



BRIEF REPORT

Radiation-Induced Rectangular Alopecia after Endovascular Embolization of Cerebral Aneurysms: The Necessity of a Comprehensive Study on Its Incidence and Critical Radiation Doses

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Dear Editor:

Endovascular embolization is the treatment of choice for cerebral aneurysms¹. It is performed under fluoroscopy for visualization of vascular lesions, which can cause a significant amount of radiation to penetrate skin and hair. Rarely, radiation-induced alopecia showing distinct clinical features occurs after cerebrovascular intervention. We

report 2 cases of radiation-induced rectangular alopecia that occurred on the same day.

A 55-year-old male patient presented with a 6-day history of an asymptomatic rectangular-shaped alopecic patch on the occipital and nuchal area (Fig. 1A). He underwent endovascular embolization of an unruptured dissecting aneurysm on his right vertebral artery (Fig. 1B) 2 weeks be-

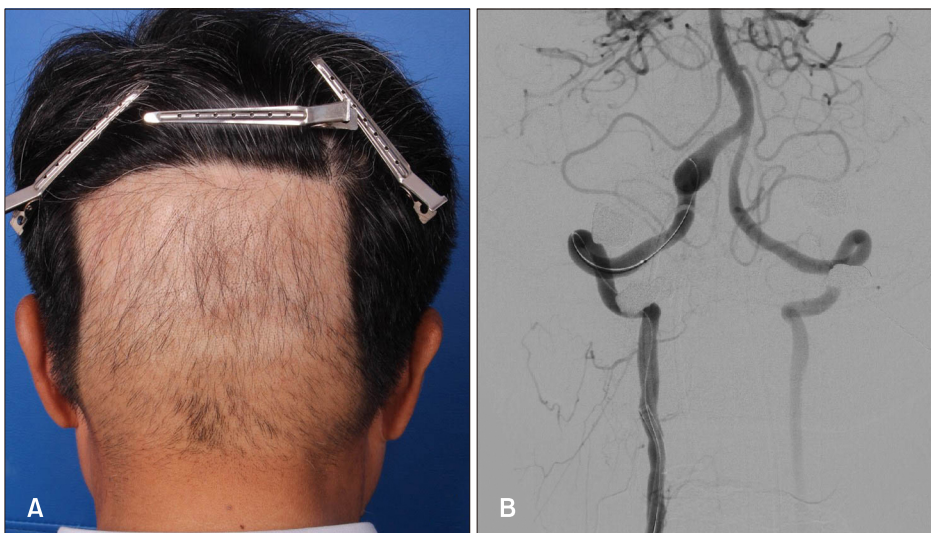


Fig. 1. Case 1. (A) Initial presentation of patient and (B) fluoroscopic view of the aneurysm on the right vertebral artery.

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Fig. 2. Case 2. (A) Initial presentation of patient and (B) full regrowth of hair on the alopecic area after 4 months. (C) Fluoroscopic view of the aneurysm on the anterior communicating artery.

fore the hair loss. The alopecic area showed marked reduction in hair density and was sharply outlined from an uninvolved area. The openings of hair follicles were preserved. The patient was kept under observation and given topical minoxidil. After 5 months, the alopecic patch was fully restored.

A 49-year-old male patient visited Wonju Severance Christian Hospital because of abrupt hair loss on his vertex and occipital area that started 9 days before (Fig. 2A). He underwent endovascular embolization of a ruptured aneurysm on his anterior communicating artery (Fig. 2C) as an emergency operation, prior to the patient of the first case but on the same day, 2 weeks before the occurrence of alopecia. The alopecic patch was non-scarring and rectangular-shaped with clear demarcation. After 4 months of using topical minoxidil, full regrowth of hair was observed (Fig. 2B).

Ionizing radiation causes radiation damage preferentially to the actively dividing matrix cells in anagen hair. Temporary and permanent alopecia could occur at radiation exposures exceeding approximately 3 and 7 Gy, respectively¹. Both cases showed unique clinical features that indicated that they were radiation-induced. First, they had definite margins, which could be mistaken as shaved. Second, the densities of hair are evenly reduced throughout the alopecic patches, sparing some proportion of hair that is theoretically thought to be of telogen phase. The locations of the two patients' alopecic patches were consistent with the levels of the vascular lesions. Conversely, the difference in height between the patients' alopecic lesions was probably due to the difference in irradiation level for the best visualization of the vascular lesion. In terms of radiation doses, both patients have received 4.2 and 5.7 Gy of total fluoroscopy doses in frontal views, respec-

tively. However, there are no comprehensive researches on average radiation exposures during the procedures or critical values of radiation dose in developing radiation-induced alopecia². Even there were no published studies on the incidence of skin complications after radiation exposure in modern endovascular neurosurgery. Although a few cases of alopecia associated with cerebrovascular intervention have been reported³⁻⁵, our two cases presented a sharply demarcated, and rectangular-shaped alopecia after endovascular embolization. As seen in these cases, radiation-induced alopecia occurring after endovascular embolization of cerebral aneurysms has characteristic clinical presentations. Thus, an accurate history and a clinical suspicion are decisive for the diagnosis. Moreover, comprehensive studies about incidence and radiation doses in post-radiation alopecia are required.

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CONFLICTS OF INTEREST

The authors have nothing to disclose.

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