

German Cancer Research Center (DKFZ) presents software systems for computer-assisted lung surgery as well as for liver and pancreatic surgery at MEDICA

Preoperative three-dimensional views of the individual patient anatomy provide physicians with added safety in planning and performing treatments. Scientists of the Division of Medical and Biological Informatics of the German Cancer Research Center (Deutsches Krebsforschungszentrum, DKFZ) have developed software systems that transform two-dimensional CT or MRT images into three-dimensional reconstructions, thus providing valuable support for physicians performing surgery in various organ systems.

For planning a surgical intervention on the liver or pancreas it is important for the surgeon to know the exact anatomic conditions around the tumor since various organs and vital blood vessels are located in the direct vicinity. Three-dimensional images that can be turned in any direction enable surgeons to determine whether a tumor is locally restricted or has already grown into neighboring tissue. Based on the location of the tumor in relation to the vessels it is possible to predict which areas will potentially be cut off from blood supply after surgery. Thus, complications can be minimized in advance.

Established at the liver surgery section of Heidelberg University Surgical Hospital, the system has now been extended for pancreatic surgery and the first operations have been performed to test it. With high probability, improved orientation will provide more safety for patients and shorten surgery times. The effect on surgery results is currently being investigated in an interdisciplinary study.

In lung cancer treatment there are cases in which the most promising treatment option is to place a radiation source directly into a tumor or its surrounding tissue (brachytherapy). However, it is often difficult for a lung specialist to find the right path to the tumor through the many tubes of the windpipe. In addition, tumors often grow in the tiniest bronchial tubes where they are impossible to reach under direct vision by a bronchoscope. Further difficulties are caused by the fact that the organ is constantly moving due to breathing.

In future, a remedy will be provided in the form of a thin catheter with a navigation probe inside. A combination of an electromagnetic tracking system, which indicates the position of the catheter tip, and a mathematical model that shows the surgeon a path through the branches of the bronchial tree will guide the radiation source safely to its destination. During the whole process the system provides the physician with a 3D visualization of the location of the catheter tip in relation to its surroundings taking into account deviations due to breathing movement. The system is in the development stage and is planned to be first used in a surgical intervention in 2006.

The task of the Deutsches Krebsforschungszentrum in Heidelberg (German Cancer Research Center, DKFZ) is to systematically investigate the mechanisms of cancer development and to identify cancer risk factors. The results of this basic research are expected to lead to new approaches in the prevention, diagnosis and treatment of cancer. The Center is financed to 90 percent by the Federal Ministry of Education and Research and to 10 percent by the State of Baden-Wuerttemberg. It is a member of the Helmholtz Association of National Research Centers (Helmholtz-Gemeinschaft Deutscher Forschungszentren e.V., HGF).

Dr. Julia Rautenstrauch
Division of Press and Public Relation
Deutsches Krebsforschungszentrum
Im Neuenheimer Feld 280
D-69120 Heidelberg
T: +49 6221 42 2854
F: +49 6221 42 2968