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Hyperbaric Intrathecal Ropivacaine in Patients Undergoing Endovenous Laser Ablation (EVLA) - A Case Series

Kala Eswaran[1], Ashish Dhadas[2], Sachin Patil[3]

Abstract

Introduction: Spinal anaesthesia using 0.75% ropivacaine heavy/hyperbaric can be used safely and effectively for endovenous laser ablation procedures (EVLA) on bilateral limb varicose veins without increased duration of hospital stay in elderly patients with comorbidities. Hyperbaric 0.75% ropivacaine was found to give adequate duration of spinal block along with hemodynamic stability and excellent post-operative recovery for EVLA procedures.

Keywords: Endovenous Laser Ablation (EVLA), Spinal anaesthesia, 0.75% hyperbaric ropivacaine

Introduction

Endovenous Laser Ablation (EVLA) method is a minimally invasive alternative method to surgery in the treatment of superficial venous insufficiency [1, 2].

The anaesthesia technique commonly used is tumescent local anaesthesia. Various anaesthesia methods such as general anaesthesia, epidural anaesthesia, unilateral spinal anaesthesia, femoral nerve block, sciatic nerve block and conscious sedation are used for EVLA [2, 3]. The EVLA procedure may involve both the limbs, may need ligation of venous perforators and may extend into other added procedures like sclerotherapy, cryolaser ablation which may prolong the duration, hence the need for spinal or general anaesthesia [1, 4].

Spinal anaesthesia offers better surgical conditions with immobile patients for longer duration [5, 6] with added advantage of dilatation of the venous system that allows better detection of incompetent veins.

We used 0.75% hyperbaric ropivacaine intrathecally, in 10 patients for bilateral lower limb EVLA procedure and present our observations in terms of sensory and motor block achieved, hemodynamic stability, early discharge and patient comfort.

Case presentation

The anaesthesia plan was discussed with the patient and surgeons and written informed consent was taken from each patient during pre-anaesthetic check-up (PAC). Consent for peri-operative collection of data and possible publication was also taken. The data recorded included age, gender, weight, height, co-morbid conditions and American Society of Anaesthesiologists physical status (ASA), diagnosis, deep vein doppler status, duration of surgery, time to sensory and motor block to T10 regression of block, time to urination/micturition, total IV fluids given intra-operatively. Table 1 & Table 2 provide "Demographic data of patients with accompanying conditions (if any)" and "Intra-operative and post-operative parameters during EVLA procedure", respectively.

Patients were kept nil per oral from 6 hours before surgery. On the day of surgery, an IV line was established on non-dominant hand using a 20 G intravenous canula. Pre-loading was done using 6-8 ml crystalloid per kg of body weight. The multi-channel monitor was attached and baseline parameters like pulse rate, blood pressure, electrocardiography and SpO_2 were recorded. Drug used was 2.0 to 2.5 ml of 0.75% hyperbaric ropivacaine (4 ml ampoule) commercially available in the Indian market.

Under all aseptic precautions, the sub-arachnoid blocks were performed using 27 G quickie spinal needle with patient in sitting position at L3-L4 intervertebral space. Patient was made supine immediately.

After the block, vitals were monitored every 2 minutes up to 15 minutes and thereafter at every 5 minute interval till completion of the procedure. All patients received O_2 by nasal prongs at 3-4 L/min.

Post-operatively all patients received only 1 dose of IV paracetamol 1 gm.

Sensory changes were assessed by ice and pin prick and motor changes assessed by modified Bromage score recorded at timed intervals. Time was noted when an upper sensory level to pinprick was at T 10 level.

Duration of surgery was noted and regression of motor and sensory block timing was noted using leg movement by patient against gravity.

Time to voiding of urine was noted.

Out of 10 patients, 2 patients needed evacuation of urine by one time catheterisation of bladder.

All patients were given 1 gm of paracetamol IV as single dose for post-operative analgesia.

None of the patient required any other analgesic drug.

[1]Consultant Anaesthesiologist, Surekha Varicose Veins Clinic at Samata Hospital, Dombivili (East), Thane, Maharashtra, India.
[2]Consultant Surgeon, Surekha Varicose Veins Clinic at Samata Hospital, Dombivili (East), Thane, Maharashtra, India.
[3]Consultant Radiologist, Surekha Varicose Veins Clinic at Samata Hospital, Dombivili (East), Thane, Maharashtra, India.

Address of Correspondence
Dr. Kala Eswaran
Consultant Anaesthesiologist, Surekha Varicose Veins Clinic at Samata Hospital, Dombivili (East), Thane, Maharashtra, India.
E-mail: drkalaeswaran@gmail.com

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Table 1: Demographic data of patients with accompanying conditions (if any)

Patient	Age (yrs)	Sex	Height (cms)	Weight (kgs)	Comorbidities	ASA Grade
1	58	Male	170	88	HTN	2
2	72	Male	172	76	IHD, PTCA, HTN	2
3	66	Female	158	72	IHD, HTN, BA	2
4	48	Female	160	92	Hypothyroid	2
5	74	Male	162	55	Nil	1
6	56	Female	145	82	HTN, DM	2
7	47	Male	162	73.5	Nil	1
8	68	Male	153	59.2	Nil	1
9	43	Male	170	107	Nil	1
10	77	Male	168	88	HTN, DM	2

HTN-hypertension, IHD- ischaemic heart disease, PTCA – percutaneous transluminal coronary angioplasty , BA – bronchial asthma , DM – diabetes mellitus

Duration of surgery was recorded from incision to final bandage by the surgeon.

All patients successfully underwent EVLA procedure under spinal anaesthesia using 0.75% hyperbaric ropivacaine and monitored anaesthesia care.

No sedation was given to any patient. Three patients reported rigors which was treated with 50 mg tramadol slow IV. Few patients needed to be prone for EVLA access.

Following surgery all patients were kept under observation overnight and discharged the next day uneventfully.

Discussion

EVLA is traditionally performed under tumescent local anaesthesia as day care surgery [1]. Tumescent anaesthesia (TA) is a local anaesthetic technique that can be used within safe limits for anaesthesia of large areas with the injection of large volumes of dilute local anaesthetic and epinephrine into subcutaneous fat [1]. Tumescent infiltrations gained widespread popularity and is used more frequently during EVLA procedures. Though this technique has specific advantages such as anaesthetization of large areas of body surface, low incidences of bleeding, prolonged post-operative analgesia and early discharge (day care), multiple needle punctures, injection of local anaesthetic solutions through veins may induce considerable pain, chances of local anaesthesia toxicity especially [1, 2] if bilateral limb surgery, prolonged duration resulting in patient discomfort and completeness of procedure may not be achieved especially if venous ligation or cryolaser therapy is required.

The main criteria for selecting the anaesthetic method for EVLA is no delay in mobilization as delay in mobilization increases risk of deep vein thrombosis [2, 3].

At our centre, most EVLA procedures are bilateral and combined with sclerotherapy and cryolaser or venous ligation procedures. Majority of the patients have co-morbidities. General anaesthesia has certain side-effects like nausea, vomiting, sore throat and muscle pain, needing ICU admission in patients with co-morbidities [1].

Spinal anaesthesia offers better surgical conditions with immobile patients for long duration with added advantage of dilation of venous system that allows better detection of incompetent veins [3]. Main side effects of spinal block include post dural puncture, headache, hypotension, bradycardia, delayed mobilization and urinary retention [1, 3, 4].

There is need for venous loading with intravenous fluids to avoid hypertension which leads to urinary retention [4], the need for urinary catheterization which is accentuated due to almost 1 to 2 litres of fluid used tumescent fluid that later gets absorbed into the circulation.

We decided to overcome these problems of spinal anaesthesia by using 0.75% hyperbaric ropivacaine recently available in the Indian market.

Ropivacaine is a long-acting amide local anaesthetic agent in pure S enantiomeric form. It has a reduced potential for cardiotoxicity and neurotoxicity, safer than the racemic preparation of bupivacaine, hence better stability in patients with multiple cardiac co-morbidities with significantly lower incidence of hypertension [5, 6]. Ropivacaine has lower lipid solubility than bupivacaine, lower penetration into myelinated motor fibres and lesser motor blockade, therefore early mobilization and less urinary retention and early discharge [5, 6].

Ropivacaine therefore fits the characteristics of an ideal spinal anaesthetic agent in day care setting that includes a rapid onset of a reliable block providing adequate surgical anaesthesia of appropriate duration, rapid recovery of sensory and motor block with minimal side effects [1].

Another alternative is to use low dose bupivacaine with adjuvants like fentanyl and clonidine. Intrathecal fentanyl increases the

Table 2: Intra-operative and post-operative parameters during EVLA procedure

Patient	Time of sensory block to T10 (mins)	Time of motor block to T10 (mins)	Start of surgery time (mins)	Duration of surgery (mins)	Intra-op hypotension or bradycardia	Motor regression (mins)	Sensory regression (mins)	First time urination (mins)	Hospital stay day(s)
1	5	7	10	110	Nil	165	180	195	1
2	8	10	12	55	Nil	180	190	250#	1
3	6	7	10	75	Nil	170	180	190	1
4	5	6	10	80	Nil	155	170	180	1
5	7	8	10	95	Nil	180	200	210	1
6	6	9	12	90	Nil	175	190	195	1
7	5	8	13	65	Nil	165	180	195	1
8	7	10	14	150	Nil	175	185	200	1
9	6	8	12	110	Nil	160	175	180	1
10	8	10	15	95	Nil	175	185	200	1

- Needed single catheter evacuation

incidence of side effects such as prenitis, nausea, vomiting and urinary retention whereas clonidine increases duration of motor block besides causing more hypotension and thus both not suited for EVLA [6].

Conclusion

Hyperbaric ropivacaine 0.75% can be used safely intrathecally and found ideal for EVLA procedures in elderly with comorbidities without serious complications and allowing early discharge.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his/her consent for his/her images and other clinical information to be reported in the Journal. The patient understands that his/her name and initials will not be published, and due efforts will be made to conceal his/her identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

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