Supplementary Online Content

This supplementary material has been provided by the authors to give readers additional information about their work.

eFigure. The Delineation of Trabecular Bone Portion (Axial and Sagittal View)
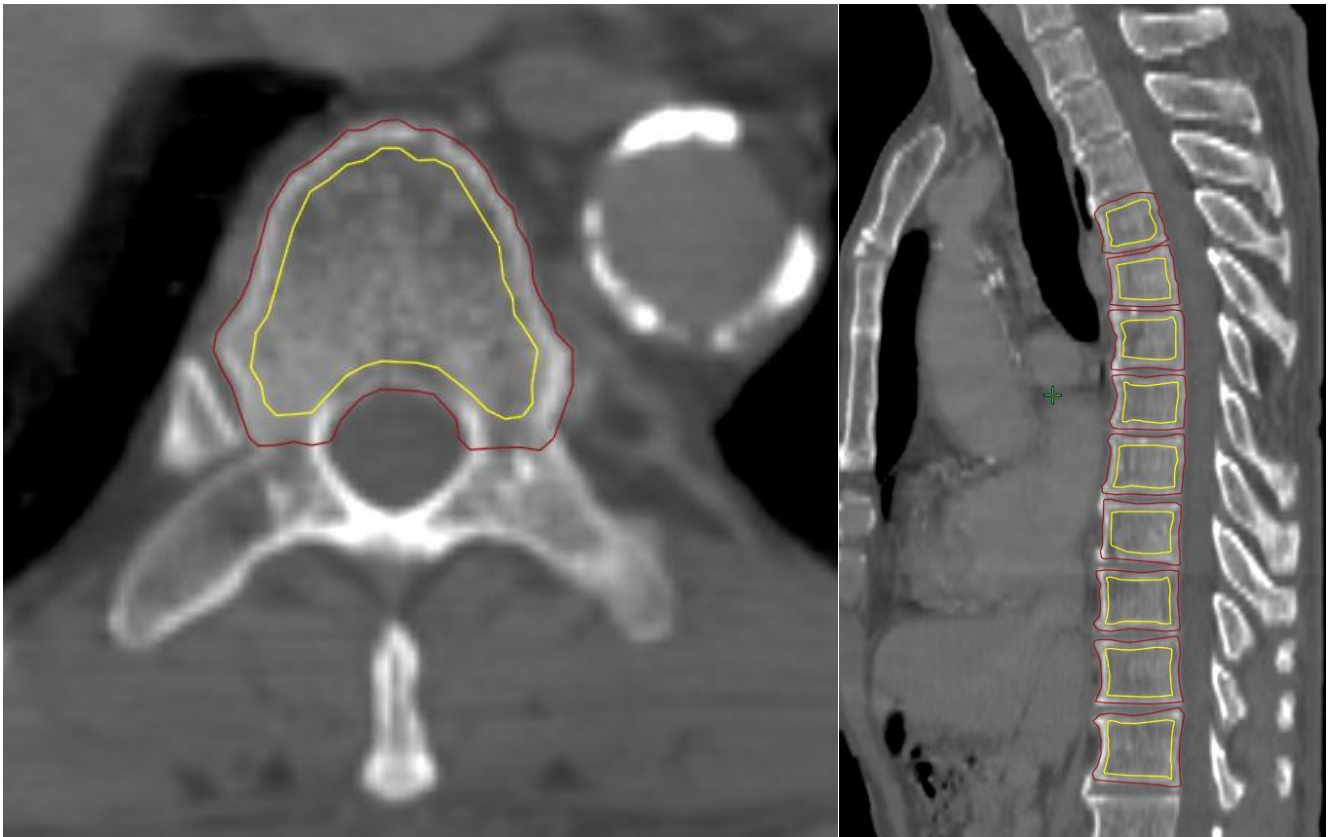

Figure legends: The brown contours meant vertebral bodies. The yellow contours meant the trabecular bone portions. The trabecular portions were created by cropping 3 mm below the surface of the brown contours. Eclipse treatment planning system version 13.7 (Varian Medical Systems, Palo Alto, USA) was used for the analysis.

eTable 1. Univariable and Multivariable Analyses Using the Fine and Gray Subdistribution Hazards Model With Observation Truncated at 3 Years

		Number of patients	Number of events	Univariable		Multivariable (Chemoradiotherapy plus univariable)					
				HR (95% CI)	p value	HR (95% CI)	p value	HR (95% CI)	p value	HR (95% CI)	p value
Chemoradiotherapy	Yes	119	14 (11.8%)	3.91 (1.41–10.9)	0.009	3.59 (1.28–10.1)	0.02	4.54 (1.59–13.0)	0.005	3.46 (1.20–10.0)	0.02
	No	196	5 (2.6%)	1		1		1		1	
Age, years	≥ 65	172	16 (9.3%)	4.56 (1.31–15.8)	0.02	4.16 (1.17–14.8)	0.03				
	< 65	143	3 (2.1%)	1		1					
Gender	Female	56	8 (14.3%)	6.14 (2.38–15.8)	< 0.001			4.25 (1.67–10.8)	0.002		
	Male	259	11 (4.2%)	1				1			
Clinical Stage (Union for International Cancer Control 6th edition)	III	97	7 (7.2%)	2.35 (0.70–7.93)	0.17						
	II	93	8 (8.6%)	2.69 (0.82–8.86)	0.10						
	I	125	4 (3.2%)	1							
Body mass index, kg / m²	≤ 21.4	158	12 (7.6%)	1.69 (0.67–4.29)	0.27						
	> 21.4	157	7 (4.5%)	1							
History of habitual drinking	Yes	282	13 (4.6%)	0.24 (0.09–0.63)	0.004						
	No	33	6 (18.2%)	1							
History of habitual smoking	Yes	263	13 (4.9%)	0.40 (0.15–1.06)	0.07						
	No	52	6 (11.5%)	1							
History of vertebral or hip fractures	Yes	23	6 (26.1%)	6.14 (2.38–15.8)	< 0.001					5.22 (1.87–14.6)	0.002
	No	292	13 (4.5%)	1						1	

Abbreviations: HR = hazard ratio; CI = confidence interval.

eTable 2. Univariable and Multivariable Analyses Using the Cox Proportional Hazards Model

		Number of patients	Number of events	Univariable		Multivariable (Chemoradiotherapy plus univariable)					
				HR (95% CI)	p value	HR (95% CI)	p value	HR (95% CI)	p value	HR (95% CI)	p value
Chemoradiotherapy	Yes	119	20 (16.8%)	4.05 (1.78–9.19)	< 0.001	3.73 (1.64–8.49)	0.002	5.34 (2.29–12.5)	< 0.001	3.54 (1.54–8.12)	0.003
	No	196	8 (4.1%)	1		1		1		1	
Age, years	≥ 65	172	22 (12.8%)	3.33 (1.35–8.22)	0.009	2.99 (1.21–7.40)	0.02				
	< 65	143	6 (4.2%)	1		1					
Gender	Female	56	10 (17.9%)	3.01 (1.38–6.55)	0.005			4.52 (2.01–10.2)	< 0.001		
	Male	259	18 (6.9%)	1				1			
Clinical Stage (Union for International Cancer Control 6th edition)	III	97	9 (9.3%)	1.85 (0.75–4.57)	0.18						
	II	93	9 (9.7%)	1.36 (0.55–3.36)	0.50						
	I	125	10 (8.0%)	1							
Body mass index, kg / m²	≤ 21.4	158	15 (9.5%)	1.25 (0.60–2.63)	0.55						
	> 21.4	157	13 (8.3%)	1							
History of habitual drinking	Yes	282	21 (7.4%)	0.27 (0.11–0.63)	0.003						
	No	33	7 (21.2%)	1							
History of habitual smoking	Yes	263	21 (8.0%)	0.55 (0.23–1.29)	0.17						
	No	52	7 (13.5%)	1							
History of vertebral or hip fractures	Yes	23	7 (30.4%)	5.63 (2.36–13.5)	< 0.001					4.36 (1.81–10.5)	0.001
	No	292	21 (7.2%)	1						1	

Abbreviations: HR = hazard ratio; CI = confidence interval.

eTable 3. Univariable and Multivariable Analyses Using the Cox Proportional Hazards Model With Observation Truncated at 3 Years

		Number of patients	Number of events	Univariable HR (95% CI)	p value	Multivariable (Chemoradiotherapy plus univariable) HR (95% CI)	p value	HR (95% CI)	p value	HR (95% CI)	p value
Chemoradiotherapy	Yes	119	14 (11.8%)	4.41 (1.59–12.2)	0.004	4.08 (1.47–11.4)	0.007	5.58 (1.98–15.7)	0.001	3.82 (1.36–10.7)	0.01
	No	196	5 (2.6%)	1		1		1		1	
Age, years	≥ 65	172	16 (9.3%)	4.60 (1.34–15.8)	0.02	4.21 (1.23–14.5)	0.02				
	< 65	143	3 (2.1%)	1		1					
Gender	Female	56	8 (14.3%)	3.57 (1.44–8.89)	0.006			4.84 (1.92–12.3)	< 0.001		
	Male	259	11 (4.2%)	1				1			
Clinical Stage (Union for International Cancer Control 6th edition)	III	97	7 (7.2%)	3.29 (0.96–11.3)	0.06						
	II	93	8 (8.6%)	3.00 (0.90–9.96)	0.07						
	I	125	4 (3.2%)	1							
Body mass index, kg / m^2	≤ 21.4	158	12 (7.6%)	1.83 (0.72–4.66)	0.20						
	> 21.4	157	7 (4.5%)	1							
History of habitual drinking	Yes	282	13 (4.6%)	0.23 (0.09–0.59)	0.003						
	No	33	6 (18.2%)	1							
History of habitual smoking	Yes	263	13 (4.9%)	0.43 (0.16–1.13)	0.09						
	No	52	6 (11.5%)	1							
History of vertebral or hip fractures	Yes	23	6 (26.1%)	6.30 (2.39–16.6)	< 0.001					5.11 (1.93–13.6)	0.001
	No	292	13 (4.5%)	1						1	

Abbreviations: HR = hazard ratio; CI = confidence interval.

eTable 4. Hazards Model With Chemoradiotherapy Plus Clinical Stages

		Number of patients	Number of events	Observation Fine and Gray subdistribution hazards model HR (95% CI)	p value	Observation Cox proportional hazards model HR (95% CI)	p value	Number of events	Observation truncated at 3 years Fine and Gray subdistribution hazards model HR (95% CI)	p value	Observation truncated at 3 years Cox proportional hazards model HR (95% CI)	p value
Chemoradiotherapy	Yes	119	20 (16.8%)	4.00 (1.60–10.0)	0.003	4.14 (1.77–9.69)	0.001	14 (11.8%)	4.62 (1.43–15.0)	0.01	4.65 (1.60–13.5)	0.005
	No	196	8 (4.1%)	1		1		5 (2.6%)	1		1	
Clinical Stage (Union for International Cancer Control 6th edition)	III	97	9 (9.3%)	0.76 (0.29–1.98)	0.58	1.30 (0.52–3.26)	0.58	7 (7.2%)	1.46 (0.38–5.53)	0.58	2.18 (0.63–7.63)	0.22
	II	93	9 (9.7%)	1.37 (0.55–3.37)	0.50	1.59 (0.64–3.93)	0.32	8 (8.6%)	3.14 (0.98–9.98)	0.05	3.47 (1.04–11.6)	0.04
	I	125	10 (8.0%)	1		1		4 (3.2%)	1		1	

Abbreviations: HR = hazard ratio; CI = confidence interval.

eTable 5. Shared Frailty Model for Single Thoracic Vertebral Fracture Including Maximum Radiation Dose

Factors	Hazard ratio (95% confidence interval)	p value
5-Gy increase of maximum radiation dose	1.14 (1.01–1.28)	0.039
5-units increase of mean Hounsfield unit	0.89 (0.84–0.93)	< 0.001
Female	3.05 (1.35–6.90)	0.007

eTable 6. Shared Frailty Model for Single Thoracic Vertebral Fracture Including Thoracic Levels of the Vertebra

Factors	Multivariable including mean radiation dose		Multivariable including maximum radiation dose	
	HR (95% CI)	p value	HR (95% CI)	p value
5-Gy increase of mean radiation dose	1.42 (1.17–1.74)	0.001		
5-Gy increase of maximum radiation dose			1.19 (1.01–1.39)	0.03
5-units increase of mean Hounsfield unit	0.88 (0.84–0.93)	< 0.001	0.88 (0.84–0.93)	< 0.001
Female	4.41 (1.86–10.4)	0.001	3.18 (1.38–7.36)	0.007
Thoracic levels of the vertebra				
T4	1		1	
T5	2.02 (0.18–22.3)	0.57	1.68 (0.15–18.5)	0.67
T6	1.88 (0.17–20.8)	0.61	1.40 (0.13–15.5)	0.78
T7	4.07 (0.41–40.2)	0.23	2.33 (0.24–22.6)	0.47
T8	11.05 (1.26–96.8)	0.03	4.90 (0.59–40.8)	0.14
T9	7.33 (0.77–69.5)	0.08	3.53 (0.39–31.8)	0.26
T10	6.20 (0.60–63.7)	0.13	3.01 (0.31–29.2)	0.34
T11	3.46 (0.18–64.8)	0.41	1.02 (0.06–16.7)	0.99
T12	26.43 (1.91–366)	0.02	5.63 (0.53–59.5)	0.15

Abbreviations: HR = hazard ratio; CI = confidence interval.
Footnote: Interpretation should be careful because of the wide CI constructed from the small number of events in each thoracic levels of vertebra.

eTable 7. Fine and Gray Subdistribution Hazards Model to Evaluate the Effect of Chemotherapy on Thoracic Vertebral Fractures in Non-CRT Group (n = 196)

		Number of patients	Number of events (%)	Hazard ratio (95% confidence interval)	p value
Chemotherapy	Yes	83	5 (6.0%)	1.93 (0.46–8.15)	0.37
	No	113	3 (2.7%)	1	

Footnote: Interpretation should be careful because of the limited sample size and number of events in non-chemoradiotherapy group.