

## A Short Note on Post Side Effects of Radiation Therapy

Ramarao Devaruppala \*

Department of Pharmacology, Gokaraju Rangaraju College of Pharmacy, Hyderabad, India

### DESCRIPTION

Late side effects occur months to years after treatment and are usually limited to the treated area. They are frequently caused by blood vessel and connective tissue cell damage. Fractionating treatment into smaller parts reduces many late effects [1].

#### Fibrosis

Irradiated tissues lose elasticity over time as a result of a diffuse scarring process.

#### Epilation

With doses greater than 1 Gy, epilation (hair loss) may occur on any hair-bearing skin. It can only happen within the radiation field/s. A single dose of 10 Gy may cause permanent hair loss, but if the dose is fractionated, permanent hair loss may not occur until the dose exceeds 45 Gy.

#### Dryness

Most radical head and neck cancer treatments exceed the radiation tolerance of the salivary and tear glands, which is approximately 30 Gy in 2 Gy fractions. Dry mouth (xerostomia) and dry eyes (xerophthalmia) can become bothersome long-term issues that significantly reduce the patient's quality of life. Similarly, sweat glands in treated skin (such as the armpit) cease to function, and the naturally moist vaginal mucosa becomes dry after pelvic irradiation.

#### Lymphedema

It is a condition characterized by localized fluid retention and tissue swelling, can result from lymphatic system damage sustained during radiation therapy. It is the most commonly reported complication in breast radiation therapy patients who receive adjuvant axillary radiotherapy after axillary lymph node surgery [2].

#### Cancer

Radiation is a potential cause of cancer, and some patients develop secondary malignancies. Cancer survivors are already

more likely than the general population to develop cancer due to a variety of factors such as lifestyle, genetics, and previous radiation treatment. The rates of these secondary cancers from any single cause are difficult to directly quantify. Only a small percentage of patients were found to have secondary malignancies as a result of radiation therapy, according to studies. These risks will be reduced by new techniques such as proton beam therapy and carbon ion radiotherapy, which aim to reduce dose to healthy tissues. It usually begins 4 to 6 years after treatment, though some hematological malignancies can develop within 3 years. This risk is greatly outweighed in the vast majority of cases by the risk reduction conferred by treating the primary cancer, even in pediatric malignancies with a higher burden of secondary malignancies [3].

#### Cardiovascular illness

As previously observed in breast cancer RT regimens, radiation can increase the risk of heart disease and death. Therapeutic radiation raises the risk of a subsequent cardiovascular event (heart attack or stroke) by 1.5 to 4 times the normal rate, depending on aggravating factors. The dose-dependent increase is related to the RT's dose strength, volume, and location. Radiation-Induced Heart Disease (RIHD) and Radiation-Induced Vascular Disease (RIVD) are terms used to describe late cardiovascular side effects (RIVD). Cardiomyopathy, myocardial fibrosis, valvular heart disease, coronary artery disease, heart arrhythmia, and peripheral artery disease are all symptoms that are dose-dependent. These and other late side effect symptoms can be caused by radiation-induced fibrosis, vascular cell damage, and oxidative stress. Most radiation-induced cardiovascular diseases develop 10 years or more after treatment, making determining causality more difficult [4].

#### Polyneuropathy caused by radiation

Because nerve tissue is radiosensitive, radiation treatments may cause nerve damage near the target area or along the delivery path. Ionizing radiation causes nerve damage in stages, the first of which is micro-vascular injury, capillary damage, and nerve demyelination. Radiation causes uncontrolled fibrous tissue growth, which causes vascular constriction and nerve

**Correspondence to:** Ramarao Devaruppala, Department of Pharmacology, Gokaraju Rangaraju College of Pharmacy, Hyderabad, India, E-mail: ramarao@gmail.com

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compression. Radiation-induced polyneuropathy, ICD-10-CM Code G62.82, affects 1-5 percent of those who receive radiation therapy [5].

Late effect neuropathy can occur in either the Central Nervous System (CNS) or the Peripheral Nervous System (PNS) depending on the irradiated zone (PNS). In the CNS, for example, cranial nerve injury typically manifests as a loss of visual acuity 1-14 years after treatment. Injury to the plexus nerves in the PNS manifests as radiation-induced brachial plexopathy or radiation-induced lumbosacral plexopathy, which can appear up to three decades after treatment.

### **Necrosis caused by radiation**

Radiation necrosis is the death of healthy tissue in the vicinity of an irradiated site. It is a type of coagulative necrosis that occurs when radiation directly or indirectly damages blood vessels in the area, reducing blood supply to the remaining healthy tissue and causing it to die by ischemia, similar to an ischemic stroke. It occurs months to decades after radiation exposure because it is an indirect effect of the treatment.

### **CONCLUSION**

Late side effects usually occur months to years after treatment and are limited to the treated area. Many late effects are reduced

by fractionating treatment into smaller parts. Hair loss, epilation, lymphedema, fibrosis, dry mouth, and eyes can all be long-term problems. Depending on aggravating factors, therapeutic radiation increases the risk of a subsequent cardiovascular event (heart attack or stroke) by 1.5 to 4 times the normal rate. Radiation-induced polyneuropathy affects 1-5% of patients who receive radiation therapy.

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