

Ready, Set, Close!

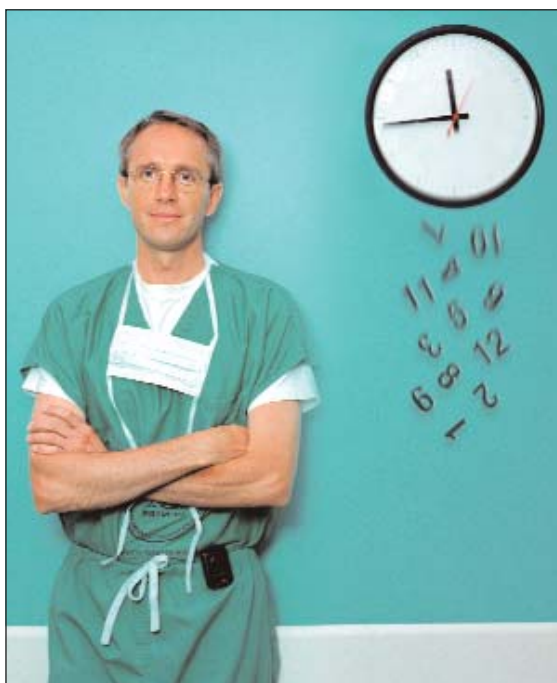
How incorporating closure devices streamlined our practice (and our lives).

BY JAMES F. MCGUCKIN, MD, AND KIMBERLY PARKINSON, MSN, RN

It was around 5:30 PM and I had just finished my eighth vascular case of the day. I still had five sheaths to pull, and the ACT of the case I had just finished was around 230 seconds. I left standing orders for the nurses to check the ACT every half hour and to page me when it was less than 180 seconds. I started off for the Same Day Surgery Unit with my angio caddy that included 4x4's, saline, peroxide, benzoin, bandages, white tape, suture scissors, and gloves. I figured that at 15 to 20 minutes per sheath removal hold, 5 minutes of postcompression observation, and a postprocedure note per patient, I would be leaving the hospital again at around 7:45 PM. At about 8:00 PM on that typical day, 15 minutes late because of repeat groin compression related to oozing, I left the hospital. As I walked toward my car, I reminded myself that I had to return to discharge the Same Day Surgery patients by 7:30 AM the next day to fulfill my hospital, physician, and insurance-related obligations.

THE BREAKING POINT

I was building an interventional practice, growing the caseload from three diagnostic studies per day to at least five interventional cases per day, on top of the previously existing diagnostic workload. I was growing the practice as a dedicated interventional radiologist through referrals from family practitioners, interventional cardiologists, nephrologists, and the vascular



surgeons. As the practice grew, the day got only a little bit longer because I honed my skills further and we learned as a team to turn the single C-arm room over faster. But what was wrong with this picture? Physician assistants did not yet exist in radiology. Nurse practitioners had just entered the hospital and the large cardiology and surgical groups had begun to employ them. The IR nurses, who were all critical care certified and experienced, were not permitted to pull arterial lines. The "line puller" of the hospital was dedicated to the cardiology catheterization laboratory.

I was exhausted. I needed help, and I had no idea where to turn. Occasionally, my partners would help pull a few lines before the end of the day, but they had diagnostic radiology responsibilities and had not made the puncture. Then one day a sales representative from a large company asked if I had ever heard of an arterial closure device. I had not heard of the subject at that point, but I can assure you my interest was piqued. Instantaneous closure—how do I sign up? In order to be certified to deploy the devices by myself, I had to complete a training period of five cases. Fortunately, those five cases came the first day. Once I was certified, I closed almost every case that had a 6-F sheath or greater, and I did it when the ACTs were still elevated. I even closed every postthrombolysis case when the PTTs were therapeutic and the lytics had been recently discontinued. The patients did well and usually went home

the same day, except those who were undergoing anti-coagulation after thrombolysis. Patients also ambulated the same day after intervention. I stopped getting paged constantly in the afternoon and early evening resulting from ACT values from all of the different units. I even started going home earlier and my dictations were current.

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Although device delivery failure, vessel occlusion, bleeding, infection, and pseudoaneurysms can occur, I believe these risks can be minimized. Care in choosing the site of arterial puncture, adherence to strict aseptic technique, and attention to device delivery protocol are all critically important to successful hemostasis with a closure device.

IMMEDIATE IMPACT

Closure devices have changed the immediate postinterventional period of patient care, specifically in the area of mobility. Patients are able to move after only a brief period of inactivity. Most patients are able to ambulate within an hour of device deployment, despite therapeutic heparinization levels and without regard to ACTs. Patients are not required to lie flat on stretchers or beds for 4 to 6 hours. Patient discomfort is decreased, while satisfaction is increased, and hospital personnel and recovery space is maximized by shorter recovery periods and earlier discharge times.

Postdeployment complications of closure devices are minimized through strict adherence to delivery protocols. Puncture site infections can be greatly reduced with adherence to strict aseptic procedures. Puncture site selection should include observation of skin integrity and the absence of pre-existing skin lesions. The area should be prepared with careful attention to avoid any risk of site contamination. At my institution, all personnel in the vicinity of the procedure table wear face-masks, gowns, and OR caps. Diabetic patients are also given prophylactic antibiotics. Cautious aseptic practices may effectively decrease site complications.

Patients need to be informed that they may have a small lump in their groin area for 4 to 6 weeks while the plug or hematoma is being absorbed, depending on what device is being utilized. Additionally, patients will need to know what should be done if spotting or bleed-

ing occurs after discharge. Finally, patients need to be reminded to remove the bandage the following morning and wash the area. These instructions will reduce complications and patient complaints.

The arterial access site choice is very important. Care should be taken to access the vessel below the inguinal ligament and above the bifurcation of the femoral artery. The size of the vessel and degree of arterial calcification are also important factors. Most importantly, however, is that if device delivery is unsuccessful, manual compression can still be performed over the femoral head to gain hemostasis.

Each arterial closure system has its own device-specific deployment technique. Expertise is gained on a particular system over the course of many deployments. Each device is associated with its own inherent device system-related complications. The postangiography care team needs to be well educated in the specific device-related adverse complications so that they can be vigilant.

Communication with the postoperative care team is also critical in successful closure device practice. Notification of device deployment will assist the postoperative care team to plan appropriate interventions, including monitoring for site bleed, ischemic changes, early ambulation, and patient/family teaching.

AND IT COULD HAPPEN FOR YOU

Closure devices have changed my professional life. They have also changed the immediate postintervention period for my patients. Additionally, I am better able to plan my daily schedule, which improves both my professional and personal life. Although there are many devices presently on the market, I have taken care to learn to use a few them well. I have my personal device preferences related to minimal tract and puncture site dilation, as well as ease of use and tactile feedback. I strongly encourage my colleagues to take the time out of their hectic schedules to become proficient using at least of the one closure systems. ■

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