Introduction
Conjoined twins represent 1:200,000 live births. The majority are connected at the thorax/abdomen (thoracoomphalopagus); however 18% are pygopagus, conjoined at the sacrum/hip.

We present a case of 9 month old pygopagus conjoined twins, scheduled for the first stage of separation procedures. Each child had a laparoscopic-assisted colostomy creation, as well as placement of tissue expanders.

Case
The patients’ preoperative imaging and diagnostic studies, which required anesthesia, revealed a conjoined sacrum with shared filum terminale, distal rectum, anus and sphincter complex. They shared one internal iliac artery and associated venous plexus. The contralateral iliac arteries and veins, as well as the genitourinary structures were not shared.

Intraoperative Course
During inhalational induction, paralysis, and intubation of Twin A, Twin B exhibited little to no sedation or muscle weakness.

Anesthesia was maintained using volatile anesthetic with titrations of fentanyl, dexmedetomidine, morphine, and cisatracurium. Ventilator settings were adjusted for a goal end-tidal carbon dioxide (EtCO₂) range of 30-34 mmHg.

During insufflation of twin A’s abdomen with CO₂, the EtCO₂ was noted to rise simultaneously on both twin A and twin B’s capnography. Both patients experienced concomitant tachycardia consistent with a developing respiratory acidosis, which required compensation by increasing the minute ventilation. The same effect was observed with insufflation of twin B. Peak inspiratory pressures only increased for the patient undergoing insufflation. During simultaneous laparoscopy the EtCO₂ was observed to rise as high as the low 60s for both twins, despite optimized minute ventilation.

Laparoscopy confirmed separate peritoneal cavities separated by a thin peritoneal membrane, with fusion of both rectal canals and a mutually common internal iliac artery. After laparoscopy aided in colostomy creation, subcutaneous tissue expanders were placed. The patients were extubated in the operating rooms and transported uneventfully to the PICU.

Discussion
Challenges for Anesthesiologists during laparoscopy include increases in HR, BP, and mean airway pressure associated with altered respiratory mechanics, as well as developing respiratory acidosis. These changes can be counteracted by increasing minute ventilation, paralysis, and sedation.

Of note in our case, the CO₂ quickly diffused from one twin to the other despite poor cross-circulation (evidenced by both intravenous and inhalation medications). The rapid gas diffusion presented an interesting challenge for our team as we balanced the offsetting benefits of normocapnea versus lung-protective ventilation.

This is the first documented instance of simultaneous laparoscopy in pygopagus conjoined twins. Procedures on conjoined twins present special challenges, and require thorough preparation. Our case involved essentially elective laparoscopy, but can be used as a reference for urgent and emergent cases in the future.

References