

ABSTRACT: ATA-ITSCON 2019

TITLE: Pilot data from a cost-effective panel of Molecular markers in the evaluation of thyroid nodules at a tertiary referral centre in Southern India

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OBJECTIVE: Testing for molecular markers on FNAC material is standard of care in patients with cytologically indeterminate thyroid nodules. The cost of these markers are extremely high in India and thereby increasing the number of incomplete as well as unnecessary thyroid surgeries.

METHODS: We chose to develop and study a laboratory developed test (LDT) for the detection of six pathogenic mutations and translocations (BRAFFV600E, RAS (N/H/K), TERT, RET-PTC, PAX-8-PPAR- γ). We piloted this test in 45 consecutive patients who underwent FNAC of their thyroid nodules from Nov 2017 to June 2018 at Narayana Health City Bangalore. Sequencing was carried out by multiplex PCR and analyzed by next generation sequencing software.

RESULTS: FNAC samples were collected from 45 patients who were evaluated for thyroid nodules. Out of these, 7 samples were used to optimise the protocol for extraction of DNA and RNA. 2 samples gave inadequate yield of DNA and RNA and hence could not be processed further. The rest 36 samples were processed further and libraries were prepared. Nine patients (25%) had positive results in their molecular testing, out of them 7 had RAS mutations [(NRAS Q61R (n=3), NRAS Q61K (n=2), HRAS Q61R (n=2)], and 2 had BRAF V600E mutation. One patient with NRAS Q61R and one patient with HRAS Q61R had follicular thyroid cancer (FTC) (Bethesda 4 on cytology) while the remaining 5 patients had indeterminate cytology (Bethesda 3) and final histopathology is not available. The two patients with BRAFFV600E mutation had locally advanced papillary thyroid cancer (PTC) requiring tracheal reconstruction. Two cases of classic PTC and one case of Medullary thyroid cancer (MTC) all with Bethesda 6 on cytology and one case of benign thyroid nodule on histopathology tested negative for mutations.

CONCLUSION: While not routinely useful in thyroid cytology, molecular panel might help select cases of cytologically indeterminate nodules (Bethesda 3 & 4) for surgery and help with pre-operative strategy in those with aggressive PTC. More data is required to validate this current set of mutations in the management of thyroid nodules.