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#### **TITLE**

Results of a novel therapeutic approach based on a modified "Cho-Do type IIIb AVM": Insights from the Korean Referral Vascular Anomalies Center.

#### **BACKGROUND**

The 'Cho-Do' angiographic classification type IIIb arteriovenous malformation (AVM) is characterized by the presence of multiple hypertrophied fistulae directly linking arteries to veins. Traditionally, therapeutic interventions for this AVM subtype involved transarterial (TA) or direct puncture (DP) ethanol embolization. However, our observations revealed a considerable number of feeding arteries entering into the vein walls and intricate vascular connections among these arteries. Consequently, we propose a modified concept of type IIIb AVM treatment, emphasizing venous coil embolization followed by ethanol injection from the venous side into feeding arteries. In order to assess the safety and efficacy of this innovative treatment strategy, a retrospective study was conducted.

#### **METHODS**

Type IIIb peripheral AVMs were retrospectively reviewed and patients were divided into transarterial embolization (old) group and venous coil embolization followed by ethanol injection (new) group. AVM characteristics, embolization techniques including embolic materials and access techniques, number of treatment sessions, angiographic outcome, and procedure related complications were reviewed.

#### **RESULT**

A total of 117 type IIIb AVM patients (55 males, median age 27 years, interquartile range; 18-36 years) were enrolled in this study. They underwent a total of 515 procedures. Forty one were new group (172 sessions) and 76 were old group (343 sessions). Demographics and AVM characteristics were not different in both groups. New groups showed significantly higher treatment outcome (36/41 [88%] of over 90% of lesion improvement) than old group (39/76 [51%]) ( $p=0.001$ ). Total treatment sessions (4.2 sessions per patient vs. 4.5 sessions) and use of ethanol amount (129ml vs. 141ml) were lower in new the group, however, there was no statistical significance. Procedure-related complications were significantly lower in new group (18/171, 11%) than old the group (80/342, 23%) ( $p=0.001$ ).

#### **CONCLUSIONS**

We proposed a modified concept of 'Cho-Do' type IIIb AVM treatment. The application of this modified approach exhibited improved treatment outcomes and reduced complications compared to the conventional embolization technique.

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