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CASE REPORT: ANESTHETIC MANAGEMENT OF A CASE OF SUBCLAVIAN-AXILLARY ARTERY RUPTURE

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Abstract

Background:

Subclavian–axillary artery injuries are rare but life-threatening events, often associated with high-energy trauma or iatrogenic causes. Their proximity to vital neurovascular structures presents unique challenges for both surgical and anesthetic teams. Prompt recognition and coordinated multidisciplinary intervention are critical for patient survival.

Case Presentation:

We report the anesthetic management of a patient with subclavian–axillary artery rupture requiring emergency surgical repair. The patient underwent general anesthesia with endotracheal intubation and was induced using intravenous fentanyl, vecuronium, and isoflurane. Comprehensive intraoperative monitoring included electrocardiography, pulse oximetry, end-tidal CO_2, core temperature, invasive arterial pressure, central venous pressure, and central venous cannulation. Hemodynamic instability persisted throughout, necessitating double inotropic support. Surgical intervention involved a median sternotomy and bypass grafting from the second part of the subclavian artery to the axillary artery using a 6 × 300 mm Dacron graft. Intraoperatively, the patient developed cardiac arrest, managed with direct cardiac compressions, intravenous adrenaline, atropine, sodium bicarbonate, and internal defibrillation (30 J), resulting in return of spontaneous circulation.

Conclusion:

This case underscores the complexity of anesthetic management in subclavian–axillary artery injuries, highlighting the need for vigilant hemodynamic monitoring, preparedness for massive transfusion and advanced resuscitation, and close coordination with the surgical team. Early recognition and a multidisciplinary approach remain key to improving outcomes in these high-risk vascular emergencies.

Keywords:

subclavian artery injury, axillary artery rupture, anesthetic management, vascular emergency, intraoperative cardiac arrest.

INTRODUCTION:

Subclavian-axillary artery injury is a rare but life-threatening condition that poses significant challenges in both diagnosis and management. These injuries are often associated with high-energy trauma, penetrating wounds, or iatrogenic complications during surgical or interventional procedures. Due to their proximity to critical neurovascular structures and the risk of catastrophic hemorrhage, prompt recognition and management are essential to minimize morbidity and mortality. From an anesthetic perspective, the management of subclavian-axillary artery injuries is particularly complex. It requires meticulous planning to balance hemodynamic stability, minimize blood loss, and maintain adequate perfusion to vital organs and the affected limb. Additionally, considerations related to airway management, the potential need for massive transfusion protocols, and coordination with the surgical and vascular teams further complicate the perioperative care.

Case report:

This report presents the case of a critically ill 21-year-old male who sustained severe polytrauma in a road traffic accident (RTA), resulting in a rare and life-threatening rupture of the subclavian-axillary artery. The patient arrived unconscious, intubated, and in critical condition with a Glasgow Coma Scale (GCS) score of 5T/15. He was profoundly hemodynamically unstable, with a blood pressure of 70/40 mmHg and a heart rate of 150 beats per minute. Patient had a huge swelling in the right clavicular region extending to neck and axillary, which was progressively increasing in size. Upon initial evaluation, his hemoglobin was found to be critically low at 5 g/dL, requiring immediate resuscitation efforts and initiation of a massive transfusion protocol. Two units of PRBC were transfused in the ER, despite which the blood pressure was low, requiring ionotrop support (Noradrenaline 4mg in 50ml NS at 15ml/hr), and Vasopressin was eventually added at 2.5ml/hr. ABG showed severe metabolic acidosis with lactic acidosis pH 7.18. His other blood investigations were normal. His injuries included a right clavicular fracture, complete transection of the right subclavian artery, multiple rib fractures, intracranial hemorrhage, vertebral injuries, and liver trauma.

A CT angiogram showed complete transection of the subclavian artery. CT brain showed acute intraventricular hemorrhage, acute SAH in right temporal convexity and comminuted minimally displaced fracture of frontal process of right zygomatic bone with extension into superior orbital margin and outer table of frontal bone, but no active neurosurgical intervention was necessary. The patient required aggressive resuscitation with double inotropic support using norepinephrine and vasopressin, ensuring hydration and organ perfusion. High-risk informed consent was obtained due to his critical condition, and the American Society of Anesthesiologists (ASA) classification was 5E. Intensive care unit (ICU) beds and blood products were reserved in preparation for the surgery.

The anesthetic plan involved general anesthesia with endotracheal tube. Induction was done using intravenous, fentanyl (50 mcg), and vecuronium (8 mg) and isoflurane . Intraoperative monitoring included electrocardiography, oxygen saturation, end-tidal CO_2, temperature, invasive blood pressure(arterial cannulation) central venous cannulation, and central venous pressure. Hemodynamic instability persisted, necessitating continued double inotropic support. The surgical team performed a median sternotomy, followed by bypass grafting from the second part of the subclavian artery to the axillary artery using a 6 × 300 mm Dacron graft. Despite meticulous intraoperative management, the patient underwent cardiac arrest, which was managed with cardiopulmonary resuscitation by directly compressing heart intraoperatively, adrenaline, atropine, bicarbonate, and internal defibrillation with 30J.

The patient received a total fluid input of 9,800 mL, including crystalloids, colloids, and blood product support (6 units of packed red blood cells, 4 units of fresh frozen plasma, and 2 units of random donor platelets). Estimated blood loss during the procedure was 3,500 mL, and urine output was 2,500 mL. Following surgery, the patient was not extubated and was transferred to the ICU for elective ventilation and continued inotropic support, along with close monitoring of arterial blood gases. Patient had a slow improvement of GCS, hence tracheostomy was done on POD 6 in view of need for prolonged ventilation. Patient underwent posterior stabilization of spine for D7 compressive fracture under general anaesthesia on POD 18. Patient's GCS improved (15/15), hence tracheostomy was decannulated on POD 38. On POD 75, patient was taken up for brachial plexus injury exploration. Cervical motor nerve was extended to musculocutaneous nerve using sural nerve graft under general anesthesia.

CONCLUSION:

The case highlights the complexity of managing subclavian artery rupture in the context of polytrauma, where rapid resuscitation, hemodynamic stabilization, and coordinated multidisciplinary efforts are paramount. Anesthetic management posed significant challenges, particularly in maintaining airway patency, optimizing hemodynamic parameters, and addressing complications such as intraoperative cardiac arrest. Successful surgical repair and anesthetic management in this critically ill patient shows the importance of structured perioperative care, invasive monitoring, and effective communication among surgical and anesthetic teams.

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