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Comparison of Post-Treatment Plasma EBV DNA with Nasopharyngeal Biopsy in Patients after Radical (Chemo) Radiation Therapy for Non-metastatic Nasopharyngeal Cancer

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PURPOSE/OBJECTIVE(S): Random nasopharyngeal biopsy after completion of intensity-modulated radiation therapy (IMRT) for non-metastatic nasopharyngeal cancer (NPC) is routinely practiced in Hong Kong to confirm local remission. Plasma EBV DNA is proven an accurate marker for NPC. We carried out a prospective study comparing the correlation between post-IMRT nasopharyngeal biopsy and EBV DNA, to investigate if EBV DNA can substitute biopsy to confirm local remission.

MATERIALS/METHODS: Patients with non-metastatic NPC treated with definitive (chemo) IMRT diagnosed between January 2011 and March 2013 were recruited. After baseline workup including plasma EBV DNA, they received radical concurrent chemoradiation with 3 cycles of cisplatin 100 mg/m^2 and IMRT 70 Gy in 35 fractions over 7 weeks to primary tumor and positive neck nodes and 66 Gy in 35 fractions over 7 weeks to high-risk nodal regions, followed by 3 more cycles of adjuvant chemotherapy with cisplatin 100 mg/m^2 Day 1 and 5-FU 1000 mg/m^2 Day 1-4 every 4 weeks. Eight weeks after IMRT, they had random 6-site nasopharyngeal biopsies regardless of endoscopic appearance together with paired plasma EBV DNA. Repeated biopsies were performed at 10 and 12 weeks after IMRT if residual tumor was noted in previous biopsy. Local remission was defined as no residual tumor 12 weeks or earlier after completion of IMRT while local persistence as residual tumor at 12 weeks after IMRT and salvage therapy was given. The percentage of EBV DNA 0 copies/ml or < 100 copies/ml in those who had local remission was compared with those who had persistence. Receiver operating characteristic (ROC) curve was examined to evaluate the performance of EBV DNA.

RESULTS: All 214 patients completed treatment without interruption of IMRT, after a median follow-up of 2.2 years. Of these, 193 (90.2%) patients who had both biopsies and EBV DNA done were evaluated. One hundred seventy-two (89.1%), 175 (90.7%), and 176 (91.2%) patients achieved local remission at 8 weeks, 10 weeks, and 12 weeks, respectively. Local persistence was noted in 17 (8.8%) patients. One hundred seventy-one (88.6%) and 181 (93.8%) patients had their EBV 0 copies/ml and less than 100 copies/ml at 8 weeks. Local persistence was detected in 5.3% in those whose EBV DNA 0 copies/ml, not different from those whose EBV DNA > 0 copies/ml (9.1%, p = 0.466). This was also not different if EBV DNA was dichotomized to < 100 copies/ml (6.1%) vs. ≥ 100 copies/ml (0%, p = 0.379). Area of ROC curve was 0.536 (95% CI = 0.353-0.719) and 0.467 (95% CI = 0.301-0.633) when EBV DNA 0 copies/ml and 100 copies/ml were chosen as cut-off, respectively. Only 1 patient (0.5%) who had local remission developed local relapse till the date of last follow-up.

CONCLUSIONS: Plasma EBV DNA could not differentiate between those who had local remission and local persistence. Nasopharyngeal biopsy was still required after completion of IMRT to rule out local persistence which prompted early salvage treatment.