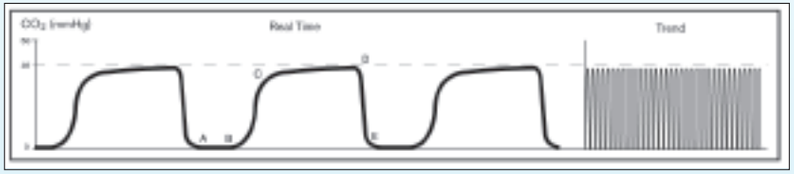
END-TIDAL CO_2

Normal and Abnormal Capnogram Waveforms

Normal Capnogram Waveform

Indications:

- ET tube is correctly positioned
- Proper ventilation is occurring



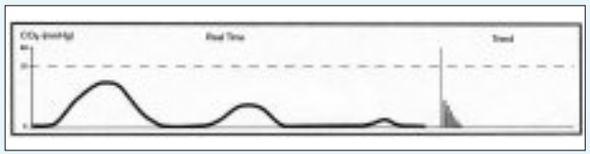
A-B: Baseline
B-C: Expiratory Upstroke
C-D: Expiratory Plateau
D: End-tidal Concentration
D-E: Inspiration

Abnormal Capnogram Waveforms

Esophageal Intubation

Observations:

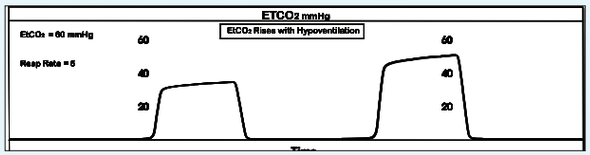
- No CO_2 sensed
- Small transient waveforms



Increasing $EtCO_2$ Level

Possible Causes:

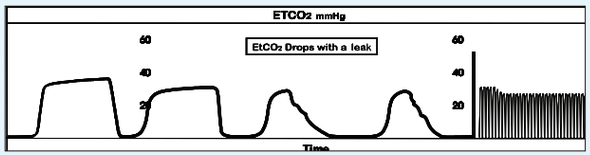
- Decrease in respiratory rate and/or tidal volume (hypoventilation)
- Increase in metabolic rate
- Rapid rise in body temperature (malignant hyperthermia)



Leak

Possible Causes:

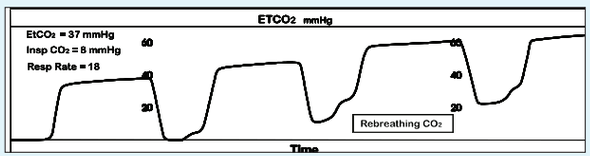
- ET tube cuff may be deflated or ruptured
- ET tube in the vocal cords
- Mask or Bag Mask Valve leak
- Artificial airway is too small for patient



Rebreathing

Possible Causes:

- Mechanical dead space
- Mechanical ventilator failure



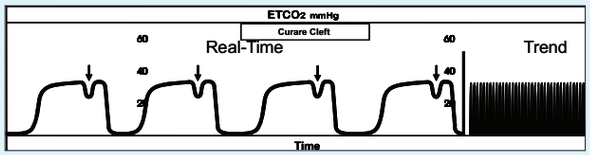
Muscle Relaxants (Curare Cleft)

Possible Causes:

- Patient is mechanically ventilated

Observations:

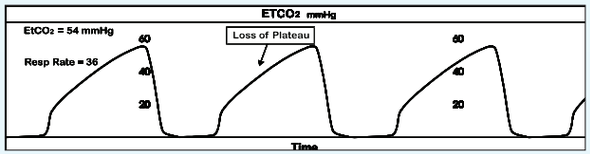
- Depth of cleft is proportional to degree of drug activity



Airway Obstruction

Possible Causes:

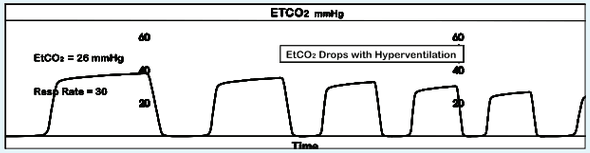
- Partially kinked or occluded artificial airway
- Presence of foreign body in the airway
- Bronchospasm
  - Elevated end-tidal CO_2 valve
  - Loss of alveolar plateau



Decreasing $EtCO_2$ Level

Possible Causes:

- Increase in respiratory rate and/or tidal volume (hyperventilation)
- Decrease in metabolic rate
- Fall in body temperature



$EtCO_2$ During Cardiac Arrest

$EtCO_2$ increases significantly with the return of effective heart function.

Observations:

- $EtCO_2$ drops during cardiac arrest
- As rescuer tires, a decrease in $EtCO_2$ is observed
- Increases with effective chest compressions and heart function