

# Ultrasonographic Characteristics of Carotid Artery after Cervical Radiation

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## Abstract

**Purpose:** We examined the characteristics of carotid ultrasound findings in patients receiving cervical radiotherapy and compared with control cases with combined risk factors.

**Subjects and Methods:** Fifteen patients (age,  $71 \pm 7$  years, 12 males) with history of cervical radiation among those evaluated by carotid artery ultrasonography from April 2012 to March 2014 at our hospital were included in the study. Background clinical data on duration after radiotherapy, original disease, hypertension, dyslipidemia, diabetes, smoking, and cerebral infarction were investigated. Maximum intima-media thickness (IMT), plaque properties, stenosis, and plaque score were determined by carotid ultrasonography. The propensity score-matching method was used to determine control cases and adjust the influence of confounding factors for comparison with patients who received cervical radiation.

**Results and Discussion:** Six (40%) of 15 patients developed cerebral infarction after cervical radiotherapy, and more than 5 years had passed since radiation therapy. Plaque properties by carotid ultrasonography in patients receiving cervical radiotherapy had noticeable clinically vulnerable plaques such as ulcerative, low-echoic, and cautionable plaques, and significant stenosis were found frequently. By carotid ultrasonography, the IMT increase was observed in several carotid artery sites including the common carotid artery, which is rarely affected by arteriosclerosis, compared with the control cases determined by the propensity score-matching method. These findings suggested that radiation therapy was associated with changes in carotid pulse echogenic properties.

**Conclusion:** Carotid ultrasound findings after cervical radiation therapy were examined to characterize the range of changes including plaque formation and stenosis in bilateral carotid arteries, especially the carotid arteries. Changes were observed in the carotid arteries due to radiotherapy, instability, and stenosis of the vessel wall may progress over time, and regular follow-up by ultrasonic examination is necessary in these patients.

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