True Entrepreneurs Give Priority to the Patient

Radiation therapy faces great challenges: more patients, less staff, and expensive treatment methods. The MAASTRO clinic (previously the Radiotherapy Institute of Limburg) is taking on this challenge by individualizing treatments and placing its bets on molecular imaging and bio-banking. The key word for the future, however, remains entrepreneurship.

The number of cancer cases is going to increase due to the aging of the population. "That is clear from the statistics that have been kept up to date for fifty years now," says Loes Klaasse, Director of Operational Management of the MAASTRO clinic in Heerlen, The Netherlands. "A certain percentage of people older than 45 will get cancer and half of them will undergo radiation treatment. Until recently, one third of the Dutch population was aged 45 or older, soon that will be 50 percent. So you can easily calculate how many people will soon be needing radiation treatment."

This calculation led to the decision of former minister Els Borst to expand the radiation treatment capacity. For the MAASTRO clinic, this means an expansion from 4 to 7 accelerators. These will be delivered by Siemens, which – as the main contractor – is also responsible for the integration of all equipment within the institute. Expansion of the treatment systems alone, however, is not enough given that the number of physicians is expected to decrease. The MAASTRO clinic is therefore looking for a solution to improve both efficiency as well as patient care through entrepreneurship. "Entrepreneurship in the care sector is necessary," says Klaasse. "When it comes to the competition, we want to surpass it with the quality provided by us. When you compete commercially, you let go of values such as the solidarity principle and I don't think that's good. The government has to make a clear decision in this matter. On the one hand, it wants to implement commercial principles and on the other hand it is afraid, rightly so, that it will cause a divide. In contrast, competition in terms of quality is very stimulating."

Molecular Imaging

Striving for quality is the starting point that is in keeping with the academic process in which the MAASTRO clinic is involved. The clinic works closely with the Academic Hos-

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Loes Klaasse, Director of Operational Management, MAASTRO Clinic, The Netherlands

pital in Maastricht (azM) and the University of Maastricht. The collaboration of these groups is known as MAASTRO – Maastricht Radiation Oncology. In 2005, the MAASTRO clinic will move to Maastricht from its current location in Heerlen. Director Philippe Lambin, also professor at the University of Maastricht and associated with the azM at the policy level: "The clinic was geared toward routine patient care. However, radiotherapy is a discipline that is experiencing intense development. This involves conducting research and providing education in an academic environment." Understanding of the physiopathology of cancer is still growing, according to Lambin, which leads to new treatment methods. "With new biological technologies – molcular imaging – it is possible to create a type of molecular identification card for a patient and his tumor so that treatments can be individualized. I therefore expect that molecular diagnosis will play a major role in the future."

New Accelerators

This is why the MAASTRO clinic is busy with a large-scale project, unique for the Netherlands. It involves systematically gathering the gene and protein patterns of a large group of patients and their tumors over the course of several years by using, among other things, Siemens PET/CT scanners that are specially equipped for simulation and molecular imaging. Lambin: "Siemens has experience with this type of imaging technologies. Furthermore, they have expertise in the field of ICT so that they can also help us with the integration of data into the information system, the coupling of clinical and biological data. In approximately five years, we hope to be able to draw conclusions from the information in the database. Siemens is also working on developing new accelerators that should eventually make individualized treatment on the basis of molecular diagnosis possible."

Vision for the Future

In addition to developing treatment techniques that are better geared toward the patient, another one of MAASTRO's important objectives is to improve efficiency. Tools to increase efficiency include automation and workflow management. Siemens will set up an integrated information system in the new location in Maastricht that brings all processes and clinical, biological and imaging data together. Siemens also offers MAASTRO advice and technological support in the field of workflow management. Klaasse: "We chose Siemens because of the integral approach, because we wanted to have only one point of contact for all equipment. But also because Siemens has a vision. They support our ambitions; it is a joint entrepreneurship. We will have to perform more treatments with fewer people. To do so, a suitable and pleasant work environment must be created and Siemens can help us achieve that."

Output Oriented Process

MAASTRO proves that improving efficiency can be combined with better care. Lambin, originally from Belgium, was shocked about the waiting list problem in the Netherlands when he joined the institute. "This is partially caused by the lack of competition. The Dutch system gives priority to the employees, not to the patient." Lambin and Klaasse could foresee an increase in the waiting period involving six to eight weeks. "Unacceptable," according to Klaasse and together with Lambin the decision was made to turn the primary process around. Klaasse: "It used

to be that preparations for the treatment were scheduled at times convenient for the employees. A couple of days after the first step, the second would follow, a couple of days later the third and so forth. Now, if a patient comes in, all preparations are performed within one or two days, regardless. Within a year, we want to reduce the waiting period to three weeks and after the move from Heerlen to Maastricht to two weeks. That will work." This turnaround demands flexibility. Employees do not automatically go home at five o'clock, but leave only after the work is done. Lambin: "The process is designed for output. This is a revolution in the healthcare sector."

Also remarkable is the introduction of the Balanced Scorecard, a tool for steering processes. While it is known in the business world, it is rarely applied in hospitals. "This too is part of entrepreneurship," says Klaasse. "We formulated a number of objectives with regard to professionalism, patient care, and personal development. This includes formulating the actions you are going to undertake toward this and providing measurable objectives. Every six months, we make the scores known internally. They always lead to spirited discussions among the employees. This is a good sign; they are involved in policy-making and are motivated to help obtain the objectives."

True Entrepreneurship

This involvement also stems from the institute's human resource management policy. Klaasse: "The fact that we are awarded large projects and receive recognition because of our focus on quality is very motivating. But in addition to that, employee training and development are of high priority to us. For example, laboratory technicians take over tasks from medical specialists and are well trained to do so. This makes their work more interesting and they get additional pay for it as well. This has cleared the way for a number of radiation therapy lab technicians to go into scientific research – an enormous boost for that profession. We try to create a work environment that is as interesting and pleasant as possible for other function groups as well. This is how we avoid shortages in staff. You always have to offer something extra, in terms of technology and HRM, in order to distinguish yourself from the rest. This is entrepreneurship at its best."

Director of Operational Management at the MAASTRO clinic, Loes Klaasse-van Remortel: "The employees' desire to achieve objectives stems in part from the objective of the HRM policy."

Radiation Oncologist Dr. Dirk De Ruysscher: "The possible uses of the system cover many fields and we obtain more information all the time with the new scanner."

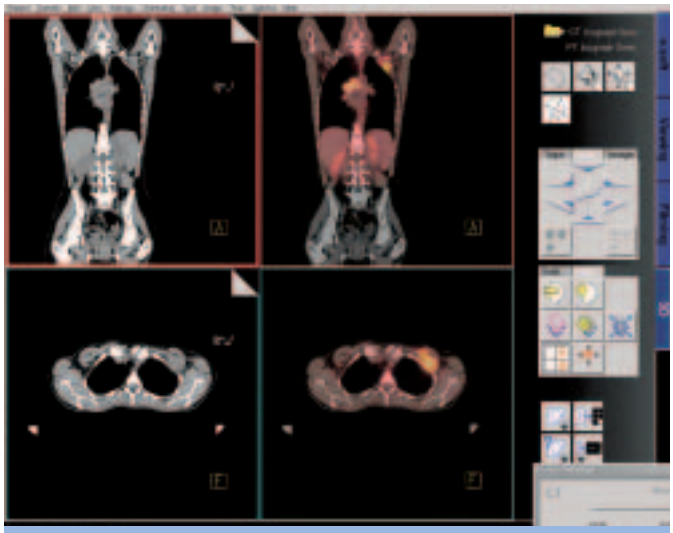
PET/CT: An ideal pair for diagnosing tumors

The radiotherapy institute MAASTRO clinic, operating its Siemens biograph PET/CT scanner for simulation purposes since the beginning of January 2004, is one of the first clinics in the world to use this innovation. Various studies are presently being set up to further examine the possibilities of PET/CT. Radiation Oncologist Dr. Dirk De Ruysscher has had several months of practical experience with the system. He is convinced that the simulation technology makes radiation therapy more efficient. "We can more effectively visualize the tumor and the lymph node metastases. In some patients, this reduces the area of radiation, which results in fewer side effects. In other patients, the spread of the tumor is sometimes underestimated with a CT scan and a part of the tumor is missed. By expanding the radiatiotherapy volume, such "geographical misses" are limited thanks to the PET/CT scan," says De Ruysscher.

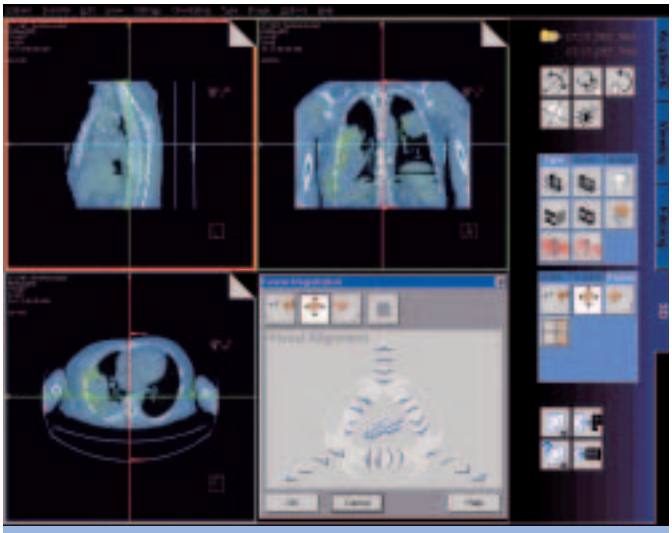
Obtaining More Information

"The possible uses of the system cover many fields and we obtain more information all the time with the new scanner," says Loes Klaasse, Director of Operational Management. Medical Director Philippe Lambin adds: "By using PET/CT for simulation purposes, we have already made some remarkable discoveries, such as finding a second lung tumor during a simulation.

The information generated by using the scanner often changes the diagnosis or treatment and that is only to the benefit of the patient. We have therefore created an edge and are now performing planning and validation studies to develop it further."



biograph provides precise tumor localization essential to radiation treatment planning and staging.



Automatic Image Registration provides reproducible alignment of the PET and CT image volumes for monitoring.

Integration of Medical Technology & IT

Klaasse sees numerous ways to make activities with PET/CT more efficient and user-friendly, together with Siemens. "What we are very happy about so far is that contacts with Siemens are inspiring. The management of Oncology Care Systems (OCS) in the United States drives toward an integrated approach to medical engineering knowledge, ICT knowledge, and the vision on workflow management," she says. "We began a development project with Siemens where we critically examined the entire patient treatment process, from registration to post-treatment monitoring, for medical engineering and ICT support opportunities, respectively the replacement of human effort. The objective is of course to make the entire process more efficient, safer and qualitatively better."

Biological Approach

New working methods are making their appearances, in part due to the arrival of the biograph PET/CT scanner for simulation. Lambin: "The aim is to start working with new isotopes. This means that we are focusing even more on the functional and biological characteristics of each individual patient." Klaasse adds: "The biological approach – molecular imaging – has seen a rapid expansion in recent years. In this area, we expect a breakthrough in cancer treatment. Biological characteristics of the tumor are used as the starting point for determining the type of treatment." Lambin: "The molecular diagnosis currently available offers the advantage of 3D images. As a result, we are able to administer more directed doses of radiation to parts of the tumor or the entire tumor. We used to treat a category of patients suffering from tumors according to a fixed protocol. If we add to that the biological characteristics of the tumor and the new imaging method, you are able to approach treatment on a much more individualized basis."

Maximum Radiation Precision

Clinical physicist André Minken and his colleagues work closely with Siemens on a study involving the respiratory gating of tumors. The PET/CT is of obvious importance in determining the movements of tumors to allow for applying radiation therapy with great precision. "In our cooperation, we strive toward the development of virtual simulation software for merging and plotting images, so that we can get a clear image of tumor activity. We are currently working ways to irradiate certain areas of the tumor with a higher dose than others. While this approach requires additional studies, it is, in principle, within the range of possibilities, considering the imaging offered by PET/CT."