

## **Significant Rise in Survival Rates for Elderly Lung Cancer Patients Treated Using Radiosurgery in Netherlands Detailed at World Conference for Lung Cancer**

*Leading Dutch Cancer Center Equipped with Advanced Varian Treatment Systems Presents Results of Major Nationwide Study into Improving Survival Rates*

**Amsterdam, Netherlands, July 6<sup>th</sup> 2011** – Details of advances in the use of stereotactic body radiotherapy (SBRT) to treat early stage lung cancer in both high risk operable and inoperable cases were presented at the biennial World Conference for Lung Cancer (WCLC) here in Amsterdam today, including significant improvements in survival of elderly lung cancer patients in the Netherlands as a result of more advanced SBRT treatments.

A study into survival rates among lung cancer patients in the Netherlands between 2003 and 2009 was one of only four, out of approximately 1900 abstracts, selected for presentation at the WCLC Presidential Symposium. The study<sup>1</sup> was outlined by Dr. Cornelis Haasbeek from VU University Medical Center in Amsterdam, where patients are treated on six advanced medical linear accelerators from radiosurgery world leader Varian Medical Systems (NYSE: VAR). This hospital has pioneered the use of SBRT in the Netherlands, involving higher doses being delivered in fewer sessions with greater precision than is usual with conventional radiotherapy.

The team at VU used the country's comprehensive population registry to monitor the survival rates of lung cancer patients aged 75 or older. Whereas previous population studies in North Holland have shown increased survival rates of up to seven months through the use of SBRT, latest research on data from the entire Dutch population of 16 million shows the average survival rate after SBRT jumps by 9.3 months in this frail population from 16.8 months to 26.1 months. "This improvement in survival rates for SBRT patients is nothing short of spectacular for a disease that is difficult to treat by any method," says Prof. Senan.

The VU study also showed a slight increase in survival rates for patients treated surgically in the Netherlands and no difference in survival rates for untreated patients.

"In the Netherlands, SBRT is now preferable to conventional radiotherapy for treating lung cancer," says Prof. Suresh Senan, professor of clinical experimental radiotherapy at VU. "Conventional radiotherapy, with its 30 to 35 daily treatments, is often not a viable option for many frail patients who may not be in any condition to travel but SBRT, involving far fewer treatment sessions, is now the preferred option." In the Netherlands, SBRT is now carried out at 11 of the 21 treatment centers offering radiotherapy.

VU University Medical Center treats over 2500 new cancer patients each year, of which about 120 are early stage non-small cell lung cancer patients. To date, more than 750 such patients have been treated using SBRT at the hospital, which was the only center in the Netherlands offering the treatment until 2006. VU University Medical Center has since helped a number of other centers to set up their stereotactic radiotherapy program and, despite this, the number of cases treated at VU has remained steady. “This indicates that there is a rise in the use of SBRT for lung cancer in general,” says Prof. Senan.

### **Other WCLC presentations in radiation medicine based treatments**

VU University Medical Center delivered 13 oral presentations at the World Conference for Lung Cancer meeting on the use of radiation medicine to treat lung cancer, more than any other center at this meeting on that subject. Among these was one<sup>2</sup> presented by Dr. Wilko Verbakel, medical physicist, who outlined the hospital’s experience of treating more than 1400 patients with Varian’s RapidArc® volumetric arc therapy treatment system, including 500 patients who were treated with RapidArc SBRT. “Radiation delivery time for a dose of 18 Gray takes less than six minutes on average and a dose of 7.5 Gray is delivered in less than three minutes,” explained Verbakel. Fast dose delivery reduces the extent of patient motion during treatment and enables clinics to conform doses more closely to the size and shape of the tumors, according to Verbakel who added that it has enabled his clinic to treat large targets with less risk to surrounding healthy tissue.

In a related paper,<sup>3</sup> Dr. Max Dahele from VU suggests that during the typical time taken to deliver lung SBRT with high dose rates, “near-rigid fixation” is not necessary and using a Novalis™ Tx linear accelerator the hospital’s standard approach is now to treat without external immobilization. “A simpler and more comfortable approach to patient set-up and positioning achieves comparable stability to that reported with near-rigid immobilization devices, without the associated cost and complexity,” said Dr. Dahele.

Another VU presentation<sup>4</sup> discussed chest wall toxicity in the risk-adapted SBRT fractionation scheme that VU university medical center employs and concluded -- based on a review of 530 tumors -- that severe chest wall pain is uncommon after risk-adapted fixed-beam SBRT, particularly in tumors located 5mm or more from the chest wall. They pointed out that this contrasts with published chronic chest wall toxicity observed in up to 30% of patients undergoing surgery.

In a paper<sup>5</sup> on 177 potentially operable early-stage non-small cell lung cancer patients who elected to undergo SBRT instead of surgery, the VU team concluded that such patients receiving SBRT had a median overall survival rate of more than five years and a local control rate of 93%, an impressive statistic. The three-year overall survival rate was nearly 85%, which compares favorably with results reported in earlier studies. “These findings are

comparable to results found in surgery and support ongoing randomized clinical trials that compare surgery and SBRT in such operable patients,” the paper concludes. “Short-term outcomes were superior to surgery and long-term outcomes were equivalent to surgery.”

### **Varian Symposium**

The World Conference on Lung Cancer also included a symposium entitled “Expanding Options for High-Risk Operable Non Small-Cell Lung Cancer (NSCLC) Patients,” sponsored by Varian Medical Systems. In this symposium, attended by more than 150 lung cancer clinicians, surgeons and radiation oncologists reported on the latest techniques for treating high-risk early stage lung cancer using either surgical approaches or non-invasive radiosurgery, depending on a patient’s clinical characteristics and risk profile.

Professor Harvey Pass of the New York University Medical Center presented his view of state-of-the-art approaches to tackling early-stage lung cancer, detailing results of local tumor control after two and three years in non-operable patients. Dr. Pass also outlined the latest results of a small phase-2 study that Dr. Robert Timmerman of the University of Texas Southwestern Medical Center, and Dr. Pass are leading to investigate whether SBRT is suitable for operable patients.

Dr. Bryan Meyers, a thoracic surgeon, and Dr. Jeff Bradley, a radiation oncologist, both from the Washington School of Medicine in St. Louis, detailed several cases involving high-risk early-stage lung cancer patients at their center, outlining how they collaborate as a multi-disciplinary team to assess a patient’s risk profile in order to arrive at a treatment recommendation on whether the patient should receive SBRT or surgery.

Surgeon Dr. Marinus Paul and radiation oncologist Professor Suresh Senan from VU University Medical Center also presented the benefits of collaboration between thoracic surgery and radiation oncology professionals to determine the optimum treatment for lung cancer patients.

### **Lung cancer**

Lung cancer is the leading cause of cancer related deaths worldwide<sup>11</sup>. In 2010, there were estimated to be 1,608,055 new cases of lung cancer worldwide and 1,376,579 deaths, representing 18.2% of all cancer deaths.<sup>12</sup> Despite recent improvements in survival for many other types of cancer, five-year survival rates for lung cancer have remained relatively poor, mainly because by the time a diagnosis is made, lung cancer is well advanced and treatment options are limited.

In the last decade, SBRT has been used to treat patients who were considered inoperable. From 2008 to 2010, there were over 40 published clinical papers on SBRT for the treatment of early stage lung cancer, plus approximately 30 review papers. Outcomes of early clinical experience in medically inoperable patients have been very encouraging<sup>1-3</sup>, including a March 2010 paper in JAMA by Dr. Timmerman, whose three-year follow-up was reached in a multicenter trial and which showed a 57 percent three-year survival and 98 percent local control. These results suggest that high-risk operable lung cancer patients may have a viable alternative treatment option to surgery.

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<sup>1</sup> "Improvements in survival of elderly patients with stage I NSCLC in the Netherlands between 2003-2009", [Publication Page: PRS.3] C.J. Haasbeek, O. Visser, D. Palma, F.J. Lagerwaard, B. Slotman, S. Senan

<sup>2</sup> "Arc-Therapies and Other Approaches for IMRT", [Publication Page: M09.2] W.F.A.R. Verbakel

<sup>3</sup> "Fast delivery of stereotactic ablative radiotherapy for lung tumors: is rigid patient immobilization necessary?" [Publication Page: Poster P1.148]" M. Dahele, W.F.A.R. Verbakel, B. Slotman, S. Senan

<sup>4</sup> "Chest wall toxicity following risk-adapted stereotactic radiotherapy for early stage lung cancer", [Publication Page: O02.01] E.M. Bongers, C.J. Haasbeek, F.J. Lagerwaard, B. Slotman, S. Senan

<sup>5</sup> "Stereotactic ablative radiotherapy (SABR) in potentially operable stage I non-small cell lung cancer patients", [Publication Page: O02.03] F.J. Lagerwaard, N.E. Versteegen, C.J. Haasbeek, B. Slotman, M.A. Paul, E.F. Smit, S. Senan

<sup>11</sup> [Youlden D, Cramb S, Baade P](#). The International Epidemiology of Lung Cancer, *Journal of Thoracic Oncology* 2008; 3:8:819-831.

<sup>12</sup> GLOBOCAN 2008 (IARC) [Section of Cancer Information](#) (10/6/2011).

<sup>13</sup> [Timmerman R et al](#). Stereotactic Body Radiation Therapy for Inoperable Early Stage Lung Cancer. *JAMA* 2010;303(11):1070-1076. [Dosoretz DE, Katin MJ, Blitzer PH, et al](#). Radiation therapy in the management of medically inoperable carcinoma of the lung: results and implications for future treatment strategies. *Int J Radiat Oncol Biol Phys* 1992; 24:3-9.

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### **About Varian Medical Systems**

Varian Medical Systems, Inc., of Palo Alto, California, is the world's leading manufacturer of medical devices and software for treating cancer and other medical conditions with radiotherapy, radiosurgery, and brachytherapy. The company supplies informatics software for managing comprehensive cancer clinics, radiotherapy centers and medical oncology practices. Varian is a premier supplier of tubes and digital detectors for X-ray imaging in medical, scientific, and industrial applications and also supplies X-ray imaging products for cargo screening and industrial inspection. Varian Medical Systems employs approximately 5,500 people who are located at manufacturing sites in North America, Europe, and China and approximately 70 sales and support offices around the world. For more information, visit <http://www.varian.com>.