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## DISCUSSION

**Dr Peter Gloviczki** (*Rochester, Minn*). I enjoyed very much, Dr Jayaraj, your presentation. It's a fantastic experience and obviously a very low rate of stent occlusion. Could you tell us about what factors affect stent occlusion. Is it the size of the stent, is it the poor inflow, or maybe other factors? That's my first question.

The second is: Could you suggest to us a technique how to reopen a chronically reoccluded iliac or iliofemoral venous stent.

**Dr Arjun Jayaraj**. Thank you, Dr Gloviczki. To answer your first question, there are many variables that play into occlusion of a venous stent. Stent size is one, and it is important to size the stents appropriately before placement. Intravascular ultrasound can be very helpful in this regard. We use luminal areas as opposed to the luminal diameter to determine necessity of intervention. We use cutoffs of

125, 150, and 200 mm for normal luminal areas for the common femoral, external iliac, and common iliac veins, respectively. Any area below the aforementioned values in a symptomatic patient merits intervention.

Other factors that govern stent occlusion include inflow into the stent and the outflow from the stent, besides development and extent of in-stent restenosis and stent compression. Stent compression is unique to venous disease and denotes development of fibrotic tissue around the stent. Risk factors for development and prevention have yet to be understood. In-stent restenosis is another problem. We typically have used cilostazol in our patient population to reduce the incidence of in-stent restenosis based on protective literature in other vascular beds.

Treatment of patients who develop either of the two—strength compression or in-stent restenosis—is



hyperdilation, dilating the stent with a balloon of caliber larger than the size of the stent. The overwhelming majority of these patients respond well to the same.

To answer your second question regarding recanalization, our workhorse for recanalization is the 0.035 Glide-wire and 0.035 Glidecath. In excess of 95% of cases, we are able to get through with just the two. Rarely, we have to use the Quick-Cross or a TriForce catheter. Once one gets wire recanalization across the occluded stent, angioplasty is pursued with a large-caliber balloon, typically an 18-mm one.

**Dr Mark Meissner** (*Seattle, Wash*). Very nice presentation, Dr Jayaraj. I have two questions for you. The first is that you reported pharmacomechanical thrombolysis to be the most common intervention. How many of these required restenting in addition to balloon angioplasty? and did those patients fare worse?

And second, how does your group follow iliac venous stents? Do you image them with duplex and do you have any parameters that would suggest impending stent failure? It's my impression that although we follow these very closely with ultrasound, we rarely find any harbingers of stent failure before such an event.

**Dr Jayaraj**. Thank you, Dr Meissner. To answer your first question, typically if the stent is undersized, usually those

patients are referred from elsewhere. We have to fracture the stent, and we typically do it using a large-caliber balloon and then reline the whole venous segment.

Now, if the stents are of adequate caliber, then we recanalize the stented vein, as I previously described. Oftentimes it's necessary to extend the stent stack down to the femoral confluence so that you have good inflow. Sometimes you pick up outflow lesions that you did not notice initially, in which case you have to extend the stent proximally. But for an adequately sized stent that is placed in a venous segment, we don't reline the whole stented segment.

With regard to your second question regarding follow-up, if they are initial stent patients, they typically get seen with a duplex study the day after the operation and subsequently at 2 and 4 weeks. Thereafter, a follow-up is actually determined by what the extent of disease is in those stents. Sometimes we follow them every 4 to 6 weeks. If they are stable for the first couple of duplexes, then we phase them out to every 3 months or so.

For our recanalization patients, be it occluded native vein recanalization or stented vein recanalization, we follow them more closely using the protocol previously noted.