



LOMA LINDA UNIVERSITY

MEDICAL CENTER

James M. Slater, MD
Proton Treatment & Research Center

Fighting Lung Cancer with Proton Therapy

Stories of people who have survived for many years after receiving proton therapy at Loma Linda University Medical Center (LLUMC) are common. June Jamerson, 87, of Grass Valley, California, is one of those patients.

In early 2002, Mrs. Jamerson received an advertisement regarding a low-cost blood panel and health screening at her local hospital. June feels the ad was providential. "I was feeling great and thought it might be a good idea to have a test like this." Her doctor ordered the tests for her and added a chest X-ray. The film showed a small lesion, "the size of the fingernail on my little finger," according to Mrs. Jamerson.

After receiving the diagnosis, Mrs. Jamerson was referred to a surgeon, who said that she should have an operation to remove the lesion. Mrs. Jamerson told her surgeon that she was, "going to call Loma Linda first, before there is any cutting."

June had good reasons to call LLUMC first. Her

husband, Paul, decided to go to LLUMC for proton therapy when he was diagnosed with prostate cancer in 1996. Paul remains in good health 17 years after treatment, and he considers himself "cured" thanks to proton therapy at Loma Linda. Most recently, in 2012, Paul's uncle was also treated with protons for prostate cancer at LLUMC as well.

After June told her surgeon she wanted to explore other options, she called 1-800-PROTONS and talked to a proton referral nurse. Dr. David A. Bush reviewed her records. Shortly thereafter, she learned she was qualified for proton treatment.

Once June was in Loma Linda, Dr. Bush ordered a few more tests to fully evaluate the extent of the tumor. The results confirmed adenocarcinoma of the lung with metastases to lymph nodes in the mediastinum, which qualified the tumor as locally advanced. After reiterating that she did not want to be treated by surgery, Mrs. Jamerson was entered into a Phase I/II study of combined chemotherapy and high-dose, accelerated proton radiation

for locally advanced non-small-cell lung carcinoma. At the time, she was the tenth patient entered into that study. The full program included induction chemotherapy followed by concomitant chemotherapy and proton therapy. June says she does not recall any side effects except for feeling tired. She completed the full treatment program and returned to Grass Valley.

Today June is as active as ever. She and Paul work together: Paul works on properties and June "keeps the books." They enjoy living near some of their seven children and their families. June enjoys playing weekly bridge with friends, one of whom works as a cancer volunteer and invited her to the local cancer survivor events held in early June 2013. June decorated a luminary bag, which glowed along with hundreds of others surrounding



June and her husband Paul

the relay for life track. On it she wrote,

“Thank God for proton radiation at Loma Linda. It saved my life from lung cancer.”

June is forever fond of Dr. Bush and the care she received, “He’s a really sweet doctor. I love him. I’ve been down to see him a few times over the years.” June remains an advocate of the care she and her family have received at LLUMC: I tell everybody about Loma Linda.” Her long-time local doctor calls her his “miracle patient.”

Treating Lung Cancer with Protons at Loma Linda.

June’s story is typical for lung-cancer patients seen by Dr. Bush and his colleagues. The James M. Slater, MD Proton Treatment & Research Center pioneered hospital-based proton therapy when it opened in 1990. It was the forerunner of proton therapy facilities in many academic medical centers across the world.

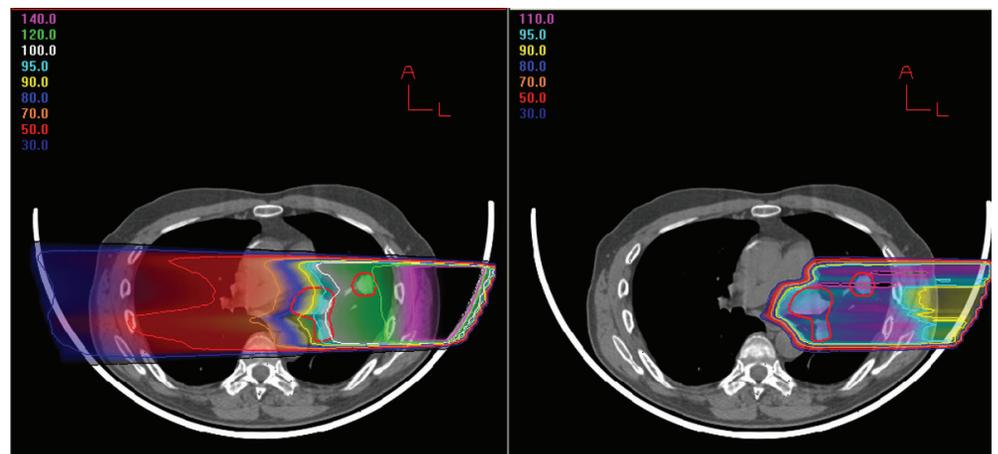
Using protons to treat non-small-cell lung cancer is one of the many treatments given to patients who are medically inoperable or, as in Mrs. Jamerson’s case, refused surgery. Protocols have been developed to take advantage of the proton beam’s ability to deliver

high radiation doses to tumor volumes while minimizing – and often eliminating – dose to normal tissues. Among the protocols are those designed to accelerate the fractionation schedule or to use hypofractionated proton therapy. Hypofractionation means delivering a course of proton treatments in fewer fractions, or treatment sessions. This means that each fraction necessary is larger. Larger fractions cause more-effective cell destruction in targeted tissues, but also can cause more-severe side effects in untargeted tissues; that is why hypofractionation is not used often with conventional radiation (X-ray) treatment. Protons are ideally suited for hypofractionation because they conform the dose so well in three dimensions. The physician can deliver fewer and larger fractions while still minimizing side effects because the dose in healthy tissues is low or absent.

The Department of Radiation Medicine began hypofractionated proton therapy in 1994 for some

cancers of the lung. Results were encouraging, and subsequently the technique was used for other cancers, including those of the liver, breast and prostate. Protocols are underway now to use hypofractionation for other sites, as a way to treat some metastases in a very few fractions. The department long ago established that hypofractionated protons are as effective as conventional proton therapy, and the use of the technique is increasing.

In cases of lung cancer, proton therapy performed at LLUMC has demonstrated its effectiveness for many years. This has been documented in several publications, most recently in the article, “High-dose hypofractionated proton beam radiotherapy is safe and effective for central and peripheral early-stage non-small-cell lung cancer”, by D. Bush, G. Cheek, S. Zaheer, J. Wallen, H. Mirshahidi, A. Katerelos, R. Grove and J.D. Slater, published in the *International Journal of Radiation Oncology Biology Physics*, 2013.



Example of a proton dose distribution for lung cancer (right) compared with a plan for the same case using X-rays. The proton plan spares the opposite lung, as well as the heart; no radiation reaches those structures.

For more information,
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