The practice of modern anesthesia requires that the adequacy of respiration and circulation are closely monitored during surgical procedures. Regarding proper airway and respiratory gas management the use of airway gas monitoring and pulse oximetry have long been the major safety features alleviating anesthesiologists anxiety in OR environment for the benefit of the patient. Naturally the ultimate goal has been to ensure sufficient oxygen supply to all metabolically active tissues of the body. On an every day basis the end-tidal CO2 and the airway gas oxygen monitoring combined with pulse oximetry and hemodynamic readings have been used to assess the well being of the patient during general anesthesia. Depending on the case, hemodynamic monitoring has been upgraded with invasive blood pressure measurement and pulmonary artery catheterization to meet the needs.

The gas exchange measurement component of the M-CAiOVX module is a useful addition to this monitoring arsenal and provides some application areas of special interest. The continuous measurement of VO2 during general anesthesia combines the effects of respiratory and hemodynamic factors and reflects more accurately the general well being of the patient than either of the parameters alone.

VO2 measurement with M-CAiOVX module would be highly useful in surgeries causing major blood loss or volume changes. Traditionally hemodynamic parameters such as pulse rate, blood pressure (usually invasive) and CVP have guided the replacement of blood loss. In a clinical setting the measurement of cardiac output and wedge pressure with a thermodilution catheter has been regarded as the ultimate means to monitor replacement therapy.

In extreme situations clinicians have also used endtidal CO2 to estimate the adequacy of circulating blood volume. Likewise the continuous VO2 measurement could be used to estimate the effect of therapeutic interventions. The goal of the volume therapy, in terms of VO2 readings, should set to values encountered before the bleeding episode. This goal should be met, if the replacement of blood volume and the oxygen carrying capacity of the blood (hemoglobin concentrations) are sufficient. To a certain extent the low hemoglobin concentration can be compensated by increasing cardiac output. This compensatory response depends highly on the volume status. In the case of volume resuscitation leading to low Hb concentrations, continuous VO2 measurement combined with hemodynamic data should readily point to the limit of compensatory mechanisms after which oxygen deficit becomes imminent.

When the VO2 measurement readings are interpreted, the change in patient temperature and the level of anesthesia should be considered. Usually patient temperature drifts to lower levels without active warming. Naturally the VO2 decreases with the change in body temperature. Anesthesia which is too light and reactions to noxious stimuli may precipitate sudden surges of VO2, especially with subsiding muscle relaxation.