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## Graded epidural anaesthesia as the sole anaesthetic technique for a life salvaging below knee amputation on a high risk patient: A case report

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### Abstract

Epidural anaesthesia has been widely accepted and routinely used for many years and widely accepted as an effective method of regional anaesthesia for pain relief. The procedure is commonly performed in combination with spinal or with General anaesthesia.

Role of Graded Epidural a sole anaesthetic modality for high risk case is challenging as it requires competency, patience, as well as a supportive team of anaesthesiologist and anaesthesia technicians. Studies reveal that regional anaesthesia has been shown to ameliorate the hyperglycemic as well as catecholamine surge to surgery.

We report a case of 56 year old man admitted with diabetic gangrene with features suggestive of impending sepsis taken up on emergency basis for below knee amputation. Pre-existing cardiac condition with long standing diabetes mellitus complicated with retinopathy along with features suggestive of impending sepsis, although made patient unfit for all modes of Anaesthesia, as a lifesaving surgery was planned we decided to give a trial of sole Graded Epidural Anaesthesia, keeping in mind to manage postoperative amputation pain.

**Keywords:** Graded epidural anaesthesia, sole anaesthetic technique, phantom limb pain, post-operative pain

### Introduction

Epidural anesthesia is a technique of injection of local anesthetic agent into the epidural space that helps in numbing the areas and decreasing the pain which becomes the basis of using Epidural anaesthesia for postoperative pain relief. Areas that can be numbed by an epidural include- the chest, Abdomen, Pelvic area and legs. Numerous studies have demonstrated the benefits of Epidural anesthesia and analgesia in reducing overall mortality and morbidity by approximately 30% compared with general anesthesia.

### Case report

We are reporting the case of 56 year male weighing 70 kg presented with gangrene of right foot for 10 days with features of impending septicemia posted for right below knee amputation. A longstanding history of Diabetes mellitus complicated with retinopathy and Hypertension for last 30 years which was poorly controlled by medication and complicated with impending sepsis. Detailed eliciting of medical history revealed on and exacerbation of breathlessness following cigarette smoking. There was a past history of rib fracture following a road traffic accident. No past history of surgeries or anaesthesia exposure.

### On physical examination

#### Appearance

Sick looking, Dehydrated making intravenous access difficult, mildly anemic, pulse-110 beats/minutes, BP: 130/90 mmHg, Temp-101F, other systemic examination reveals no abnormality except for basal lung crepitations.

Airway Assessment after COVID rtPCR - Revealed mallampatti class 3, Normal thyromental distance, adequate and painless neck movements.

Spine examination – Painless and non-tender revealed a very narrow interspinous space without kyphoscoliosis, no neurological deficits.

Hence we anticipated difficult intravenous access and difficult regional anaesthesia.

### Investigation

RBS: 250 with insulin, Urine acetone negative, Hb-9.1 gm/dl, Platelet count 3lakhs/mm<sup>3</sup>, Total count of WBC - 22,400 cells/mm<sup>3</sup>, S. creatinine-0.9mg/dl, Urea-32 mg/dl, HbA1c: 8.9%, Chest X-ray - cardiomegaly, Emphysematous lung fields, prominent hilar markings with previous healed area of rib fracture

ECG- Concentric left ventricular hypertrophy

Abdominal sonography reveal mild fatty liver.

Doppler both lower limb vessels

Bilateral atherosclerotic change. No obvious flow in superficial femoral, anterior tibial and arterial dorsalis pedis of right lower limb. No detectable flow in superficial femoral artery of right lower limb. About 70%-90% flow reduction in rest of the arteries of both lower limb.

Echocardiography- Moderate left ventricular hypertrophy with systolic dysfunction (LV), Left ventricular ejection fraction 56%. The challenge was about the plan of anaesthesia, because the patient was unfit for any type of anaesthesia, as a lifesaving procedure the operation was planned under a Graded sole Epidural anaesthesia using bupivacaine so that the preoperative vital parameters were not significantly altered. Choosing Graded Epidural Anaesthesia as a sole anaesthetic technique was the best possible modality in our hospital setup for this high risk patient as Graded epidural anaesthesia is always superior in maintaining hemodynamic stability intraop. Superiority of Epidural anaesthesia over intravenous analgesics was also proved by relieving phantom limb pain developed in the postoperative period.

### Anaesthetic management

After adequate possible emergency optimization and with adequate blood products arranged, a detailed written informed high risk consent was obtained for the planned anaesthesia procedure of Graded epidural anaesthesia along with a backup plan for general anaesthesia in view of anticipated difficult regional anaesthesia access. Patient was reassured to allay anxiety and was given T. Pantoprazole 40mg, N.P.O was maintained.

After preparation of OT, checking anaesthesia machine with emergency resuscitation drugs, intravenous fluids, infusion pump, difficult regional anaesthesia equipments and equipment for general anaesthesia patient was shifted to OT. On receiving inside OT – Monitors for ECG, Non-invasive Blood pressure, pulse oximetry, temperature probe were connected. Two wide bore cannulae were established under strict asepsis under local anaesthesia and was preloaded judiciously in view of concentric LVH with balanced salt solution.

In view of anticipated difficult regional anaesthesia access sitting position was opted for Epidural anaesthesia. Under strict asepsis under local anaesthesia with 2% plain lignocaine, L3-L4 Space was infiltrated for epidural needle placement. In L3-L4 space, 18 G Tuohy needle was inserted, epidural space was identified by loss of resistance to air technique as well as by hanging drop technique and epidural catheter was threaded and fixed at 10 cm from skin following which a test dose of 2ml 2% lignocaine with 1:2lakh adrenaline was given which revealed negative for intravascular/intrathecal route.

In supine position 0.5% Bupivacaine was given epidurally in 5ml aliquots to a total of 15ml to achieve a sensory block level of T12 with stable vitals Intra-operatively epidural top up with 3ml 2% Lignocaine with adrenaline and 3ml of 0.5% bupivacaine given followed by epidural infusion with 0.5% bupivacaine at 4ml/hr with hourly blood sugar and urine output monitoring. Intraoperative blood loss was managed with judicious crystalloids and whole blood as intraoperative blood loss exceeded the calculated maximum allowable blood loss in view of pre-existing anemia and underlying cardiac condition. Surgery completed uneventful Postoperative analgesia was with epidural anaesthesia with 0.2% ropivacaine at 3 to 4 ml/hour and supplemented with Epidural buprenorphine at 150 microgram at twelve hourly interval. As anticipated in spite of all analgesic measures patient developed phantom limb pain in the post-operative period which was managed with epidural bupivacaine which again proved the superiority of Epidural bupivacaine for phantom limb pain.

### Discussion

Epidural regional anesthesia is safe and cost-effective technique for providing quality surgical anesthesia and prolong post-operative pain relief and thus also effective in blunting autonomic, somatic and endocrine response triggered by surgical insult. International consensus on neuroaxial anesthesia and analgesia revised and accepted for use of a poly pharmacological approach for treatment of intra and post-operative pain and relaxation. Extensive research had done and continuing on local anesthetics and various adjuncts added to them. In this case bupivacaine was used for sole graded epidural agent. Epidural bupivacaine has been using extensively for many years. In the regression of motor block bupivacaine is excellent to its rapid onset of action, Onset of sensory block (8 to 30minutes) maximum upper spread (T7-T8 after L2-3 or L3-4 lumbar space injection) and duration (4-6 hours) are similar after equal doses of levobupivacaine and bupivacaine 15 ml of 0.5%. Addition of adjuvant will enhance the effectiveness of local anesthetics by reducing development of tolerance. Epidural anesthesia and analgesia have the potential to reduce or eliminate perioperative physiologic stress responses to surgery and thereby decrease complications and improve outcomes. The effect of epidural anesthesia and analgesia on cardiovascular coagulation, pulmonary, gastrointestinal physiology, surgical stress response, immune function cognition, complications and surgical outcomes are studied extensively and results are excellent in favor of epidural anesthesia. In this patient epidural anesthesia avoided fluid overload cardiac depressant anesthetics drugs, nephrotoxic drugs respiratory depressant drugs etc. which made the operative goal achieved.

### Conclusion

Improvement in equipments, drugs and technique have made epidural an excellent anesthetic technique with applications in surgery, obstetrics and orthopaedic and other cases. Single injection and catheter techniques can be used for anesthesia and as well as for post-operative analgesia. To use Graded epidural anaesthesia as a sole anaesthetic technique not only requires skill, competency but also a very supportive updated anaesthesiology OT team.

**Conflict of interest**

None of the authors have conflict of interest.

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