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CASE REPORT

MANAGEMENT OF CASE OF MASSIVE SPLENOMEGALY WITH GAUCHER'S DISEASE FOR SPLENECTOMY.

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Abstract

Gaucher's disease is a rare lysosomal storage disease caused due to deficiency of enzyme glucocerebrosidase which presents with bone marrow depression, hypersplenism, hepatosplenomegaly, bony involvement and neurological complication. We report perioperative management of a 19 year female patient with massive splenomegaly and hypersplenism posted for splenectomy. The anaesthesia challenges include major fluid shift leading to changes in haemodynamics, changes in respiratory mechanics.

Introduction:-

Gaucher's disease is a autosomal recessive genetic disorder caused by mutation in a gene located on chromosome 1. It involves dysfunctional metabolism of sphingolipids. It was first described by Philipe Gaucher in 1882 [1]. Due to deficiency of enzyme glucocerebrosidase, glycosylceramide accumulates particularly in white blood cells, in the spleen, liver, kidneys, lungs, brain and bone marrow.

We describe a case of young female who was diagnosed case of Gaucher's disease, Type I, with massive splenomegaly posted for splenectomy. Multiorgan involvement, changes in respiratory mechanics, haematological changes with expected major blood loss and possible haemodynamic instability make anaesthesia challenging.

Case report:-

A 19 yr old female a known case of Gaucher's Disease since 8 years. Presented with complaints of distension of abdomen, pain in abdomen and difficulty in breathing. She was operated for hip dislocation on right side 7 years ago. We could not get anaesthesia details for the same surgery. Clinical examination revealed Grade IV splenomegaly and hepatomegaly. On blood investigation complete blood count showed severe anaemia with haemoglobin of 6.8 gm/dl, total leucocyte count of 2600 per cumm, RBC of 1.2 billion per cumm and platelet count of 40,000 percumm which was suggestive of hypersplenism. Liver function test and kidney function test were normal. X-ray showed no abnormality. USG abdomen detected massive splenomegaly, mild hepatomegaly and mild ascitis. CT examination also suggestive of massive splenomegaly and mild hepatomegaly. Her bone marrow examination confirmed the diagnosis of Gaucher's disease. Splenectomy was planned. Patient was transfused with 2

units of whole blood, 4 units of packed red cells and 3 units of platelets. Before surgery her haemoglobin was improved to 8 gm % and platelet count was 84,000 percumm.

We planned general anaesthesia for her. Preoperative informed consent was obtained and patient was kept fasting overnight. Intravenous access with 16 G on left hand and 18 G on right hand was obtained. Monitoring was done with non invasive blood pressure, electrocardiogram, pulse oximeter, end tidal CO2 monitor and temperature probe. In premedication inj ranitidine 50 mg, inj ondansetron 4 mg was given.Inj midazolam 1 mg, inj fentanyl 100 ug was given. Patient was induced with inj propofol 100 mg, inj succinyl choline 100 mg and intubated with 7 no cuffed endotracheal tube. Maintenance was done with oxygen, nitrous oxide 50:50%, isoflurane and inj vecuronium.

Exploratory laparatomy was done by midline incision due to massive splenomegaly and splenectomy was performed. A spleen weighing about 6 kg was removed. The specimen of spleen is shown in figure 1.Total blood loss was 2.5 L and corrected with 4 Ringer lactate solution, 3 packed red cells and 5 platelet concentrates.Warm fluids were used for replacement and use of warming blanket helped to maintain the temperature of patient. She was haemodynamically stable throughout the surgery except one episode of hypotension 78/40 mm of Hg which was corrected with inj Mefentermine 6 mg. Patient was catheterized, hrly urine output was measured which was adequate for duration of surgery. Patient was reversed, extubated and shifted in surgical intensive care unit. Postoperative course was uneventful and patient was discharged on 7th postoperative day.

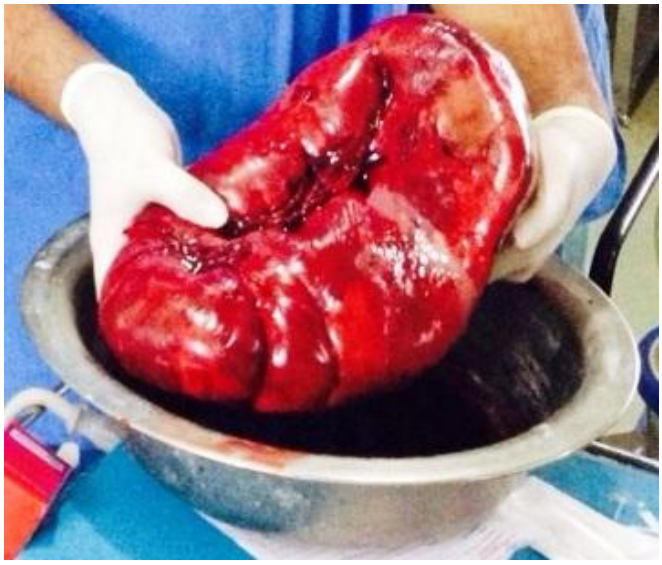

Figure 1:- Specimen of Spleen

Discussion:-

Gaucher's disease is one of lysosomal storage disease caused by deficiency of enzyme glucocerebrosidase [2]. It's deficiency results in accumulation of glucocerebroside in macrophages resulting in bone marrow depression, hepatosplenomegaly, hypersplenism, skeletal disorders, painful bone lesions and neurological complications. The disease is caused by a recessive mutation in a gene located on chromosome 1 and affects both male and female. The carrier rate among Ashkenazi Jews is 8.9% while the birth incidence is 1 in 450 [1].

It has three common clinical subtypes [3, 4]. GD Type I Non neuropathic – It is the most common form of disease occurring in about 1 in 40000 live birth, type I patients may live well into adulthood. GD Type II is acute infantile neuropathic typically begins within 6 months of age, has an incidence rate 1 in 100,000 live birth. Affected children usually die by the age of 2 year. GD III is chronic neuropathic can begin at any time in childhood or even in adulthood, occurs in about 1 in 100,000 live birth .Patients often live into their early teen years and adulthood [5].

Clinical course:-

Hepatomegaly and splenomegaly:-

The size of the spleen can be 1500 to 3000 ml as opposed to normal size of 50-200 ml. It may decrease the affected individual's capacity for eating by exerting pressure on the stomach. In addition the rapid and premature destruction of blood cells leads to anaemia, neutropenia, leucopenia and thrombocytopenia with an increased risk of bleeding and infection. Our patient also had anaemia at presentation which was treated preoperatively with blood transfusion. Risk of splenic rupture increases due to enlarged spleen.

Severe pain frequently associated in hips and knees. There could be Avascular necrosis and acute infarcts which disturb daily living activities and can require joint replacement in future. [10,11,17]. Yellowish brown skin pigmentation may be present, Osteopenia can start in childhood, aggravate in teenage years and persist through later life. 75% of persons develop visible bony abnormalities due to the accumulated glucosylceramide leading to osteoporosis .Our patient also operated for hip dislocation 7 yrs ago so we had done careful positioning of patient and taken all the precautions regarding positioning. In GD1 patients low bone mineral density has increased the risk for fractures of spine and femur [15]. Deformity of distal femur in the shape of Erlenmeyer flask is commonly described leading to aseptic necrosis of femur. Neurological symptoms occur in Type I – impaired olfaction and cognition;Type II – convulsions, hypertonia, mental retardation and apnoea; Type III – myoclonus, convulsions, dementia. Parkinson's disease is more common in Gaucher's disease and their heterozygous carrier relatives [6]. Gaucher's Disease can be diagnosed by measuring glucocerebrosidase enzyme level by sequencing of beta glycosidase gene [4,5]. Bone marrow or liver biopsy shows crinkled paper cytoplasm and glycolipid laden macrophages.

Treatment:-

Enzyme replacement therapy with intravenous recombinant glucocerebrosidase can reduce liver and spleen size, reduce skeletal abnormalities and can reverse other manifestations. [7,8] Available recombinant glucocerebrosidases are Imiglucerase, Velaglucerase, Taliglucerase, Eliglustat It should be lifelong therapy, but cost of therapy is a worrisome factor. Our patient was type I with hypersplenism, grade IV splenomegaly and hepatomegaly. She had dyspnoea and dull aching abdominal pain due to organomegaly. It increases Intraabdominal pressure (IAP) which markedly affects mechanical properties of chest wall and consequently respiratory function. Normal subjects in a supine position during anaesthesia have physiologic values of IAP ranging from o to 7 cm of H_2O (5 mm of Hg) [9]. Increased IAP (11 to 13 mm of mg) results in cephalad displacement of abdominal content ,decrease oxygenation ,increase respiratory elastance and resistance and also in addition to that changes in shape and pattern of motion of chest wall, reduction in lung volume; all these factors promote atelectasis formation. Ultimately all these changes in respiratory mechanics make anaesthesia challenging. Low haemoglobin level that was 8 gm can decrease oxygen carrying capacity and makes patient prone for early hypoxia. Pulmonary hypertension and hypoxemic interstitial lung disease can rarely found in these patients but it increases morbidity and mortality and are mostly fatal [16]. Pulmonary hypertension and the hepato- pulmonary syndrome are generally encountered in patients who have had a splenectomy [18]. Low platelet count of 84,000 percumm increased the chance of bleeding. In addition to that deranged platelet function and deficiencies of other coagulation factors can cause bleeding and it is found that XI deficiency is common in Ashhenazi Jews [12]. Also in Gaucher's disease with known skeletal involvement can have thrombin-anti- thrombin complexes and increased levels of D-dimer that lead to prolonged activation of coagulation [13,14]. So we avoided putting epidural catheter and central venous line. However as a precaution more extensive monitoring like Central venous line and Arterial line was immediately available if required. Patient was catheterized and hrly urine output was measured which was sufficient. Iv diclofenac and iv tramadol were administered for postop analgesia. Postop recovery was uneventful. As it is rare clinical entity we could not get references regarding anaesthesia management of Gaucher's Disease. In such patients Splenectomy is the choice of surgical mode of therapy which does not cure the Gaucher's Disease but relieves abdominal pain, respiratory difficulty and reverts blood counts to normal.

Conclusion:-

In Gaucher's Disease detailed preanaesthetic evaluation and proper optimization of patient before surgery would improve perioperative outcomes.

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