INTRODUCTION: It was recently shown that administration of the inhalational anesthetics (IN-ANES) Halothane (H) and Isoflurane (IF) to intravenously anesthetized (IV-ANES) patients during stable single-lung ventilation conditions (1LV), did not change $P_{O_2}$. In this previous study, end-tidal concentrations ($F_{ET}$) of H and IF were held constant at 1.45 and 0.15 MAC, respectively, for approximately 20 min so that arterial concentrations were 1.20 and 0.88 MAC, respectively, and venous concentrations were 0.95 and 0.82 MAC respectively. However, in view of the relatively short duration of IN-ANES administration, it is possible that clinically relevant tissue concentrations of IF-ANES were not achieved. The purpose of this study was to re-examine the question of the effect of IN-ANES on $P_{O_2}$ during 1LV conditions by first anesthetizing 1LV patients with IN-ANES ($F_{ET}$) for 1 MAC for >1 hour and then switching to IV-ANES (for >1 hour so that $F_{ET}$) IN-ANES = 0%).

METHODS: Eight consenting adult patients, requiring thoracotomy and 1LV (via a double-lumen tube) in the lateral decubitus position for various thoracic surgical procedures, had peripheral venous, systemic arterial and pulmonary artery catheters inserted under local anesthesia. The patients were alternately assigned to either a H (n=4) or IF (n=4) study group. Anesthesia was induced and maintained with the assigned IN-ANES and 100% O$_2$ (see first table below). Steady state single-lung ventilation (2LV) conditions were achieved (Step 1; 2LV, IV-ANES) with $F_{ET}$=1.0, tidal volume=12 mL/kg (peak airway pressure 25+3 cm H$_2$O) and respiratory rate adjusted so that $P_{CO_2}=41+5$ mm Hg. When the pleura was opened, 1LV was initiated with $F_{ET}$=1.0, tidal volume=10 mL/kg (peak airway pressure 34+3 cm H$_2$O) and rate adjusted so that $P_{CO_2}=42+2$ mm Hg. Serial arterial and mixed venous $P_{O_2}$ and gases documented achievement of steady state 1LV conditions during IN-ANES (Step 2; 1LV, IV-ANES). IV-ANES was then discontinued and IV-ANES administered with fentanyl 5 μg/kg, diazepam 10 mg and intermittent boluses of Na thiopental 50 mg until $F_{ET}$ and $F_{ET}$IF were <0.08% (Step 3; 1LV, IV-ANES). Step 3 was completed before any pulmonary vessels were ligated. At the end of the procedure the atelectatic lung was re-expanded and 2LV re-instituted (Step 4; 2LV, IV-ANES). Hemodynamic profiles and arterial and mixed venous blood gases were measured at the end of each experimental step.

RESULTS: The first table shows the temporal and IN-ANES depth profile for each experimental step.

The second table shows the $P_{O_2}$ (mean±SD) at each experimental step in both the H and IF groups.