

# Radiation-Induced Carotid Artery Stenosis: What Nurses Need to Know

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**BACKGROUND:** Radiation therapy (RT) to the neck is used to treat malignancies such as cancers of the head and neck and lymphomas. Although RT improves survival rates and health outcomes in patients with cancer, it can contribute to late effects, including radiation-induced carotid artery stenosis (RI-CAS). Comprehensive cancer survivorship care includes detection, surveillance, and management of RI-CAS.

**OBJECTIVES:** This article provides an overview of the incidence, risk factors, detection, surveillance, and management of RI-CAS in cancer survivors.

**METHODS:** A literature search was conducted using PubMed®, Embase®, and Web of Science for articles published from January 2008 through June 2022. Search terms included *carotid stenosis*, *radiation therapy*, and *cancer survivors*. This updated review includes content from older references, which serve as a literature-based foundation for the clinical care of cancer survivors at risk for or diagnosed with RI-CAS.

**FINDINGS:** CAS is a long-term sequela of RT to the neck and can lead to serious complications. As part of a cancer survivorship plan of care, nurses monitor patients for RI-CAS so that survival rates and patients' quality of life improve.

## KEYWORDS

carotid artery stenosis; survivorship;  
cancer survivors; radiation therapy

## DIGITAL OBJECT IDENTIFIER

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IN 2006, THE INSTITUTE OF MEDICINE AND THE NATIONAL RESEARCH COUNCIL published the book *From Cancer Patient to Cancer Survivor: Lost in Transition*, which stated that cancer survivors were “lost in transition,” with no clear guidelines about how to provide care for them (Hewitt et al., 2006). Since then, healthcare organizations and government agencies have continued to develop guidelines to improve cancer survivorship care. One component of survivorship care is the prevention, detection, and surveillance of long-term effects, as well as interventions relating to the consequences of cancer and its treatments (Ross, 2018). Cancer treatments such as chemotherapy, immunotherapy, and radiation therapy (RT) have contributed to an increase in survival rates among patients with cancer. However, these treatments also have side effects and adverse effects. Nurses and other clinicians provide long-term surveillance and management of those side effects.

RT to the neck is used to treat malignancies of the head and neck and lymphomas. RT, with a combination of comprehensive treatments, has improved survival rates and health outcomes in patients with cancer (Yang et al., 2021). However, serious complications resulting from RT to the neck include RT-induced carotid artery vasculopathy and related ischemic strokes (Wilbers et al., 2015). RT can cause microvascular and macrovascular radiation-induced (RI) carotid injury (Yang et al., 2021). RI carotid injury is defined as an RT-induced condition that leads to stenosis or occlusion of the major vessels, which can result in carotid artery stenosis (CAS) (Groarke et al., 2014). The North American Symptomatic Carotid Endarterectomy Trial and the European Carotid Surgery Trial classified CAS occlusion as follows: mild (0%–29%), moderate (30%–69%), severe (70%–99%), and totally occlusive (Lancellotti et al., 2013). RT can cause injury and changes to the vessel wall over time and can lead to serious complications. To better manage RI-CAS, nurses can practice from an updated knowledge base, which includes an understanding of pathophysiologic and arterial changes that may result from RT, RI-CAS prevalence and risk factors, risk reduction strategies, and recommendations for surveillance and treatment.

## Purpose

With a focus on cancer survivors who have received RT to the neck, this article provides a scholarly foundation about RI-CAS, including its characteristics, incidence rate, risk factors, detection and surveillance, and management strategies. In addition, this article will discuss nursing implications associated with RI-CAS clinical care.