"A Picture is worth of thousand words" and "A Stitch in time saves nine"; these proverbs remind me the importance of TEE in the setting of Trauma. In a typical Trauma Bay scenario, one may see a morbidly obese involved in a high speed MVC with hypotension and tachycardia. With obvious hemodynamic compromise, the patient is intubated and the primarily assessment is performed. In this scenario, there are no obvious injuries and FAST exam is negative. However, despite ongoing fluid resuscitation and the initiation of vasopressors, the patient’s vital signs do not improve. Here, the TEE probe is placed by the Anesthesiologist (Rescue TEE) and reveals a traumatic aortic dissection. The course of the patient changes and he is immediately taken to OR for surgical repair. This is an example where TEE played an essential role in the evaluation of an unstable trauma patient from blunt trauma.

It is difficult to diagnose thoracic injuries (the heart or the great vessels) with conventional imaging such as chest X ray and transcutaneous ultrasound. Patients with high velocity traumatic chest injury are at risk for aortic dissection, myocardial contusion and acute ventricular dysfunction, traumatic ventricular septal defect, cardiac tamponade, and hemothorax. These injuries are visualized by TEE.

Some studies have concluded that TEE should be initial test for all suspected traumatic aortic injury because of its high sensitivity and specificity for detection. In addition, TEE is quick to perform and provides additional safety to the patient without having to move the patient from Trauma Bay to the CT scanner or angiographic suite, causing potential delay to the operating room for definitive treatment.

In penetrating thoracic injuries, cardiac carries a high fatality rate. The most common location for injury is right ventricle because of its location within the mediastinum. On occasion, the left ventricle can also be injured, especially with high velocity projectile injuries that enters the thoracic cavity at oblique angles.
Mechanism of trauma plays an important role in developing a differential diagnosis for the patient’s unstable state after blunt trauma. An aortic injury should be particularly suspected when sudden deceleration is present in the history. It has been reported that up to 18% of deaths in the setting of high-velocity accidents are secondary to rupture of the aorta. In fact, blunt aortic injury is the second most common cause of death in blunt traumatic injury. Because of this, TEE should play a key role in the diagnosis of traumatic aortic injury in the setting of a patient with significant blunt chest trauma or who presents with a high velocity mechanism. In another study, 32 consecutive trauma patients were prospectively evaluated with TEE and the findings compared with aortography. The author found that the sensitivity of TEE for the diagnosis of subadventitial aortic disruption was 91% and the specificity was 100%. The authors concluded that TEE should be considered as first-line imaging for the evaluation of trauma patients with suspected injuries of the thoracic aorta.

Other case series presented results of 101 patients who arrived to the ED with a diagnosis of possible traumatic rupture of the aorta. To compare TEE to the gold standard aortogram, these patients were evaluated simultaneously with both TEE and Aortography. The investigators were able perform TEE in 93 of them. The study also concluded that patients with severe blunt chest trauma TEE and CT had similar diagnostic accuracy for the identification of the acute trauma aortic injury that required an operation.

Currently, there is not much data to support the role of TEE. However, the importance of TEE in trauma is slowly evolving. The rate limiting factors for adaptation of TEE in trauma may be due to a few drawbacks. One hurdle is the need for trained professionals who can produce right images during emergency situations. The learning curve is steep and usually TEE is a tool of subspecialist who use TEE for other non-emergent reasons. Thus, the availability of cardiologist, cardiac anesthesiologist and CV Surgeons during emergency situations may limit its feasibility.

As mentioned earlier, another caveat in the usage of TEE in trauma is the amount training one needs. A potential solution which would address the need for experts is implementing mandatory TEE training during the Anesthesia residency program. A well-developed curriculum would provide the increased numbers of experts. Standardization of expertise would be achieved through completion of Basic TEE certification.
Chest trauma can result in significant cardiothoracic injury. Because of its ease and its portability, TEE assessment of traumatic aortic injury after trauma, should be routinely performed in patients sustaining severe multiple trauma from violent deceleration accidents, even in the presence of a non-enlarged mediastinum on admission in chest X-ray.

Having said that, there are some relative contraindications for the TEE such as an unstable cervical spine, history of sternal radiation or upper esophageal pathology, recent oral intake, & an uncooperative patient. These factors can make the TEE examination very difficult and may result in higher rate of complications. Keeping this in mind, one has to weigh the risk and benefits of TEE. In general, TEE should not be attempted in uncooperative and combative patients or in patients with unstable neck fractures.

In conclusion, TEE has a promising role in Thoracic Injuries to diagnose cardiac and large vessel injuries, especially when time to diagnosis is an important factor.

References


How do you put the TEE in Trauma?

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