

Supplementary table 1. Dosimetric parameters for clinical target volumes (CTV) and selected organs at risk using IMPT for oropharyngeal carcinomas

Organ	Dosimetric Parameter	Value, mean (sd)
CTV 1	V95%	99.8% (0.35)
	D95%	68.8 Gy (2.5)
CTV 2	V95%	99.7% (0.37)
	D95%	63.5 Gy (1.9)
CTV 3	V95%	99.4% (0.86)
	D95%	56.4 Gy (1.6)
Parotid, ipsilateral	Mean dose	39.9 Gy (9.6)
Parotid, contralateral	Mean dose	17.4 Gy (9.1)
Oral cavity	Mean dose	13.2 Gy (7.5)
Larynx	Mean dose	31.5 Gy (9.8)
Superior pharyngeal constrictor	Mean dose	56.2 Gy (9.1)
	V50%	78.5% (21.1)
Middle pharyngeal constrictor	Mean dose	52.8 Gy (13.5)
	V50%	67.1% (33.9)
Inferior pharyngeal constrictor	Mean	33.6 Gy (9.7)
	V50%	16.2% (16.1)
Brainstem	D2%	24.9 Gy (9.2)
Spinal cord	D2%	30.6 Gy (7.8)
Esophagus	Mean dose	16.8 Gy (8.9)
Mandible	Mean dose	25.4 Gy (7.5)
	D2%	65.7 Gy (5.5)

Supplementary Table 2. Patient, disease, and treatment characteristics and outcomes for 5 patients who developed any disease recurrence following proton therapy for oropharyngeal cancer.

Age	Sex	Smoking status	Primary site	Initial stage	Initial Tumor p16 status	Initial therapy	Recurrence type	Time to recurrence	Therapy for recurrence	Patient vital and disease status
57	M	Former	Let tonsil	T2N2bM0 (IVA)	Positive	Induction carboplatin and paclitaxel followed by concurrent cisplatin-IMPT 70 Gy(RBE)/33 fx	LR + RR; possible second primary with nodal metastasis; right (contralateral) glossopharyngeal sulcus and right level Ib lymph node	43 mos.	Surgery and postoperative reirradiation	Alive, NED; under active treatment (postoperative reirradiation)
64	M	Former	Left BOT	T2N2bM0 (IVA)	Positive	Single modality IMPT 66 Gy(RBE)/30 fx	RR; left level IIa lymph node	20 mos.	Salvage neck dissection	Alive, NED 3 months after salvage surgery
49	M	Never	Synchronous primaries of base of tongue and hypopharynx	Each T4N2cM0 (IVB)	Unknown	Induction TPF followed by concurrent cisplatin-IMPT 70 Gy(RBE)/33 fx	LRR; details unknown	13 mos.	Unknown	DOD, 11 mos. after recurrence
61	M	Former	Base of tongue	T3N2bM0 (IVA)	Positive	Concurrent cisplatin-IMPT 70 Gy(RBE)/33 fx	Distant metastases to lung with locoregional control	13 mos.	Stereotactic radiation therapy to lung with subsequent disease progression;	AWD, 8 mos. after distant recurrence; not currently receiving any therapy
61	M	Former	Right Tonsil	T2N2bM0 (IVA)	Positive	Induction carboplatin and paclitaxel followed by concurrent cisplatin-IMPT 70 Gy(RBE)/33 fx	RR; right level IIa lymph node	12 mos.	Salvage neck dissection	Alive, NED 24 mos. after salvage surgery

IMPT=intensity modulated proton therapy; TPF= taxol, cisplatin, 5-fluorouracil; LRR=locoregional recurrence; LR=local recurrence; RR=regional recurrence; NED= no evidence of disease (cancer), DOD=dead of disease (cancer); AWD=alive with disease (active cancer)