

# Intrathecal catheterization by epidural catheter: management of accidental dural puncture and prophylaxis of PDPH

A Jadon, N Sinha

## Citation

A Jadon, N Sinha. *Intrathecal catheterization by epidural catheter: management of accidental dural puncture and prophylaxis of PDPH*. The Internet Journal of Anesthesiology. 2007 Volume 16 Number 2.

## Abstract

We have described an easy and practical technique to reduce the incidence of post dural puncture headache (PDPH) after accidental dural puncture. The intrathecal catheter provides a conduit for administration of appropriate local anaesthetic for rapid onset of intraoperative surgical anaesthesia and postoperative pain relief. This procedure also avoids the risks associated with a repeat attempt at epidural analgesia.

## INTRODUCTION

Accidental dural puncture during epidural occurs in 0.4 to 6.0% patients <sup>1</sup>. Due to large opening and associated CSF leak, large number of patients (75-86%) develop post-dural puncture headache (PDPH), which is mostly severe in nature <sup>2</sup>. Epidural blood patch is an effective treatment of severe post-dural puncture headache however, its effectiveness decreased if dura mater puncture is caused by a large bore needle <sup>3</sup>. Epidural catheters have been used to prevent severe PDPH and manage accidental dural puncture by insertion of epidural catheter in to the subarchnoid space and using them as spinal catheter for continuous spinal anaesthesia <sup>4,5</sup>. Intrathecal catheter insertion following unintentional dural puncture reduces the requirement for epidural blood patch <sup>6</sup>.

A case report of three cases intended for epidural anaesthesia managed successfully with epidural catheter inserted in subarchnoid space after accidental dural puncture, presented here. Informed (written) consent was taken from all the patients before procedure.

## CASE-1

A 32-year-old female with # left hip posted for DHS (decompression hip screw). She was a known case of mitral stenosis, stopped treatment 3 months before injury without medical advice (due to superstitious reasons). Previous medical record showed moderate MS and advised penicillin prophylaxis, lasix, digoxin and surgery when feasible. Physical examination: thin built, height 155cm, approximate

weight 45 Kg, heart rate was 80/min, BP- 110/64 mmHg. , diastolic murmur (2/5 grade) was present in mitral area, both lungs were clear and other systems were also normal. All biochemistry reports were in normal range. Low dose spinal with mixture of bupivacaine and fentanyl along with epidural catheter technique (if surgery duration is long and postoperative pain relief) was planned (patient refused for general anaesthesia). During combined spinal epidural technique (CSEA) spinal block was given with 1 ml. (0.5%) heavy bupivacaine+ 12.5 microgram fentanyl by 27G pencil point needle. During epidural, insertion of catheter was difficult for which needle was rotated and dural puncture resulted. Epidural Catheter (20G) was inserted in subarchnoid space 3 cm up. A top-up was given through catheter after 90 minutes with 1 ml mixture (0.5 ml 0.5% heavy bupivacaine+ 0.5 ml saline). Duration of surgery was 126 minutes. Intraoperatively vitals remain stable except, two doses ephedrine (3 mg each) was given when BP was decreased >20% of baseline values. Postoperatively patient was monitored continuously with ECG, NIBP and Pulse oxymeter. Postoperative analgesia was given by 2 ml mixture (0.1% bupivacaine+ 12.5microgram fentanyl) on demand basis. Four doses were given over 36 hours. Catheter was removed after 36 hrs. Patient was observed for 7 days and followed up for 1 year without any complains.

## CASE-2

Thirty year old male patient with # tibia-fibula left leg posted for open reduction and internal fixation. Had no

significant past medical or anaesthetic history. Physical examination and biochemistry were within normal limits. Epidural block given at L3/L4 in sitting position by 18G WEISS Epidural needle (BD Perisafe TM Ref No 401426), however patient moved during procedure and accidental dural puncture occurred. An epidural catheter (20G) was inserted cephalad direction up 4.0 cm. After aspiration of clear CSF 7.5 mg of 0.5% heavy bupivacaine was given. Catheter fixed and labeled as spinal catheter and patient was positioned supine. Level of sensory block (pin prick) showed effect up to T10. After 70 minutes 5 mg dose was again repeated as patient was feeling discomfort. Surgery lasted for 130 minutes. Intraoperative course was uneventful. Postoperatively patient continuously monitored in high dependency area. Postoperative pain managed with mixture of 0.1% bupivacaine 2 ml. + 30 micro gram buprinorphine given through spinal catheter on demand. Four such doses were given in 40 hours, than spinal catheter was removed. The patient was followed up for 10 day (until discharge) without any complains.

### **CASE-3**

A 36-year-old female patient wt 86 kg. Height 154 cm posted for total hysterectomy under epidural anaesthesia. She was hypothyroid taking eltroxin 100 micro gram/day. Hypertensive, on treatment with tab. Losartan 50 mg once daily. Preoperative assessment showed short neck with MP class III (anticipated difficult intubation), pulse 84/ min. BP 150/90 mm Hg. Systemic examination and investigation were normal except nonspecific ST-T changes in ECG. Localization of epidural space was difficult and during second attempt, accidental dural puncture occurred with 18G Tuohy needle at L3-L4 level. Epidural catheter (18G) was inserted in subarchnoid space and threaded 3 cm cephalic. Two milliliter of bupivacaine heavy 0.5% mixed with 25 microgram fentanyl was injected through catheter over 5 minutes. The sensory block was achieved up to T6-T8 level. Relaxation and operative condition were excellent until 120 minutes when 1 ml of .05% heavy bupivacaine was again given due to poor relaxation. Surgery lasted for 176 minutes. Ephedrine (24 mg) was used in 6 mg increments to maintain blood pressure.

Postoperative analgesia was given with 1 ml 0.2% bupivacaine +12.5 mg fentanyl through spinal catheter on demand basis. Patient required five such doses in 36 hrs and than catheter was removed. No PDPH occurred as patient was observed for 7 days postoperatively and than on 3

consecutive visits for features of PDPH or other complaints regarding neuraxial block.

All three Catheter tips sent for culture reported sterile.

### **DISCUSSION**

An epidural blood patch (EBP) remains the standard against which all other treatments for a PDPH are compared however; it is not without its complications. Approximately 35% of patients who receive an EBP report back pain <sup>7</sup>. Neck pain, leg pain, paresthesias, radiculitis, fever, temporary cranial nerve palsies and convulsions have been reported following the administration of an EBP <sup>8,9</sup>. It is not uncommon to obtain a second wet tap when attempting to place an EBP <sup>8</sup>. Role of prophylactic epidural blood patch in the management of PDPH is not well established <sup>10,11</sup>.

Although the continuous spinal anaesthesia is standard anaesthesia technique, the use of epidural catheter as spinal catheter was debatable. However use of epidural catheter as spinal catheter got acceptance slowly as it was noted that thin catheter which were meant for continuous spinal anaesthesia were responsible for neural complications and there insertion is also difficult <sup>12</sup>. Deliberate intrathecal insertion of an epidural catheter after accidental dural puncture have been reported in obstetric patients <sup>13</sup>.

Etiology by which catheter prevents PDPH is not known however it is postulated that it stimulates inflammatory cells to accumulate near the entry of catheter and closing of dural tear. Formation of fibrin around the intrathecal catheter at the dural tear has also been described in an experimental study using cats <sup>14</sup>.

Insertion of epidural catheter in spinal space after accidental dural puncture is now becoming common. A survey in the United Kingdom aims to explore the current management of accidental dural puncture compared the findings to a similar survey undertaken in 1993. In 47 units (28%), the epidural catheter is now routinely placed intrathecally following accidental dural puncture. This is in contrast to the previous survey, which found that catheters were re-sited in 99% of units <sup>15</sup>. We used buprenorphine and fentanyl for postoperative pain relief along with low concentration of bupivacaine. Both the drugs have been used intrathecally in the past with safe record of accomplishment <sup>16</sup>.

### **CORRESPONDENCE TO**

Dr. Ashok jadon 44, Beldih Lake Flats, Dhatkidih

Jamshedpur-831001, Jharkhand (India) Mobile:  
09431179528 e-mail: ashok.jadon@tatamotors.com

## References

1. Berger CW, Crosby ET, Groeckl W. North American survey of the management of dural puncture occurring during labour epidural analgesia. *Can J Anaesth* 1998; 45: 110-114
2. Gordon H. Morewood, A rational approach to the cause, prevention and treatment of post dural puncture headache (Current Review). *Can Med Assoc J* 1993; 149 (8)
3. Safa-Tisseront V, Thormann F, Malassine P, Henry M, Riou B, Coriat P, Seebacher J. Effectiveness of epidural blood patch in the management of post-dural puncture headache. *Anesthesiology* 2001; 95(2):334-9.
4. Cohen S, Amar D, Pantuck EJ, et al. Decreased incidence of headache after accidental dural puncture in caesarean delivery patients receiving continuous postoperative intrathecal analgesia. *Anaesthesiol Scand* 1994; 38:716-8.
5. Dennehy KC, Rosaeg OP. Intrathecal catheter insertion during labour reduces the risk of post-dural puncture headache. *Can J Anaesth* 1998; 45:42-5.
6. Segal S, Tsen LC, Datta S. Intrathecal catheter insertion following unintentional dural puncture reduces the requirement for epidural blood patch. *Anesthesiology* 1999. Abstracts of SOAP papers.
7. Abouleish E, Vega S, Blendinger I, Tio TO. Long term follow up of epidural blood patch. *Anesth Analg* 1975; 54:459-63.
8. Steve Schwalbe, MD . Pathophysiology and Management of Post-dural Puncture Headache: A Current Review. 2006 SOAP Education Committee, [www.imd-inc.comD](http://www.imd-inc.comD).
9. Marfurt, P. Lyrer, U. Ruttimann, S. Strebel and M. C. Schneider. Recurrent post-partum seizures after epidural blood patch (Case Report *British Journal of Anaesthesia* 2003; 90(2): 247-250
10. Palahniuk RJ, Gumming M. Prophylactic blood patch does not prevent post lumbar puncture headache. *Can Anaesth Soc J* 1979; 26: 132-3.
11. Scavone BM, Wong CA, Sullivan JT, Yaghmour E, Sherwani SS, McCarthy RJ. Efficacy of a prophylactic epidural blood patch in preventing post dural puncture headache in parturients after inadvertent dural puncture. *Anesthesiology* 2004; 101(6):1422-7
12. Puolakka R, Pitkanen MT, Rosenberg PH. Comparison of three catheter sets for continuous spinal anesthesia in patients undergoing total hip or knee arthroplasty *Reg Anesth Pain Med.* 2000; 25(6):584-90
13. Kevin C. Dennehy, Ola P Rosaeg. Intrathecal catheter insertion during labour reduces the risk of post- dural puncture headache *Can J Anaesth* 1998; 45(1): 42-5
14. Yaksh TL, Noueihed RT, DurantPAC. Studies of the pharmacology and pathology of intrathecally administered 4-anilinopiperidine analogues and morphine in the rat and cat. *Anesthesiology* 1986; 64: 54-66.
15. R. Baraz, R. E. Collis. The management of accidental dural puncture during labour epidural analgesia: a survey of UK practices. *Anaesthesia* 2005; 60 (7): 673-679.
16. Kenneth H. Gwirtz, Jerry V. Young, Robert S. Byers, Christopher Alley, Katherine Levin, Scott G. Walker, and Robert K. Stoelting. The Safety and Efficacy of Intrathecal Opioid Analgesia for Acute Postoperative Pain: Seven Years' Experience with 5969 Surgical Patients at Indiana University Hospital. *Anesth Analg* 1999; 88:599

**Author Information**

**Ashok Jadon, MD**

Senior Consultant and Head of Department, Department of Anaesthesia, Tata Motors Hospital

**Neelam Sinha, MBBS, DNB**

Resident, Department of Anaesthesia, Tata Motors Hospital