

**Quality Improvement Activity: High Risk Heparin**

A 36-year-old female was admitted to the surgical ICU from the emergency department with evidence of increased intracranial pressure. Following a STAT CT scan, the patient began to exhibit signs of Cushing's Triad. The neurosurgeon decided to do a bedside EVD to relieve the pressure on the patient's brain. After the drain was placed, the patient was stabilized and then taken to surgery to remove a colloid cyst that was blocking the drainage of her left ventricle. After coming back from surgery, the neurosurgeon ordered her to be on a daily dose of heparin and daily monitoring of her anti-Xa to ensure that her EVD would not form a venous thromboembolism. For the following 24 hours, the patient's anti-Xa stayed within the normal range of 0.5-1.2. During shift change, the night nurse stated that she was not able to get an anti-Xa level drawn on the patient due to lack of time. The day nurse said not to worry about it, she could get it done. While the nurse was going to deliver the patient's morning meds, she forgot that she needed to check the patient's anti-Xa before administering her morning dose of heparin. After administration, she told herself that she would redraw the blood after she gave her other patient their medication. When the nurse came back into the patient's room, she noticed severe facial droop, slurred speech, and left-sided weakness. She initiated a code stroke, and the patient was taken down to a STAT CT. The CT scan showed a massive hemorrhagic stroke due to a ruptured vessel. The patient's anti-Xa was sent to the lab stat, and the level was 2.4. The patient was given protamine sulfate, and sent to the OR to undergo endovascular coiling.

**In what way did the patient care or environment lack? Is this a common occurrence?**

In the scenario above, the patient was put on daily heparin to try to avoid venous thromboembolisms. When a patient is in the critical care area and on high-risk heparin, their Anti-Xa level should be very closely monitored to ensure that they are not receiving too much heparin and that their body is processing it well. If it is not, they are at an increased risk of excessive bleeding. In this scenario, the patient's anti-Xa level went unchecked, which resulted in a massive bleed in her brain. This was a total lack of patient care which resulted in a life-threatening incident. The nurse should have checked the patient's anti-Xa level before ever giving another dose of heparin. Although we cannot know if the blood vessel would have ruptured if the anti-Xa levels were within the normal range, it can be assumed that the magnitude of the stroke was a direct result of the amount of heparin in the patient's blood. If the nurse knew what the patient's anti-Xa level was, she would have held the morning dose of heparin which would have stopped the stroke from becoming so massive.

**Which circumstance led to the occurrence?**

The circumstance which directly led to the occurrence was the nurse not checking the patient's anti-Xa level before administering the morning dose of heparin.

**In what way could you measure the frequency of the occurrence?**

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I believe that an easy way to measure the frequency of this type of incident occurring is reviewing charts. By seeing how often the patients who are on heparin have a hemorrhagic stroke, and then checking how often the patients on heparin anti-xa levels were checked, you will get a better idea of how well high risk heparin is being monitored. In general, any patient on high risk heparin should have their anti-xa level checked on time and before heparin can be continued to be administered. Another way you can gauge how often these levels go unchecked is to interview the nurses who work on the floor. As a nurse in a leadership role, you could also observe the nurses on the floor and see first-hand how often they are checking the patient's anti-xa level.

**What evidence-based ideas do you have for implementing interventions to address the problem?**

I believe that there should be a safe check within Epic before administering heparin. In meditech, the nurse would have to manually input the patient's lab value to ensure that it was within the normal range. If the nurse had to do this on Epic, no nurse would ever administer heparin without first having an anti-xa level. I also think that anytime heparin is ordered, there should automatically be an anti-Xa level ordered an hour before administration, so that the nurse is reminded that they need to check the level before. Lastly, I believe that people change the way they do things when they are taught the reasoning behind it. I think that a continued education course should be utilized to ensure that each nurse understands the importance of monitoring these levels while the patient is receiving heparin.

**How will you measure the efficacy of the interventions?**

I believe the most effective way to measure the efficacy of the intervention is to monitor how accurately the patient's anti-xa levels are monitored. You can do this by reviewing patients' charts who are on heparin. You can also have an ongoing count of how many patients on heparin have an excessive bleeding incident, and if their anti-Xa level was checked before the incident happened.