

CASE STUDY

Repositioning Direxion™ Without a Wire in Two Advanced Embolization Cases

BY R. DANA TOMALTY, MD



Figure 1. CT showing acute extravasation from the spleen and a large subcapsular bleed.

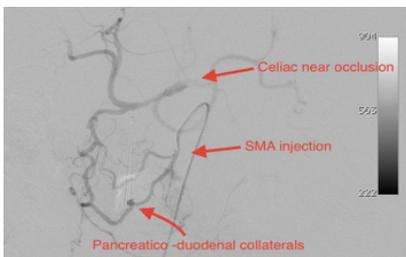


Figure 2. Angiogram showing retrograde filling of the splenic artery through pancreaticoduodenal collateral branches.

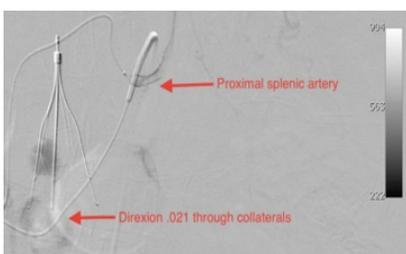


Figure 3. Angiogram showing the Direxion™ Microcatheter moving through the pancreaticoduodenal collateral branches to the proximal splenic artery.

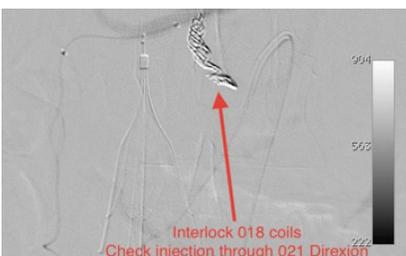


Figure 4. Angiogram showing a nest of Interlock™-18 Detachable Coils that have occluded the vessel.

CASE 1

Presentation

An 85-year-old woman fell down some stairs at her home and was brought to the hospital for treatment. She was on warfarin-sodium tablets and her prothrombin time was high (PT-INR of 3). She presented with moderate hypotension, alleviated by fluids and blood.

A quick CT showed acute extravasation from her spleen with a large subcapsular bleed (**Figure 1**). The trauma surgeon asked for a proximal splenic embolization while they prepared the patient for a laparoscopic splenectomy.

Procedure Description

On initial angiography, the origin of the patient's celiac artery was nearly occluded, and it could not be cannulated to access the splenic artery. Instead, we accessed the superior mesenteric artery (SMA) and performed an injection, which demonstrated retrograde filling of the splenic artery through pancreaticoduodenal collateral branches (**Figure 2**).

With diagnostic access in the SMA, we then placed a preshaped 0.021-inch (0.53 mm) Direxion™ Microcatheter into the vessel and maneuvered predominantly without wire guidance to avoid causing any spasm through the collaterals to the origin of the splenic artery. Due to the impressive flow rates of the 0.021-inch (0.53 mm) Direxion™ Microcatheter, we were able to obtain a good angiogram (**Figure 3**). Once we reached our target, we placed several Interlock™-18 Fibered Detachable Coils at the origin of the splenic artery. The stable nature of the Direxion™ Microcatheter allowed us to create a precise, dense pack of coils at our intended location. The good flow rates of Direxion™ allowed us to then get another good check with a postembolization angiogram (**Figure 4**). Finally, angiography was completed with a diagnostic catheter injection (**Figure 5**), which demonstrated complete occlusion of the splenic artery. Upon completion of the embolization procedure, the patient had an uneventful laparoscopic splenectomy.

Discussion

The torque characteristics of the Direxion™ Microcatheter provided by the outer layer of nitinol as well as its soft-shaped tip allowed us to maneuver the catheter predominantly without wire guidance and without causing spasm in this case. These features are unique to the Direxion™ Microcatheter, and its other features, including excellent flow rates and a stable platform for coiling, helped to make this case possible.

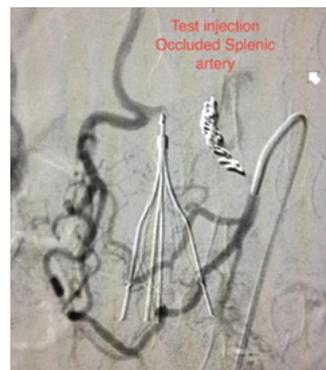


Figure 5. Completion angiogram showing complete occlusion of the splenic artery.



Figure 6. CT angiogram demonstrating active extravasation with a massive hematoma.

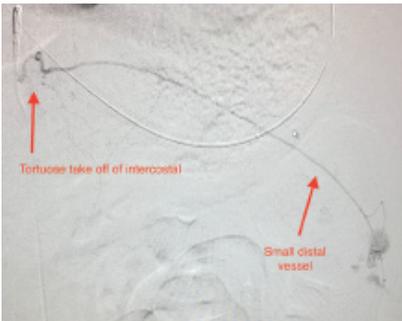


Figure 7. Angiogram of the intercostal artery.

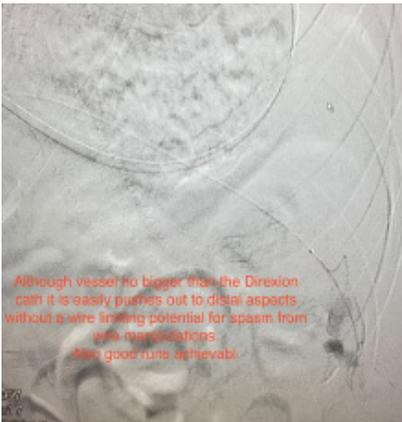


Figure 8. Despite the very small size of the vessel, the Direxion™ Microcatheter moves easily out to the target location without the use of a guidewire.

CASE 2

A 66-year-old woman presented to the hospital after a motor vehicle accident with active extravasation in her left lateral chest wall, requiring massive transfusions. On CT angiography, she demonstrated active extravasation with a massive hematoma (**Figure 6**).

Procedure Description

We quickly engaged the intercostal artery with a reverse-curve Mickelson diagnostic catheter and performed an injection (**Figure 7**), which showed a very small and distal vessel with a sharp takeoff. Intercostal arteries are prone to spasm, but we had to access and embolize the bleed. We placed a 0.021-inch (0.53 mm) Direxion™ Microcatheter through the Mickelson catheter and successfully cannulated the intercostal vessel. The Direxion™ Microcatheter moved easily without a wire, which we elected to do to avoid the risk of wire-induced spasm. We moved very distal with Direxion™ and were still able to perform good injections in the small vessel (**Figure 8**). Embolization was performed (**Figure 9**), and the patient stabilized.

Discussion

The Direxion™ Microcatheter has great torqueability and pushability, which allows for distal access in very small vessels without the need for a wire. This technique to reposition the catheter tip without a wire reduces the risk for spasm and possible perforation of the vessel. Once in a distal vessel, the ability to get good injection volumes for excellent angiographic visibility is important, and this can be achieved with Direxion™. Finally, the stability of the Direxion™ Microcatheter is also ideal for coil and other embolizations with little risk of catheter displacement.

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Figure 9. Postembolization angiogram

DIREXION™ AND DIREXION HI-FLO™

CAUTION: Federal law (USA) restricts this device to sale by or on the order of a physician. Rx only. Prior to use, please see the complete "Directions for Use" for more information on Indications, Contraindications, Warnings, Precautions, Adverse Events, and Operator's Instructions.

INTENDED USE/INDICATIONS FOR USE: The Direxion and Direxion HI-FLO Torqueable Microcatheters are intended for peripheral vascular use. The pre-loaded Fathom and Transend Guidewires can be used to selectively introduce and position the microcatheter in the peripheral vasculature. The microcatheter can be used for controlled and selective infusion of diagnostic, embolic, or therapeutic materials into the vessel. **CONTRAINDICATIONS:** None known **WARNINGS:** • Never advance or withdraw an intravascular device against resistance until the cause of resistance is determined by fluoroscopy. Movement of the microcatheter or guidewire against resistance may result in damage or separation of the microcatheter or guidewire tip, or vessel perforation. • This Direxion Microcatheter family is not intended for use in the coronary vasculature or neurovasculature. • The Direxion HI-FLO Microcatheter is not designed for the delivery of embolic coils. • Use of excessive force to manipulate the microcatheter against resistance can cause a fracture in the nitinol shaft. Take care not to over-torque the microcatheter, and to relieve any tension before withdrawal by rotating the microcatheter in the opposite direction. **PRECAUTIONS:** • This device should be used only by physicians thoroughly trained in percutaneous, intravascular techniques and procedures. • Do not introduce the microcatheter without guidewire support as this may cause damage to the proximal shaft of the catheter. • Because the microcatheter may be advanced into narrow sub-selective vasculature, repeatedly assure that the microcatheter has not been advanced so far as to interfere with its removal. **ADVERSE EVENTS:** The Adverse Events include, but are not limited to: • Allergic reaction • Death • Embolism • Hemorrhage/Hematoma • Infection • Pseudoaneurysm • Stroke • Vascular thrombosis • Vessel occlusion • Vessel spasm • Vessel trauma (dissection, perforation, rupture)

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