Broken Sheath Tip Retrieval from AV Graft using Embolectomy Catheter.

- Joachim “Kim” Hertel, M.D., Nephrology Associates PC, Augusta, Georgia

Case Report

- A hemodialysis (HD) patient presents with thrombosis of her right upper arm brachial-axillary graft.
- Thrombectomy is performed by placing an anterograde venous directed 7x11 sheath and using Angiojet rheolytic therapy in the venous limb of the graft followed by angioplasty of the culprit venous anastomotic stenosis using a 8x8 Conquest (CQ) balloon. Then a retrograde 7x11 arterial directed sheath is placed and the arterial plug is pulled into the lumen of the graft.
- Then the plug is macerated with the 8x8 CQ balloon using pressures to 15 atm as it is trapped at the arterial sheath and flow is established.

Arterial 7x11 Sheath Fragmentation

- The 7x11 arterial directed (retrograde) sheath must have been damaged during angioplasty maceration of the arterial plug. In the process of pulling the arterial directed sheath it broke off leaving the tip behind with blood shooting out of the cannulation site of the graft.
- Manual pressure was applied immediately on the graft outflow and the cannulation site to trap the fragment and control bleeding.
- Angiogram was performed to diagnose location of sheath tip while still applying manual pressure.

Different Techniques for Trapping of Fragment

- Occlude outflow manually or using balloon (causes increased bleeding from the cannulation site)
- Occlude inflow manually or using balloon
- Apply external pressure on the fragment
- Stick one or more needles into the outflow of the graft to serve as sieve
- Immobilize fragment by sticking a 21 g needle into the graft and through the fragment seems to be the best method as it pins the foreign body and prevents thrombosis of the graft
Trapping of Fragment using Balloon occluding Graft Outflow

- Arterial directed Sheath puncture Site occluded by Finger tip

Magnification – No Contrast

Trapping Balloon

Fragment dislodges into the Lumen of the Graft
- Threading a wire through the cannulation site into the orifice of the broken fragment did not work due to collapse of the orifice induced by the angioplasty and twisting of the sheath. Thus the lumen of the proximal sheath tip was occluded.
- The attempt to thread a wire into the lumen of the fragment caused the broken sheath tip to dislodge. The fragment is now free within the lumen of the graft.
- Therefore the cannulation site was closed with a Z-stitch using 3-0 Nylon and a button and hemostasis was achieved.

Cannulation of Fragment using Ministick Kit
- After failure to rethread a wire in retrograde direction the anterograde direction was attempted as the orifice on that side was undamaged.
- The graft was cannulated with a Ministick kit and the lumen was successfully cannulated.
- 5F Cannula was introduced into the lumen of the Fragment and the 0.018 wire was exchanged for 0.035 wire.
- 5F Cannula was exchanged for a 9F sheath.

Retrieval of Fragment with Mosquito and Threading Guidewire

UNSUCCESSFUL

- Broken Arterial Sheath
- Fragment End in Graft Wall

Mosquito Forceps
Trapping Balloon

Benston Wire

Control Bleeding from Cannulation Site using Z-Stitch and Button
- Dislodged Fragment now free in Lumen of Graft
- Button and Z-Stitch

Trapping Balloon

Anterograde Cannulation using Ministick Kit
Sheath Tip cannulated with Ministick using 0.018 wire

5F Cannula into Orifice of Lumen and through the Fragment

9F Sheath in Graft with 0.035 wire through the lumen of the fragment

Fragment Retrieval using Embolectomy Catheter
- Snares are typically used to retrieve foreign bodies. We decided to attempt retrieval with the materials that already were on the table.
- After it was determined that a 7F sheath tip could fit into a 9F sheath it was decided to attempt pulling the fragment into the 9F sheath using an embolectomy catheter. This did not work due to lack of perfect alignment.
- Gently pulling the 9F sheath out of the graft while also pulling on the embolectomy balloon caused the fragment successfully retrieved.

Fragment trapped by over-the-wire Embolectomy Catheter

Retrieval of Fragment
The fragment follows the 9F Sheath out of the Graft
Final Procedure Steps

• After fragment retrieval the 9F sheath is placed back into the graft and angiogram is performed.
• Wall-adherent clots and venous anastomotic stenosis are angioplastied again using the 8x8 CQ Balloon and final angiogram is satisfactory.
• 7F venous sheath and 9F sheath are removed using Z-stitch and button.
• Procedure is over.