

# Hyperbaric Oxygen Therapy for Hemorrhagic Radiation Cystitis

Alexander Greenstein MD

Department of Urology, Tel Aviv Sourasky Medical Center, Tel Aviv affiliated with Sackler Faculty of Medicine, Tel Aviv University, Ramat Aviv, Israel

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In their study of hyperbaric treatment to control urinary bleeding in patients with radiation-induced hemorrhagic cystitis reported in this issue of *IMAJ* [1], Shilo eloquently demonstrated, albeit in a case series, that this therapy was efficacious in 84% of the patients. A durable freedom from significant hematuria was achieved in 96% [1].

Radiation is one of the most common tools in the treatment of abdominal and pelvic malignancies. Once the bladder is exposed to the radiation, a hemorrhagic cystitis may develop. Bleeding from the affected bladder mucosa may occur in 5%–10% and as late as 10 years after the radiation treatment [2]. Hemorrhagic cystitis is a debilitating process associated with bladder pain and gross macrohematuria. Various urologic measures such as instillation of medication into the bladder and continuous bladder irrigation are used to stop the bleeding. The radiation affects the vasculature of the bladder mucosa, causing ischemia and sloughing of the mucosa and consequential bleeding.

Hyperbaric oxygen stimulates angiogenesis, resulting in recovery of the bladder mucosal lining. When the mucosa is regenerated the hematuria ends. A prerequisite to the use of hyperbaric oxygen is the established diagnosis of radiation-induced hemorrhagic cystitis. It is essential to exclude other causes of macroscopic hematuria such as bladder tumors, which may also appear years after the radiation.

The hyperbaric treatment is provided while the patient is in a pressurized hyperbaric chamber. Since the pressure is higher than the atmospheric pressure, more oxygen is delivered to the injured mucosa. The patient breathes 100% oxygen through a mask for a period of 90 minutes. A hyperbaric therapy course usually comprises 40 sessions. Successful treatment is defined as cessation of urinary bleeding and pain. Success is achieved in about 70% of the patients treated [3]. Early treatment is probably more effective.

Technically, the hyperbaric treatment is not complicated. The patient can either lie down or sit in the chamber while reading and listening to music. With appropriate preparation and instructions most patients are able to complete the series of planned sessions [4]. In Israel we have accumulated vast experience with various types of hyperbaric therapy and, as mentioned, it is technically a routine procedure.

It is necessary that the urology com-

munity become more aware of hyperbaric oxygen therapy for radiation-induced hemorrhagic cystitis. Patients should be referred to this treatment before more invasive measures are proposed, such as embolization of iliac arteries or cystectomy. In addition, hyperbaric treatment may be effective in managing other radiation-induced side effects that might emerge later, such as soft tissue necrosis (skin and vagina), proctitis and fistulas [5].

## Address for correspondence:

**Dr. A. Greenstein**

Dept. of Urology, Tel Aviv Sourasky Medical Center, 6 Weizmann Street, Tel Aviv 64239, Israel

**email:** surgeo4@post.tau.ac.il

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**“The trees that are slow to grow bear the best fruit”**

Moliere (1622-1673), French playwright and actor considered one of the greatest masters of comedy in western literature

**“If you must play, decide on three things at the start: the rules of the game, the stakes, and the quitting time”**

Chinese proverb