

ANAESTHETIC MANAGEMENT OF A CASE OF HOMOCYSTINURIA

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SUMMARY

We are reporting a case of homocystinuria which we recently anaesthetised for cataract surgery.

A 10 year old girl presented with diminished vision in both eyes for 1½ months & was diagnosed to be a case of bilateral spherophakia with right subluxated lens. Patient had history of convulsions associated with fever at the age of one year whereupon there was evidence of mental retardation .On further investigation, patient was found to have homocystinuria as confirmed by urine chromatography. Patient was put on oral pyridoxine hydrochloride 750mg per day & aspirin 50mg per day for one month. On examination, patient was uncooperative, was mentally retarded, had brittle light coloured hair and a malar flush. Oral cavity revealed prognathism and crowding of teeth and high arched palate. Patient had long and tapering fingers. Nasal mucosa was congested suggesting mild upper respiratory tract infection. X-ray spine revealed gross osteoporosis. During her visit to the preanaesthesia clinic she was advised to withhold aspirin 72 hours prior to surgery. She was pre medicated with syrup promethazine 5mg one hour prior to surgery. The patient was allowed and encouraged to drink water upto 3 hours prior to surgery in order to avoid preoperative dehydration. Intravenous infusion of phenytoin in isolyte P (Paediatric balanced solution with Dextrose) was started at 2 mg/kg per hour prior to induction. Monitoring included precordial stethoscope, electrocardiography, pulse oximetry, ETCO₂ and noninvasive blood pressure. She was then administered glycopyrolate 0.1 mg to ensure dry mouth during surgery, morphine 2mg followed by thiopentone sodium 70mg and vecuronium bromide 2.5 mg intravenously. Lungs were ventilated with oxygen, nitrous oxide and halothane 0.5% after which trachea was intubated with a 6mm high volume low pressure cuffed endotracheal tube when muscle relaxation was achieved. Anaesthesia was maintained with nitrous oxide and 0.5%halothane. Patient was wrapped properly with warm sheet, effort being made to maintain normothermia. Legs were elevated and calf muscles were massaged every 5-10 minutes to avoid venous stasis throughout the surgery. Low molecular weight dextran (Lomodex 70) was started in addition to the phenytoin infusion through a three way port. The systolic pressure and pulse rate each was maintained above 100mmHg and 100 beats per minute respectively.

On completion of surgery, 20 minutes before anticipated extubation injection ondansetron 2mg was given intravenously for prevention of PONV & injection tramadol 25mg for post operative pain relief. Residual neuromuscular block was reversed with glycopyrolate 0.2mg and neostigmine 1mg intravenously and trachea was extubated. She was shifted to post anaesthesia care unit for further observation and monitoring. Lomodex was continued for 2 hours into the post operative period and the total quantity infused was 250ml. The patient was put on phenytoin 2.5mg/kg intravenously twice a day for two days following which she was put on oral phenytoin. Post operatively, patient was followed up till the seventh post operative day. There was no thromboembolic episode and she was discharged a week following an uneventful postoperative course.

DISCUSSION

Homocystinuria a genetic disorder with an incidence of 1:2,00,000 was first described by Field and associates in 1962, and independently in the same year by Gerritsen Vanghn and Waisman (1962). It is an autosomal recessive disorder characterized by absence of enzyme cystathionine B-synthetase which results in raised plasma homocystine levels. Homocystine interferes with the normal crosslinkage of collagen, an effect that likely plays an important role in ocular (ectopia lentis), skeletal (metaphyseal changes in the long bones, knock knees, flat feet, kyphoscoliosis, fine sparse hair) and vascular (thrombo embolic phenomenon which leads to convulsions and mental retardation) manifestations. Interference with normal ground substance in vessel walls may predispose to arterial and venous thrombotic diathesis. Increased platelet adhesiveness results from homocystine accumulation contributing to the thrombotic occlusive disease often encountered. Recurrent cerebrovascular accidents secondary to thrombotic disease may account for the mental retardation seen in our case although the effect on cerebral cell metabolism by the raised levels of circulatory methionine and homocystine could be responsible¹. The diagnosis is confirmed by the demonstration of a characteristic magenta colour in response to nitroprusside as seen in our patient². Treatment of homocystinuria is aimed at reducing the homocystine levels in urine and plasma by the administration of diet with low methionine content and high levels of pyridoxine. These patients most commonly present for ophthalmic surgeries. Careful preoperative assessment along with skillful anaesthetic perioperative management is essential in view of vascular manifestations of the disease¹. Since anaesthesia per se may also be responsible for increased incidence of intravascular thrombosis due to the stress responses generated, it would be logical to assume that local anaesthesia would be a practical alternative³. But as this case was an uncooperative, mentally retarded youngster, it was necessary to use general anaesthesia. It was, therefore, important to prepare the child for a suitable post operative outcome. Problems encountered in our case were mental retardation, convulsive disorder, thromboembolic predisposition and uncooperative child. The pre operative preparation, conduct of anaesthesia and management of the early postoperative periods were designed to promote:

- (i) reduction in blood viscosity and platelet adhesiveness;
- (ii) maintenance of high cardiac output and rapid circulation time
- (iii) reduction of vascular resistance and improvement of peripheral perfusion;
- (iv) good venous return
- (v) quick recovery and early postoperative ambulation³.

Patients may pose an intubation problem and chest deformity may lead to ventilatory difficulties. The main problems are hypoglycaemia and thrombosis⁴. Blood glucose was measured regularly and hypoglycaemia prevented by use of dextrose containing solutions^{4,5}. It was decided to withhold aspirin before surgery taking the nature of surgery into account. Pyridoxine supplementation was continued to the day of surgery as it has a known role in decreasing platelet adhesiveness³. The convulsions were controlled by starting an infusion phenytoin half an hour prior to surgery and continued well into the postoperative period. Dehydration which would cause an increased viscosity and sludging was avoided by encouraging clear fluid ingestion upto three hours prior to surgery and a brisk crystalloid infusion. Halothane has been promoted as the agent of choice because of its vasodilatory properties and its ability to maintain microcirculation as has been suggested earlier. The role of dextran to decrease platelet adhesiveness has been well documented. Intravenous infusion of Lomodex 70 during operation helped in achieving the above requirement as well as in promoting venous return. In addition to this, we had kept her lower limbs elevated and gave intermittent calf massage to promote the same^{3,4,6}. We followed the patient postoperatively for seven days & did not encounter any thromboembolic phenomenon or a convulsive episode. The combined regimen instituted as part of anaesthetic technique contributed to the prevention of thrombotic complications and resulted in the uneventful recovery of this child.

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