

Access Site Problems Encountered More Frequently Today as Procedures Become More Complex



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Welcome to the June edition of *Vascular Disease Management*. I have chosen to comment on Dr. Gupta and colleagues' article on the utilization of an absorbable gelatin foam mixed with iodinated contrast to seal a life-threatening rent in a femoral artery associated with profound hypotension. The technique that was utilized, including delivery catheters, occlusion balloons, and preparation of the injectate is described in detail. The authors relate that they had utilized the same technique previously to successfully treat a case of a coronary artery perforation during an interventional procedure.

I have chosen to comment on this article as I think that this technique has great potential merit in treating patients with dangerous bleeds secondary to invasive procedures. Although I have never utilized gelatin foam, I have interventionaly treated patients with coils, thrombin injections, prolonged balloon inflations, and covered stent grafts presenting with life threatening bleeds following invasive procedures.

Every invasive procedure begins with vascular access and ends with some means of closing that access site. Historically manual pressure was the typical means of achieving hemostasis. More recently access closure tools have been developed to aid in closing arterial puncture sites. Although there are many access closure tools available, none are universally successful, and some may have associated risks such as vascular occlusion or infection. None of these tools close inadvertent back wall sticks or sites where a sheath may have kinked during the procedure resulting in an incomplete seal with the vessel. None of these tools can treat cases where there has been operator error with inadvertent loss of the access site. No access closure tool is designed to close wire perforations.

Access site problems are being encountered more commonly as interventional procedures are increasingly being utilized when treating patients with complex vascular problems. These treatments often require large bore devices, stiff guidewires, and aggressive anticoagulation. The vessels being accessed are frequently severely diseased with little or no elastic recoil.

These patients are often infirmed with little ability to compensate hemodynamically with even minimal blood loss. Failure to stop the bleeding quickly may result in hypotension and hemodynamic collapse. Extreme pain, precipitation of myocardial ischemia, and the need for transfusion may occur with access site bleeding. Long term patency of the treated vessel is diminished in patients with significant access site bleeding.

Because all invasive procedures begin and end with access, interventionists must be meticulous in trying to avoid bleeding complications. Clearly ultrasound guided access utilizing small bore needles is preferable. The common femoral artery must be accessed below the inguinal ligament and above the bifurcation. Posterior wall puncture should be avoided. The smallest sheaths allowable for treatment success should be utilized. Wire advancement should be monitored to avoid wire perforations. The level of anticoagulation should be determined before sheath removal. In my opinion operators must treat vascular access with utmost attention in every invasive procedure.

If there is suspected bleeding I believe that immediate angiographic assessment is preferable to sending the patient to first have computerized tomographic imaging. Angiography discerns if there is ongoing bleeding and it discloses the culprit if active. In the majority of cases bleeding can be stopped by inflating a balloon across the bleeding site at low pressures for 8-10 minutes. In some cases more aggressive definitive action is required.

The technique described by Dr. Gupta is unique. This technique allowed closure of a large femoral arterial rent. It may allow successful treatment of wire perforations of very small arteries. Before there is generalized adoption of this technique, operators must be cognizant that there are no large studies with this method. Potential early and late complications are not fully understood. Randomized controlled trials are virtually impossible as major access site bleeds are life-threatening complications requiring immediate action. The best treatment of access site complications remains prevention.