

**SUPPLEMENTAL TABLE 1**

Comparison between the general characteristics of the entire study cohort and of patients who received <sup>99m</sup>Tc-MDP bone scans

Characteristic	Entire study cohort (n=80)	Patients who received <sup>99m</sup> Tc-MDP bone scans*(n=47)	P value	Test
Mean age ± SD (years)	52.3 ± 9.2	53.7 ± 7.5	0.89	T-test
Sex, n (%)			0.99	Fisher's exact
Male	74	44		
Female	6	3		
Tumor site, n (%)			0.57	Fisher's exact
Oral cavity	59	37		
Oropharynx	9	3		
Hypopharynx	10	7		
Larynx	2	0		
Histology			0.36	Fisher's exact
Squamous cell carcinoma (SCC)	78	46		
Non-SCC	2	1		

SD = standard deviation

\* 47 out of the 80 patients received <sup>99m</sup>Tc-MDP bone scans

**SUPPLEMENTAL TABLE 2**

Assessment of skeletal metastasis by <sup>99m</sup>Tc-MDP bone scan, <sup>18</sup>F-fluoride PET/CT, and <sup>18</sup>F-FDG PET/CT

	FN	TP	TN	FP	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)	Accuracy (95% CI)
<b>Lesion-based analysis</b>									
<sup>99m</sup> Tc-MDP bone scan	39	19	210	2	32.8 (21.0-46.3)	99.1 (96.6-99.9)	90.5 (69.6-98.8)	84.3 (79.2-88.6)	84.8 (80.0-88.9)
<sup>18</sup> F-fluoride PET/CT	13	45	210	2	77.6 (64.7-87.5)	99.1 (96.6-99.9)	95.7 (85.5-99.5)	94.2 (90.2-96.9)	94.4 (91.0-96.9)
<sup>18</sup> F-FDG PET/CT	33	25	212	0	43.1 (30.2-56.8)	100.0	100.0	86.5 (81.6-90.5)	87.8 (83.3-91.4)
<b>Patient-based analysis</b>									
<sup>99m</sup> Tc-MDP bone scan	7	5	34	1	41.7 (15.2-72.3)	97.1 (85.1-99.9)	83.3 (35.9-99.6)	82.9 (67.9-92.8)	83.0 (69.2-92.4)
<sup>18</sup> F-fluoride PET/CT	4	8	34	1	66.7 (34.9-90.1)	97.1 (85.1-99.9)	88.9 (51.8-99.7)	89.5 (75.2-97.1)	89.4 (76.9-96.5)
<sup>18</sup> F-FDG PET/CT	4	8	35	0	66.7 (34.9-90.1)	100.0	100.0	89.7 (75.8-97.1)	91.5 (79.6-97.6)

FN= false negative; TP= true positive; TN= true negative; FP= false positive; PPV= positive predictive value; NPV= negative predictive value; CI= confidence interval

The lesion-based analysis in this subgroup demonstrated that the sensitivities of <sup>18</sup>F-fluoride PET/CT, <sup>18</sup>F-FDG PET/CT, and <sup>99m</sup>Tc-MDP bone scan were 77.6%, 43.1%, and 32.8%, respectively. On a patient-based analysis, the sensitivities were 66.7%, 66.7%, and 41.7%, respectively. In accordance with previous reports, the results from this subgroup showed that <sup>18</sup>F-fluoride PET/CT had a markedly higher sensitivity for the detection of bony metastases compared with MDP bone scan. The sensitivity of <sup>18</sup>F-FDG PET/CT in this subgroup was not consistent with those calculated on a patient- or lesion-based analysis. This result is likely due to the presence of fewer osteolytic lesions in this patient group, which would lead to an underestimation of the detection power of <sup>18</sup>F-FDG PET.

**SUPPLEMENTAL TABLE 3**Comparison of the Detection Rates of Skeletal Metastases by <sup>18</sup>F-FDG PET/CT and <sup>18</sup>F-fluoride PET/CT

According to the Changes in Bone Morphology on CT Scans

	Change on CT			
	Osteosclerotic (n=37)	Osteolytic (n=13)	Mixed (n=9)	Not visible (n=39)
<sup>18</sup> F-FDG PET/CT	43.2 (27.1-60.5)	92.3 (64.0-99.8)	100.0	46.2 (30.1-62.8)
<sup>18</sup> F-fluoride PET/CT	91.9 (78.1-98.3)	69.2 (38.6-90.9)	100.0	38.5 (23.4-55.4)
<i>P</i> value	0.01	NS	NS	NS

NS = not significant

**SUPPLEMENTAL TABLE 4**

Comparison of the Detection Rates of Skeletal Metastases in Different Subgroups

	<b>Primary locoregional advanced disease (n=60)*</b>	<b>Locoregional recurrence (n=14)</b>	<b>Known M1 disease (n=6)</b>
<b>Patients with bone metastases</b>	10	2	6
<b>Bony metastasis detected by:</b>			
<sup>18</sup> F-fluoride PET/CT alone	1 <sup>†</sup>	1	0
<sup>18</sup> F-FDG PET/CT alone	1	0	2
Both modalities	7	0	4
Neither modality	1	1	0

\* Total number of patients in each subgroup, † Number of patients with bony metastasis

**Impact on treatment and subgroup analysis:** In this study, an additional 11% (2/18) of the patients with bony metastases were revealed by <sup>18</sup>F-fluoride PET/CT alone; as a result, their treatment was changed to palliative chemotherapy. In the subgroup of patients with primary advanced locoregional disease, <sup>18</sup>F-FDG PET/CT detected bony metastases in 8 patients (Table 5). The additional <sup>18</sup>F-fluoride PET/CT scanning identified an additional case. Among the 14 patients with locoregional recurrence, two had bony metastases. None of them were detected by <sup>18</sup>F-FDG PET/CT and one was correctly diagnosed by <sup>18</sup>F-fluoride PET/CT. In the patients with known disseminated disease, all of the 6 cases with bony metastases were detected by <sup>18</sup>F-FDG PET/CT