F-18 FDG PET-CT for response evaluation in head and neck malignancy

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Background: Head and neck squamous cell carcinoma (HNSCC) accounts for 90% of head and neck cancers. There has been no established qualitative system of interpretation for therapy response assessment using 18F-FDG PET-CT for HNSCC.

Objective: To

1. Apply Likert scale (Deauville criteria score (DS)) and SUVmax to all follow up PET scans
2. Determine whether interpretation of follow up PET scans can be improved
3. Categorise patients as responders vs non-responders to treatment

Methods:

Retro-prospective analysis of nodal status of pre and post-RT PET-CT in patients diagnosed with HNSCC (n=45) from May 2013 - March 2018.

Inclusion criteria:

Node positive HNSCC

Scheduled for organ preservation therapy with curative intent

No initial neck surgery

Hypermetabolic neck nodes in pre-RT PET-CT

Follow up with PETCT imaging, additional radiological imaging, clinical or histopathological evidence after six months.

DS ranged from 1-5.

Results:
Forty-five patients (M/35, F/10, age range 18-80 years (median 54 years)) were included for the study.
There were 22 patients in DS 1 group. Of the 10 patients in the DS 2 group and 9 patients in DS 3 group, the p-value was found to be 0.0051 and 0.01 respectively while comparing pre and post-RT SUVmax levels showing that RT/CRT had significantly reduced the SUVmax levels of the nodes. As there were only 4 patients in the DS 4-5 group, it was too small to allow a reliable calculation for p-value for comparing the effect of RT.

Of 7/45 patients who had progression, the same was confirmed in 5 (71.4%) patients by tissue diagnosis and 2 (38.6%) patients by subsequent imaging and clinical follow-up. They were all in DS 3-5 groups.
There was no disease progression in DS 1-2 groups.
It was found that 38/41 patients with DS 1-3 had no nodal recurrence showing a high NPV of 93%. Of the 4 patients with DS 4-5 all had active disease showing PPV of 100%.
Good concordance was noted between DS and clinical response in these patients. The p-value was found to be 0.004. This highlighted that DS 2-3 was useful in predicting absence of nodal recurrence and DS 4-5 in predicting disease progression.

Conclusion:
Equivocal PET scan in HNSCC poses clinical dilemma. All patients with DS 4 or 5 on post-treatment PET scan can be considered as non-responders and should be routinely scheduled for neck dissection. Deauville score seems to satisfy the requirements for a simple qualitative method of interpreting PET scans and for identifying patients requiring neck dissection. Consensus regarding qualitative assessment would facilitate standardisation of PET reporting in clinical practice and enable comparative multicentric studies.

Key words: HNSCC, Deauville score, pre- RT PET-CT, post-RT PET-CT