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Safe HEP-EPI: Preventing Inadvertent LMWH Administration After Epidural Placement Through System-Level Anticoagulation Controls

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Introduction

Regional anesthesia techniques, including epidural catheter placement, are integral to perioperative multimodal analgesia. However, their use in patients requiring anticoagulation carries a rare but potentially catastrophic risk of neuraxial hematoma. At tertiary centers, high patient comorbidity burdens necessitate strict adherence to anticoagulation timing guidelines. Despite established recommendations, inappropriate perioperative administration of low molecular weight heparin (LMWH) following epidural placement has been observed, , representing a predictable and preventable safety risk within existing perioperative workflows.

Materials and Methods

This quality improvement initiative was conducted at a tertiary academic center to improve adherence to anticoagulation safety standards in patients with epidural catheters. A standardized interdisciplinary workflow was developed targeting anesthesiology, surgery, nursing, and pharmacy teams. The intervention emphasized avoidance of intraoperative LMWH administration following epidural placement, substitution with unfractionated heparin (UFH) when required and appropriate, enhanced documentation standards, mandatory interdisciplinary verification of epidural status, pharmacy-level dispensing hard-stops, and electronic health record (EHR) safety flags. Retrospective review of Acute Pain Service records was used to assess baseline compliance with anticoagulation guidelines and to identify episodes of inappropriate LMWH administration. This project received Institutional Review Board exemption from LHSC.

Results/Case Report

Baseline review identified multiple instances of LMWH (Dalteparin) administration intraoperatively after epidural catheter placement, contrary to current safety guidelines. Implementation of the standardized workflow improved interdisciplinary communication and clarified anticoagulant selection and timing. Key interventions included preoperative identification of epidural placement, intraoperative confirmation during surgical pause, pharmacy hard-stops for LMWH dispensing, and visible chart reminders. Early auditing demonstrated improved compliance with UFH use during appropriate perioperative windows and elimination of inadvertent intraoperative LMWH dosing in patients with epidural catheters. Documentation accuracy and awareness of neuraxial anticoagulation safety significantly improved across teams. Ongoing monitoring focuses on sustained compliance, neurologic surveillance adherence, and prevention of anticoagulant-related neuraxial complications.

Discussion

This quality improvement initiative demonstrates that inadvertent LMWH administration after epidural placement is a preventable, system-driven safety risk rather than an individual error. A standardized multidisciplinary workflow design

incorporating EHR and pharmacy safeguards can reliably align clinical practice with established neuraxial anticoagulation guidelines. Such system-level interventions are critical to reduce the risk of preventable harm and enhancing safety in perioperative care.

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