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Hyperbaric Oxygen Therapy for Cancer Patients with Radiation-Induced Tissue Injuries

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INTRODUCTION

- Cancer, secondary to cardiovascular disease, is the leading cause of death worldwide (Centers for Disease Control and Prevention, n.d.).
- Radiation is a standard cancer therapy, however it can cause fibrosis of blood vessels, the breakdown of soft tissue, and subsequently lead to necrosis.
- Hyperbaric oxygen therapy (HBOT) is a healing treatment consisting of administering 100% oxygen to the body in a pressurized chamber.
- HBOT facilitates capillary regrowth, blood flow restoration, and increases wound healing time.

PICO QUESTION

Among adult patients with cancer, how does the use of hyperbaric oxygen therapy improve the healing time of radiation-induced tissue injury compared to those not receiving the therapy?

FIGURE 1



Figure 1: Sechrist hyperbaric chamber at the Moose Jaw Union Hospital, Saskatchewan, Canada.
Note: From *HBOT Chamber* [Photograph], by James Heilman, MD, 2008, Wikimedia Commons (<http://creativecommons.org/licenses/by-sa/3.0/>) CC by 3.0

FIGURE 2

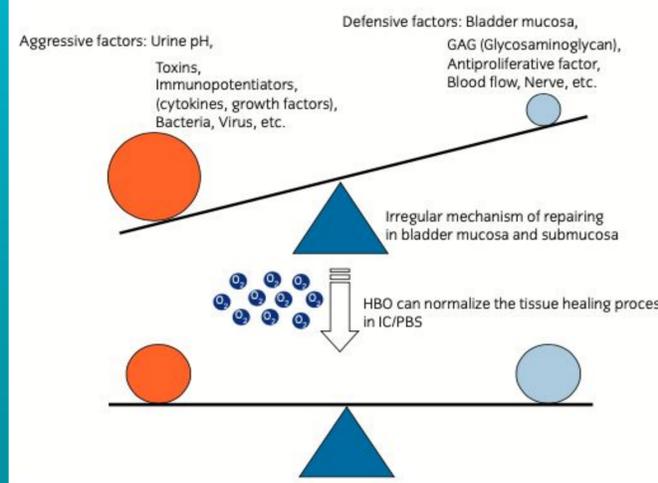


Figure 2: Cancer and radiation treatments can disproportionately reduce the body's healing capabilities. HBOT can restore healing functions (Tanaka et al., 2019).

METHODS

Databases: CINAHL & PubMed
Search Terms: *hyperbaric oxygen therapy, injury, radiation, and cancer*
Inclusion Criteria: Articles that identified uses of HBOT when treating post-radiation injuries for breast, head, neck, and pelvic cancers, articles from 2019-2024
Exclusion Criteria: Age group other than adults, articles highlighting alternative treatment modalities
Total number of articles: 12

FIGURE 3 & FIGURE 4



Figure 3: Upper leg wound before (A) and after (B) HBOT treatment (Generaal et al., 2020).

Figure 4: Wound healing progression after (A) 3 months, (B) 6 months, (C) 8 months, and (D) 11 months (Enomoto et al., 2017).

RESULTS

- For adult individuals with cancer undergoing HBOT, it was found that in as little as 25 sessions, patients reported improved pain, edema, and erythema in long-term follow up appointments. Control groups not undergoing HBOT did not exhibit improvement of symptoms.
- Whereas adverse reactions to standard radiation include fibrosis, impaired movement, pain, and relative need for of analgesics, physiotherapy, and reconstructive therapy, negative outcomes of HBOT are found to be mainly fatigue, barotrauma, and myopia.
- HBOT decreased wound healing time while improving pain and patients' quality of life when assessed using the Quality of Life Questionnaire (EORTC QLQ).
- Limitations to the use of HBOT include its obtainability, professional training for use, and the therapy being utilized and researched in more recent years.

CONCLUSION

- HBOT reduces tissue healing time and other systemic symptoms attributed to radiation injuries.
- As cancer mortalities have declined over the past several decades (American Cancer Association, 2024), adjunctive therapies, such as HBOT, are critical to help improve patient quality of life.
- Further research can be conducted to evaluate the efficacy of HBOT compared to other methods of treating radiation induced tissue injury, and its impact on diseases other than cancer injury.

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