Chapter 23
Intraoperative Coagulopathy

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Problem

The morning started like any other. The day was sure to be busy because you are supervising a resident in two back-to-back cases and you are also the lead cardiac anesthesiologist responsible for overseeing the daily workflow for the service. Your first case is a 68-year-old male with triple vessel coronary artery disease and normal heart function scheduled to undergo coronary artery bypass grafting. This is your resident's second rotation through cardiac, so you're hopeful this "normal EF CABG" will be a straightforward case for him. Induction and line placement go very smoothly. The surgical fellow quickly takes down the left IMA, setting a personal record. The patient transitions on and off cardiopulmonary bypass without any difficulty. After evaluating the grafts, the surgeon asks for the radio to be turned to their favorite 80's rock station with the volume turned up. She directs your resident to give protamine and you step out to deal with administrative duties. It seems you have only been gone for a few minutes when you get a call from your resident—the surgeon is frustrated because of ongoing bleeding. The radio is now off—a bad sign—and the surgeon is asking about the coagulation studies and none too nicely. A messy end to what seemed a perfectly smooth case. Your resident hung platelets and FFP which seemed only to upset the surgeon more—the patient's preoperative hematocrit was 41% and up to now he has received no blood products. Hurling yourself into the breech, you speak up asking the surgeon what's wrong only to be confronted with a brusque "does the field look wet to you?" You ask the resident to run another ACT and hurry back. Things seemed to be going so well. What a way to start the day. The result of the ACT is 453 s.

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Solution

As you look at the anesthesia workstation, the problem at hand becomes evident. Sherlock Holmes has nothing on you! Vials of heparin and protamine, which are similar in appearance, lie side by side on the workstation. Upon further inspection you identify that the protamine vial is unopened while a half-full vial of heparin is on the anesthesia tray. You ask the resident about your observation who then acknowledges he may have inadvertently administered additional heparin instead of protamine. You notify the surgeon immediately and proceed with protamine administration. The bleeding improves, a repeat ACT is 120 s, and everyone relaxes. Not a disaster, just a near miss.

Discussion

Medication errors in anesthesia, often referred to as adverse drug events (ADEs) or adverse drug reactions (ADRs), include administration of the wrong drug, dose, concentration, repetition of administration or omission of critical administration. The incidence may exceed 5%, These errors can lead to potential life-threatening adverse events. Literature on this topic is limited and largely driven by self-reporting, thus underrepresenting the true incidence. Various factors contribute to error including distraction, inattention, haste, lack of familiarity or experience with a medication, and lack of communication. Similarities in medication packaging and labeling have also been identified as potential causes. Certain drugs may look alike-sound alike (LASA). New technologies are in place including bar-code assisted medication systems which have improved safety outside the operating room and demonstrate promise intraoperatively.

In this case, inadvertent heparin administration led to ongoing coagulopathy and bleeding, noticed by the surgeon, despite a directive to administer protamine. The team appropriately performed repeat analysis and a review of the processes (checking medication vials) which raised the suspicion of medication error. Although the patient remained hemodynamically stable, transfusion and the associated risks may have been avoided had protamine been correctly administered. This incident did not result in injury, but there was a potential for harm.

The definition of what constitutes harm often prompts the conversation of whether patient disclosure of error is warranted. Most would agree errors leading to serious adverse events or outcomes must be disclosed. There is less consensus among providers when errors pose a potential for harm. Apprehension regarding disclosure is often related to fears of subsequent patient mistrust and litigation, yet research has shown the opposite is true. Transparency and immediate disclosure will foster the patient-physician relationship and may provide valuable information that prompts process improvement to prevent similar errors from recurring. Transparency in turn depend upon the existence of a safe culture within the

operating room that allows disclosure without shame. This is the key to establishing a learning environment that optimizes team performance, making the team even more than resilient. It is anti-fragile!

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