Anaesthetic Management Of W.P.W. Syndrome

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Abstract

This is a case report of anaesthetic management of two cases of W.P.W. (Wolff Parkinson White) Syndrome. W.P.W.syndrome is an uncommon cardiac disorder. It goes undetected unless patient develops abnormal rhythm. Anaesthetic management differs according to presentation of the patient & type of surgery

CASE I

A 42 year old male patient with chronic alcoholism and chronic smoking had a road traffic accident and was admitted with lower 1/3 femur fracture with tibia, fibula compound fracture with patella multiple fragmented fracture on right side along with right sided $4^{th} – 5^{th} – 6^{th}$ post end rib fractures.

There was no history of head injury or unconsciousness, major blood loss or active external bleeding. No significant past or surgical history.

ON EXAMINATION

Th patient was stable, except for pain at the fracture sites. Vital signs were temperature of 37±C, Pulse Rate 94 / minute regular. Respiratory rate 20 / min. Blood pressure 130 / 80 mmHg.

Systemic examination showed air entry was equal on both sides. Chest pain during forceful respiration was present. Heart sounds were normal.

ON INVESTIGATIONS

Available investigations including ABG were within normal limits.

CHEST X-RAY SHOWING

Fracture post ends of $4^{th} – 5^{th} – 6^{th}$ ribs. Lung fields within (Normal) limits.

ELECTROCARDIOGRAM

The EKG showed short P.R interval with slurred QRS complex. Cardiology evaluation was done. It was diagnosed as Wolff Parkinson's White syndrome. (W. P. W. Syndrome). A 2D echo was done to rule out other cardiac abnormalities. It was within normal limits, with ejection fraction of 65%.

The patient was posted for emergency, proximal femur screwing with distal femur nailing with patellar tension band wiring with Illizarow for the Tibia fibula fracture.

The risk of Anaesthesia, prolonged duration of surgery and surgical risk was explained to patient and relatives. High risk consent in view of WPW syndrome and prolonged duration of surgery was taken. Starvation was confirmed. Blood grouping cross matching was done. The case was planned to be performed under combined spinal epidural block.

All the antiarrhythmic drugs were kept ready. In L_3-L_4 intervertebral space, epidural space was located by Doglloiti's method. A 16G epidural catheter was kept in epidural space after negative aspiration for blood and CSF. In $L_4 – L_5$ space a subarachroid block was given with a 23 G spinal needle with 2 cc. of 0.5%. bupivacaine heavy) with 25 µg fentanyl. (total volume of 2.5 cc). Preoperative sensory block was up to T_{10}. Foley's catheterisation was done.

Intraoperatively all vitals were monitored and maintained. 100% O_2 by Hudson's mask was started at 6 li/min. After 1½ hrs. epidurally Bupivacaine 0.375% (plain) at a rate of 5 ml / hr was started. Sensory level was maintained up to T_{12}. 7 hrs after subarachnoid block, Inj. Fentanyl 50 µgs epidurally with 9cc of normal saline was given. The surgery lasted for 8 hrs. The epidural catheter was kept in situ for post operative analgesia for 2 days. Inj. Tramadol 50mg epidurally was given every 6 hourly.

Blood loss was 400 cc approximately. CVP was maintained

between 4-8 cm H2O.& the patient maintained the vital parameters within normal limits throughout the surgery. EKG did not show any new changes. . Urine output was 1500ml.Postoperatively patient was monitored for 3 hrs and then shifted to ward.

CASE NO. 2

A 26 years male, nonalcoholic, non smoker patient was diagnosed to have WPW (Wolff Parkinson's White syndrome) since 5 months when he had palpitations for 2-3 days and consulted private practitioner. The patient was diagnosed with Hypertension and WPW syndrome and since then he was kept on antihypertensive medication. The patient had hematuria since 15 days. He was diagnosed to have early stage of renal cell carcinoma and was posted for left sided nephrectomy.

The patient was on Tab. Amlodepine 5 mg tid, Tab Atenolol 50 mg OD, Tab Aldomet 500 mg tid.

ON EXAMINATION

The patient was stable with pulse rate of 78/min reg., blood pressure 140/80 mmHg supine position, air entry equal on both sides, heart sounds were normal.

INVESTIGATIONS

Hemoglobin was 12 gm%, rest blood chemistry within normal limits.

PREVIOUS EKG

The EKG showed short PR interval with slurred QRS complex (Delta wave) with effective normal PT interval. The other EKG at the time of palpitation was showing SVT. The EKG on admission was within normal limits with normal PR interval and normal qrs configuration.

The patient was advised to continue the antihypertensives till the morning of the surgery. Cardiology evaluation was done. 2D echo was normal with EF 60%. The patient was posted for left sided nephrectomy.

High risk consent in view of WPW syndrome with previous history suggestive of SVT episode with hypertension was explained to the patient. NPO was confirmed. Blood grouping, cross match was done, blood was kept ready. Patient was wheeled to operation theatre. Manual blood press, cuff, cardioscope, pulse oximeter, capnography were attached. Basal readings were noted.

On left upper limb a 16G Intravenous access was taken. Right upper limb central venous access was established. CVP was 4-6 cm H_2O. General anaesthesia was planned for this patient.

The patient had received premedication Inj. Glycopyrollate 0.2mg Im. The morning dose of antihypertensives Tab amlodepine, Tab.Aldomate, Tab. Atenelol was given.

Induction was done with Inj. Propofol 100mg with inj. Vec 6mg intravenously after 3 min of O_2 : N_2O, 50%:50% and then oxygenation 100% O_2 1 min, intubation was done with a 9.5 No. portex cuffed endotracheal tube. Sedation was given with inj. Midazolam 1 mg IV and inj. Fentanyl 100 µg IV for analgesia and maintained with O_2 : N_2O (50:50) with inj. Propofol 2-4 mg./kg./hr infusion and inj. Vecuronium.

The ptient was in supine position. Intraoperative vitals monitored and maintained. Blood pressure was maintained around 120-140 systolic and 70-80 mm Hg diastolic, Spo_2 90-100%, $EtCo_2$ 30-35 mmHg, CVP 4-6 cmH_2O. Intraop ‘T' wave inversion in lead I-II and III seen without ST segment changes and hemodynamic unstability. Throughout surgery patient was given 5 pints of Ringer; 1 pint of Dextrose NS and 1 pint of Gelofuscin, blood loss was 300 ml, urine output was 550 ml.

Intraoperatively ABG was done (when ‘T' wave inversion was seen), which showed pH 7.23g, Po_2 168 mm, Pco_2 36 mHg, Bec deficit 12 mEq. It was treated with Sodabicarb slowly by intravenous infusion over period of 2 hrs. Serum electrolytes (Na , K) were within normal limits. Again ABG at the time of reversal taken which was within normal limits.

Reversal was done with inj. Neostigmine 3 mg + inj. Glycopyrollate 0.4 mg IV after through orotracheal suction with regular spontaneous respiration with a blast of air extubation done. Postoperatively the patient shifted to Anesthesia ICU for monitoring. No new EKG changes seen Cardiology evaluation done in view of ‘T' wave inversion in lead I,II,III intraoperatively. No active management was advised. The EKG changes were normalised in 24 hrs Patient was stable then shifted to ward after 48 hrs of the extubation.

DISCUSSION

WPW syndrome is Wolff Parkinson's White Syndrome which is a type of the pre-excitation syndrome. A pre-excitation syndrome caused by the accessory pathway i.e. Bundle Of Kent joining atria and ventricle bypassing normal atrio- ventricular pathway.

Short P-R. interval and Delta wave is the expression of preexcitation caused by the accessory path. WPW syndrome patients may be asymptomatic as in our first case who was incidentally diagnosed or some patients may have cardiac abnormalities like 2nd patient and may become symptomatic. The management of the patient if diagnosed preoperatively is not very difficult, but sudden intraop appearance of short PR and delta wave can be troublesome because the patients of WPW syndrome are very known for having life threatening arrhythmias [1] They can have two types of arrhythmias.

1. Atrial fibrillation which can result into ventricular fibrillation.
2. Circus movement type of re-entral tachycardia causing PSVT(Paroxysmal supraventricular tachycardia) or VT(Ventricular tachycardia). This type of arrhythmias are difficult to terminate. Patient may have palpitation, dyspnea, anginal pain anxiety or fatigue.

In addition to classical WPW syndrome, there is a subgroup of patients who are having ‘WPW pattern'. They have surface EKG are similar to WPW syndrome but are asymptomatic. Careful history in these patients is very important. Asymptomatic patients with intermittent pre-excitation require no treatment. They have very less chances of developing tachycardia [2] .

Preoperatively there is no way to determine the presence of accessory AV conduction pathway in the presence of normal EKG tracing. Managing the case thorough preop history and clinical evaluation is very important. If the patient has been asymptomatic then chances of life threatening arrhythmias are less but if patient is symptomatic then chances of arrhythmias especially under anaesthesia are highly increased [1] The facts of unmasking of WPW syndrome under anaesthesia has been mentioned in the literatures. [4]

Anaesthetic drugs tend to change the physiology of the atrio-ventricular conduction hence they tend to affect the behavior of the patient under anaesthesia.

Regional anaesthesia is having advantage over general anaesthesia due to avoidance of multiple drugs, noxious stimuli of laryngoscopy but hemodynamic stability is worrisome problem. Epidural anaesthesia is preferred to spinal due to controlled and segmental block with better hemodynamic stability [7] .The chances of arrhythmias are increased in general anaesthesia because of stimuli of Laryngoscopy or pain in lighter plane of anaesthesia.but hemodynamic stability is better with general anaesthesia.

Many volatile anaesthetic agents can precipitate conduction via pre-existing anomalous pathway leading to manifestion of WPW pattern [3] . Sevoflurance and Isoflurance have no effect and are preferred to halothane. Isoflurane is agent of choice because it suppresses the acc pathway. Atropine, Glycopyrollate, and Ketamine precipitate tachycacdia resulting in PSVT or atrial fibrillation [4] .

Droperidol has effect on both antegrade and retrograde conduction, hence depresses conduction and stabilizes rate in doses of 200 µg -600 µg/kg. Fentanyl in dosage between 30-50 µg/kg when used along with Droperidol, has shown excellent effect compared to be used alone. Fentanyl is associated with adequate hemodynamic stability and bradycardia is helpful for the safe management [5] .

Propofol has no effect on the refractory period of accessory pathway. So it is a preferred induction agent. There are references showing disappearance of delta waves on Propofol induction. [6]

Thiopental can also be an agent that can be used as it is also devoid of any effect on the accessory pathway. The same is true with benzodizepines. N_2O can be used safely.

Muscle relaxants Rocuronium is cardiostable and is preferable to Pancuronium which causes tachycardia. Atracurium causes histamine release with less autonomic safety [4] .Newer relaxants Cis-atracurium, Mivacurium can be safe because of reversal with Neostigmine and Glycopyrollate is not required. Avoidance of Neostigmine has been recommanded in patients with WPW syndrome. So for this reason Cis-atracurium can be preferred.

Oxytocin should be avoided as it triggers SVT.

Adequate depth of anaesthesia is a must to avoid stimuli of laryngoscopy and pain which can trigger SVT is required.

These patients are very prone for arrhythmias especially PSVT, if PSVT occurs and patient is hemodynamically stable then vagal maneuvers, Lignocaine, Adenosine can be administered. If this is ineffective then Procainamide can be used. If still not responding and patient in atrial fibrillation or hemodynamically unstable then DC cardioversion may be needed.

Digitalis and Verapamil are strictly contraindicated because

they suppress normal pathway and increase conduction of accessory pathway.

Regional anaesthesia gives upper hand by the devoid of such drugs and their effects. So it is preferred over general anaesthesia if given a choice.

So to summarize, Regional anaesthesia can be preferable [7]. If general anaesthesia required Propofol, Fentanyl, Droperidol, Isoflurane, Enflurane,Sevoflurane, N_2O, Benzodizepines can be used safely. Antiarrhythmic drugs and defibrillator must be kept ready. Never use Digitalis and Verapamil. Even asymptomatic patients can develop arrhythmias, at any time of surgery so meticulous monitoring pre-op, intra and post operatively is mandatory.

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