Complete Bronchus Transection After Blunt Trauma

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Patient was a 25 year old female, unrestrained driver, that was involved in a roll-over motor vehicle collision. She was thrown from her car and found approximately 30 feet from her vehicle. There was loss of consciousness and when EMS arrived, she was altered and combative. She was subsequently transferred to our trauma bay where she continued to be combative and was intubated by the trauma team. Trauma workup revealed multiple injuries including splenic laceration, liver laceration, bilateral rib fractures, multiple facial fractures, left lung contusion with a small left sided pneumothorax, as well as a right main stem bronchus transection. A right sided chest tube was placed and she was subsequently transferred to the ICU under the care of our trauma surgeons.

Overnight in the ICU, despite multiple attempts by the critical care team to solely ventilate the left lung, it became increasing difficult to ventilate the patient. She also had a persistent air leak on the right side despite the chest tube. We were called to take the patient to the operating room for a thoracotomy with exploration of chest cavity.

On our arrival to the ICU, she had a 7.5 single lumen endotracheal tube in place. Her most recent ABG was 7.15/76/91/96% (FiO2 60). Once in the operating room, we switched the 7.5 single lumen ETT to a 37 French left sided double lumen tube over a double lumen tube exchanger. This was performed without difficulty. Once placement was confirmed via fiber-optic bronchoscopy, we initiated one lung ventilation. The first ABG approximately 30 minutes after initiation of OLV was 7.31/50/275/100 (FiO2 100). As the surgeons explored the chest cavity, the transection of the right main bronchus was determined to be at the level of the carina. There were no obvious vascular injuries. There was a discussion on how to proceed at this point. Due to where the right main bronchus was transected, there was a concern of whether we were going to be able to isolate the left lung adequately because the DLT would be in the way of the surgical field. The DLT would have partially occluded the posterior edge of the repair. The cardiothoracic surgeon requested perfusion to be on standby in case we were not able to ventilate the patient during the repair and ECMO was needed. Decision was made to retract the DLT above the carina and to intermittently ventilate the patient on the surgical field via a 6.0 reinforced single lumen ETT.

The reinforced single lumen ETT was placed directly by the surgeon into the left main bronchus under direct visualization, allowing us to ventilate the left lung. Once adequate oxygenation and ventilation took place, the surgeon removed the ETT and worked on the primary repair of the right main bronchus transection. The ETT was intermittently placed in and out of the left main bronchus a handful of times to allow intermittent ventilation, as well as to provide adequate exposure in the surgical field to complete the repair of the transected right main bronchus. Once the repair was completed, the 37 French left sided DLT was advanced into proper position, the right lung was
inflated, and bronchoscopy was performed to ensure that the repair was adequate. At the conclusion of the case, the DLT was switched out to a single lumen ETT via the double lumen tube exchanger. She was transferred to the ICU intubated and stable. Multiple post-operative bronchoscopies showed that there was no air leak from the repaired bronchus. She was discharged from the hospital on POD #12.

Bronchus transection after blunt chest trauma is a very uncommon injury, occurring in less than 1% of patients with blunt trauma. However, when a bronchus transection does occur, it is associated with high mortality; as 80% of patients who have a tracheobronchial rupture die within two hours of the injury. Most tracheobronchial ruptures occur within 2.5 cm of the carina and the proximal right main bronchus is more likely to be involved. Signs and symptoms include dyspnea, pneumomediastinum, pneumothorax and soft tissue emphysema. A persistent air leak after a properly placed chest tube is also highly suggestive of a bronchial rupture. On x-ray, the “fallen lung” sign may be seen. This refers to the peripheral location of the collapsed lung as opposed to the usual centrally displaced location. The “fallen lung” sign is not commonly seen, but is very specific for a bronchus transection. This injury is something that necessitates surgical management in an expeditious manner.

References: