

Latest thing in heart disease treatment: 3-D printing

A hospital in Guangzhou opened China's first 3-D printing laboratory for cardiovascular medicine on Wednesday, with the facility expected to provide help in diagnosis, surgery preparation and realtime surgical guidance.

The lab at Guangdong General Hospital, a joint project with a company in Zhuhai, Guangdong province, was established to promote the clinical applications to further development the technology.

About 6.7 million structural heart disease patients in China need surgery, with the disease featuring a wide range of individual differences, complex treatment plans and difficult surgeries, according to Zhuang Jian, the hospital's president and an expert in cardiovascular medicine.

The hospital's affiliated Guangdong Cardiovascular Institute has made 3-D printed models for 28 patients with congenital heart disease.

In treating a 2-year-old child in September, for example, the 3-D printed model helped doctors identify the exact cause of the disease and helped reduce the time to find four tiny lung-related airway structures from the usual two to three hours to 30 minutes.

The printed heart models are based on imaging examination results, with the whole heart and specific areas available.

The models also aid communication with patients' families, showing them the situation and the surgical plan.

Models printed with hard materials are used for teaching; those with soft materials assist in the treatment of patients.

As a short-term goal, the lab hopes to use the models to assist in diagnosis, surgical guidance and clinical treatments involving blood flow.

In the medium term, it hopes to be able to print tailor-made items for transplantation. In the long run, it hopes to produce artificial hearts using cell cultures as the 3-D material.

The hospital also plans to build a bank of 3-D models of various heart disease cases, which can help with teaching, Zhuang said.

Zheng Zhe, assistant president of the Chinese Academy of Medical Sciences' Fuwai Hospital, and an expert in cardiovascular diseases, said the present cardiovascular models printed with 3-D technology are mostly used for teaching.

"3-D models make teaching easier than with pictures alone," he said. "But most models are not detailed enough for clinical use."

For the present, experienced doctors can give good diagnoses of cardiovascular diseases with 3-D images displayed on a computer, he said.

Whether 3-D models will become popular will be largely decided by the materials used in the printing, he said, adding that models made of cells will be much more useful.