

Ask the Clinical Instructor

A Q&A column for those new to the cath lab

**Questions are answered by:
Todd Ginapp, EMT-P, RCIS, FSICP**



Todd is the Cardiology Manager for Memorial Hermann Southeast in Houston, Texas. He also teaches an online RCIS Review course for Spokane Community College, in Spokane, Washington, and regularly presents with RCIS Review Courses.

Question 1: “We have some physicians that want to use a heparinized flush system during heart catheterizations, and some others that do not care. Which is correct?”

Whether you use heparinized flush on your table or not is likely a decision based upon physician preferences. There is not an evidenced-based resource that I can find on this topic. However, if we apply some common sense, we can see that heparin-based flush could be considered in the patient’s best interest.

Years ago, catheters did not have a good anti-thrombotic coating. Heparin was actually administered to patients even for simple diagnostic cases (see the next question). We don’t see too many clots at the catheter tip, or on the catheter itself, because of these properties of current catheters.

For those of you who do not use heparinized saline flush, you could try a couple of simple experiments that might show you why heparin flush could be beneficial.

A Sheath Experiment

At some point during your case (after a few minutes without flushing the sheath), withdraw 10ccs of flush from the sheath and gently discharge it into a 4x4. It is highly likely that you will see a few clots in that waste. Heparinized flush is intended to help reduce the formation of clots. Remember, if you can see a clot, there are many more microscopic clots likely to be present.

A Wire Experiment

Normally, most people will leave their diagnostic ‘J’ wire in the bowl on the table. Some may actually wipe it down and set it on the drape to use for their catheter advancements. At the end

of the case, straighten out the ‘J’ and look up and down the wire. You will possibly see some drops (or maybe even clots) of blood all along the wire. The ‘J’ wire is a tiny wire wrapped around a bigger wire. When we straighten it, we are actually compressing the coiling of that wire to get the ‘J’ out of the end. Any blood in those grooves will be squeezed out. You might actually need a magnifying glass to be able to see the blood.

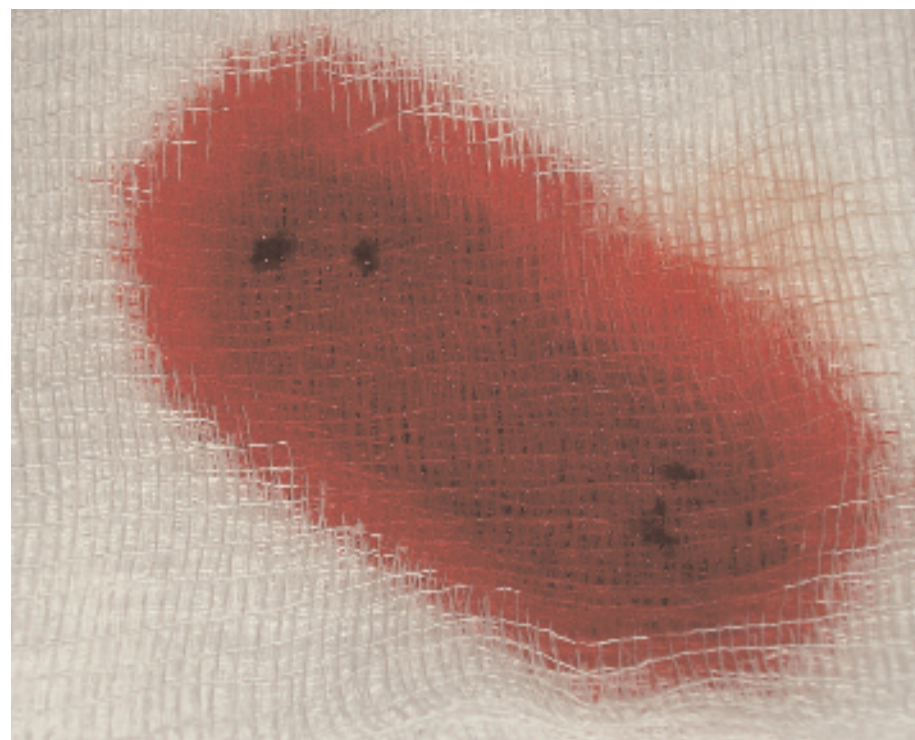
The use of heparinized saline flush is intended to reduce both of these occurrences, as well as reduce the chance of clot formation on the wire and the catheter while it is in the body. While I have seen many different concentrations of heparinized saline systems, the most common appears to be 2 units of heparin per 1ml of saline. At this concentration, what little makes it into the body is inconsequential.

Question 2: “Half of our cardiologists want to administer a heparin bolus prior to the diagnostic catheterization, and the other half do not. Is there a reason that they are, or are not, administering heparin in these cases?”

Again, this is mainly physician preference. As mentioned in the last question, technologies have advanced. Not only is equipment becoming more and more anti-thrombogenic, but diagnostic cases are also becoming shorter in duration.

To answer the question, I will offer a couple of quotes from common catheterization textbooks:

“Intravenous unfractionated heparin is no longer required during routine coronary arteriography. If the patient has disease that requires



Here we can see small clots obtained during a “waste” removal from a sheath a few minutes after the diagnostic procedure was completed. While these small clots are visible, there will likely be others not visible. The use of heparinized saline flush can certainly help to decrease the size of these clots. Question: If you or a physician do not draw back a waste syringe before flushing a sheath, where do you think these clots go after you flush the sheath?

prolonged use of catheters and wires in the central circulation, heparin may be considered.”¹

“Heparin is recommended for patients in whom a prolonged (>20 minute arterial time) catheterization procedure is anticipated...in most medical centers, additional heparin (beyond that included in heparinized flush solution) is omitted from routine left-sided heart catheterizations when the procedure is performed in a timely manner.”²

“Although the use of heparin is mandatory for interventional or prolonged diagnostic procedures, most laboratories have abandoned the use of systemic heparinization for simple diagnostic catheterizations, here the complications are extremely low with or without heparin.”³

Summary

I believe no evidence-based approach to these two questions exists, because there haven’t been the studies to confirm/disprove anything discussed above. Short of that data, each physician will approach each of these issues based upon education and experience. Just understand, that there does not appear to be a “right” or “wrong” way to approach these issues. n

References

1. Libby P, Bonow RO, Mann DL, Zipes DP. *Braunwald’s Heart Disease: A Textbook of Cardiovascular Medicine*, 8th ed. Philadelphia: Elsevier Science; 2007.
2. Kern M, ed. *The Cardiac Catheterization Handbook*, 4th ed. Philadelphia, PA: Mosby, An Affiliate of Elsevier Science, 2003.
3. Baim DS, ed. *Grossman’s Cardiac Catheterization, Angiography, and Intervention*, 7th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2006.



Palur Balakrishnan, MD

Dr. Balakrishnan began his career in invasive cardiology many, many (I’ll stop there) years ago. He states, “When I began training, we were still performing diagnostic catheterizations by the brachial cut-down method. Heparin was given to prevent distal thrombus development during the procedure.”

“When the Judkins technique was introduced, we began to do more catheterizations through the femoral artery,” he continued. “We would routinely give heparin and then

reverse it after the procedure with protamine.” When asked about his change in practice to currently not administering heparin during a routine diagnostic catheterization, he said “In the mid-80’s, we stopped routinely administering heparin. No one really knows why we stopped, other than there was not a difference in complications between giving it and not giving it.”

Dr. Balakrishnan echoes that “there aren’t any studies to prove or disprove the routine use of heparin during routine cardiac catheterizations.” He notes, “Theoretically, any time heparin is in the body, it can create bleeding issues, most of which could be managed with protamine in the diagnostic setting.”