Randomized clinical trials have demonstrated that four different sealing or suturing devices can shorten hemostasis time, reduce the discomfort of manual or mechanical compression and allow for earlier ambulation without increasing peripheral vascular complications after cardiac catheterization and percutaneous coronary interventions.\(^1\)\(^-\)\(^4\) Whether the mechanism of action of these devices is a mechanical suturing or collagen stimulation of hemostasis combined with a "plugging" or "sandwiching" of the arteriotomy, each provides adequate sealing of the puncture site until the natural healing process occurs. Table 1 summarizes the techniques and material utilized for each of these Food and Drug Administration-approved devices.

**Second-generation devices.** In an attempt to develop devices which are safer and more "user-friendly", each of these devices has gone through considerable modification and improvement such that second-generation devices have now been released. For example, more precise delivery of a collagen "plug" is now possible with the VasoSeal ES device, which utilizes a temporary wire anchor as compared to the original needle depth measurement technique. Likewise, the improvement and downsizing of the AngioSeal device has simplified its ease of use. The Perclose suturing devices are also smaller and easier to use with the release of the Closure system and its knot-tying apparatus. Several other manufacturers are also developing and initiating clinical investigation of suture type closure devices (X-Site, Sutura, etc.). Thus, the suture approach to access site closure will continue to mature in the next few years.

The most recently approved device, Duett, is not simply another collagen sealing device, but rather employs a concept of mixing two biochemicals, collagen and thrombin, in an attempt to create a better "seal" and stimulus for hemostasis than collagen alone. With the introduction of the Duett sealing device, it is clear that emphasis will now be placed on creating a rapid biochemical or hemostatic bond at the arteriotomy site which will form an adequate temporary seal until fibrosis occurs and arteriotomy closure is complete. If the hemostasis process can be stimulated to occur faster or to yield a stronger or more complete seal of the arteriotomy with these new biochemical approaches, then these devices may represent an improvement over the current collagen sealing devices.

**Conclusions.** Each approach for arterial access site closure after cardiac catheterization or percutaneous coronary intervention, whether it be sealing or suturing, will undoubtedly be available in the future, and it may that certain anatomical or clinical situations will favor one device over another. There certainly will be operator preferences; however, the device or devices that can provide a simple approach and reliable hemostasis will have the greatest acceptance.

**References**