

**VP01.23****Non-invasive Diagnostic Triaging of Suspected Lung Cancers based on Immunocytochemistry Profiling of Circulating Tumor Cells**

Dr Sewanti Limaye², Dr Darshana Patil¹, Dr Dadasaheb Akolkar¹, Mr Pradip Fulmali¹, Dr Pooja Fulmali¹, Ms Archana Adhav¹, Mr Sachin Apurwa¹, Mr Sushant Pawar¹, Dr Shoeb Patel¹, Dr Rohit Chougule¹, Dr Vishal Ranjan¹, Mr Pradyumna Shejwalkar¹, Ms Shabista Khan¹, Mr Raja Dhasarathan¹, Dr Vineet Datta¹, Dr Stefan Schuster¹, Dr Cynthe Sims¹, Dr Prashant Kumar¹, Dr Pradip Devhare¹, Dr. Ajay Srinivasan¹, Mr Rajan Datar¹

¹Datar Cancer Genetics, Nashik, India, ²Kokilaben Dhirubhai Ambani Hospital and Medical Research Institute, Mumbai 400053, India

Background: Diagnosis of lung cancer in suspected individuals is based on histopathological examination (HPE) of tumor tissue obtained by an invasive biopsy. However, lung biopsies are associated with various procedural risks and may often not be possible owing to anatomical considerations as well as patient comorbidities. It is also estimated that around 60% of all lung biopsies are benign, indicating a disproportionate number of individuals who undergo an invasive biopsy that is subsequently deemed unnecessary. We present a non-invasive approach for diagnostic triaging of symptomatic individuals with suspicious findings on radiological scans (such as lung nodules in Low Dose Computed Tomography, LDCT) of suspected of lung cancer. **Methods:** We collected peripheral blood from 1256 individuals (827 males and 429 females) including 682 previously diagnosed cases of lung cancer as well as from 574 individuals who were suspected of lung cancer, underwent blood collection prior to undergoing a biopsy, then underwent an invasive biopsy and were subsequently diagnosed with lung cancer based on HPE of tumor tissue. Peripheral blood mononuclear cells (PBMCs) were isolated from blood samples and treated with an epigenetically activating medium which induces cell death in normal (non-malignant) hematolymphoid cells as well as epithelial cells in peripheral blood, but selectively confers survival privilege on apoptosis resistant Circulating Tumor Cells (CTCs). In a subset of 305 samples, including 146 previously known cases and 159 suspected cases, CTCs were profiled by immunocytochemistry (ICC) using IVD approved antibodies to detect lung-specific markers (Napsin-A, TTF-1 and p40). ICC findings were compared with the HPE results to determine concordance. **Results:** Detection of CTCs was concordant with presence of malignancy in 642 (94.1%) of the 682 previously diagnosed cases (retrospective group) and was predictive of malignancy in 550 (95.8%) of the 574 suspected cases (prospective group) with an overall concordance of 94.9% among the 1256 cases. In a subset of 305 samples, ICC profiling with Napsin-A, TTF-1 and p40 was concordant with prior diagnosis in 126 (86.3%) of 146 previously known cases and was prospectively concordant with subsequent HPE analysis in 146 (91.8%) of the 159 suspected cases of lung cancer with an overall concordance of 89.2%. **Conclusion:** The study shows a high sensitivity in CTC detection by ICC profiling. This approach can be used for non-invasive triaging of individuals suspected of lung cancer for further evaluations. In cases where a diagnostic biopsy is unviable, a liquid biopsy based approach can non-invasively provide relevant diagnostic direction.