Supine vs. Prone Positioning for Breast Radiation Therapy

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INTRODUCTION
- Breast cancer is one of the most common cancers that occur in the United States.
- Due to advances in cancer diagnosis, breast cancer is often diagnosed earlier causing patients to be treated faster and live longer.
- These patients are at greater risk for developing long-term complications.
- There is not a definitive best way to position breast cancer patients for their treatment to help reduce these complications.

WHAT IS RADIATION THERAPY?
- It is one of the three principle modalities used to treat cancer.
- Cancer involves an unregulated, uncontrolled replication of cells, making it highly susceptible to ionizing radiation.
- Radiation therapy delivers high doses of ionizing radiation precisely to the tumor while limiting the dose received by the normal, healthy tissue.

(Breast cancer is one of the most common cancers that occur in the United States. (Deseyne et al., 2017))

BREAST CANCER TREATMENT
- Breast cancer patients are treated with a multidisciplinary approach that includes surgery, radiation therapy, and chemotherapy.
- Radiation therapy drastically reduces the risk of local cancer recurrence in most patients.
- Radiation treatment for breast malignancy is one of the most technically challenging procedures performed in the radiation oncology department.
- Breast anatomy varies widely among patients.
- Along with breast tissue, the chest wall, nearby lymph nodes, and supraclavicular areas are often treated as well, depending on the patient.
- Identical daily positioning of the patient is crucial to ensure the treatment area receives the correct dose during each treatment.

(Washington & Leaver, 2016)

CONCERNS WITH TREATMENT
- Treatment of left-sided cancers results in increased risk of cardiac toxicity, cardiac diseases, and ischemic heart events.
- It is important to find treatment techniques that will lower the dose to the cardiac components without compromising target tumors volume. (Saini, Hwang, Biagioli, & Das, 2018)

SUPINE POSITIONING
- The patient lies on back in selected immobilization device with both arms elevated above their head, resting on the device.
- The device is often on an incline, with the patient’s head and thorax slightly elevated.
- The patient’s chin is lifted, and arms are positioned to minimize skin folds surrounding the breast tissue.
- The head is turned away from the treatment side. (Washington & Leaver, 2016)

PRONE POSITONING
- The patient lies on stomach on breast board with both arms elevated alongside their head.
- The affected breast falls through an opening in the breast board. (Washington & Leaver, 2016)

RESEARCH FINDINGS
SUPINE POSITION
- Better suited for small-breasted patients.
- Preferred treatment if chest wall and regional lymph nodes need to be treated.
- For left-sided breast treatment, supine deep inspiration breath hold has found to have the same dose reducing effects of prone positioning. (Saini et al., 2018)

PRONE POSITION
- Better suited for large-breasted patients.
- Delivers lower lung and heart doses compared to supine. (Saini et al., 2018)
- Position cannot be used if the chest wall and regional lymph nodes need to be treated.
- Immobilization device obstructs anterior beam access to regional lymph nodes.
- Position has decreased repositioning accuracy. (Kahan et al., 2018)

CLINICAL METHOD FOR PREDICTING THE BENEFIT OF PRONE VS. SUPINE POSITIONING
- Statistical model uses three anatomical determinants of the patient to accurately estimate the benefits of one position over the other by means of heart doses.
- Method worked successfully for 98% of treated patients.
- Tool is recommended for use in facilities that employ prone positioning. (Kahan et al., 2018)

REFERENCES