A study of the respiration induced kidney movement and dynamic target localization using imaging ultrasound

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ABSTRACT

Movement of abdominal and thoracic organ is a major issue in non invasive surgery. The movement of various abdominal organs has been previously studied [1-2]. It was found that the movement was most significant for the liver and the kidney. The movement pattern of the liver can be assumed to be in a single plane as it closely follows the movement of the diaphragm. However the, movement of the kidney is three dimensional and follows complicated patterns. This is could be due to the effect of various factors such as the respiratory movement, heart-rate, diaphragmatic movement and the movement of the ribs. In this study, we quantify the relation of kidney movement and the breathing pattern obtained through the movement of skin markers. The position of the kidney is estimated from a series of b-mode ultrasound images captured in the supine position. The study was conducted on set of 20 healthy volunteers. The results indicate that the movement of the kidney is highly subject specific and has poor repeatability. However, it is closely related to the breathing pattern of the individual. The movement of the right kidney was observed to be always greater than the left.

References

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