Sir,

Endoscopic retrograde cholangiopancreatography (ERCP) is both a diagnostic and therapeutic procedure. It is usually done under moderate-to-deep sedation without intubation. This mandates proper monitoring of these patients during ERCP procedure. Monitoring includes pulse oximeter, noninvasive blood pressure, electrocardiography, and capnography.\(^1\) Capnography gives an instantaneous feedback about the patient ventilation status. However, monitoring end-tidal carbon dioxide (ETCO\(_2\)) in a spontaneously breathing patient without intubation can be difficult.\(^2\) Introduction of ERCP scope into the esophagus adds to this difficulty as it prevents the expired air from entering the nasal cavity. Hence, we present a unique technique wherein gas sample line was connected to the suction catheter with the help of three ways to monitor ETCO\(_2\) effectively in spontaneously breathing patients undergoing ERCP.

In this technique, ETCO\(_2\) monitoring apparatus was modified using suction catheter and three ways. First of all, 16 F suction catheter was cut at an appropriate length. Three ways were then attached to the cut end of suction catheter, and ETCO\(_2\) sample line was attached to the other end of the three ways [Figure 1a]. All standard American Society of Anesthesiologists monitors were attached, and patients were sedated based on the standard institute protocol. After the patient was sedated, 2% lignocaine jelly was applied in one of the nostrils, and suction catheter was gently passed through the nostril until a good capnograph was seen [Figure 1b]. After this, hepatologist was asked to insert the ERCP scope and to look for the suction catheter tip while entering the esophagus [Figure 1c]. If required, suction catheter tip was further adjusted and placed under vision just near to the laryngeal inlet.

Capnography is one of the important monitoring parameters which can detect any change in the patient ventilation status earlier than the pulse oximeter.\(^3\) Until now, we have been using the nasal adaptors for monitoring the capnography in patients undergoing ERCP. However, after the ERCP scope was introduced into the esophagus, capnograph used to get diminished and became unreliable for further use during the ERCP procedure. This can easily be understood by the fact that the diameter of ERCP scope ranges from 12 to 14 mm. When this large scope was introduced into the esophagus, it breaks the continuity of the nasopharyngeal airway with that of the laryngeal inlet. This results in the dispersion of the expired air by the scope, thus resulting in a decrease in the tidal volume coming out of the nasal cavities. Therefore, to overcome this problem, we have precisely placed the tip of suction catheter just near to the laryngeal inlet opening with the help of ERCP scope. Placing suction catheter tip near inlet also decreases the chances of mixing expired air with that of atmospheric air, thus resulting in a more reliable capnograph. Being a tertiary care center in liver disease, we are doing more than 100 ERCPs in a month under deep sedation. We are using this technique routinely without any complication. However, we suggest large randomized clinical trials before this technique can be used widespread.

**Financial support and sponsorship**

Nil.

**Conflicts of interest**

There are no conflicts of interest.
Letters to Editor

Gaurav Sindwani, Kelika Prakash, Mahesh Kumar Arora
Department of Anesthesia, Institute of Liver and Biliary Sciences, New Delhi, India

Address for correspondence:
Dr. Gaurav Sindwani,
Department of Anesthesia, Institute of Liver and Biliary Sciences,
New Delhi - 110 070, India.
E-mail: drsindwani25@gmail.com

References

1. Sheahan CG, Mathews DM. Monitoring and delivery of sedation. Br J Anaesth 2014;113 Suppl 2:i37-47.
2. Mehta JH, Williams GW 2nd, Harvey BC, Grewal NK, George EE. The relationship between minute ventilation and end tidal CO2 in intubated and spontaneously breathing patients undergoing procedural sedation. PLoS One 2017;12:e0180187.
3. McCarter T, Shaik Z, Scarfo K, Thompson LJ. Capnography monitoring enhances safety of postoperative patient-controlled analgesia. Am Health Drug Benefits 2008;1:28-35.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

How to cite this article: Sindwani G, Prakash K, Arora MK. An innovative way of monitoring end-tidal carbon dioxide during endoscopic retrograde cholangiopancreatography. Saudi J Anaesth 2018;12:650-1.
© 2018 Saudi Journal of Anesthesia | Published by Wolters Kluwer - Medknow