Prevention of IV Infiltrates and Extravasation Injuries in the Periop Setting
Johns Hopkins School of Medicine

Program/Project Description.
Vesicant drugs are solutions that can cause tissue necrosis, and extravasation occurs with administration of a vesicant into surrounding tissues. When improperly administered through intravenous (IV) catheters, vesicants can cause significant extravasation injuries. These injuries include ulceration resulting in pain, plastic surgery, and disability. In addition to significant morbidity for the patient, there is a cost to the hospital and chance of litigation. Anesthesiology and Critical Care Medicine (ACCM) providers at the Johns Hopkins Hospital regularly administer hyperosmolar solutions, vasoconstrictive substances, and concentrated electrolyte solutions in the perioperative setting that are considered vesicants. However, ACCM providers often remain unaware of extravasation injuries that are often reported more than 24 hours postoperatively. Our goal is to increase awareness about common vesicants, educate staff about management of IV extravasation, improve compliance with vesicant administration protocols, and ultimately reduce injuries related to IV extravasation. In addition to provider education, a future goal is to improve tracking and documentation of intravenous extravasation events in the hospital by providers and nursing staff.

Process.
The idea to reduce IV extravasation arose from root-cause analyses (RCA) of cases of extravasation collected in our hospital Patient Safety Network (PSN) reporting system. The Risk Management department, in conjunction with faculty and residents in the department of ACCM collaborate on the RCA effort. Resident involvement occurs through a practice-based learning course that was recently developed as part of an 18-month curriculum at the Johns Hopkins Medical Institutions. Resident education, dictated by the Accreditation Council for Graduate Medical Education (ACGME) outlines six core competencies that all residents are expected to demonstrate: a) patient care, b) medical knowledge, c) practice-based learning and improvement, d) interpersonal and communication skills, e) professionalism, and f) systems-based practices. The program to reduce IV extravasation helps providers achieve these competencies and improve patient safety.

Solution.
Our solution will be implemented in January and February of 2011. The initial step is to assess current anesthesia provider knowledge about the proper administration of vesicants and treatment of IV extravasation through a survey made up of questions and information taken from the Johns Hopkins Hospital Policies Online and current medical literature. Next, a presentation will be delivered to anesthesia providers in a Grand Rounds setting with the purpose of educating colleagues about vesicants. Following the presentation, the original survey will be readministered to anesthesia providers to assess learning. A chart with a compiled list of vesicants and recommended dilutions and rates of infusion will be used as a resource in the operating room and resident handbook to prevent the occurrence of IV extravasation in the hospital.

Measurable Outcomes.
Results will include an assessment of provider knowledge prior to the Grand Rounds educational session, as well as changes in provider knowledge after the educational session. Compliance with proper vesicant administration will be followed through random sampling of provider practices and tracking of medication administration through the electronic intraoperative anesthesia data recording system. In addition, a review will be conducted of any reported IV extravasation cases and management strategies to determine if recommendations and/or hospital policies have been followed.

Sustainability.
Solutions will be sustained with continued support from the ACCM and Risk Management Departments at JHMI. In addition, new residents and anesthesia providers will continue to receive education on the prevention of IV extravasation.

Role of Collaboration and Leadership.
The departments of ACCM and Risk Management have collaborated to identify the harms associated with vesicant drug administration devise this solution to prevent IV extravasation. Students in the ACCM program for Quality, Patient Safety, and Risk Management, as well as human factors engineers, also help to ensure the success of this effort.
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