

عنوان مقاله:

A Mathematical Study for a New Electrodes Position in Electrical Impedance Tomography for Early Pulmonary Edema Detection

محل انتشار:

چهارمین کنفرانس بین المللی علوم و مهندسی (سال: 1395)

تعداد صفحات اصل مقاله: 8

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خلاصه مقاله:

Congestive Heart Failure (CHF), disability of pumping blood efficiently throughout the body by heart, is one of the widespread diseases. It causes abnormal accumulation of fluid into lungs which is called Pulmonary edema (PE). So monitoring and imaging lungs for these situations for early detection is important. Today, imaging systems are significant tool for observing inside the body and diseases or injuries diagnosis. The common imaging methods which are used now have some limitations which most of them are being invasive, high cost, low accuracy, and portability. Electrical Impedance Tomography is one of the recent methods which attracted lots of attentions to itself because of its noninvasiveness, low cost and portability. This a method which the region of interest with electrodes array, will be stimulated by an alternative signal with high frequency and then conductivity distribution of that region will be reconstructed. In conventional methods, electrodes were located around the region of interest and in ring shape. In this paper a new electrodes position is introduced, which is vertically alongside of the region of interest. The efficiency of proposed electrode positions was investigated by mathematical modeling. Results showed that by electrodes positioned vertically, the reconstructed images in 3D could estimate the position and volume of the inclusions accurately. Also time spent on image reconstruction was lower so it could be used in portable devices with low power processors.

کلمات کلیدی:

Congestive Heart Failure (CHF), Pulmonary edema (PE), Electrical Impedance Tomography

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