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Epidural Catheter Removal before Unanticipated Anticoagulation: The Pharmacy Fail-safe

To the Editor:—Systemic anticoagulation in the presence of an indwelling epidural catheter increases the risk of spinal hematoma.^{1,2} Many patients receive thromboprophylaxis perioperatively, and these medications are usually administered according to institutional protocols. However, if the degree and timing of anticoagulation are altered, it is critical that the Pain Service be notified to allow timely catheter removal and appropriate neurologic assessment.

Recently, our Pain Service noted two cases in which unanticipated systemic heparinization was initiated in patients with indwelling epidural catheters. Both patients were emergently anticoagulated with intravenous standard heparin after confirmed diagnosis of lower extremity deep venous thrombosis or pulmonary embolism. A third patient with a prosthetic heart valve was administered a “treatment” dose of low molecular weight heparin (ardepain; 10,000 U) to prevent valvular thrombosis. Removal of the epidural catheters in these three patients necessitated interruption of the heparin therapy, theoretically placing the patients at increased risk for further thromboembolic complications.³ The apparent breakdown in communication between the Pain Service, surgical services, and nursing, which resulted in therapeutic anticoagulation of three patients with indwelling epidural catheters, lead us to increase our educational efforts and search for additional measures that would decrease the possibility of subsequent incidents.

A new system that uses the pharmacy as a “fail-safe” was implemented at the Mayo Clinic in December 1998. Because all medication orders are filled by pharmacists using a central computer, all patients who receive an epidural infusion are identified within the pharmacy database. In conjunction with our pharmacy and computer support colleagues, we modified the programming to notify personnel of impending anticoagulation in a patient with an indwelling epidural catheter. For example, when a patient with an epidural is prescribed intravenous (not subcutaneous) standard heparin, low molecular weight heparin, thrombolytics, or abciximab (ReoPro; Lilly, Indianapolis, IN), the order is flagged and the pharmacist receives an alert notice. The Pain Service resident is immediately contacted, and the epidural catheter is removed. The anticoagulant is administered 1–2 h after catheter removal.^{4,5} This system allows the Pain Service to participate proactively in the timing of catheter removal and subsequent anticoagulation, as well as closely monitor the patient’s neurologic

status. Currently, we do not request notification before administration of warfarin because the anticoagulant effect is not immediate.

Within 1 month of the introduction of this system, a pharmacist prompted by a computer flag alerted the Pain Service to a heparin infusion order in a patient with an indwelling epidural catheter. We were able to liaise promptly with the surgical service to allow safe removal of the catheter.

This pharmacy fail-safe provides additional protection against unanticipated anticoagulation in patients with indwelling epidural catheters. However, education of the entire patient care team and continued vigilance remain paramount in decreasing the risk of spinal hematoma.

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References

1. Vandermeulen EP, Van Aken H, Vermeylen J: Anticoagulants and spinal-epidural anesthesia. *Anesth Analg* 1994; 79:1165–77
2. Horlocker TT, Wedel DJ: Spinal and epidural blockade and perioperative low molecular weight heparin: Smooth sailing on the *Titanic*. *Anesth Analg* 1998; 86:1153–6
3. Ginsberg JS: Management of venous thromboembolism. *N Engl J Med* 1996; 335:1816–28
4. Liu SS, Mulroy MF: Neuraxial anesthesia and analgesia in the presence of standard heparin. *Reg Anesth Pain Med* 1998; 23:157–63
5. Horlocker TT, Wedel DJ: Neuraxial block and low molecular weight heparin: Balancing perioperative analgesia and thromboprophylaxis. *Reg Anesth Pain Med* 1998; 23:164–77

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