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How I Do It: Thrombosed Arteriovenous Graft Resulting from a Crushed Stent in a Nonambulatory Hemodialysis Patient

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There are several reports of externally deformed, crushed, or collapsed metallic intravascular stents (1–11). Endovascular approaches to the resultant stenoses or thromboses have achieved restoration of blood flow in select cases, including hemodialysis access (10). Described below is a case of a thrombosed arteriovenous graft (AVG) that resulted from external compression and subsequent collapse of a previously placed stent. The technique used to restore patency to the graft has not been described in the previous literature.

Case Report

An 83-year-old patient with end-stage renal disease (ESRD) on hemodialysis presented with a thrombosed left upper extremity arteriovenous graft (AVG). The patient was unable to ambulate independently and relied on her grandson to lift her from her wheelchair. On examination, the AVG was superficial and thrombosed.

A thrombectomy was performed by initially passing a catheter over a wire to the central veins, and an angiogram was taken as the catheter was pulled back towards the AVG (Fig. 1). The angiogram showed a crushed intravascular stent just proximal to the venous anastomosis. Another stent was seen just distal to the crushed stent. The patient underwent successful expansion of the proximal stent and dilatation of the vein with a 7 × 4 mm balloon (Fig. 2). Thrombectomy of the AVG using standard techniques was successful (Fig. 3).

Discussion

Several options exist for percutaneous revascularization of a collapsed or crushed metallic intravascular stent. One report describes bilateral iliac artery stent collapse and intervention with angioplasty balloon dilation (11). The authors concluded that since the pressure gradient measured across both stented segments was 0 mmHg, no further intervention was necessary (11). Another report describes a similar technique in a hemodialysis access. In this case, manipulation of a guide wire across the collapsed stent was followed by predilation of the stent with a PTA balloon measuring 6 mm × 4 cm, and then deployment of a self-expandable stent within the lumen of the previously collapsed stent. This series of interventions was followed by mechanical thrombolysis to achieve patent venous runoff by angiography (10).

Our case is the first published report of revascularizing an occluded hemodialysis access circuit in the setting of a crushed bare-metal stent by inflation of an angioplasty balloon within the lumen of the stent, without subsequent restenting. In performing the procedure, the operator must be cautious not to allow the guidewire (and subsequently the angioplasty balloon) to traverse the struts of the stent. In addition, the operator must ascertain if the stent has been

merely bent, or if it is truly broken. If the latter is the case on fluoroscopic evaluation, it may be safer to deploy a covered stent in the broken stent prior to balloon dilation, in order to avoid rupturing the balloon on the potentially sharp struts that may protrude into the vascular lumen.

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Fig. 1.
(A) A crushed intravascular stent is seen; (B) magnified view of initial angiogram by pull-back.

Fig. 2.
Successful angioplasty of self-expanding stent.

Fig. 3.
Final angiogram following successful thrombectomy.