Skin Injuries from Iatrogenic Fluoroscopy

Do you document the radiation dose to the patient's skin after a procedure so that the cumulative skin dose can be determined?

A 68-year-old man presented with a painful, non-healing ulcer on his back. He had previously undergone percutaneous transluminal coronary angioplasty (PTCA) with a cardiac stent placement and insertion of a pacemaker. He required replacement of the pacemaker and other revision procedures for a total of four procedures that ranged in length from one to eight hours. The ulcer developed within two weeks after the last treatment and had persisted for 20 months. The patient received local wound care and was referred to the burn unit for hyperbaric oxygenation therapy but experienced no improvement. It was not until a year later that he was diagnosed with a fluoroscopic-induced injury. The surgeon performed a wide excision of the ulcer and included subcutaneous tissue to deep fascia. A turnover latissimus dorsi flap was used to cover the defect and then skin grafted. The patient recovered and was healed and free of pain six months after surgery.

In another case, a 58-year-old man underwent PTCA with placement of three cardiac stents. The procedure lasted 90 minutes. Four years later, he had an additional two stents placed, which took a total of 260 minutes. Two years after that, he had three more stents placed during a seven-hour procedure with a total fluoroscopy time of 110 minutes. Two weeks after the last procedure, he developed a skin lesion on his back that remained stable for 14 months, after which the lesion ulcerated and became painful, with pain radiating up and down the patient's spine. The lesion was widely excised down to fascia and closed with a local fasciocutaneous flap. The patient recovered and was doing well at three months after surgery.

Due to an increase in the number and length of fluoroscopy procedures during the last two decades, the incidence of radiation burns to patients has increased. These cases can be difficult to diagnose and are often misdiagnosed. Dermal necrosis may occur at high radiation doses, and late dermal necrosis can occur as long as a year after radiation exposure. Although dosimetry was not used to measure radiation exposure in these cases, based on the tissue damage, the level of radiation likely exceeded 18 Gy (1 Gy = 100 rem). Patients who undergo PTCA are at particular risk because of prolonged fluoroscopy time in addition to the multiple procedures that are often required.

Reference
Radiation-induced hair loss

Are you aware of lesser known adverse effects related to radiation exposure?

A 29-year-old woman was diagnosed with carotid-ophthalmic cerebral aneurysms. Her symptoms included severe headaches, but she had no neurologic deficits. Her treatment included embolization of two aneurysms with a three-month interval in between. Before treatment, she had a normal head of hair.

Two weeks after her initial treatment, she lost hair in the occipital area where the radiation was focused. The area was a 13 cm x 10 cm square patch of almost total hair loss. The scalp was normal and her bilateral occipital and superficial temporal arteries had good pulses. Because the patient was on anticoagulant therapy, her physician did not perform a cutaneous biopsy. The hair regrew, but fell out again two weeks after the second treatment.

The patient’s health care providers believe the hair loss was caused by prolonged exposure to radiation in the same skin area and limited variation in the direction of the application. The localization of hair loss along the scalp margins occurred because this area received the highest doses of radiation.

The patient’s estimated radiation exposure was more than 3 Gy (1 Gy = 100 rem). According to the US Nuclear Regulatory Commission, 0.1 rem (0.001 Gy) is the annual exposure limit for members of the public. The patient’s hair regrew again within four months after the final treatment.

TAKEAWAY

Endovascular procedures are becoming widely used for the treatment of vascular lesions. Perioperative team members should educate themselves on the adverse effects that can occur with prolonged radiation exposure, including those that may occur rarely.