

Impedance imaging research in China

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Abstract: In China, the related techniques of impedance imaging were firstly studied in 1990s and the following research aims were proposed: 1) Applying electrical impedance tomography (EIT) to dynamically monitoring the developing processes of some diseases and severe injuries in vital organs; 2) Applying impedance imaging to early detect superficial cancer, such as breast cancer.

According the first aim the following researches have been completed. 1) The basic requirements of resolution for EIT as image monitoring modality; 2) the bio-impedance detection techniques which satisfy the requirements of resolution for EIT monitoring; 3) imaging reconstruction algorithm and application software which fits the needs for dynamic monitoring of EIT; 4) experimental research on physical phantom for dynamic image monitoring; 5) experimental research on animal models for dynamic image monitoring; 6) clinical trials for dynamic image monitoring. Through the above researches, a very good application prospect of EIT has been validated for dynamic functional image monitoring in bedside. Mean while the problems should be solved in further research were proposed: 1) How to deal with interfere in long time monitoring: a) how to reduce or eliminate the general interfere in clinical conditions, and b) how to inherit the former monitoring information after the monitoring process was interrupted by severe interfere during long term monitoring. 2) How to design comfortable electrodes and its support system for long term monitoring. 3) To acquire more clinical cases and find out the relationship between EIT and the physiological or pathological changes of patient.

The following areas were studied to achieve the second aim: 1) the basic bio-physics studies of electrical impedance scanning (EIS) shown that there are a significant impedance differences between breast cancer tissues and gland cancer tissues; 2) a single-frame multi-imaging EIS system was designed to adapt the detection of breast cancer.

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