

Supplemental Table 1: Studies reporting utility of Post-Rx. 131-I SPECT-CT for evaluation of differentiated thyroid cancer

| Author Journal | No. Pts/Scans Design | Setting Indication | Scan type Activity | Camera CT settings | Site of Radioactivity Foci Findings/Comments |
|---------------------------------------|-------------------------|---|------------------------------|---|--|
| Ciappuccini R et al. 2011 EJE | 170/170 Pros | First RA Routine | Post-Rx I-131 0.9-4.8 GBq | Symbia T2 | Neck/distant; Follow-up: median, 29 months, range 1.5-4.5 years Prognostic value of post-ablation SPECT-CT for recurrence was assessed in follow-up evaluation: 32 (19%) pts. had persistent/recurrent ds: 18 with nodal mets, 8 with distant mets and 6 with both SPECT-CT was negative or equivocal in all patients free of disease at follow-up SPECT-CT was positive in 78% and negative in 22% pts with persistent or recurrent disease Post-ablation scintigraphy has 78% sensitivity and 100% specificity for predicting recurrent disease |
| Qiu Z et al 2010 Head & Neck; Pros | 561/ Pros | First RA RAI Rx for mets Selected | Post-Rx I-131 3.7-7.4 GBq | Millenium Hawkeye 140 kV, 2.5 mAs | Neck SPECT-CT identified parapharyngeal metastases in 14/561 (2.5%) pts. Parapharyngeal mets were associated with regional and/or distant mets |
| Grewal et al. 2010 JNM | 148/148 Retro | First RA (74%) Recurrent or metastatic ds. (26%) Routine | Post-Rx I-131 1.7-8 GBq | Philips Precedence 120 kV, adjusted mAs/kg | Neck/distant SPECT-CT changed N in 15% postsurgical pts and in 21% recurrence pts SPECT-CT changed ATA risk classification in 7/109 (6.4%) pts SPECT-CT identified non-iodine avid metastases in 32/148 (22%) pts Size of nodal mets was measured on CT component of SPECT-CT SPECT-CT avoided additional imaging in 48% pts |
| Mustafa et al. 2010 EJNMMI | 151/151 Pros | First RA Routine | Post-Rx I-131 1.8-5.3 GBq | Symbia T2, T6 140 kV, 20-40 mAs | Neck Accuracy SPECT-CT > Planar in 24.5% pts SPECT-CT revised N score in 24.5% pts LNM occurs in 26% pts with T1 and 22% pts with microcarcinoma (≤ 1 cm) |
| Schmidt et al. 2010 EJNMMI | 81/81 Retro | First RA Routine | Post-Rx I-131 1.5-5.3 GBq | Symbia T2, T6 140 kV, 40 mAs | Neck 60/61 pts with negative SPECT-CT were disease free at 5 months 17/20 pts with positive SPECT-CT were disease free at 5 months Metastasis size <0.9 ml predicted treatment success |

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| Aide et al. 2009 JCEM | 55/55 Pros | First RA Routine | Post-Rx I-131 2.9-4.0 GBq | Symbia T2 ?kV, 60 mAs | Neck SPECT-CT clarified diagnosis in 16 pts with indeterminate planar scans: 9/9 pts without disease had negative SPECT-CT 4/5 pts with disease had positive SPECT-CT |
| Kohlfuerst et al. 2009 EJNMMI | 41/53 Pros | First RA (23 pts) FU (18 pts) Selected | Post-Rx I-131 2.9-7.5 GBq | Symbia T 130 kV, 25mAs | Neck/distant SPECT-CT impact 21/33 (63.6%) pts, changed N score 12/33 (36.4%) SPECT-CT impact 14/19 (73.7%) pts, change M score 4/19 (21.1%) Changed treatment in 10/41 (24.4%) pts 8/33 (24.2%) changed treatment due to N score 2/19 (10.5%) changed treatment due to M score |
| Wang et al. 2009 Clin Imag | 94/94 Retro | First RA Routine | Post-Rx I-131 3.7-7.4 GBq | Infinia Hawkeye 140 kV, 2.5 mAs | Neck/distant Accuracy SPECT-CT > planar in 20/94 (21%) pts Changed treatment in 22/94 (23%) pts SPECT-CT identified unsuspected metastases in 7/94 (7%) pts |
| Schmidt et al. 2009 EJNMMI | 57/57 Retro | First RA Routine | Post-Rx I-131 1.5-5.3 GBq | Symbia T2, T6 140 kV, 40 mAs | Neck SPECT-CT completes N staging SPECT-CT changed N score in 20/57 (35%) pts SPECT-CT changed risk stratification in 14/57 (25%) pts |
| Chen et al. 2008 JNM | 23/37 Pros | First RA Selected | Post-Rx I-131 3.7-7.4 GBq | Millenium Hawkeye 140 kV, 2.5 mAs | Neck/distant Incremental diagnostic value SPECT-CT > planar in 17/23 (74%) pts SPECT-CT clarified 69/81 (85%) inconclusive planar foci Changed treatment in 8/17 (47%) pts |
| Tharp et al. 2004 EJNMMI | 71/71 Retro | First RA (28/54) FU (26/54) | Post-Rx I-131 1.4-9.7 GBq | Millenium VG Hawkeye 140kV, 2.5 mAs | Neck/distant Incremental diagnostic value SPECT-CT > planar in 41/71 (57%) pts |

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| | | Selected | (54 pts) Diagn. I-131 143–187 MBq (17 pts) | | Diagnostic SPECT-CT changed treatment in 7/17 (41%) pts |
| Ruf et al. 2004 NMC | 25/25 Pros | First RA Selected | Post-Rx I-131 3.7 GBq | Millenium Hawkeye 140 kV, 2.5 mAs | Neck/distant SPECT-CT impact in 17/39 (44%) foci Changed treatment in 6/24 (25%) pts |
| Yamamoto et al. 2003 JNM | 17/17 Retro | First RA Routine | Post-Rx I-131 3.7-7.4 GBq | Aquilon CT Picker Prism | Neck/distant Accuracy SPECT-CT > SPECT 15/17 (88%) pts Co-registration with external fiducial markers feasible |

Pts. = patients; ds. = disease; Retro = retrospective, Pros = prospective, First RA = post-surgery at time of first radioablation with I-131, FU = follow-up from post-surgery 6 months onwards, Routine = SPECT-CT performed on consecutive pts, Selected = SPECT-CT performed on selected pt group, Post-Rx = post-therapy scan, LNM = lymph node metastases, Sen = sensitivity, Spec = specificity

Supplemental Table 2: Studies reporting utility of diagnostic pre-ablation SPECT-CT for evaluation of differentiated thyroid cancer

| Author Journal | No. Pts/Scans Design | Setting Indication | Scan type Activity | Camera CT settings | Site of Radioactivity Foci Findings/Comments |
|----------------------------|-------------------------|---|---|--|---|
| Wong et al. 2010 AJR | 48/48 Retro | First RA Selected | Diagn. I-131 37 MBq | Symbia T6 140kV, 100 mAs | Neck/distant SPECT-CT changed TNM stage in 10/48 (21%) pts SPECT-CT changed proposed I-131 dose selection in 28/48 (58%) pts SPECT-CT identified unsuspected metastases in 4/8 pts with M1 |
| Barwick et al. 2010 EJE | 79/85 Retro | FU Routine | Diagn. I-123 350-400 MBq | Millenium Hawkeye 140kV, 2.5 mAs | Neck/distant Planar: Sen 41% Spec 68% Accuracy 61% SPECT: Sen 45% Spec 89% Accuracy 78% SPECT-CT: Sen 50% Spec 100% Accuracy 87% SPECT-CT provided additional information in 42% pts and 70% foci |
| Spanu et al. 2009 JNM | 117/117 Pros | First RA (8%) FU (92%) Routine | Diagn. I-123 185 MBq (108 pts) Post-Rx I-131 3.7 GBq (9 pts) | Millenium Hawkeye Infinia Hawkeye 4 140kV, 2.5 mAs | Neck/distant SPECT-CT has incremental value over planar scan in 67.8% pts SPECT-CT changed treatment in 35.6% pts with disease SPECT-CT led to avoidance of I-131 therapy in 20% pts without disease SPECT-CT identified 158 foci compared to only 116 foci on planar |
| Wong et al. 2008 AJR | 53/56 Retro | First RA (47 pts) FU (6 pts) Selected | Diagn. I-131 37 MBq (47 pts) 150 MBq (6 pts) | Symbia T6 140kV, 100 mAs | Neck/distant Diagnostic value SPECT-CT > planar in 53/130 (41%) neck foci Diagnostic value SPECT-CT > planar in 17/17 (100%) distant foci SPECT-CT using diagnostic I-131 activities feasible Allows adjustment of prescribed radioiodine activity |

Pts. = patients; Retro = retrospective; Pros = prospective; First RA = post-surgery at time of first radioablation with I-131; FU = follow-up after surgery and initial radioablation, 6 months onwards; Routine = SPECT-CT performed on consecutive pts; Selected = SPECT-CT performed on selected pt group; Diagn. = diagnostic pre-ablation scan; Post-Rx = post-therapy scan; LNM = lymph node metastases, Sen = sensitivity, Spec = specificity

