たな動注用CDDP製剤の登場も，動注の適応を広げる可能性がある。一方，動注の長期成績は併存する肝硬変の関与も大きいため，延命に寄与したデータは得られておらず，いずれのレジメも標準的治療と評価される段階には至っていない。今後も多様化が予想される動注療法の真価を得るには，科学的な臨床試験による検証が必要と考えられる。

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Micronester: A New Pushable Fibered Microcoil for Embolotherapy

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Abstract

A prototype 0.018 pushable fibered microcoil with an extended length of 14 cm was developed and used successfully for the first time to treat a patient with bilateral varicocele. This new coil provides immediate cross-sectional occlusion when "nested" into a densely packed coil mass. Potential uses of this new microcoil are discussed.

Key words: Varicocele—Pulmonary arteriovenous malformation—Microcatheter—Microcoil

Pushable fibered coils have been used as the primary occluding device for pulmonary arteriovenous malformation (PAVM) and varicocele, as well as many arterial occlusions [1–4]. Fibered stainless and platinum coils (0.035 inch) are commonly used for venous and arterial occlusion. They are readily advanced through standard angiographic catheters with 0.035–0.038 inch inner diameters (ID).

The development of microcatheters in the late 1980's led to a need for fibered microcoils with a 0.018 ID. A variety of excellent fibered 0.018 inch platinum microcoils, with varying diameters, are available from many manufacturers.

Our experience occluding PAVM with a standard 0.035 inch fibered platinum coil with diameters ranging from 4–12 mm and an extended length of 14 cm was reviewed recently [3, 4]. This long coil is packed into a tight 1 cm nest, producing cross-sectional occlusion of a vessel, analogous to the type of cross-sectional occlusion obtained with a detachable silicone balloon. The purpose of this report is to describe our first usage of this long-fibered microcoil, developed to pass easily through microcatheters with 0.018–0.024 ID.

Case Report

A 37-year-old man was referred to us because of scrotal pain. An ultrasound study revealed bilateral varicocele. Transcatheter embolotherapy was performed for symptom control. Through a 7-F sheath placed in the right femoral vein, a 7-F specially shaped varicocele catheter (Hopkins Gonadal curve; Cordis, Miami, FL, USA) for left-sided varicocele and a 5-F standard Simmons I curved catheter (Glidecath; Boston Scientific, Natick, MA, USA) for right-sided varicocele were used as guiding catheters. As the orifice of both the right and left internal spermatic vein (ISV) was unusually narrow, a microcatheter (Fas Tracker 325; Boston Scientific, Natick, MA, USA) with 0.024 inch endhole was coaxially advanced distally into both ISVs. 4-mm and 6-mm 0.018 Micronester Coils (Cook, Bloomington, IN, USA) with 14 cm extended length were placed in four different sites of the left ISV in addition to a single site in a collateral vein, and three sites in the right ISV (Fig. 1). These coils were deployed by two different techniques: "wire push" using a coil-pusher (Trupush; Cordis, Miami, FL, USA) and "squirt technique" by vigorous flushing with saline using a 1 ml luer lock syringe. Additionally, 4 and 6-mm 0.035 Nester Coils (Cook, Bloomington, IN, USA) were placed proximally within 2 cm of the entrance into both ISVs through a 5F catheter.

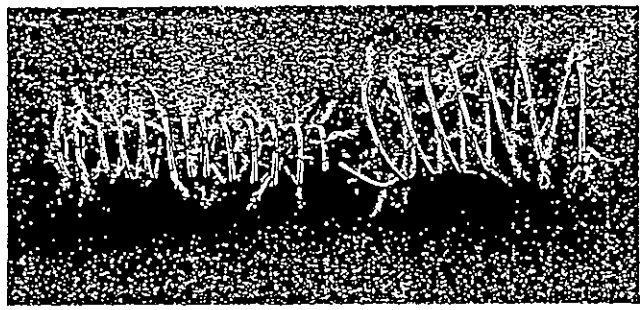

Figure 1. Prototypes of 4 mm (left) and 8 mm (right) 0.018 Micronester Coils (Cook, Inc.) are shown. The extended length is 14 cm in both Synthetic fibers (Dacron) are attached transversely along the core wire.

Totally, eight 4-mm and six 6-mm Micronester Coils were used; all were successfully deployed through the microcatheter at each occlusion site. No coil was stuck in the microcatheter and no coil migration was observed during the procedure. Better "nests" of Micronester Coils were obtained when they were deployed by wire push technique rather than the "squirt technique" (Fig. 2). Complete occlusion of both ISVs was confirmed on post-procedure DSA. This patient had an excellent result without recurrence.

Discussion

Pushable fibered microcoils are generally favored for occluding arteries and veins of the body over non-fibered mechanical or electrolytic detachable coils because of ease of use and thrombogenecity of the former and the larger cost of the latter. The new extended length microcoil described in this report permits tight nesting (packing) and immediate cross-sectional vessel occlusion. Potentially, less coils are needed per occlusion than with the currently available pushable fibered microcoils.

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Figure 2. A 37-year-old man with bilateral varicocele underwent coil embolotherapy. Through a 7 F sheath in the right femoral vein, a 5 F Simmons 1 curved catheter was placed at the orifice of the right ISV. A 0.024 ID microcatheter, FasTracker 325, was coaxially advanced for coil deployment. (a) Micronester Coils (4 and 6 mm) were deployed by squirt technique in the distal right ISV through the microcatheter. (b) At the proximal level, 4 and 6 mm Micronester Coils deployed by wire push technique show better "nests" (arrow) compared with those deployed at the distal and middle levels by the squirt technique.

The Micronester has appropriate length and fiber content, which preserves easy pushability through microcatheters with a 0.018–0.024 ID. The use of a pusher wire to advance and deploy the Micronester through the endhole while gently moving the microcatheter back and forth allows tight packing into a 1 cm coil mass. In this first report, we used either 2 or 3 Micronesters at each level of the ISV, but quite possibly good long-term occlusion could be obtained with 1 or 2 coils/occlusions site. We also noted that better packing of the Miconester was obtained by deploying it with a pusher wire than by the "squirt technique."

As with all platinum microcoils, the radial force of the Micronester is much less than stainless steel coils. They are not suitable for deployment in the proximal portion of a high flow fistula unless 4 or 5 cm of the initial coil is first "anchored" (deployed) in a side branch proximal to the fistula.

The Micronester, like other pushable microcoils, is not suitable for occlusion of a narrow neck aneurysm like those occurring in the cerebral circulation. It may be ideal though for trapping a "false aneurysm" by occluding an artery distal and proximal to the arterial injury. Standard micro "Tornado" or "Vortex"-shaped pushable fibered coils should still be used in instances when one more coil is necessary and there is less than a 1 cm length of the vessel remaining to be occluded.

Conceivably, the new extended length microcoil might have additional applications for use in arterial trauma, occlusion of the gastroduodenal artery for peptic ulcer disease, or potentially for packing the gastroduodenal artery distal to a reservoir indwelling catheter [5].

Addendum

Since submission of this technical note, additional "bench testing" has been done with 0.027 ID microcatheters (Renegade HI-FLO (Boston Scientific, Natick, MA, USA) and Mass Transit (Cordis, Miami, FL, USA)). The micronester will not deploy dependably with standard coil-pushers through large ID microcatheters. The micronester will deploy well through these newer large end hole microcatheters using an 0.025 TFE-coated Newton LT (Cook, Bloomington, IN, USA).

This new coil deploys equally well by the "squirt" technique through all microcatheters with lumens of 0.021–0.027.

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