

TITLE:

Vibration Response Imaging (VRI) for Predicting Postoperative Lung Function in Patients with Lung Cancer

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PURPOSE:

Preoperative radionuclide studies of regional ventilation and perfusion ($^{133}\text{Xe-V/Q}$) together with lung function tests are established methods for predicting pulmonary function after resection for lung cancer. VRI technology records lung sounds, generating quantitative lung data indicative of the regional acoustic energy contributed by each lung. We compared the use of VRI with $^{133}\text{Xe-V/Q}$ for predicting postoperative lung function.

METHODS:

Twenty-two patients (10F, age=65yrs+8yrs) with lung cancer referred for preoperative evaluation were enrolled. Recording by VRI-XP device (DeepBreeze, Or-Akiva, Israel) were done immediately after radiospirometric tests. Predicted postoperative FEV₁(FEV₁ppo) and DLco (DLco-ppo) were calculated by subtracting the percent functional uptake or percent acoustic energy of the lung to be resected from the total. VRI and $^{133}\text{Xe-V/Q}$ perfusion results were compared by Pearson correlation, absolute error (AE), and Wilcoxon test for paired

RESULTS:

There was a good correlation between the VRI and $^{133}\text{Xe-V/Q}$ for the calculation of FEV₁ppo (R=0.74) and DLco-ppo (R=0.79). There was no significant difference ($p > 0.05$) between the mean values of FEV₁ppo as calculated by VRI ($37\% \pm 12\%$) and $^{133}\text{Xe-V/Q}$ ($39\% \pm 9\%$); AE=6.9±4.3. Similarly, there was no significant difference ($p > 0.05$) between the mean values of DLco-ppo as calculated by the VRI ($37\% \pm 12\%$) and $^{133}\text{Xe-V/Q}$ ($38\% \pm 14\%$); AE=6.7±5.1.

CONCLUSIONS:

Prediction of postoperative lung function by VRI technology is similar to $^{133}\text{Xe-V/Q}$. The present study is still ongoing and more data will be collected for continuation and confirmation of the present analysis.

CLINICAL IMPLICATIONS:

VRI technology may play an important role in prediction of post-operative lung function. Furthermore, the VRI technology is non-invasive and radiation free, thus posing no risk to patients.