

QUICK
REFERENCE
GUIDE

CAPNOGRAPHY DURING PROCEDURAL SEDATION



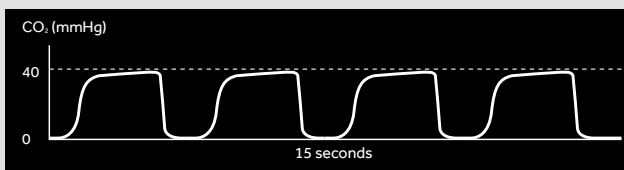
Medtronic
Further. Together

Changes in capnography values and waveforms may help clinicians understand a patient's level of comfort, sedation, and respiratory function during procedural sedation.

Diagnosis ¹	Values ¹		Intervention ¹
Normal	SpO ₂	Normal	None required, continue sedation
	etCO ₂	Normal	
	RR	Normal	
	Waveform	Normal	

Waveform²

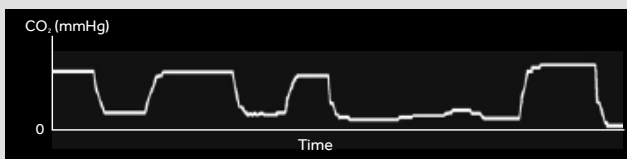
etCO₂ 35–45 mmHg



Diagnosis ¹	Values ¹		Intervention ³
Ineffective breathing pattern	SpO ₂	Normal	Reassess patient and continue sedation
	etCO ₂	Normal	
	RR	Normal	
	Waveform	Variable	

Waveform¹

etCO₂ 35–45 mmHg



Diagnosis ¹	Values ¹		Intervention ¹
Hyperventilation	SpO ₂	Normal	Reassess patient and continue sedation
	etCO ₂	↓	
	RR	↑	Hyperventilation can be a sign of anxiety, pain or metabolic issues ³
	Waveform	Decreased amplitude and width	

Waveform¹

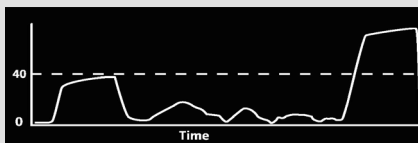
etCO₂ <35 mmHg



Diagnosis ¹	Values ¹		Intervention ¹
Hypopneic hypoventilation (shallow breathing)	SpO ₂	Normal	Reassess patient and continue sedation
	etCO ₂	↓	
	RR	↓	
	Waveform	Decreased amplitude	
	SpO ₂	↓	Reassess patient
	etCO ₂	↓	Cease drug administration or reduce dosing
	RR	↓	Assess for airway obstruction
	Waveform	Decreased amplitude	Consider supplemental oxygen

Waveform¹

etCO₂ <35 mmHg



Diagnosis ¹	Values ¹		Intervention ¹
Hypopneic hypoventilation with periodic breathing	SpO ₂	Normal or ↓	Reassess the patient
	etCO ₂	↓	Cease drug administration or reduce dosing
	RR	↓	
	Waveform	Decreased amplitude	Assess for airway obstruction
	Other	Apneic pauses	Consider supplemental oxygen

Waveform¹

etCO₂ <35 mmHg



Diagnosis ¹	Values ¹		Intervention ¹
Bradypneic hypoventilation	SpO ₂	Normal	Reassess patient and continue sedation
	etCO ₂	↑	
	RR	↓	
	Waveform	Increased amplitude and width	
	SpO ₂	↓	Reassess patient
	etCO ₂	↑	Cease drug administration or reduce dosing
	RR	↓	Assess for airway obstruction
	Waveform	Increased amplitude and width	Consider supplemental oxygen

Waveform¹

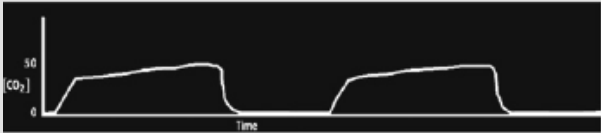
etCO₂ >45 mmHg



Diagnosis ¹	Values ¹		Intervention ¹
Bronchospasm	SpO ₂	Normal or ↓	Reassess patient Bronchodilator therapy Cease drug administration
	etCO ₂	Normal, ↓ or ↑ depending on duration and severity of bronchospasms	
	RR	Normal, ↓ or ↑ depending on duration and severity of bronchospasms	
	Waveform	Curved	
	Other	Wheezing	

Waveform¹

etCO₂ <35 mmHg



Diagnosis ¹	Values ¹		Intervention ¹	
Partial airway obstruction	SpO ₂	Normal or ↓	Full airway patency restored with airway alignment	Reassess patient Establish IV access
	etCO ₂	Normal		
	RR	Variable	Noisy breathing and stridor resolve	Consider supplemental O ₂
	Waveform	Normal		
Partial laryngospasm	Other	Noisy breathing and/or inspiratory stridor	Airway not fully patent with airway alignment Noisy breathing and stridor persist	Cease drug administration

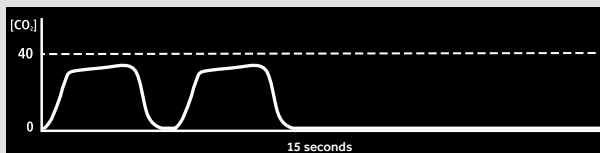
Waveform¹

etCO₂ <35 mmHg



Diagnosis ¹	Values ¹		Intervention ¹
Apnea	SpO ₂	Normal or ↓ depending on duration	Reassess patient Use: • Stimulation • Bag mask ventilation • Reversal agents (as appropriate)
	etCO ₂	Zero	
	RR	Zero	
	Waveform	Absent	
	Other	No chest wall movement or breath sounds	Cease drug administration
Complete airway obstruction	SpO ₂	Normal or ↓ depending on duration	Airway patency restored with airway alignment
	etCO ₂	Zero	Waveform present
Complete laryngospasm	RR	Zero	Airway not patent with airway alignment
	Waveform	Absent	
	Other	Chest wall movement and breath sounds present	No waveform Positive pressure ventilation

Waveform¹



1. Krauss B, Hess DR. Capnography for procedural sedation and analgesia in the emergency department. *Ann Emerg Med.* 2007;50(2):172-81. Epub Jan. 12, 2007.
2. Gravenstein JS, editor. *Capnography: Clinical Aspects.* Cambridge University Press. 2004, 2011.
3. <https://nurseslabs.com/ineffective-breathing-pattern/>
4. MedicineNet.com. Definition of hyperventilation. <http://www.medicinenet.com/script/main/art.asp?articlekey=3853>. Accessed April 10, 2016.

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