Ankle Block- An Alternative to Conventional Anaesthesia for Foot Surgery in a Patient with Cardiac Disease

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PRESENTATION OF CASE

A 64-year-old gentleman presented to us for wound debridement of left foot with diabetic ulcer. The patient had 2 ulcers (5 X 3 cm and 3 X 2 cm) on the left foot since around 10 days. Earlier the ulcers were smaller in size for which he was getting dressing done from a local hospital.

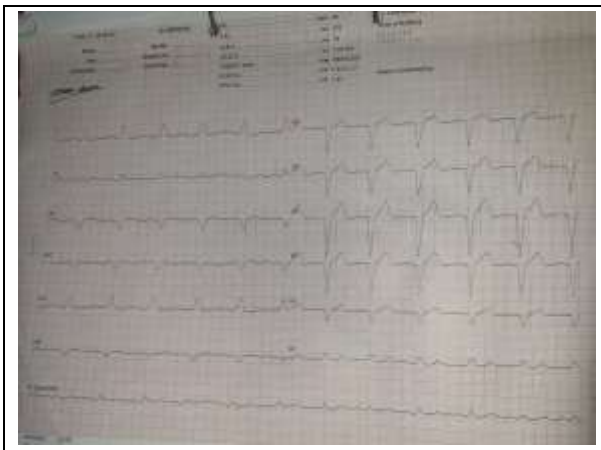

Figure 1. ECG Changes (Pre-Operative)

Figure 2. ECG Changes – Intraoperative- as Seen on the Monitor

Figure 3. Surgery on the Go

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DIFFERENTIAL DIAGNOSIS

Left diabetic foot ulcer with ischemic heart disease with type II diabetes mellitus.

CLINICAL DIAGNOSIS

A 64 years old male presented to the surgery department with diabetic ulcer left foot. He was a known case of Ischemic heart disease with history of coronary stenting done 10 years ago, now on tab aspirin 75 mg once a day. He was a known case of type 2 Diabetes Mellitus on tab metformin 500 mg BD since 20 years. He also took anti tuberculosis treatment for 6 months for pulmonary tuberculosis 12 years ago. Patient was a known smoker and occasional alcoholic. His metabolic equivalents were more than 4 but his activity level had come down since 7 days because of the foot ulcer. He was a clerk by occupation. He was classified as ASA III patient.

His ECG findings were- Left Bundle Branch Block with wide QRS as shown in figure 1. Chest X ray showed prominent broncho vascular markings. Preoperatively, dobutamine stress echo was done which showed that there was no new regional wall motion abnormality at low and peak stage of the test of dobutamine stress test. Ejection fraction was 60% at rest which increased to 65% at imprest. Impression given was- Inconclusive dobutamine stress echo for inducible ischemia. Since his Fasting Blood Sugar was high- 325 mg/dL and charting showed similar readings endocrine department reference was done. His HbA1c was 8.2%. Endocrine opinion was to stop oral hypoglycaemic agents and to switch to inj Insulin subcutaneously 3 IU three times a day and a dose of injection Lantus 6 IU was prescribed 2 hours after dinner. With this treatment for 2 days his morning fasting blood sugar came down to 156 mg/dL. Since he was on insulin, morning electrolytes was also asked for. He was posted as first case in OT the following day after 6 hours of solid food fasting. Following are his investigations on the day of surgery- Hb- 8.9 gm%, Total Leucocyte Count- 10.53X 109/L, platelet count - 393,000/µL, S. Urea- 38.4 mg/dL, S. Creatinine- 0.70 mg/dL, serum electrolytes- sodium- 136 meq/dL, potassium-4.9 meq/dL, LFT- WNL, coagulation tests- PT-12.9 secs, INR-0.98.

PATHOLOGICAL DISCUSSION

Diabetic neuropathy and repeated trauma of the insensitive foot causes development of diabetic ulcers/ diabetic foot. These may further get complicated by bacterial or fungal contamination, peripheral arterial diseases and atherosclerosis all commonly associated with diabetes mellitus.[1]

The diabetic foot ulcers are regarded as precursors of typically painless cardiovascular or cerebrovascular accidents, thus awareness and anticipation along with multidisciplinary team approach is required. Perioperative management consists of preoperative optimization of the vital organs, controlling infection, maintaining acid-base balance and electrolytes level and blood volume, intraoperative hemodynamic stability and complete analgesia and postoperative glycaemic control, care of wound and analgesia.

DISCUSSION OF MANAGEMENT

Surgeries of the foot can be performed under general or regional anaesthesia.

Under regional anaesthesia, various techniques can be used like[2]-

1. Central neuraxial blockade- spinal anaesthesia and epidural anaesthesia.
2. Plexus block - lumbar and sacral plexus block.
3. Peripheral nerve block- popliteal sciatic nerve block, ankle block, and
4. Local infiltration anaesthesia.

Our aim of anaesthesia was to provide him with adequate anaesthesia and analgesia without causing much hemodynamic perturbations since he was a known case of ischemic heart disease and diabetes mellitus type II since 20 years. Because of the long history of diabetes, we were expecting components of autonomic neuropathy also in him. The prevalence of confirmed Cardiovascular Autonomic Neuropathy (defined as the abnormality of at least two cardiovascular HR results) in clinical studies in unselected populations, including both T1DM and T2DM patients, varies from 16.6 to 20%, and this prevalence may increase to 65% with increasing age and diabetes duration. In particular, the prevalence may increase up to 38% in T1DM and 44% in T2DM patients aged 40–70 years and up to 35% in T1DM and 65% in T2DM patients with long standing diabetes[3,4] For above reasons we opted for Ankle block as there are no hemodynamic changes associated with ankle block and it is safe, easy to administer with rapid onset of action. The sensory supply to the foot and ankle is by branches of the femoral and sciatic nerves. The motor supply is almost exclusively from the posterior tibial nerve (a branch of the sciatic nerve.[5] Regional anaesthesia techniques are preferred for lower limb orthopaedic procedures.[6] We gave our patient anatomical landmark guided ankle block. Before procedure following was done- Resuscitation equipment and drugs were checked. Procedure was explained to patient and consent obtained. He was explained that three separate needle pricks would be given. On the morning of surgery, patient was premedicated with tab ranitidine 50 mg and tab metoclopramide 10 mg in view of anticipated gastroparesis secondary to diabetic autonomic neuropathy. Intravenous access was established, and intravenous fluids were started. Monitoring was done as per ASA recommendations (ECG, pulse oximetry, NIBP) and baseline parameters recorded. Heart rate- 78/minute, NIBP first reading was 193/98 mm of

Hg which came down to 147/83 after 3-4 readings after 0.5 mg of midazolam given iv. ECG showed wide complex QRS with left bundle branch block as shown in figure 2. The patient was made to lie in supine position. The left foot was painted and draped using all aseptic precautions. In ankle block, five peripheral nerves are blocked: Sural nerve, deep peroneal nerve, superficial peroneal nerve, Posterior tibial nerve (all four are branches of sciatic nerve) and saphenous nerve (terminal branch of femoral nerve).

Technique Used

20 ml of 0.25% bupivacaine was prepared in a sterile manner.

Posterior Tibial Nerve

A 23G needle was introduced along the medial aspect of the Achilles tendon at the level of the cephalic border of the medial malleolus and advanced anteriorly towards the posterior border of the tibia, posterior to the posterior tibial artery and 5 ml of LA was injected here.

Sural Nerve

A 23G needle was introduced along the lateral border of the Achilles tendon at the level of the cephalic border of the lateral malleolus and advanced anteriorly towards the fibula. A subcutaneous infiltration of 5 ml LA was done from the Achilles tendon to the fibula.

Saphenous Nerve, Superficial and Deep Peroneal Nerve

To block these three nerves, a single site is sufficient. A 23G needle was inserted 1 cm just lateral to the anterior tibial artery at the level of an imaginary line crossing the cephalic borders of the lateral and medial malleoli. To block the deep peroneal nerve, the needle is advanced perpendicularly to the skin and 3 ml of LA was given deep to the fascia. To block the superficial peroneal nerve, the needle was withdrawn up to the skin and turned towards the lateral malleolus and 3 ml LA was injected as subcutaneous infiltration between the lateral malleolus and the anterior border of the tibia. Saphenous nerve was blocked by again withdrawing the needle up to the skin and turning the needle towards the medial malleolus while infiltrating 3 ml LA subcutaneously as the needle was advanced towards the medial malleolus. Intraoperatively, the patient had smooth and stable haemodynamics and he did not experience any pain. With the ankle block and sedation with just 0.5 mg midazolam, the case was conducted with success and without any anticipated complications or patient discomfort.

FINAL DIAGNOSIS

Left diabetic foot ulcer with ischemic heart disease with type II diabetes mellitus.

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