CO2 Insufflation: Ensuring Safety in the Advanced Endoscopy Patient

The Problem

CO2 insufflation has been introduced into the advanced endoscopy unit. During procedures such as endoscopy, ERCP and colonoscopy this type of insufflation has been shown to lead to enhanced patient recovery, but its use has been associated with rare cases of CO2 narcosis.

Aim/Goal

Our overall goal was to assess the impact of CO2 insufflation on ventilation and expired CO2 and understand the anesthetic implications of CO2 insufflation in our patient population/case mix. Specific goals:

- Educate GI Anesthesiology Team about CO2 insufflation and its potential impact on patient ventilation.
- Assess the impact of CO2 on the patient's blood CO2 level and determine whether current respiratory monitors (ETCO2) are valid during CO2 insufflation.
- Trial a noninvasive monitor that measures transcutaneous CO2.

The Team

Anesthesiology: K Zaleski MD ,S. Barnett MD, and the GI Anesthesia Division: R. Cohen MD, R. Steinbrook MD, E, Sundar MD, MA Vann MD, R Glidden MD, R Kverga MD, D. Feinstein MD, F. Shapiro DO,
Advanced Endoscopy Gastroenterology: R. Chuttani MD, D. Pleskow MD, M. Sawhney MD MS, and T Berzin MD MS.

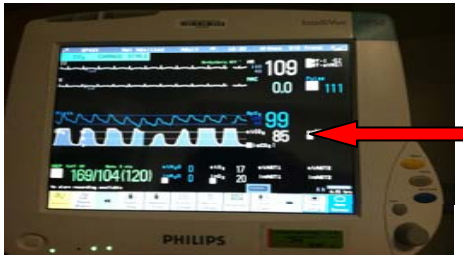
The Interventions

- E-mail Notification to Anesthesiology providers regarding introduction of CO2 with reminder notices posted by each Anesthesia machine.
- Discussion of initial observations and concerns at Faculty Hour.
- Provision of ABG syringes and lab slips to confirm PaCO2 value in the setting of high ETCO2 values.
- Trial of transcutaneous PaCO2 monitor to confirm accuracy of ETCO2 monitoring in upper GI cases using CO2 insufflation.

The Results/Progress to Date

1. Early observation of elevated EtCO2 and PaCO2 during MAC Anesthesia with CO2 insufflation.

Case	Scope Time	Start ETCO2	End ETCO2	End PaCO2
ERCP, stent pull	12 min	42	68	67
ERCP, pre-cut	38 min	40	83	96



This displays the high ETCO2 observed during CO2 insufflation.

2. Transcutaneous Monitoring: Easy to use during cases

This displays transcutaneous CO2 during insufflation.

Lessons Learned

Changes in technique and equipment that are directed at improving one aspect of a patient's care can have unintended consequences. Our example shows that although the administration of CO2 improves the GI outcome, it may have negative effects during the administration of anesthesia.

When new techniques are introduced it is very important that all disciplines are educated and informed about the change in practice and possible consequences.

Next Steps/What Should Happen Next

- Publish clear guidelines for patients who should receive CO2 for insufflation and when to change from CO2 to air during a procedure.
- Include a statement on CO2 insufflation as part of the time out prior to procedures.
- Regular monitoring or spot checks of patient's carbon dioxide levels during CO2 insufflation and collect data on any adverse events.
- Perform cost benefit analysis of additional monitoring with a transcutaneous CO2 monitoring.

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