

Introduction:

In this study, we developed the system that could analysis and store the data acquired by real-time tracking the movement of abdominal surface due to respiration motion which have a high correlation with organ movement occurred by a respiration with a CCD camera and an image board, and then we performed the experiment of correlation between internal organ movement and external abdominal surface movement for the medium size animal of Guinea-pig using the developed system

Materials and Methods:

The experimental system was consisted with imaging acquisition part and image signal analyzing part. The image acquisition of internal organ was performed with a C-arm fluoroscopy system, and abdominal surface images were acquired with a CCD camera and NI image board. The developed system was applied to a Guinea-pig prior as application experiment for small animal. The information of the internal organ movement was acquired with C-arm fluoroscopy system by tracking the fiducial gold marker pre-implemented into liver, which was used in Cyberknife radiation therapy. The data acquisition of internal organ movement due to respiration and abdominal surface movement was performed under general anesthesia.

Results:

In spite of a steady state, the movement feature of abdominal surface of the Guinea-pig due to a respiration was more and less fluctuated in period and amplitude. The period of the breathing cycle ranged from 1.2 to 1.4 sec, and the frequency patterns for both the internal marker and the external marker were similar. The peak-to-peak motion of the internal marker was varied from 1.3 to 2.0 mm, and that of the external marker was varied from 1.4 to 2.2 mm.

Conclusion:

The inference of correlations between internal organ motion and external organ motion in the experiment using guinea-pigs having relatively short breathing cycle would be help to perform clinical trials for patients in future.