Size			Weight
●	1	Neonate	2 – 5 kg
●	1.5	Infant	5 – 12 kg
●	2	Small Paediatric	10 – 25 kg
●	2.5	Large Paediatric	25 – 35 kg
●	3	Small Adult	30 – 60 kg
●	4	Medium Adult	50 – 90 kg
●	5	Large Adult	90+ kg

Assessment for Difficult Intubation: Evaluate: 3-3-2 Rule

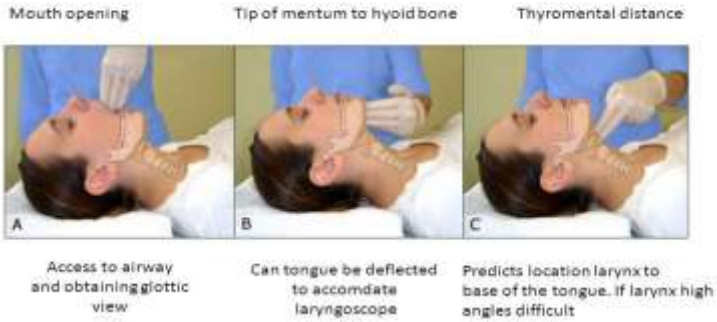
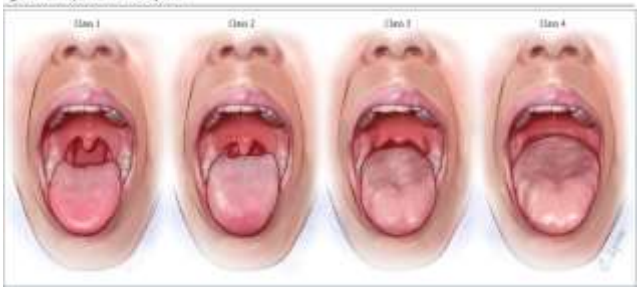
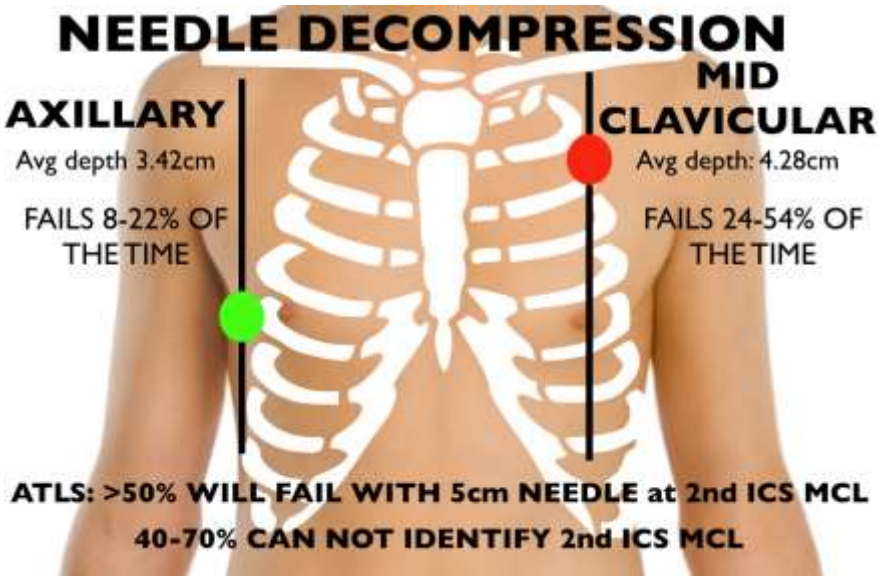


Figure 2: Mallampati Classification System



Needle Thoracostomy Landmarks

At the time this book was printed the only authorized site for chest needle decompression of a tension pneumothorax is the ***2nd Intercostal Space(ICS), Midclavicular Line(MCL).*** *Refer to the most current version of the ALS-PCS for changes to the authorization.*



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SPECIAL PROJECT PALLIATIVE CARE MEDICAL DIRECTIVE

A Paramedic may provide the treatment, transport and/or referral prescribed in this Medical Directive for registered patients if authorized. For this defined population paramedics should prioritize patient comfort and are not required to follow the described regimen of strict vital signs, cardiac monitoring and transport as directed in the Basic Life Support Patient Care Standard (BLS PCS).

28B**TREAT AND REFER – PALLIATIVE CARE SPECIAL PROJECT**

INDICATIONS – Patient registered in palliative care program **AND** Symptoms improved to patient's/Substitute Decision Maker's (SDM) satisfaction **AND** After informed discussion patient/SDM preference to remain at home

CONDITIONS

	Treat and Refer
Age	**≥**18yrs
Other	Valid DNR Patient registered in Paramedic Palliative Care Program

CONTRAINDICATIONS

Treat and Refer
Concerns of patient abuse or neglect Patient and SDM cannot demonstrate decision-making capacity based on the Aid to Capacity Evaluation Tool Uncontrolled or new seizures

TREATMENT

	Treat and Refer
Plan	Paramedics may treat patients according to this medical directive and, in collaboration with the patient/SDM, honour wishes to remain at home (treat and refer). Paramedics will notify the patient's palliative care team.

CLINCAL CONSIDERATIONS

1. A period of observation is recommended after the administration of any medication if the patient is not transported to ensure adequate response and no unexpected immediate adverse effects
2. Transport should be considered if there is strong suspicion of reversible causes including but not limited to:

- Complete bowel obstruction with no prior history of same
- New Spinal Cord Compression
- New Superior Vena Cava (SVC) Obstruction
- Airway obstruction
- Suspected new pathologic fracture

3. If patients do not meet the treat and release conditions, paramedics should patch to a BHP, follow the patient refusal standard and document appropriately.
4. Observational time post medication administration should be a minimum 30 minutes to watch for adverse reactions. This time is based on the 30-minute dosing interval within the directives and the typical onset of action timeline of medications included within the palliative care directives.

29B**PAIN OR DYSPNEA – PALLIATIVE CARE SPECIAL PROJECT**

INDICATIONS – Patient registered in palliative care program **AND** Uncontrolled pain or dyspnea **OR** Uncontrolled dyspnea with suspected bronchoconstriction.

CONDITIONS

	Morphine	**Hydromorphone**	**Salbutamol**
Age	≥18yrs	≥18yrs	≥18yrs
Other	N/A	N/A	For Dyspnea with suspected bronchoconstriction only

CONTRAINDICATIONS

Morphine	**Hydromorphone**	**Salbutamol**
Allergy to Morphine	Allergy to HydromMorphone	Allergy to Salbutamol

TREATMENT

	Morphine	**Hydromorphone**	**Salbutamol**	
Route	SC/IV/CVAD	SC/IV/CVAD	MDI	NEB

Dose	2-10mg	0.5-2mg	Up to 800mcg *	5mg
Max. Single Dose	10mg	2mg	800mcg *	5mg
Dosing Interval	15min	15min	5-15min prn	5-15min prn
Max # of Doses	4	4	3	3

**1 Puff = 100mcg.*

CLINCAL CONSIDERATIONS

1. If orders are available for the patient, either morphine or hydromorphone may be administered within the range specified above per the emergency

orders. Any doses outside the range specified must be confirmed with a Base Hospital Physician prior to administration.

2. If there are no orders available or patients are opioid naïve the lower range of doses should be used.
3. If the patient is already on a regular opiate, the same opiate should be used. If the patient is on a regular opiate regimen that does not include either morphine or hydromorphone and does not have emergency orders available, paramedics should confirm with a Base Hospital Physician prior to administering morphine or hydromorphone.
4. Salbutamol should only be used in patients whose dyspnea is accompanied by wheezing or a history of response to bronchodilators.
5. Observational time post medication administration should be a minimum 30 minutes to watch for adverse reactions. This time is based on the 30-minute dosing interval within the directives and the typical onset of action timeline of medications included within the palliative care directives.

30B**HALLUCINATIONS OR AGITATION - PALLIATIVE CARE SPECIAL PROJECT**

INDICATIONS – Patient registered in palliative care program **AND** increasing agitation or suspected new or increased hallucinations.

CONDITIONS

	Haloperidol	**Midazolam**
Age	≥18yrs	≥18yrs

CONTRAINDICATIONS

Haloperidol	**Midazolam**
Allergy to Haloperidol	Allergy to Midazolam
Known Parkinson's of Lewy Body Dementia	
Neuroleptic Malignant Syndrome	

TREATMENT

	Haloperidol			**Midazolam**
Route	SC	IV	CVAD	SC/IV/CVAD
Dose	0.5-1mg			0.5-2mg

Max Single Dose	1mg	2mg
Dosing Interval	30min	30min
Max # of Doses	2	2

CLINCAL CONSIDERATIONS

1. Haloperidol should be used as the first line agent for the treatment of agitation and hallucinations. Midazolam can be used in patients with contraindications to Haloperidol.
2. Observational time post medication administration should be a minimum 30 minutes to watch for adverse reactions. This time is based on the 30-minute dosing interval within the directives and the typical onset of action timeline of medications included within the palliative care directives.
3. Regardless of the patient's illness progression consideration for reversible causes should still be made.
4. **Neuroleptic Malignant Syndrome (NMS)** is a known severe adverse reaction to typical antipsychotic medications including Haloperidol.

Although rare it can be life threatening especially if undiagnosed and untreated. NMS is classically characterized by a triad of muscle rigidity, fever and altered mental status. (Berman M.D., 2011, 44).

5. Assessment of vital signs in the palliative setting is generally discouraged, however, assessing the patient's temperature prior to administering Haloperidol is a quick tool to help rule out NMS and ensure safe administration of this medication.

31B**NAUSEA OR VOMITING – PALLIATIVE CARE SPECIAL PROJECT**

INDICATIONS – Patient registered in palliative care programs **AND** Nausea and/or vomiting

CONDITIONS

	Haloperidol	**Ondansetron**	**DimenhyDRINATE**
Age	≥18yrs	≥18yrs	≥18yrs
Other	N/A	Contraindication to Haloperidol	Contraindication to Haloperidol

CONTRAINDICATIONS

Haloperidol	**Ondansetron**	**DimenhyDRINATE**
Allergy to Haloperidol	Allergy to Ondansetron	Allergy to Dimenhy**DRINATE** or other antihistamines
Known Parkinson's or Lewy Body Dementia		Overdose on antihistamines or anticholinergic or tricyclic antidepressants

Neuroleptic Malignant Syndrome		

TREATMENT

	Haloperidol			**Ondansetron**			**DimenhyDRINATE**		
Route	SC	IV	CVAD	PO/SC	IV	CVAD	SC	IV	CVAD
Dose	0.5-1.0mg			4mg			25-50mg		
Max Single Dose	1mg			4mg			50mg		
Dosing Interval	30min			N/A			N/A		
Max # of Doses	2			1			1		

CLINCAL CONSIDERATIONS

1. Dimenhy**DRINATE** is rarely used in the palliative care population as it can cause delirium, increased

drowsiness, and does not target the appropriate receptors to control the nausea in most patients. It should only be used in patients with contraindications to Haloperidol where Ondansetron cannot be used.

2. *Generally,* Haldoperidol (Haldol) is the best choice for patients that are actively vomiting, and Ondansetron is the best choice for those who are nauseated and **not** actively vomiting.
3. Ondansetron has the least sedative effect of the three medications
4. **Neuroleptic Malignant Syndrome (NMS)** is a known severe adverse reaction to typical antipsychotic medications including Haloperidol. Although rare it can be life threatening especially if undiagnosed and untreated. NMS is classically characterized by a triad of muscle rigidity, fever and altered mental status. (Berman M.D., 2011, 44).
5. Assessment of vital signs in the palliative setting is generally discouraged, however, assessing the patient's temperature prior to administering Haloperidol is a quick tool to help rule out NMS and ensure safe administration of this medication**.**
6. Observational time post medication administration should be a minimum 30 minutes to watch for adverse reactions. This time is based on the 30-minute dosing interval within the directives and the

typical onset of action timeline of medications included within the palliative care directives.

32B**TERMINAL CONGESTED BREATHING – PALLIATIVE CARE SPECIAL PROJECT**

INDICATIONS – Patient registered in palliative care programs **AND** Congested/loud/rattling breathing in patient near the end of life.

CONDITIONS

	Glycopyrrolate	**Atropine**
Age	≥18yrs	≥18yrs

CONTRAINDICATIONS

Glycopyrrolate	**Atropine**
Allergy to Glycopyrrolate	Allergy to Atropine

TREATMENT

	Glycopyrrolate			**Atropine**		
Route	SC	IV	CVAD	SC	IV	CVAD
Dose	0.4mg			0.4mg		
Max Single Dose	0.4mg			0.4mg		
Dosing Interval	N/A			N/A		

Max # of Doses	1	1

CLINICAL CONSIDERATIONS

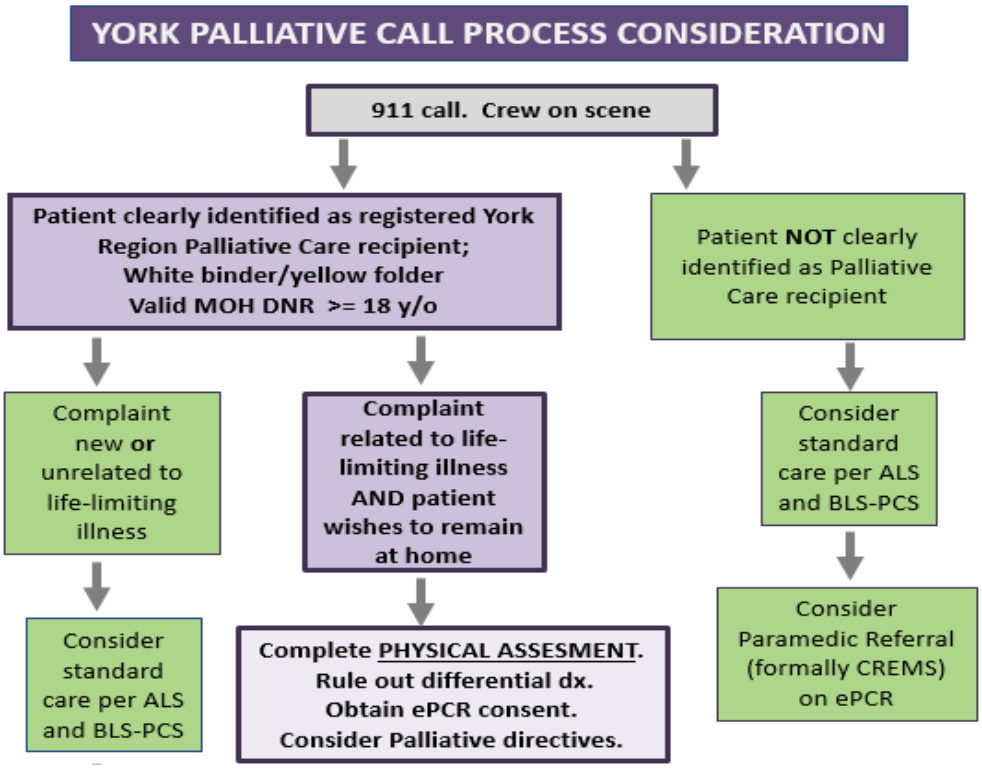
1. Patient repositioning and gentle turning of the head to the side can be done instead of medication however suction of the oropharynx is not appropriate as it will likely cause discomfort and a gag reflex.
2. Observational time post medication administration should be a minimum 30 minutes to watch for adverse reactions. This time is based on the 30-minute dosing interval within the directives and the typical onset of action timeline of medications included within the palliative care directives.

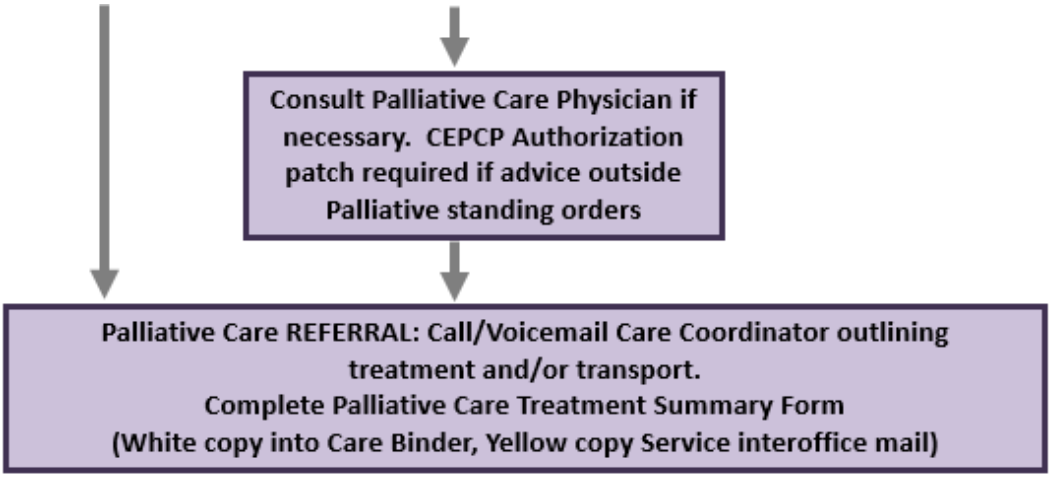
York Region Simplified Palliative Performance Scale

Patient Appears Normal	%	Ambulation	Activity Level/ Evidence of Disease	Self-Care	Intake	LOC
	100	Full	Normal	Full	Normal	Full
	90	Full	Normal/Some Disease	Full	Normal	Full
	80	Full	Normal with Effort/Some	Full	Normal/Reduced	Full
	70	Reduced	Unable to do Normal Work/Significant Disease	Full	Normal/Reduced	Full
	60	Reduced	Unable to do	Occasional	Normal/Reduced	Full or

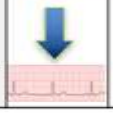
			Hobbies/Significant Disease	Assistance		Confused
	50	Mainly Sit	No Work Activity/Extensive Disease	Considerable Assistance	Normal/Reduced	Full or Confused
	40	Mainly Bed	Unable to do Most Activity/Extensive Disease	Mainly Assisted	Normal/Reduced	Full or Drowsy +/- Confusion
	30	Bed Bound	No Activity/Extensive	Total Care	Normal/Reduced	Full or Drowsy +/- Confusion
	20	Bed Bound	No Activity/Extensive	Total Care	Minimal	Full or Drowsy +/-

						Confusion
	10	Bed Bound	No Activity/Extensive	Total Care	Mouth Care Only	Drowsy or Coma
Death	**0**	**-**	**-**	**-**	**-**	**-**





At any time, patient or SDM decides on transport, follow the ALS PCS. If you think the Palliative Care Directives are more appropriate for the patient's goals of care, a BHP patch is required. Once transport is initiated, treat concurrently with the BLS PCS.

	HR & BP	Resp.	Temperature	Pupils	Bowel Sounds	Diaphoresis
Anticholinergic **Anticholinergics** –Atropine, scopolamine, glycopyrrolate benztropine, trihexyphenidyl **Antihistamines** – Chlorpheniramine, Cyproheptadine, Doxylamine, Hydroxyzine, Dimenhydrinate, Diphenhydramine, Medizine Promethazine		No change		Dilated		
Cholinergic Organic Phosphorous Compounds: Carbamates • Arecholine, Pilocarpine, Urecholine (Betanechol), Carbachol, Choline, Metacholine, Mushrooms	No change	No change	No change	Pinpoint		
Opioid Morphine • Codeine • Tramadol • Heroin • Meperidine • Diphenoxylate • Hydromorphone • Fentanyl • Methadone • Propoxyphene • Pentazocine • DXM • Oxycodone • Hydrocodone				Pinpoint		
Sympathomimetic Caffeine, cocaine, amphetamines, methamphetamines, Ritalin, LSD, Theophylline, MDMA				Dilated		
Sedative-Hypnotic anti-anxiety agents, muscle relaxants, antiepileptics and preanesthetic medications –Barbituates –Benzodiazepines				No change