Utility of the Direxion™ Torqueable Microcatheter in Challenging Cases

BY ILAN RZADKOWOLSKY-RAOLI, MD

A microcatheter is an essential tool in an interventionist's armamentarium. We are fortunate to have a bounty of low-profile catheters to choose from today, most of which display an assortment of the qualities ascribed to a successful device: good torque response, distal flexibility, kink resistance, fluoroscopic visibility, low stretch, high pressure, and the ability to easily pass materials, including guidewires and embolic materials. Each of us has a favorite; however, this preference is mostly derived from default experience during training and availability in the face of tight financial constraints during practice rather than from real-world testing of each device.

One of the most widely used microcatheters has been the Renegade HI-FLO™ System from Boston Scientific. It is truly a workhorse, able to navigate tortuous vessels and retain a measure of torqueability and trackability. I confess it was my go-to microcatheter throughout most of my career. Because of my fondness for it, I eagerly jumped at the chance to put the Direxion™, the newest microcatheter from Boston Scientific, to the test.

Billed as the "world's first truly torqueable microcatheter," it is constructed from a slotted, nitinol hypotube. The proximal cuts are farther apart to retain pushability, while the distal slots are closer together to sustain flexibility. This unique shaft contributes to its smooth trackability, as it easily navigates twisting vessels and acute branches without the buckling (and loss of access), which lengthens procedure times and increases radiation exposure. Four different preformed tip configurations are available, further facilitating superselective manipulation.

I submit here two sample cases where this singular tool allowed me to successfully complete therapy where other microcatheters failed.

CASE 1

A 65-year-old man with large hepatocellular carcinoma (HCC) occupying segments 7 and 8 of the liver presented

Figure 1. A celiac angiogram showing active extravasation of contrast from a posterior branch of the right hepatic artery supplying the HCC. Note the poor perfusion to the remaining liver due to systemic low blood pressures.

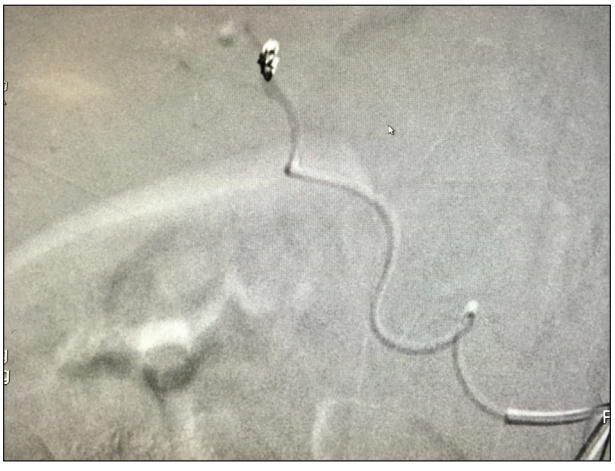

Figure 2. Angiogram taken during coil embolization, showing traversal of the difficult turn and the superselective position of the catheter tip.

Results from case studies are not necessarily predictive of results in other cases. Results in other cases may vary.

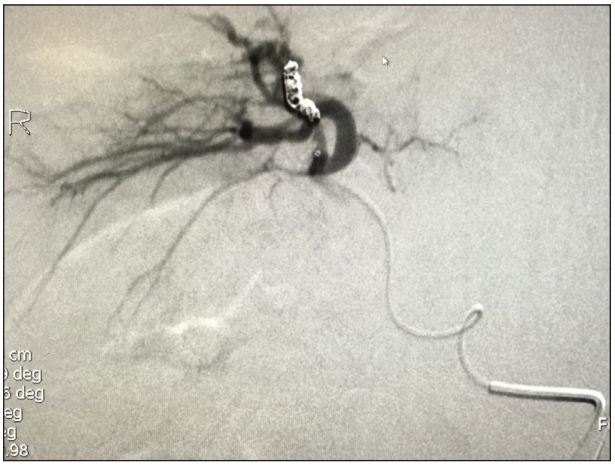

Figure 3. Final angiogram showing successful exclusion of the ruptured artery.

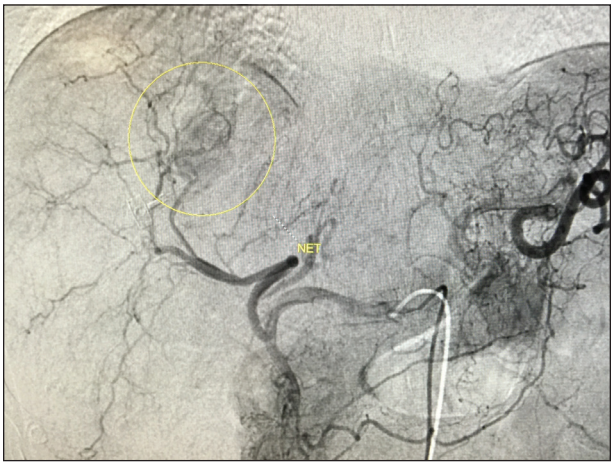

Figure 4. A celiac angiogram showed faint tumor blush near the dome of the liver with hepatic arterial supply derived from both segment 7 and 8 branches. Note the bend of the proper hepatic artery after the GDA and the severe, near-180° angulation of the right hepatic artery distal to the left hepatic artery take-off.

with rapid decompensation with hypotension, tachypnea, and a 6-g/dL drop in hemoglobin in 12 hours. A quick noncontrast CT scan showed evidence of tumor rupture with a large amount of hemoperitoneum. A celiac angiogram showed active extravasation of contrast from a posterior branch of the right hepatic artery supplying the HCC (Figure 1). There was poor perfusion to the remaining liver due to systemic low blood pressures.

The first twist after the tip of the guiding catheter just before the gastroduodenal artery branch is a very acute turn, reversing almost 135° on itself. Another microcatheter would not make this turn without kicking out the guiding catheter. This was the first case in which I was able to use the Direxion™ Microcatheter.

After the tight loop was surpassed (Figure 2) while maintaining guiding catheter placement, three more turns were navigated, including another relatively sharp angulation at the branching of the offending artery. Most other small-bore catheters would have surrendered their torqueability after the first turn. Gaining this position was the key to successfully prosecuting the case (Figure 3).

CASE 2

A 57-year-old woman with a history of primary neuroendocrine tumor of the colon was treated with hemicolectomy. A metastatic lesion straddling segments 7 and 8 of the liver had been previously treated with percutaneous thermal ablation (both radiofrequency and microwave) with partial success. The patient presented for bland embolization.

A celiac angiogram showed faint tumor blush near the dome of the liver, with hepatic arterial supply derived

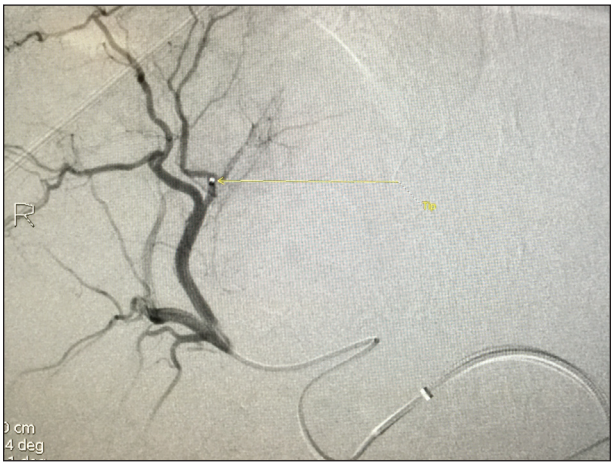

Figure 5. A superselective angiogram from the segment 8 hepatic artery after embolization of the medial branch.

from both the segment 7 and 8 branches (Figure 4). There was severe bend of the proper hepatic artery after the gastroduodenal artery and near-180° angulation of the right hepatic artery distal to the left hepatic artery takeoff. This second flexure could not be crossed with a conventional microcatheter without buckling the support catheter.

Embolization of the medial branch was performed (Figure 5). This position was gained using the Direxion™ Microcatheter, which did not yield trackability despite the unfavorable anatomical bend of the proximal right hepatic artery.

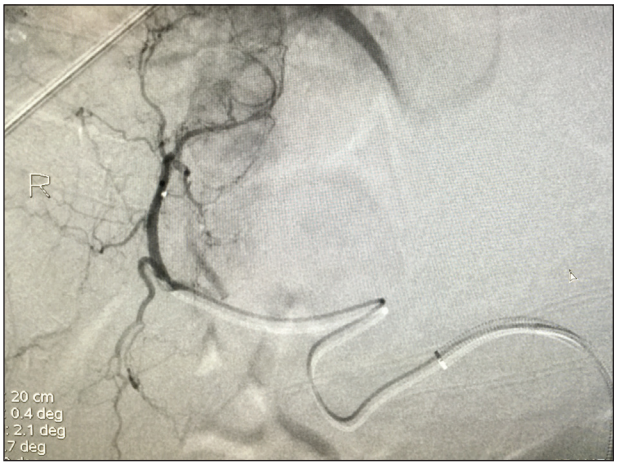

Figure 6. A superselective angiogram from the segment 7 hepatic artery at a different position than Figure 5. There is tumor blush medially. The mouse pointer shows the general location of the catheter tip, seen as a dark spot slightly distally.

Figure 7. Completion celiac angiogram showing successful embolization of the tumor-feeding arterial branches with stasis of contrast and cast of vessels.

A superselective angiogram from the segment 7 hepatic artery showed tumor blush medially, and preparation was made for embolization (Figure 6). Again, this location was attained despite power-bleeding anatomy. Embolization of the tumor-feeding arterial branches was successful, with stasis of contrast and cast of vessels (Figure 7).

DISCUSSION

The cases in this article illustrate the capabilities of the Direxion™ Microcatheter to outperform most other examples of its class. With its unmatched torqueability and trackability as a consequence of its unique shaft design, as well as its slick feel due to its lubricious outer coating, the Direxion™ is rapidly becoming my first choice for slightly challenging anatomy. Add to this mix the array of tip configurations and both high-flow and low-profile diameters, and there is no location that cancer is safe! ■

Ilan Rzadkowolsky-Raoli, MD, is with Palmetto General Hospital in Hialeah, Florida. He has disclosed that he received no compensation related to this article and is not a consultant to Boston Scientific Corporation.