Serum glutathione peroxidase 3 as a biomarker of postoperative relapse in patients with lung cancer

In-Jae Oh,1 Hyun-Ju Cho,1 Tae-Ok Kim,1 Chul-Kyu Park,1 Jung-Hwan Lim,1 Young-Chul Kim,1 Ju-Sik Yoon,1 Sang-Yun Song,1 Kook-Joo Na,1 Yoo-Duk Choi,2 Byung-Chul Ahn,2 Seung-Won Lee2,4 Chonnam National University Hwasun Hospital, Jeonnam, Korea, 2Chonnam National University Medical School, Gwangju, Korea

Background: Glutathione peroxidase 3 (GPx3) which is an extracellular secretory protein is down regulated in patients with early stage lung cancer. We examined the usefulness of serum GPx3 as a biomarker for monitoring of relapse after surgery.

Methods: We prospectively collected serial serum samples at baseline, 3 months (3m), 6 months (6m), and 12 months (12m) after operation from the patients who underwent surgery during the year 2013. GPx3 levels were measured three times per sample using the enzyme-linked immunosorbent assay, and the mean values were analyzed by t-test and paired t-test.

Results: A total of 170 (100 adenocarcinoma, 41 squamous cell carcinoma, 29 others) patients were analyzed in this study. Mean age was 64.1 years old (range, 39-80) and 27 (15.9%) out of 165 lung cancer patients were confirmed relapse during the median follow-up period of 597.5 days (range, 5-938). The mean GPx3 value at postoperative 6m was significantly elevated in relapsed group than control group (7.90 ± 2.44 µg/mL vs. 6.99 ± 1.79 µg/mL, p=0.047). The mean GPx3 differences were significantly higher in relapsed group than control group at 3m (-0.38 ± 0.39 µg/mL vs. -0.21 ± 0.36 µg/mL, p=0.044), 6m (-0.37 ± 0.42 µg/mL vs. -0.19 ± 0.30 µg/mL, p=0.024), and 12m (-0.38 ± 0.42 µg/mL vs. -0.19 ± 0.28 µg/mL, p=0.012). The mean time to relapse was significantly shorter in high level of GPx3 group at postoperative 3m (694.83 ± 31.86 days vs. 839.05 ± 24.31 days, p=0.007). The mean time to relapse was significantly shorter in high level of GPx3 difference group between baseline and postoperative 3m (729.76 ± 34.89 days vs. 838.18 ± 24.03 days, p=0.002).

Conclusion: Serum mean GPx3 value at postoperative 6m and the mean GPx3 difference were significantly elevated in relapsed lung cancer. The mean time to relapse was significantly shorter in high level of GPx3 group at postoperative 3m. More large scaled validation studies are warranted.

* Due to unforeseen circumstance, this poster was not presented.

The biological impact of e-cigarettes on airway epithelial cell transformation and gene expression

Stacy J. Park,1 Tonya C. Walser,1 Linh M. Tran,1 Catalina Perdomo,2 Teresa Wang,2 Long-Sheng Hong,1 Paul Pagano,1 Rui Li,1 Zhe Jing,1 Elvira Liclican,1 Jill E. Larsen,1 Kostyantyn Krysan,1 Michael C. Fishbein,2 John D. Minna,2 Marc E. Lenburg,2 Avrum Spira,2 Steven M. Dubinett1 1Chonnam National University Hwasun Hospital, Jeonnam, Korea, 2Chonnam National University Medical School, Gwangju, Korea

Because the electronic cigarette (ECIG) is designed to deliver nicotine without combusting tobacco, they are widely advertised as a safer alternative to tobacco cigarettes (TCIGs). ECIGs are controversial due to the lack of quality control standards and the paucity of data on their safety and long-term health effects. The absence of product standards and regulation, leading to variability in product quality is a major concern. Studies analyzing the contents of the ECIG cartridge and/or vapor have revealed the presence of major tobacco-specific nitrosamines, volatile organic compounds, and metals. Multiple studies have detected inconsistent levels of nicotine in cartridges and refills between ECIG manufacturers compared to the content labeling. For this reason, each component of ECIGs is the subject of public health and safety concern. In this study, we assess the impact of ECIG exposure on the carcinogenic potential of immortalized human bronchial epithelial cells on a background of silenced p53 and activated KRAS, mutations often observed in the airway of current and former smokers at risk for lung cancer. Our preliminary results demonstrate that exposure to clinically relevant concentrations of ECIG vapor-conditioned media enhance the cancer-associated risk for lung cancer. Our preliminary results demonstrate that exposure to clinically relevant concentrations of ECIG vapor-conditioned media enhance the cancer-associated behavior of ‘at-risk’ airways with a demonstrated capacity for malignant transformation. We observed enhanced colony growth in anchorage independent assays and increased cell invasion-associated morphological changes in three-dimensional air-liquid interface models. In addition, we found that mutant epithelial cells exposed to ECIG vapor-conditioned media induces airway gene expression changes that are similar to those seen with TCIG exposure. Currently, we are defining an ECIG exposure signature. In addition, we will also evaluate the effects of chemical substances present in ECIGs such as tobacco-specific nitrosamines. These studies will identify the potential impact of ECIGs on airway epithelium carcinogenesis and add to our overall understanding of early disease pathogenesis in human lung cancer. These studies were supported by funding from the following: NIH/NCI #U01CA152751 (SMD, TCW), NCI #U01CA152751-51 (SMD, TCW, SJP), NCI #U01CA152751-AS (SMD, KK), NCI #T32-CA009120-36 (SMD, SJP, PCP),