ABSTRACT

Methods

We recruited a combination of newly diagnosed individuals, patients demonstrating TKI resistance, and patients with proven progression outside medical care in the Clinical Research Division of the National Institute of Cancerology (INCan) and Eastern Cooperative Oncology Group (ECOG) clinical trials. EGFR and ALK testing were performed using Biocept’s Amplidyne system (Sureplex-2M and SURE-Profiler). The diagnoses were confirmed by histopathologists. All patients were previously treated with EGFR TKI and had received at least one prior systemic therapy or radiation. “Liquid biopsy” was defined as any sample obtained from the bloodstream which contains cancer cells or clumps of cells that have been shed from the primary tumor or metastases, as well as circulating tumor DNA (ctDNA) which is shed into the bloodstream by circulating tumor cells (CTCs) and fragmented tumor DNA.

RESULTS

Tumor samples were considered for liquid biopsy analyses if they had been obtained from patients with advanced NSCLC. ctDNA analysis was positive in 42 of 50 patients (84%); of these, 17 patients had resistance to TKI, 17 patients were N1 tumors, and 8 patients had therapy failure (Table 1). While the patients with positive samples were not representative of the entire cohort, the results were consistent with other studies showing high concordance between ctDNA and tissue-directed biopsies.

CONCLUSIONS

The results of this study suggest that liquid biopsy analyses using ctDNA may be useful in identifying EGFR and ALK mutations, as well as other actionable mutations, in patients with advanced NSCLC. Further studies are needed to determine the clinical impact of liquid biopsy analyses in the management of these patients.

STUDY DESIGN

**Figure 1**: Study Design. 60 patients with advanced NSCLC were recruited to a prospective study of Target Selectors. All patients were newly diagnosed and had been enrolled in the Eastern Cooperative Oncology Group (ECOG) 3094 clinical trial, which included patients with advanced NSCLC who were treated with EGFR TKI as a first-line treatment. The trials included patients with EGFR mutations, ALK rearrangements, and other actionable mutations. All patients were previously treated with EGFR TKI and had received at least one prior systemic therapy or radiation. “Liquid biopsy” was defined as any sample obtained from the bloodstream which contains cancer cells or clumps of cells that have been shed from the primary tumor or metastases, as well as circulating tumor DNA (ctDNA) which is shed into the bloodstream by circulating tumor cells (CTCs) and fragmented tumor DNA.

Circulating nucleic acid was extracted from blood plasma and used in Target Selectors’ assays specific for the amplification of BRAF, KRAS, or EGFR kinase mutations. (1) B (1) DEL19+T790M in exon 19 (2) L858R mutation within exon 21 (3) T790M mutation within exon 21 (4) EGFR mutation T790M (5) ALK rearrangement (6) Isolated EGFR mutation T790M (7) ALK rearrangement.

METHODS

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