



A CASE OF MOYA MOYA DISEASE WITH RECURRENT ISCHEMIC ATTACK POSTED FOR STA - MCA BYPASS.

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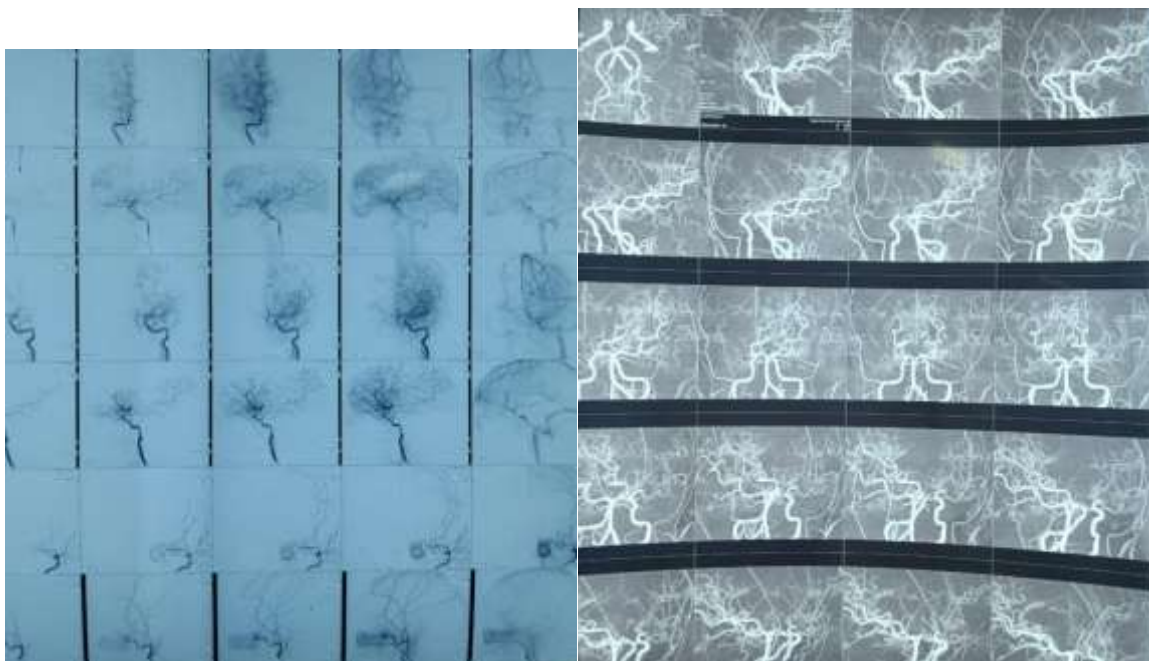
INTRODUCTION

Moyamoya disease (MMD) is a rare, chronic, and progressive occlusive cerebral vasculopathy with no known aetiology. Surgical revascularization has been shown to be superior to medical treatment in preventing ischaemic and haemorrhagic strokes in MMD. Perioperative management of these patients is challenging for anaesthesiologists. To reduce perioperative cerebrovascular events, understanding the underlying pathophysiology of the disease and ensuring adequate cerebral perfusion and neuroprotection are crucial.⁽¹⁾ Perioperative management has a direct impact on the outcome of surgery. We present the case of a 22-year-old male weighing 100 kg, diagnosed with Moyamoya disease, underwent a superficial temporal artery to middle cerebral artery (STA–MCA) bypass

CASE REPORT

A 22 year old male weighing 100 kgs with BMI of 38.4 presented with complaints of on and off headaches for 1.5 years associated with tingling sensation and weakness of all four limbs. The patient also gives a history of facial weakness with deviation of angle of mouth 1 year ago which was diagnosed as ischemic stroke and patient was started on antiplatelet therapy , gradually resolving weakness over a course of 6months. The patient was currently on tab.

Ecospirin 150mg OD and tab. Atorvastatin 20mg OD. Airway examination revealed anticipated difficult bag and mask ventilation in view of heavy jaw, short and thick neck and obesity with STOPBANG score of 4/8 and poor functional capacity. Other systemic examinations were unremarkable. Investigations including 2D ECHO were unremarkable. MRI cerebral angiography revealed complete occlusion of bilateral MCA and significant faint flow in bilateral ACA with multiple small lenticular striate collaterals. MRI brain showed acute lacunar infarcts in bilateral frontal lobe. Diagnosed as a case of Moya Moya disease posted for STA-MCA bypass



The patient was brought to the operating room and standard ASA monitoring was established. The patient was positioned in the ramped position to optimize airway alignment. Preoxygenation was carried out with 100% oxygen for 4 minutes. Premedication was administered with inj.glycopyrrolate 20 mg and inj. Fentanyl 100 mcg. Induction of anesthesia was achieved with propofol 160 mg. Mask ventilation was performed using a two-hand technique with the aid of an oropharyngeal airway, achieving adequate chest rise and satisfactory oxygenation. Tracheal intubation was then performed using a flexometallic endotracheal tube (size 8.0 mm ID), and the tube was secured at 22 cm at the angle of the mouth. Bilateral air entry was confirmed on auscultation and with capnography. Following induction of general anesthesia and endotracheal intubation, anesthesia was maintained with oxygen, air, and a volatile agent along with opioid supplementation. Analgesia was maintained with Scalp Block with inj. Bupivacaine 0.25% 15ml , inj. PCM1g every 6th hourly and intermittent boluses of 20mcg. The patient was positioned supine with the head turned to the contralateral side and fixed in a Mayfield head clamp. Care was taken to avoid excessive neck rotation or venous compression. Invasive arterial pressure monitoring and temperature probes were placed, and normocapnia and normothermia were maintained throughout the procedure.

After sterile preparation and draping, the neurosurgical team performed the STA–MCA bypass. The superficial temporal artery was dissected and an end-to-side anastomosis was completed with a cortical branch of the middle cerebral artery under the microscope. Hemodynamic stability was maintained during temporary clipping of the MCA, with mild hypertension induced to optimize cerebral perfusion. Adequate graft patency was confirmed intraoperatively using indocyanine green angiography



The patient was extubated smoothly after ensuring full recovery and was shifted to the neurosurgical ICU for postoperative monitoring and neurological assessment. Regular neurological assessment was done every 4th hourly. Incentive spirometry was encouraged every 8th hourly.

DISCUSSION

MMD is an occlusive cerebral vasculopathy, seen both in children and adults. It is characterized by bilateral or unilateral occlusive or stenotic changes at the distal portion of the internal carotid arteries and the proximal portions of the anterior cerebral arteries and middle cerebral arteries (MCAs), with the posterior cerebral arteries rarely involved. Dilated collateral vessels are abnormally formed, which give the pathognomonic appearance of “a puff of cigarette smoke” on angiogram, which is “moyamoya” in Japanese(2-4)

A direct bypass refers to anastomosing a branch of the external carotid artery, commonly the superficial temporal artery (STA), to a branch of the internal carotid artery. The MCA is the most utilised target, particularly its M4 branch, which is a terminal cortical segment. A direct bypass achieves an increase in blood flow to the ischaemic brain immediately. This procedure is commonly done in adults but is technically more challenging in children as the vessel calibre is much smaller.(3) Assessment of preexisting symptoms is important, as a history of frequent preoperative TIAs points to a precarious cerebral blood supply that demands meticulous perioperative management and is an important risk factor for complications.(3)

The main goal in the anaesthetic management of patients with MMD is balancing the cerebral oxygen supply and demand. Patients presenting for extracranial-intracranial bypass procedures often have exhausted their cerebral oxygen reserve, with the microcirculation maximally dilated and the oxygen extraction ratio raised; therefore, there are multiple perioperative considerations for these patients.(3) Neuromonitoring devices including electroencephalogram, somatosensory- and motor-evoked potentials, transcranial Doppler, jugular bulb oxygen saturation, and near infrared spectroscopy can be used.

The intraoperative haemodynamic goal is usually within 10% to 20% of the baseline blood pressure. Careful blood pressure management is essential to maintain adequate cerebral blood flow and reduce the risks of ischaemic or haemorrhagic strokes.

Augmentation of blood pressure to 20% above baseline is encouraged during anastomosis period, to maintain and improve collateral flow.

Normothermia, normovolemia, normotension and normocarbia are essential in perioperative management of MMD

A haemodynamically stable and smooth emergence is essential to prevent haemorrhagic or ischaemic complications. Adequate muscular blockade reversal and pain control helps to ensure normocapnoea, reduce stress and prevent agitation, reduce nausea and vomiting, and maintain graft patency. Clinical neurological assessment is performed as soon as possible.(1)

The most common postoperative complications are new ischaemia and cerebral hyperperfusion syndrome.(5)

In our patient, obesity (100 kg) added an additional layer of complexity, influencing airway management, ventilation, and pharmacologic considerations. Obese patients have decreased functional residual capacity and pulmonary compliance, predisposing them to rapid oxygen desaturation during induction. Excess soft tissue in the upper airway increases the potential for difficult mask ventilation or intubation, necessitating careful preoxygenation, optimal positioning, and readiness with airway adjuncts. Intraoperative ventilation also requires careful adjustment of tidal volumes, inspiratory pressures, and PEEP to ensure adequate oxygenation while avoiding barotrauma.

Pharmacologic management in obese patients requires attention to altered drug distribution. Lipophilic agents, such as propofol and volatile anesthetics, have increased volume of distribution, whereas hydrophilic drugs like neuromuscular blockers should be dosed based on lean body weight to avoid prolonged effects. Cardiovascular changes associated with obesity, including increased

cardiac workload and potential for hemodynamic instability, demand vigilant monitoring throughout surgery. Postoperative airway obstruction and hypoventilation are also important concerns. In this case, these challenges were effectively anticipated and addressed, contributing to a smooth intraoperative course and uneventful extubation following the STA–MCA bypass.

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