

Giant sacrococcygeal teratoma: Management concerns with reporting of a rare occurrence of venous air embolism

Sir,

Sacrococcygeal teratoma (SCT) is the most common tumor in neonatal period derived from totipotent cells from node of Hensen arising in the sacrococcygeal region with an incidence of 1 in 35,000–40,000 live births.^[1,2] We report a rare occurrence of venous air embolism during the surgical excision and its successful management.

A 24-hour-old, term neonate, weighing 3.4 kg, born by cesarean section presented with a huge sacral mass of size 20 cm × 20 cm, involving coccyx, extending to both buttocks, with intact skin [Figure 1]. Tumor resection was planned at 24 h of birth. Preoperative hemoglobin was 16 g/dl, and other investigations were within normal limits. Blood for grouping and crossmatching was sent. Chest roentgenogram was normal. Echocardiography showed a small patent ductus arteriosus with patent foramen ovale with left-to-right shunt, and computed tomography scan showed a large heterogeneous sacrococcygeal mass with little intrapelvic extension [Figure 2].

Preoperatively, two intravenous (IV) lines (22 gauge) were secured. Inhalational induction was done with sevoflurane in 100% oxygen. Muscle relaxation achieved with atracurium 0.5 mg/kg. Airway secured with an uncuffed endotracheal tube size 3.0, and analgesia was achieved with 2 µg/kg fentanyl. Anesthesia maintained with sevoflurane (minimum alveolar concentration 1.2) with 50% oxygen in air. A peripherally-introduced central catheter of size 22 gauge inserted via cephalic vein.



Figure 1: A neonate with a giant sacrococcygeal teratoma with the intact skin

Monitoring included invasive arterial blood pressure (24 gauge-right radial artery), electrocardiography (ECG), nasopharyngeal temperature, end-tidal CO₂, urine output, and pulse oximetry. The ventilation got impeded in prone position, resulting in the increased airway pressure of 32 mm Hg and drop in SpO₂ to 88%, and the mass was lifted and positioning readjusted with intermittent manual ventilation. Normothermia (35.6–37.0°C) maintained using warm IV fluids via in-line warming system. Intraoperative massive blood loss required transfusion of packed red blood cells 150 ml and fresh frozen plasma 60 ml. Intraoperatively, sudden change in ECG showed inverted T-waves and ST-segment elevation along with profound hypotension and fall in end-tidal CO₂. Since, the probability of the venous air embolism was very high, hence surgeons were accordingly informed so as to flush the surgical site with saline. Patient was administered 100% oxygen and IV fluid bolus as well as infusion dopamine at 10 µg/kg/min was initiated. The rhythm normalized thereafter. Arterial blood gas analysis had metabolic acidosis (pH 7.19) iCa²⁺ - 0.67 mmol/L, and hypocalcemia was treated with 20 mg/kg calcium gluconate. Middle sacral vessels were ligated, and complete resection of tumor with the coccyx was done. Postoperatively, neonate was electively ventilated due to massive fluid shifts.

Literature pertaining to the anesthesia management is limited and is fraught with challenges. Perioperative



Figure 2: Contrast-enhanced computed tomography of the abdomen and pelvis coronal view showing a large heterogeneous sacral mass with erosion and destruction of coccygeal segments

concerns include the meticulous preparation of the operation theater. Difficulty in ventilation is known with such a large mass in the prone position which was eased in our case by repositioning which could be the reason for hypoxia and hypoventilation.^[3] The temperature regulation is very vital in view of disproportionately large exposed surgical field to the body surface area with limited reserves of the neonate, to prevent coagulopathy and delayed recovery due to hypothermia.^[3] Massive transfusion and the handling of the tumor may result in tumor lysis syndrome with hyperkalemia leading to cardiac arrest.^[3,4] However, hyperkalemia was not noted, but hypocalcemia due to massive transfusion was adequately treated with injection calcium gluconate. Resection of such a large vascular tumor with opened sinuses was perhaps the reason for the air entrapment in our case and lead to an episode of venous air embolism not commonly reported in literature with SCT.

En bloc resection of large SCT is full of challenges and surprises, and it requires a very meticulous planning, vigilance, and multidisciplinary team approach with expertise for favorable outcome. With the advent of new diagnostic and therapeutic tools,^[3,5] for example, color Doppler, preoperative embolization, radiofrequency ablation, and open fetal surgery, most cases are being dealt in the antenatal period although the postnatal diagnosis and management is becoming less frequent but not completely obsolete.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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