Letters to the Editor

Intraventricular hemorrhage after ventriculoperitoneal shunt removal

Sir,

Ventriculoperitoneal (VP) shunt insertion is commonly carried out for management of symptomatic hydrocephalus. Infection, hemorrhage, neural trauma, shunt malfunction, and obstruction are well-recognized complications of the procedure. Neurologic deterioration after a short surgical procedure is a matter of concern. Deterioration of sensorium owing to intracranial hemorrhage after shunt removal is rare. We report acute neurologic deterioration in a 28-year-old man after VP shunt removal was done under monitored anesthesia care (MAC). The patient presented with external displacement of abdominal end of VP shunt (in situ). He had a history of tuberculous meningitis with hydrocephalus for which the shunt was inserted. Except for signs of infection at the abdominal incision site, the patient had no other physical, neurologic, or hematologic abnormality. VP shunt removal was planned under MAC. In the operation theater, an intravenous (IV) access was secured and routine monitors were connected. After ascertaining a negative intradermal sensitivity test, various sites in the scalp, neck, and abdomen were infiltrated with lignocaine 2% and adrenaline (1:200000). As the patient was apprehensive, propofol 20 mg and fentanyl 50 μg was given IV and oxygen was administered by facemask (4 L/min). The patient remained calm and was responsive to verbal commands with stable vitals. The procedure lasted for 30 min. At the end of procedure, the patient was shifted to the recovery room where his Glasgow Coma Scale (GCS) was observed to be deteriorated (after 20 min) from a full score of 15 to 10. Meanwhile, signs of respiratory obstruction were observed and the oxygen saturation decreased to 85%. The patient was immediately shifted to the intensive care unit after securing the airway. An arterial blood gas analysis of the patient did not reveal any significant abnormality. However, the computed tomographic scan of brain revealed intraventricular hemorrhage. An external ventricular drain (EVD) was inserted following which the GCS improved to full score after 2 h. The patient’s trachea was extubated 12 h later and the EVD was removed 48 h after insertion. The patient was discharged on third postoperative day without any residual neurologic deficit.

In patients with tuberculous meningitis, hydrocephalus may occur due to blockage of basal cistern and sylvian fissure by exudates, vascular adhesive arachnoiditis, 4th ventricular outlet, or aqueductal obstruction. Insertion of VP shunt is indicated in such patients when hydrocephalus is associated with signs of raised intracranial pressure. Neurologic deterioration after short surgical procedures may be attributed to both surgical and anesthetic causes. Anesthetic causes, such as drug overdose, hypoxia, hypercarbia, hypothermia, and metabolic and electrolyte imbalance were ruled out, in our case. A neurosurgical complication, such as intraventricular hemorrhage, venous air embolism, pneumocephalus, acute hydrocephalus or seizures, was suspected. VP shunt surgery is known to be complicated by intracerebral and intraventricular hemorrhage. In long-standing cases the shunt catheter may adhere to the ventricular wall or choroid plexus owing to arachnoiditis. In such a scenario, if the shunt is not carefully removed, that may lead to inadvertent intracranial bleeding. Probably, a similar event occurred in our patient that led to acute neurologic deterioration during early postoperative period.

Figure 1: Computed tomographic scan of brain with ventriculoperitoneal shunt in situ; (a) before shunt removal and intraventricular hemorrhage and (b) after shunt removal.
Anesthetic management for removal of adrenocortical carcinoma with thrombus in the inferior vena cava extending to the right atrium

Sir,

Adrenocortical carcinoma is a rare, rapid growing tumor which tends to metastasize to the liver, lungs, kidney, renal veins and inferior vena cava. Rarely tumor thrombus may extend through inferior vena cava (IVC) up to the right atrium (RA). Surgical removal poses a challenge to both surgeons and anesthesiologist because of the complications involving surgical access, bleeding, massive blood transfusion, coagulation defect, pulmonary embolism, large fluid shifts, and significant post-operative complications. We report the anesthetic management of a patient with such an involvement.

A 10 kg, one-year-old child was scheduled for inferior vena cava balloon tamponade followed by laparotomy, right adrenal tumor excision and IVC tumor thrombectomy. Investigations showed an elevated testosterone and dehydroepiandrosterone sulfate levels and computerized tomography scan revealed a 5 × 5 cm right adrenal tumor with tumor thrombus extending up to the IVC-RA junction. Echocardiography did not show thrombus extension in the RA and right ventricular function was normal.

The child was premedicated with oral trichloryl 750 mg 1 h before surgery. He was anesthetized with air, oxygen and sevoflurane, under standard monitoring in the cardiac catheterization suite, for positioning of the IVC balloon under image intensifier guidance. A 24G intravenous cannula was placed and trachea intubated with a 5 mm ID uncuffed oral endotracheal tube after neuromuscular blockade with atracurium. Anesthesia was maintained with a 50% mixture of air and oxygen, isoflurane, fentanyl and intermittent boluses of atracurium. A thrombus blocking the IVC up to the IVC-RA junction with collateral flow in the azygos vein was noted on injecting a contrast medium through the femoral vein.

The IVC balloon was placed via the right femoral vein at the IVC-RA junction and the balloon catheter was inflated with physiological saline solution for endoluminal occlusion of the free IVC near RA junction under image intensifier guidance. Following balloon occlusion of the IVC, child was transferred to the operating room where anesthesia was maintained with air, O₂, isoflurane, morphine and atracurium. Invasive monitoring was established with right IJV cannulation to monitor the central venous pressure, right radial artery cannulation for invasive blood pressure, and a temperature probe was inserted. The urinary bladder was catheterized to monitor urine output.

Intraoperatively, after the tumor resection IVC was exposed and thrombus was removed. The inflated RA balloon was pulled out through the same incision to ensure removal of residual thrombus. During this maneuver, there was excessive bleeding. Child was resuscitated with fluid, blood and blood products. Adrenaline infusion (0.1 mcg/kg/min) was started to maintain vitals. 3 ml of 10% calcium gluconate and 20 ml of 7.5% sodium bicarbonate were also infused. Central venous pressure, which was maintained at 6-8 cm of H₂O, fell to -2 cm H₂O with the acute bleeding.

This case re-emphasises the importance of careful postoperative monitoring and radiologic evaluation of all neurosurgical cases even when the procedure is of short duration and is performed under MAC.

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