

## THE DIAGNOSTIC IMPLICATIONS OF BRAF MUTATION DETECTION IN FINE-NEEDLE ASPIRATION BIOPSY SAMPLES READ AS SUSPICIOUS FOR PTC

Jara, Sebastian<sup>1</sup>; Bhatnagar, Ramneesh<sup>4</sup>; Guan, Hui<sup>2</sup>; Gocke, Christopher<sup>3</sup>; Ali, Syed<sup>2</sup>; Tufano, Ralph<sup>1</sup>  
<sup>1</sup>Johns Hopkins School of Medicine, Department of Otolaryngology - Head and Neck Surgery, Baltimore, MD, USA; <sup>2</sup>Johns Hopkins School of Medicine, Department of Pathology-Cytopathology, Baltimore, MD, USA; <sup>3</sup>Johns Hopkins School of Medicine, Department of Pathology - Molecular Pathology, Baltimore, MD, USA; <sup>4</sup>University of Maryland Medical Center, Department of Pathology, Baltimore, MD, MD, USA

**Background/Purpose:** Fine-needle aspiration (FNA) has proven efficacy for detection of malignancy in thyroid nodules. However, management of patients with cytology “suspicious for papillary carcinoma” remains problematic. Numerous studies have investigated panel testing of multiple molecular markers on FNAs with indeterminate cytology. We sought to assess the diagnostic accuracy of *BRAF* mutation testing on thyroid FNAs “suspicious for papillary carcinoma.”

**Methods:** Records of all patients at two institutions with FNA results “suspicious for papillary carcinoma” who subsequently underwent thyroidectomy over an eleven-year period were reviewed. Corresponding archived FNA samples were tested for *BRAF* mutation using the MutectorR assay. Results were correlated with surgical pathology data to investigate the potential effect of *BRAF* mutation detection on surgical decision-making.

**Results:** Sixty-six patients with FNA findings “suspicious for papillary carcinoma” underwent thyroidectomy. Forty-two (63.6%) had a final histopathological diagnosis of papillary thyroid carcinoma (PTC), 2 (3%) had follicular thyroid carcinoma (FTC), 1 (1.5%) had mucoepidermoid carcinoma, and 21 (31.8%) had benign diagnoses. Of the 42 patients with histologically-proven PTC, 35 (83%) initially underwent total thyroidectomy, 5 (12%) underwent hemithyroidectomy, and 2 (5%) underwent completion thyroidectomy. FNA samples from 48 (65%) patients underwent *BRAF* screening and the *BRAF* mutation was detected in 17 samples (35.4%). *BRAF* testing had a 46.9% sensitivity, 86.7% specificity, 88.2 % PPV, and 41.9% NPV for predicting PTC on final histopathology. Four (80%) patients who underwent hemithyroidectomy required subsequent completion thyroidectomy, two (50%) of which had *BRAF* detected on FNA.

**Discussion & Conclusion:** *BRAF* testing is a helpful diagnostic adjunct in patients with suspicious for PTC cytology.