

# Considerations When Performing an Epidural Blood Patch on a Patient Anticoagulated with Low Molecular Weight Heparin: A Case Report



Samuel J MacCormick MBBCh, Lynn R Kohan MD, Jessica Sheeran, MD  
Department of Anesthesiology, University of Virginia, Charlottesville, Virginia

## Learning Objectives

Upon completion of this learning activity, participants should be able to:

1. Describe signs and symptoms and treatment of Post-Dural Puncture Headache (PDPH)
2. Describe clinical considerations for performing and Epidural Blood Patch (EBP) on a patient anticoagulated with Low Molecular Weight Heparin (LMWH)

## Background

### Postdural puncture headache (PDPH)

- Potential complication that can occur after accidental violation of the dura during placement of an epidural anesthetic.

### MOA:

- Exact mechanism unclear; related to intracranial hypotension.
- Decreased volume of cerebrospinal fluid (CSF) due to leakage of CSF through dural hole → tension on the meninges and headaches.

### Treatment:

- Conservative: abdominal binder, hydration, NSAIDs/Acetaminophen and caffeine.
- Epidural blood patch (EBP); prevents leakage of additional CSF and allows dura to heal by injecting autologous blood into epidural space<sup>1</sup>.

### Additional considerations with anticoagulated patients:

- The timing of EBP procedure.
- Weigh increased risk of bleeding or inability for required clot strength to form when appropriately anticoagulated against risk of adverse events from interrupted anticoagulation (i.e DVT).

Medication Dosing Regimen	Hold LMWH Before Procedure	Restart LMWH After Procedure	Hold LMWH Before Catheter Removal	Restart LMWH After Catheter Removal
<b>Prophylactic Dosing:</b> Enoxaparin (LMWH): 30mg SQ BID, 40mg SQ QD	<b>At least 12 hours</b>	<b>At least 12 hours after needle/catheter placement</b> (Following day)	<b>Avoid</b>	<b>At least 4 hours after catheter removal</b>
<b>Therapeutic Dosing:</b> Enoxaparin (LMWH): 1mg/kg SQ BID, 1.5mg/kg SQ QD	<b>24 hours</b> , consider checking Anti-Xa in elderly/renal insufficiency	<b>24-72 hours</b> (24 hours after non-high risk bleeding surgery, 48-72 after high-bleeding-risk surgery)	<b>Remove catheter prior to initiation of therapeutic LMWH</b>	<b>At least 4 hours after catheter removal</b>

Figure 1: ASRA guidelines for holding Low-Molecular Weight Heparin (LMWH) before and after neuraxial procedures<sup>5</sup>

## Patient Description

A 36-year-old G2P1001 with a history of endometriosis, asthma, childhood seizures, and pulmonary embolism secondary to oral contraceptives, presented for a planned cesarean section (CS) due to a 4<sup>th</sup> degree laceration with prior delivery. In her third trimester, she was started on prophylactic LMWH 40mg BID, which she discontinued 12 hours prior to CS.

**PSH:** Lap Left Oophorectomy, FAVD

**Meds:** Enoxaparin 40 BID, Albuterol, Lamotrigine, Folic Acid, Trazodone, Pantoprazole

**Allergies:** NKDA

**Social Hx:** Non-smoker, No Alcohol Consumption

**Exam:** MP3, TM <3FB, Normal Cardiopulmonary exam, Normal Spinal Anatomy

**EKG:** NSR

## Case Description

### Primary anesthetic:

- Combined spinal epidural due to c/f prolonged procedure (dense adhesions from prior surgery for endometriosis)
- 1<sup>st</sup> attempt → Complicated by accidental dural puncture with a 17-gauge Tuohy epidural needle.
- 2<sup>nd</sup> attempt → Successful at an interspace above the initial attempt with T4 surgical level.
- Removed catheter 4hrs post uncomplicated CS.
- LMWH restarted 12 hours after removal of catheter.

### PDPH complication:

- Developed approximately 24 hours post dural puncture.
- Symptoms- severe (9/10 pain), positional, bilateral frontal headache with nausea and dizziness; relieved while in the supine position worse when upright.

### Treatment:

- Conservative measures unsuccessful (abdominal binder, hydration, NSAIDs/Acetaminophen and caffeine).
- EBP performed 36 hours post delivery after holding her prophylactic LMWH dose for 18 hours → Immediate relief.
- LMWH was resumed 12 hours after the EBP.

### Post discharge/repeat EBP:

- Discharged home next day
- PDPH symptoms returned 74 hours after initial EBP
- Held LMWH for 18 hours
- The same EBP procedure repeated successfully (30ml autologous blood)
- Prophylactic LMWH dose restarted 12 hours after the second EBP → Immediate Relief
- Remained asymptomatic

## Follow-Up

Patient was discharged from L&D several hours following her second EBP. She remained headache free and did not return for any additional interventions. Upon follow-up, patient did not develop further headache, or more importantly, any signs or symptoms consistent with epidural hematoma. Of note, she also did not have any thrombotic complications (i.e. DVT) during the duration of her treatment course.

## Discussion

### Epidemiology PDPH:

- Incidence of accidental dural puncture with a Tuohy epidural needle is 0.04-6%; up to 80% of these patients may develop PDPH<sup>2</sup>.
- Pregnant patients: ↑ risk PDPH (female gender, young age, and regional anesthesia in addition to a lower CSF volume in pregnancy)<sup>3</sup>.

### EBP and additional considerations with pregnancy:

- Timing of procedure to maximize their chance for clot strength in order to allow for symptomatic relief.
- Anticoagulated patient is common
  - Complicated medication dosing
  - VTE risk 5x higher in pregnant woman vs. non-pregnant woman, and up to 20-fold higher in the puerperium period → significantly higher percentage of pregnant woman requiring anticoagulation therapy compared to non-pregnant patients<sup>4</sup>.
- American Society of Regional Anesthesia and Pain Medicine (ASRA) guidelines
  - Recommend holding BID prophylactic doses of LMWH for 12 hours prior to performing neuraxial procedures, restarting a minimum of 12 hours following needle/catheter placement and restarting a minimum of 4 hours following catheter removal<sup>5</sup>
  - No guidelines specific to EBP in an anticoagulated patient

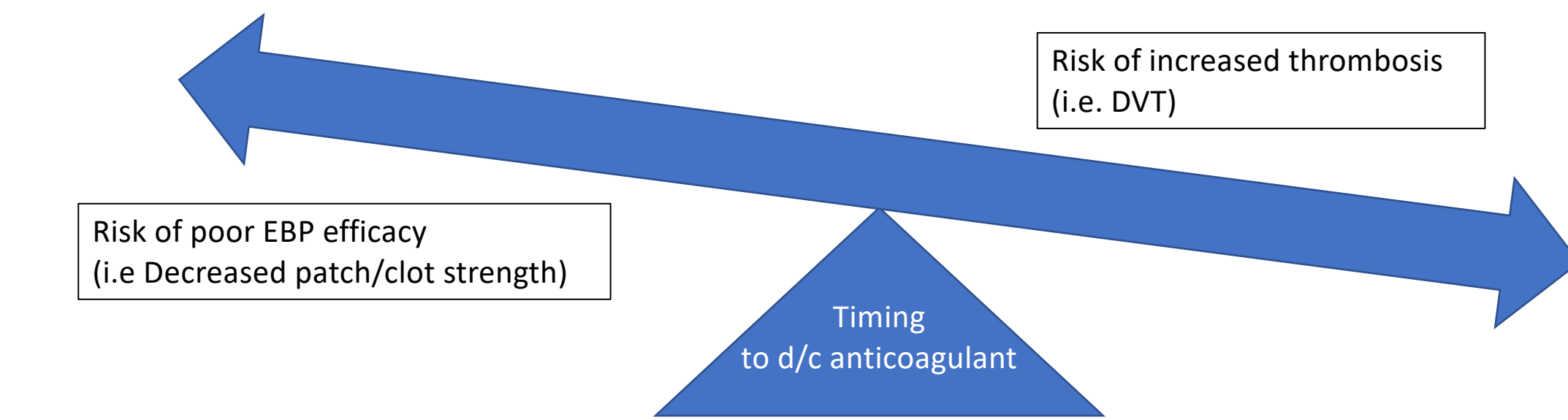


Figure 2: Figure illustrating the balancing act involved in holding/restarting anticoagulation before and after an EBP procedure while considering the increased risk of thrombosis vs the risk of a poor functioning EBP.

### 2 Case Reports: Both successful for symptomatic relief of PDPH without adverse outcomes

1. Held LMWH 12h prior to EBP<sup>6</sup> and restarted LMWH 12 hours following EBP
2. Held LMWH 24h prior to EBP<sup>7</sup> and restarted LMWH 12 hours following EBP

### What we did:

- Held our patient's LMWH for 18 hours prior to EBP (1.5 times the minimum recommended time for neuraxial procedures with BID prophylaxis LMWH) and restarted LMWH 12 hours after EBP
- Concern that waiting 18h after her LMWH dose contributed to need for second EBP (2nd EBP is not common)
- 30% of patients receiving an EBP will have return of their headache, although not as severe<sup>9</sup>. Of those requiring repeat EBP, 17% will require two EBP's and 1.5% will require three EBP's<sup>8</sup>.

### Take home:

- With the increased complexity of obstetric patients, the need to perform an EBP on an anticoagulated patient may become more common in the future. With this case report, we add to the evidence of timing for holding and restarting LMWH prior to EBP procedures while maintaining efficacy and minimizing the risk of of thrombosis (i.e DVT)

## References

1. Di Giovanni A, Galbert M, Wahle W. Epidural Injection of Autologous Blood for Post-Lumbar Puncture Headache-II. Additional Clinical Experiences and Laboratory Investigation. *Anesth Analg* 1972; 51:226-232.
2. Shear T, Ahmed S. Epidural blood patch for chronic daily headache with postural component: a case report and the review of published cases. *Pain Physician* 2008; 11(1):77-80.
3. Ahmed S, Jayawarna C, Jude E. Post lumbar puncture headache: diagnosis and management. *Postgrad Med J* 2006; 82(973):713-6.
4. Marshall AL. Diagnosis, treatment, and prevention of venous thromboembolism in pregnancy. *Postgrad Med* 2014;126(7):25-34. doi:10.3810/pgm.2014.11.2830
5. Horlocker TT, Wedel DJ, Rowlingson JC, et al. Regional Anesthesia in the Patient Receiving Antithrombotic or Thrombolytic Therapy. *Regional Anesthesia and Pain Medicine* 2010;35(1):64-101. doi:10.1097/aap.0b013e3181c15c70.
6. Scott EW, Sueltenfuss MS. Epidural Blood Patch in a Patient Taking Enoxaparin, Following Acoustic Neuroma Resection. *Journal of Blood Disorders & Transfusion* 2011;02(03). doi:10.4172/2155-9864.1000109.
7. Gaiser RR, Berkowitz DH, Chou D. Epidural blood patch in a patient taking enoxaparin. *Journal of Clinical Anesthesia* 2004;16(5):386-388. doi:10.1016/j.jclinane.2003.09.011.
8. Booth JL, Pan PH, Thomas JA, Harris LC, D'Angelo R. A retrospective review of an epidural blood patch database: the incidence of epidural blood patch associated with obstetric neuraxial anesthetic techniques and the effect of blood volume on efficacy. *Int J Obstet Anesth* 2017;29:10-17. doi:10.1016/j.ijoa.2016.05.007.
9. Taivainen T, Pitkanen M, Tuominen M, Rosenberg P. Efficacy of epidural blood patch for postdural puncture headache. *Acta Anaesthesiol Scand* 1993;37:702-5.