Minibasket for Percutaneous Embolectomy and Filter Protection Against Distal Embolization: Technical Note

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Abstract. As an alternative approach to thrombectomy in peripheral arteries, a miniaturized Dormia basket was designed which is attached to a 0.021 inch guidewire and can be introduced coaxially by a 3F thin-walled catheter. The device was applied successfully in 6 patients: for percutaneous thrombectomy in 5 patients with peripheral embolization during angioplasty and as a protective filter during thrombectomy in 1.

Key words: Thrombectomy, percutaneous—Dormia basket, miniaturized

Emboli of thrombotic material during balloon angioplasty of peripheral arteries may be removed surgically [1] or dissolved by intraarterial thrombolysis [2]. Alternatively, percutaneous removal by aspiration thrombectomy [3] and, more recently, by use of several rotating embolectomy devices [4–8] has been described. In order to simplify further percutaneous removal of embolic fragments, we developed a miniaturized Dormia basket.

Materials and Methods

The device (W. Cook Inc, Copenhagen, Denmark) is designed as a helical Dormia-basket made from eight ultrathin stainless steel wires which are soldered to a 0.021 inch guidewire (Figs. 1, 2). The soldered parts of the basket are highly radiopaque thus facilitating identification under fluoroscopy. The 0.021 inch wire is 145 cm long and runs in a 125-cm long 3F thin-walled Teflon catheter. The assembled system can be inserted through any 1 mm (0.038 inch) lumen catheter. After withdrawing the outer 3F catheter for about 2 cm, the basket opens to a diameter of 6 mm and an unconstrained length of 14 mm. Its distal part ends in a floppy tip of 20 mm length.

Clinical Results

The system was applied clinically in 6 patients. In 5 patients, the minibasket was used for percutaneous embolectomy, in 1 patient as a protective filter.

Percutaneous Embolectomy

In 1 patient with a short occlusion of the left superficial femoral artery (case #1), a small thrombus was detached by balloon angioplasty and embolized to the peroneal artery (Fig. 2A). The embolic material was removed with a single basket pass (Fig. 2B) and extracted through a 9F introducer sheath.

A second patient underwent recanalization of an occluded 14-cm long femoral endoprosthesis (Wallstent, Schneider-Medinvent Inc, Lausanne-Switzerland) with an 8F Simpson atherectomy catheter. At the completion of the procedure, the angiogram showed multiple tiny wall-adherent particles distal to the stented segment which did not embolize as blood flow was blocked by the 9F introducer sheath. To prevent dislodgement of the particles,
Fig. 1. Detail of the miniaturized 8-wire Dormia basket inserted through a 3F Teflon catheter. The assembly is introduced through a 9F sheath (arrows).

Fig. 2. Clinical application of the device (case #1). A Complete occlusion of the left peroneal artery (arrow) by a single embolus during balloon angioplasty of a short-segment superficial femoral artery occlusion. B After insertion of the minibasket (curved arrow), the embolus is removed and patency of the peroneal artery (straight arrow) is completely restored.

Fig. 3. A Embolic occlusion of the right superficial femoral artery (curved arrow). A minibasket is placed distally as a protective filter (#1, arrowhead). B A second basket (#2, arrowhead) is placed proximal to the first (#1, arrowhead) for thrombus removal. C After completion of the procedure, the vascular lumen is fully restored (open arrow).