Josh's Corner

Articles that shaped my practice

Subject: Prehospital Intubations

Article 3 –

Taghavi S, Jayarajan SN, Khoche S, Duran JM, Cruz-Schiavone GE, Milner RE, Holt-Bright L, Gaughan JP, Rappold JF, Sjoholm LO, Dujon J, Pathak A, Santora TA, Houser SR, Goldberg AJ. Examining prehospital intubation for penetrating trauma in a swine hemorrhagic shock model. J Trauma Acute Care Surg. 2013 May;74(5):1246-51. doi: 10.1097/TA.0b013e31828dab10.

Synopsis –

Thirteen pigs were anesthetized with an intramuscular technique and then with propofol once intravenous access was obtained. Six of the pigs were intubated and manually ventilated, and seven were bag-valve masked-ventilated manually. Lines were inserted and baseline labs and hemodynamic indices were recorded. The catheter in the carotid was opened and labs and hemodynamic variables were recorded every 10 minutes. Starting at 30 minutes, there was more blood loss in intubated pigs. All of the pigs died, on average, around 50 minutes.

Details –

All 13 pigs were placed in the supine position and had a femoral arterial line, right internal jugular venous introducer with pulmonary artery catheter, and a right carotid catheter inserted. The pigs were maintained at 100% oxygen saturation using a FiO_2 of 1. Baseline values were recorded 10 minutes after the last line was placed. Once exsanguination started, time of death was defined when the investigators were unable to measure blood pressure. When the pigs were hemorrhaging, there were no significant differences in mean arterial pressure, cardiac index, and central venous pressure. The pH was only significantly increased in the intubated pigs compared to nonintubated at baseline. There was no significant difference in arterial oxygen content and only a trend for a higher bicarbonate level and lower CO_2 content in the intubated pigs after the first 10 minutes. In general there was a nonsignificant trend for the intubated pig to have a lower body temperature. There was also a trend for a higher lactate (except baseline to the first 10 minutes) and base deficit in the intubated pigs.

Questions raised –

Are pigs similar enough to humans to draw any conclusions from this study? Is placing a catheter in the carotid artery an acceptable model for penetrating trauma? Does the use of anesthetizing agents that blunt the physiologic responses to trauma affect the results of this study? Does something physiologic occur with intubation that increases bleeding in traumatically injured patients? Would similar results occur in the intubated pigs if they were not hyperventilated?