**Case:** A 22 year old, 50kg female presented for left submandibular gland sialoendoscopy. The patient had an eleven month history of left neck swelling which occurred after ingestion of food. CT scan revealed sialolithiasis and sialadenitis. Past medical history includes exercise induced asthma and irritable bowel syndrome. Medications include fexofenadine and levalbuterol.

Prior to start of case, the FDA approved 15 item pre-anesthesia checkout was performed. There were no signs of CO2 absorbent exhaustion or incompetent unidirectional valves. Expandable breathing circuit without gas sampling port at Y-piece was used.

General anesthesia was induced smoothly with propofol, fentanyl, lidocaine and rocuronium. Endotracheal tube was visualized passing through vocal cords. Capnography revealed a high inspired CO2 tracing (Fig 1). Breath sounds were equal bilaterally. There was equal chest rise. Next, the end tidal carbon dioxide (ETCO2) sampling line was inspected. It was noted that it was placed accidentally at the distal end of the expiratory limb (Fig 2). ETCO2 sampling line was repositioned to the distal Y-piece (Fig 4). The capnograph returned to a normal tracing (Fig 3). The case proceeded uneventfully.

**Discussion:** Capnography monitors ventilation in anesthetized patients. Physiologic changes such as cardiac output, distribution of pulmonary blood flow or metabolic activity alter CO2 production and hence capnography. An abnormal capnography tracing where inspiratory downstroke does not return to baseline usually indicates malfunction of inspiratory or expiratory valves or exhaustion of CO2 absorbent. In a circle system, gas flow is unidirectional in controlled ventilation with the placement of inspiratory, expiratory valves and CO2 absorbent. If either of unidirectional valves becomes incompetent, exhaled gas enters inspiratory limb. During the next inspiratory cycle, inspired gas will have a higher concentration of CO2 hence producing a higher baseline inspiratory CO2. Rebreathing CO2 also occurs when CO2 absorbent is depleted. In the case described, neither of these explained the abnormal capnograph. When the ETCO2 sampling port is misplaced at the distal end of the expiratory limb, it will be sampling diluted CO2 resulting in artificially lower ETCO2. During the inspiratory phase, inspired ETCO2 will be high since the sampled gas still contains CO2. Hence, peaks and troughs of capnograph will not be observed during respiratory cycles. Therefore, ETCO2 sampling port should be placed immediately distal to the Y-piece for a true measurement during exhalation and inspiration. (Fig 5)

In conclusion, if abnormal capnography is seen where the baseline inspiratory CO2 is higher than usual, inspect the circuit for rebreathing and consider examining the position of ETCO2 sampling port. We recommend confirming ETCO2 sampling port is connected immediately distal to Y-piece before starting a case for accurate CO2 measurement.

**References:**
1. Eger, Ethans. The Effects of Inflow, Overflow and Valve Placement on Economy of the Circle System. Anesthesiology. 1968;29;93-100