Supplementary material

Tab. S1. Subjective analysis. Inter-rater reliability (yes/no)

Group	Answers			Same answers (*N* = 60)	K (CI 95%)
		Y	N		
PULM (open)	**Y**	35	0	57 (95%)	0.895 (0.781–1.000)
	N	3	22		
PULM (blinded)	**Y**	21	10	45 (77%)	0.536 (0.327–0.745)
	N	4	25		
CARDIO	**Y**	19	1	42 (70%)	0.437 (0.248–0.627)
	N	17	23		
EME	**Y**	32	4	53 (88%)	0.759 (0.591–0.926)
	N	3	21		
UUP	**Y**	37	10	47 (78%)	0.466 (0.226–0.705)
	N	3	10		

Please note that all physicians (except for the first group) were blinded to the diagnosis. PULM – pulmonologists; CARDIO – cardiologists; EME – emergency medicine expert; UUP – US un-experienced physicians; CI – confidence interval; Y – "yes" to at least one parameter (horizontal artifacts or greyscale); B – "no" to both parameters (horizontal artifacts and greyscale)

Tab. S2. Subjective analysis. Inter-rater reliability (A/B/C/D)

Group	Answers					Same answers (*N* = 60)	K (CI 95%)	Weighted K
		A	B	C	D			
PULM (open)	**A**	15	0	1	0	53 (88%)	0.837 (0.726–0.948)	0.903
	B	3	8	0	0			
	C	0	0	8	0			
	D	0	0	3	22			
PULM (blinded)	**A**	9	6	0	2	38 (63%)	0.423 (0.255–0.590)	0.556
	B	0	4	0	4			
	C	1	1	0	4			
	D	1	3	0	25			
CARDIO	**A**	11	0	2	0	38 (63%)	0.435 (0.273–0.597)	0.516
	B	2	4	0	1			
	C	0	0	0	0			
	D	6	4	7	23			
EME	**A**	21	0	1	0	47 (78%)	0.670 (0.523–0.816)	0.784
	B	3	4	0	1			
	C	1	1	1	3			
	D	1	1	1	21			
UUP	**A**	5	5	8	3	24 (40%)	0.216 (0.064–0.367)	0.264
	B	3	6	3	7			
	C	1	1	3	2			
	D	0	2	1	10			

Please note that all physicians (except for the first group) were blinded to the diagnosis. PULM: pulmonologists; CARDIO: cardiologists; EME: emergency medicine expert; UUP: US inexperienced physicians; CI – confidence interval; A – both horizontal artifacts and greyscale are significantly different; B – greyscale only significantly different; C – horizontal artifacts only significantly different; D – no significant differences for either horizontal artifacts or greyscale

Tab. S3. Subjective analysis. Inter-rater reliability (horizontal artifacts)

Group	Answers			Same answers (*N* = 60)	K (CI 95%)
		A	B		
PULM (open)	**A**	24	0	54 (90%)	0.800 (0.651–0.949)
	B	6	30		
PULM (blinded)	**A**	10	13	46 (77%)	0.452 (0.233–0.672)
	B	1	36		
CARDIO	**A**	13	0	45 (75%)	0.480 (0.286–0.675)
	B	15	32		
EME	**A**	24	4	51 (85%)	0.699 (0.518–0.880)
	B	5	27		
UUP	**A**	18	10	43 (72%)	0.427 (0.198–0.656)
	B	7	25		

Please note that all physicians (except for the first group) were blinded to the diagnosis. PULM – pulmonologists; CARDIO – cardiologists; EME – emergency medicine expert; UUP – US inexperienced physicians; CI – confidence interval; A – horizontal artifacts significantly different; B – horizontal artifacts not significantly different

Tab. S4. Subjective analysis. Inter-rater reliability (greyscale)

Group	Answers			Same answers (*N* = 60)	K (CI 95%)
		A	B		
PULM (open)	**A**	26	1	59 (98%)	0.966 (0.901–1.000)
	B	0	33		
PULM (blinded)	**A**	19	6	48 (80%)	0.589 (0.381–0.796)
	B	6	29		
CARDIO	**A**	17	3	47 (78%)	0.552 (0.343–0.760)
	B	10	30		
EME	**A**	28	2	54 (90%)	0.800 (0.649–0.951)
	B	4	26		
UUP	**A**	20	20	36 (60%)	0.250 (0.044–0.456)
	B	4	16		

Please note that all physicians (except for the first group) were blinded to the diagnosis. PULM: pulmonologists; CARDIO – cardiologists; EME – emergency medicine expert; UUP – US inexperienced physicians; CI – confidence interval; A – greyscale significantly different; B – greyscale not significantly different

Tab. S5. Objective "global" sub-analysis (Adobe Photoshop)

	PTX patients				Control subjects		
	PTX	Contralateral	*p*-value	AUC ROC	Left side	Right side	*p*-value
Pixel (N)	193658 ± 37318	201234 ± 37397	0.435	-	217782 ± 29091	214242 ± 30120	0.645
Mean (greyscale)	61.77 ± 12.27	45.87 ± 10.58	<0.001	0.84	48.86 ± 12.61	48.19 ± 12.70	0.839
Pixel min (greyscale)	14.57 ± 12.02	11.00 ± 10.20	0.220	-	12.37 ± 9.92	13.70 ± 10.75	0.620
Pixel max (greyscale)	162.10 ± 32.67	98.73 ± 26.25	<0.001	0.92	110.57 ± 28.07	101.80 ± 26.20	0.216
Range (greyscale)	147.53 ± 32.75	87.73 ± 25.58	<0.001	0.93	98.20 ± 25.61	88.10 ± 26.09	0.136
Median (greyscale)	61.67 ± 11.77	45.33 ± 12.18	<0.001	0.82	47.83 ± 14.45	47.17 ± 14.99	0.775

All values are reported as mean ± standard deviation. PTX – pneumothorax; AUC – area under curve; ROC – receiver operating characteristics

Tab. S6. Objective "global" sub-analysis (ImageJ)

	PTX patients				Control subjects		
	PTX	**Contralateral**	***p*-value**	**AUC ROC**	**Left side**	**Right side**	***p*-value**
Pixel (N)	189,181 ± 35373	195,514 ± 35373	0.493	-	213,988 ± 27,960	211,666 ± 27,840	0.748
Mean (greyscale)	60.06 ± 13.65	42.31 ± 11.94	<0.001	0.84	45.62 ± 13.92	44.74 ± 13.92	0.807
Pixel min (greyscale)	11.13 ± 12.11	7.20 ± 7.96	0.143	-	8.47 ± 8.44	8.63 ± 9.13	0.942
Pixel max (greyscale)	164.00 ± 34.89	106.00 ± 33.89	<0.001	0.86	112.83 ± 27.96	104.23 ± 26.77	0.229
Range (greyscale)	152.87 ± 34.31	98.80 ± 32.52	<0.001	0.87	104.37 ± 25.35	95.60 ± 25.31	0.185
Standard deviation (greyscale)	17.26 ± 4.73	14.61 ± 4.27	0.027	0.66	14.75 ± 4.17	14.95 ± 4.41	0.859
Mode (greyscale)	57.80 ± 17.89	40.13 ± 20.19	<0.001	0.76	42.67 ± 21.47	41.47 ± 24.12	0.839

All values are reported as mean ± standard deviation. PTX – pneumothorax; AUC – area under curve; ROC – receiver operating characteristics

Tab. S7. Objective "global" sub-analysis. Ratio comparison (Adobe Photoshop and ImageJ)

Adobe Photoshop				
	PTX patients	**Control subjects**	***p*-value**	**AUC ROC**
Mean ratio	1.38 ± 0.29	1.10 ± 0.08	<0.001	0.82
Range ratio	1.78 ± 0.60	1.21 ± 0.30	<0.001	0.90
Median ratio	1.43 ± 0.39	1.13 ± 0.12	<0.001	0.78
ImageJ				
	PTX patients	**Control subjects**	***p*-value**	**AUC ROC**
Mean ratio	1.48 ± 0.37	1.13 ± 0.10	<0.001	0.82
Range ratio	1.64 ± 0.49	1.19 ± 0.25	<0.001	0.85
Mode ratio	2.88 ± 6.03	2.29 ± 4.29	0.663	-

All values are reported as mean ± standard deviation. PTX – pneumothorax; AUC – area under curve; ROC – receiver operating characteristics

Tab. S8. Objective "targeted" sub-analysis

Adobe Photoshop							
	PTX patients				**Control subjects**		
	PTX	**Contralateral**	***p*-value**	**AUC ROC**	**Left side**	**Right side**	***p*-value**
Pixel (N)	47,689 ± 9,265	47,541 ± 7,526	0.946	-	47,089 ± 6,935	46,363 ± 7,167	0.692
Mean (greyscale)	71.47 ± 13.06	47.39 ± 9.37	<0.001	0.93	50.18 ± 11.61	50.12 ± 11.69	0.983
Pixel min (greyscale)	25.03 ± 17.58	17.60 ± 10.58	0.052	-	19.87 ± 13.16	19.97 ± 13.82	0.977
Pixel max (greyscale)	156.67 ± 35.00	87.57 ± 14.15	<0.001	0.97	95.03 ± 20.18	94.00 ± 18.00	0.835
Range (greyscale)	131.63 ± 37.61	69.97 ± 14.49	<0.001	0.94	75.17 ± 23.48	74.03 ± 20.32	0.842
Median (greyscale)	70.97 ± 12.52	45.47 ± 11.80	<0.001	0.91	48.40 ± 14.29	48.53 ± 14.23	0.923

Tab. S8 (continued). Objective "targeted" sub-analysis

ImageJ							
	PTX patients				Control subjects		
	PTX	Contralateral	*p*-value	AUC ROC	Left side	Right side	*p*-value
Pixel (N)	47,556 ± 8,381	48,330 ± 7,179	0.702	-	47,662 ± 5,819	47,096 ± 5,823	0.708
Mean (greyscale)	70.46 ± 14.43	44.19 ± 11.18	<0.001	0.92	46.98 ± 13.10	46.79 ± 12.80	0.955
Pixel min (greyscale)	21.33 ± 17.95	11.43 ± 10.35	0.011	0.61	15.03 ± 12.52	14.60 ± 13.46	0.898
Pixel max (greyscale)	157.40 ± 35.81	88.80 ± 16.80	<0.001	0.96	95.43 ± 21.09	91.93 ± 18.08	0.493
Range (greyscale)	136.07 ± 38.02	77.37 ± 13.15	<0.001	0.94	80.40 ± 23.13	77.33 ± 20.89	0.592
Standard deviation (greyscale)	15.28 ± 4.97	14.68 ± 4.14	0.613	-	14.02 ± 4.93	13.85 ± 5.28	0.898
Mode (greyscale)	69.53 ± 15.51	41.93 ± 20.00	<0.001	0.88	41.73 ± 20.30	41.57 ± 22.58	0.976
All values are reported as mean ± standard deviation. PTX – pneumothorax; AUC – area under curve; ROC – receiver operating characteristics							

Tab. S9. Objective "global" sub-analysis. Comparison between Adobe Photoshop and ImageJ results

	PTX patients		Control subjects	
	PTX	Contralateral	Left side	Right side
Pixel (N)	<0.001	<0.001	<0.001	0.044
Mean (greyscale)	<0.001	<0.001	<0.001	<0.001
Pixel min (greyscale)	<0.001	<0.001	<0.001	<0.001
Pixel max (greyscale)	0.266	0.089	0.034	0.002
Range (greyscale)	0.001	0.008	<0.001	<0.001
Mean ratio (greyscale)	<0.001		<0.001	
Range ratio (greyscale)	0.092		0.260	
Data are reported as p-values. PTX – pneumothorax				

Tab. S10. Objective "targeted" sub-analysis. Comparison between Adobe Photoshop and ImageJ results

	PTX patients		Control subjects	
	PTX	Contralateral	PTX	Contralateral
Pixel (N)	0.949	0.102	0.201	0.116
Mean (greyscale)	0.002	<0.001	<0.001	<0.001
Pixel min (greyscale)	<0.001	<0.001	<0.001	<0.001
Pixel max (greyscale)	0.780	0.346	0.789	0.091
Range (greyscale)	0.031	<0.001	<0.001	0.030
Mean ratio (greyscale)	<0.001		0.001	
Range ratio (greyscale)	0.004		0.379	
Data are reported as *p*-values. PTX – pneumothorax				

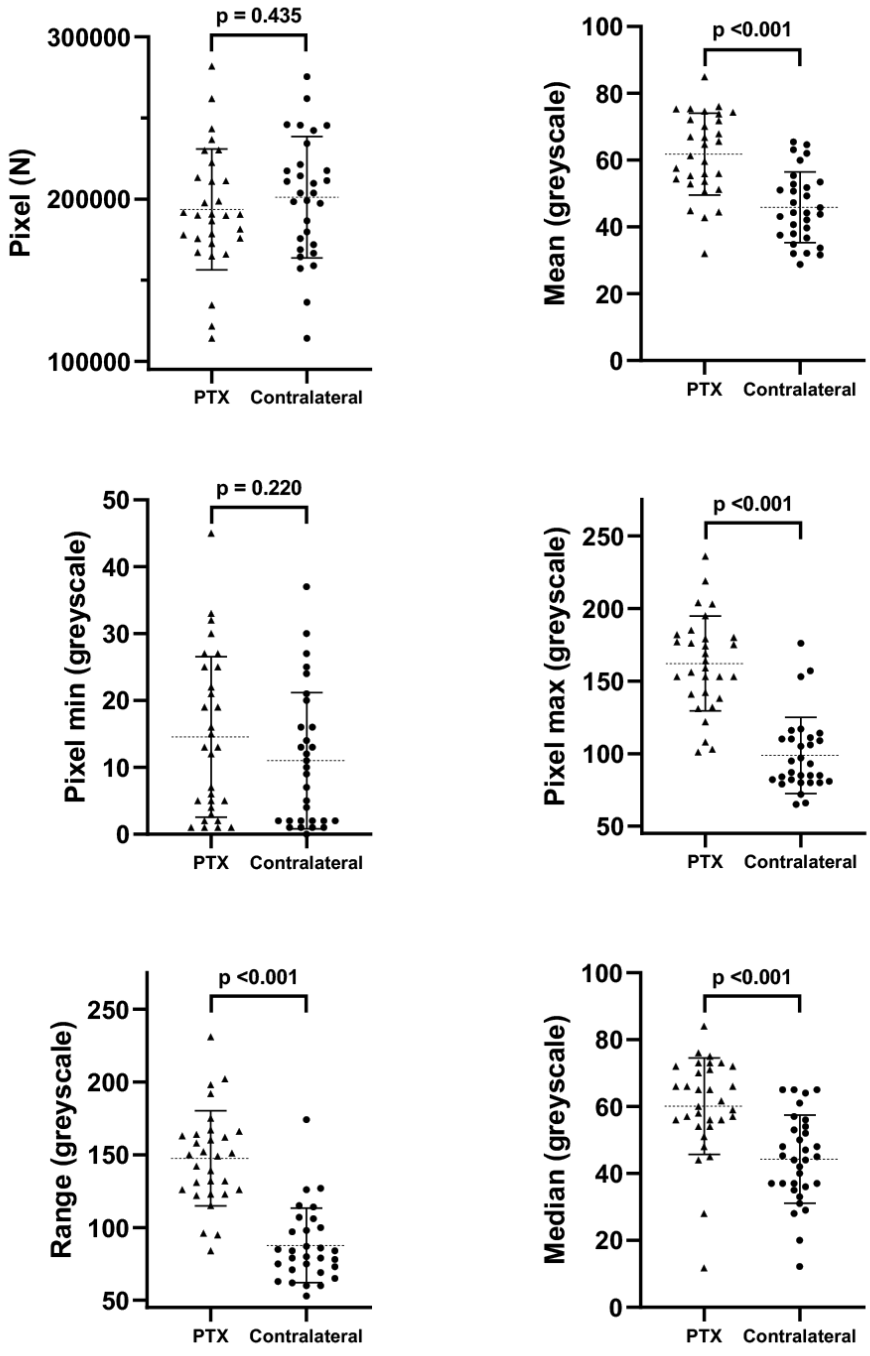

Fig. S1. Objective "global" sub-analysis. Comparison between pneumothorax side vs. contralateral side (cases, Adobe Photoshop). PTX – pneumothorax

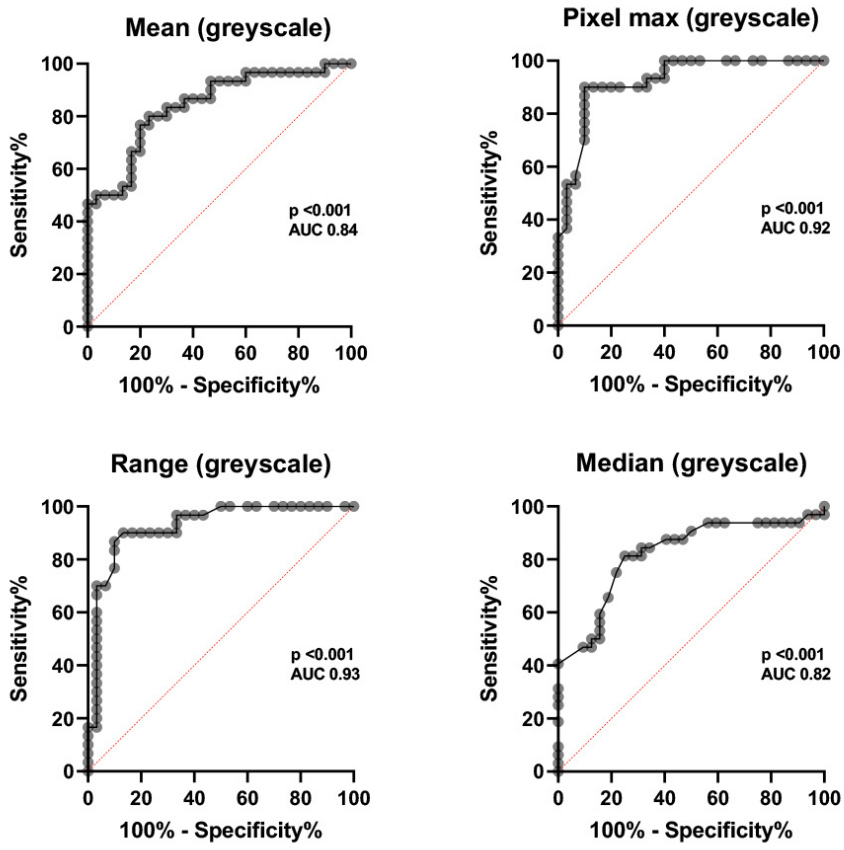

Fig. S2. Objective "global" sub-analysis. Receiver operating characteristics curves for pneumothorax group (cases, Adobe Photoshop). AUC – area under curve

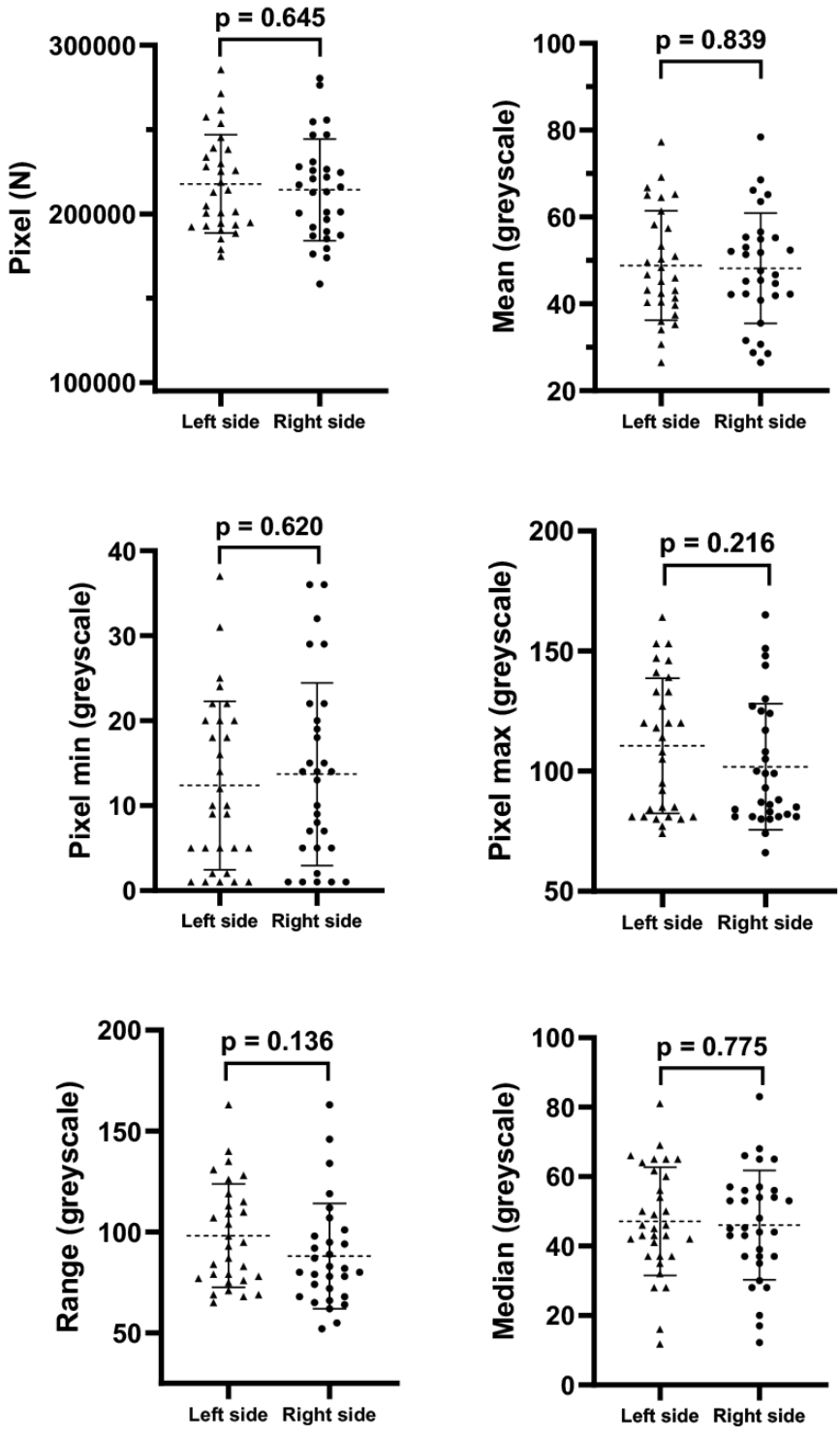

Fig. S3. Objective "global" sub-analysis. Comparison between left side vs. right side (controls, Adobe Photoshop)

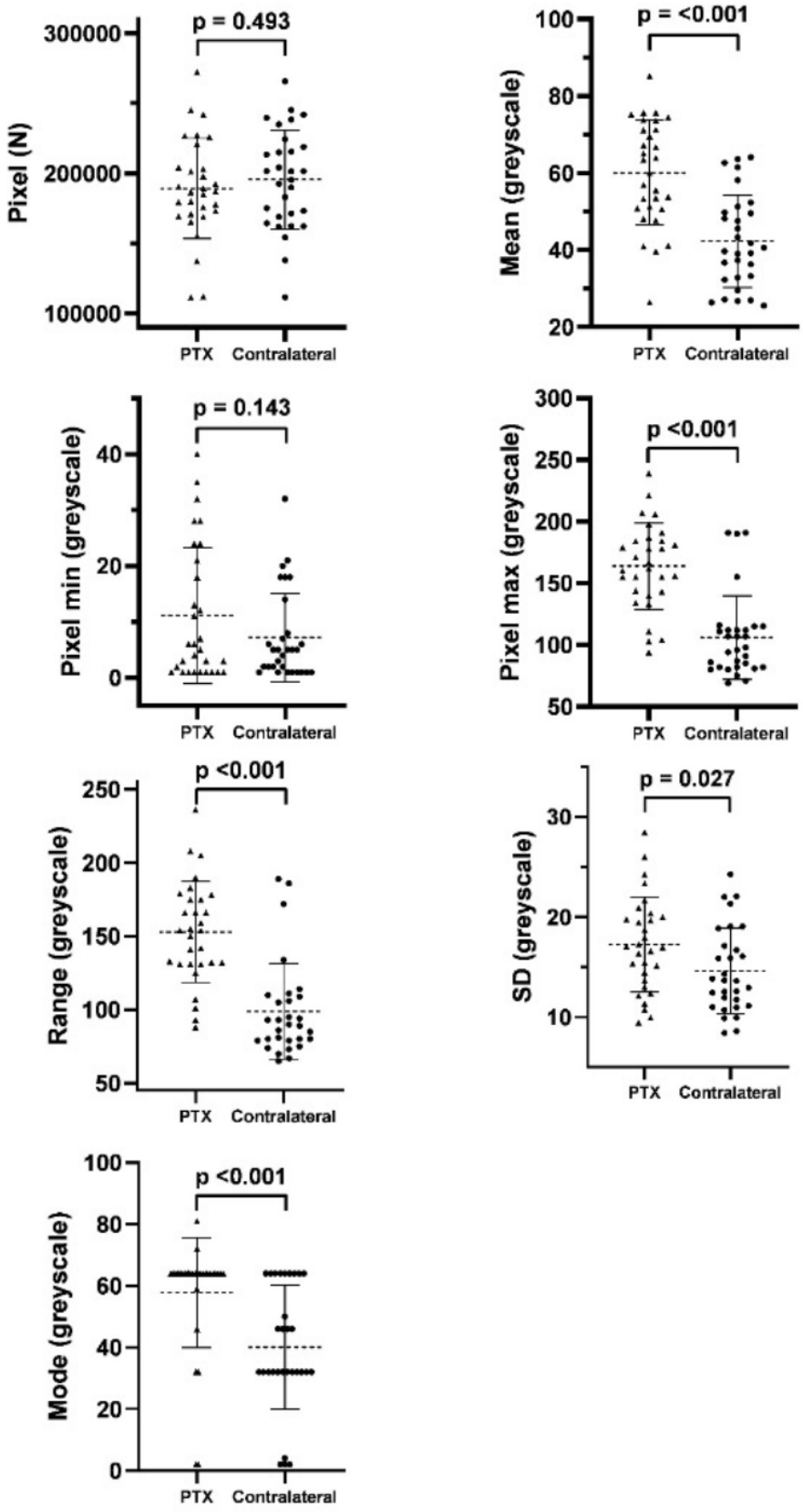

Fig. S4. Objective "global" sub-analysis. Comparison between cases and controls with Adobe Photoshop. PTX – pneumothorax. AUC – area under curve

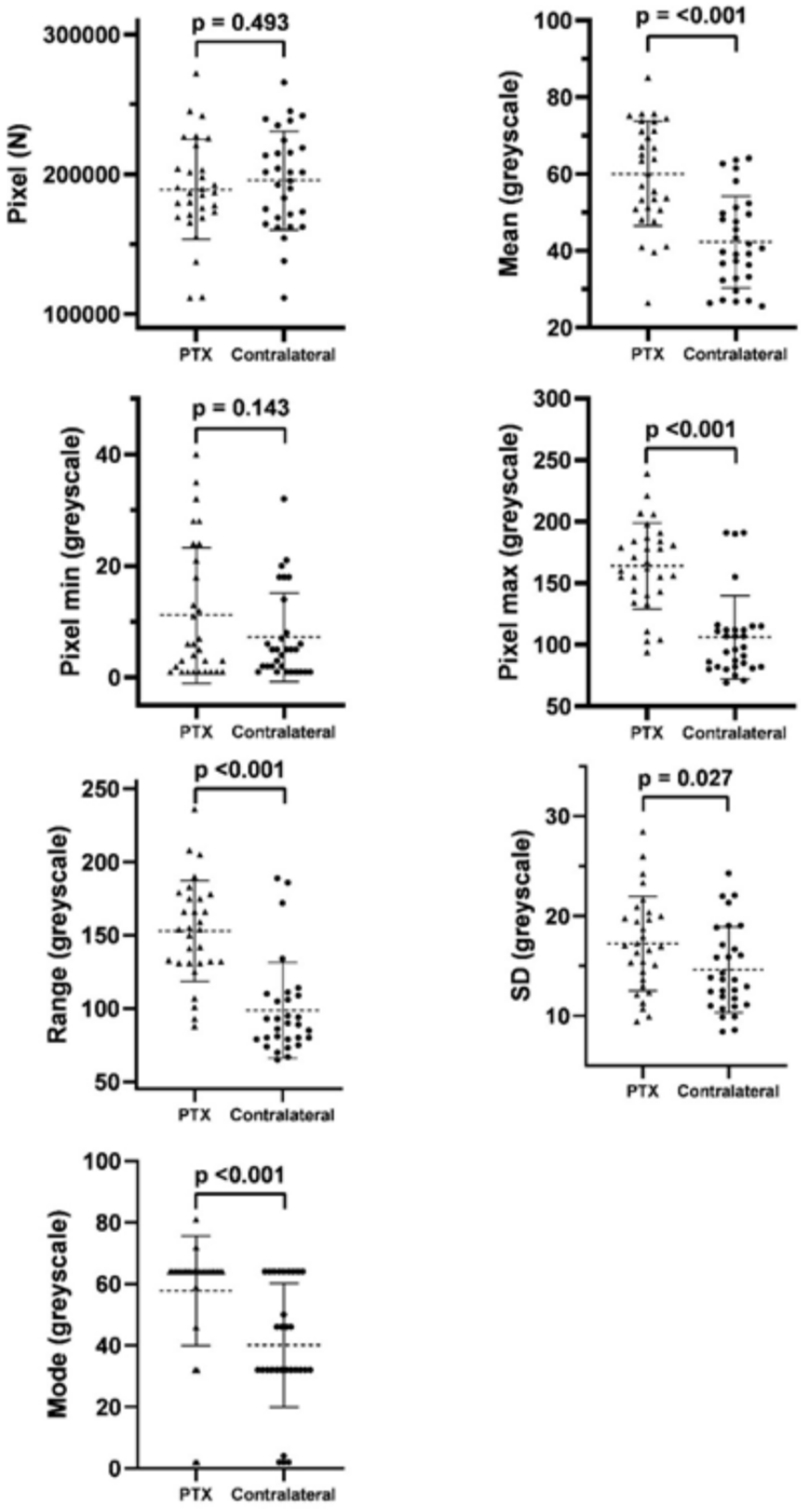

Fig. S5. Objective "global" sub-analysis. Comparison between pneumothorax side vs. contralateral side (cases, ImageJ). PTX – pneumothorax. SD – standard deviation

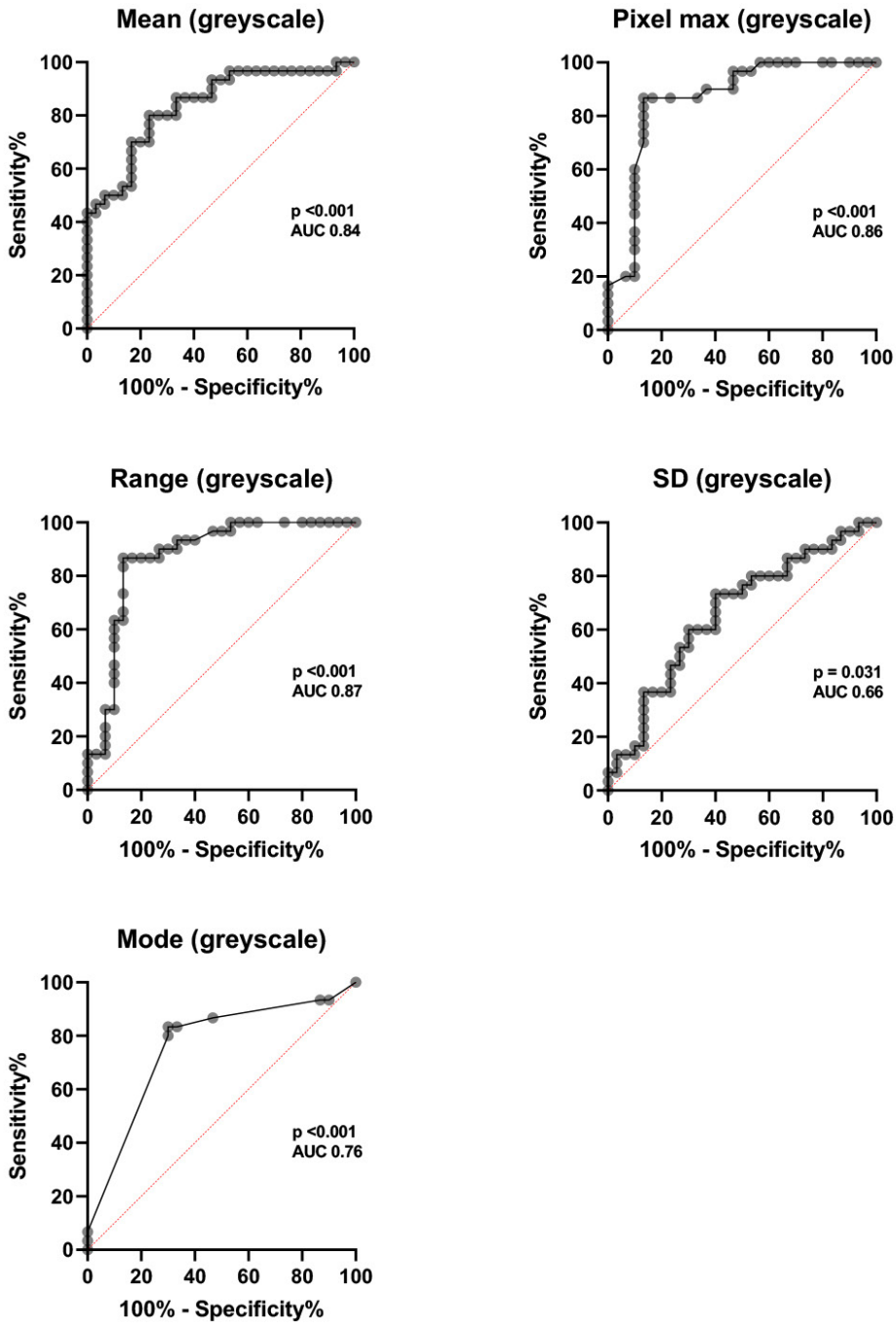

Fig. S6. Objective "global" sub-analysis. Receiver operating characteristics curves for pneumothorax group (cases, ImageJ). AUC – area under curve. SD – standard deviation

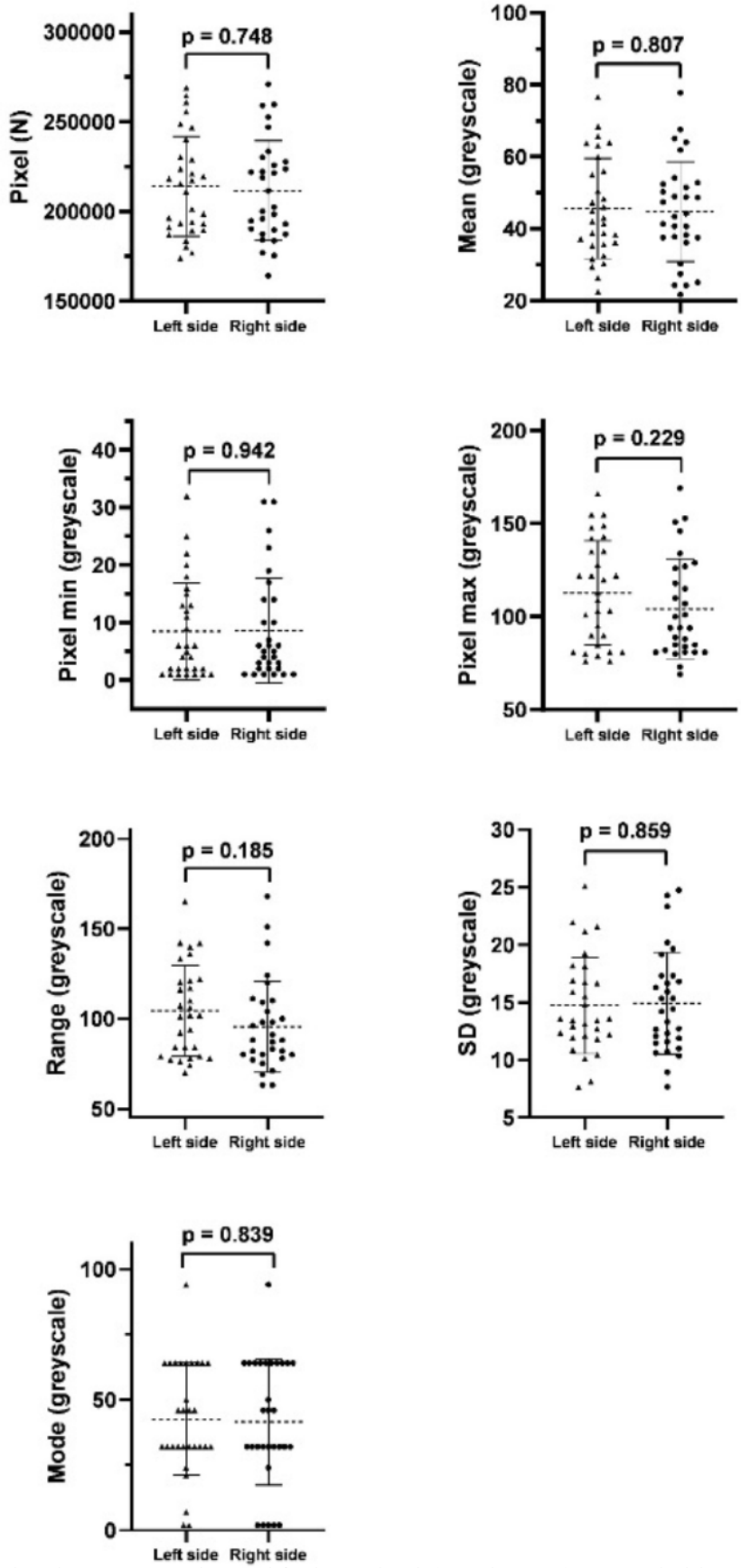

Fig. S7. Objective "global" sub-analysis. Comparison between left side vs. right side (controls, ImageJ). SD – standard deviation

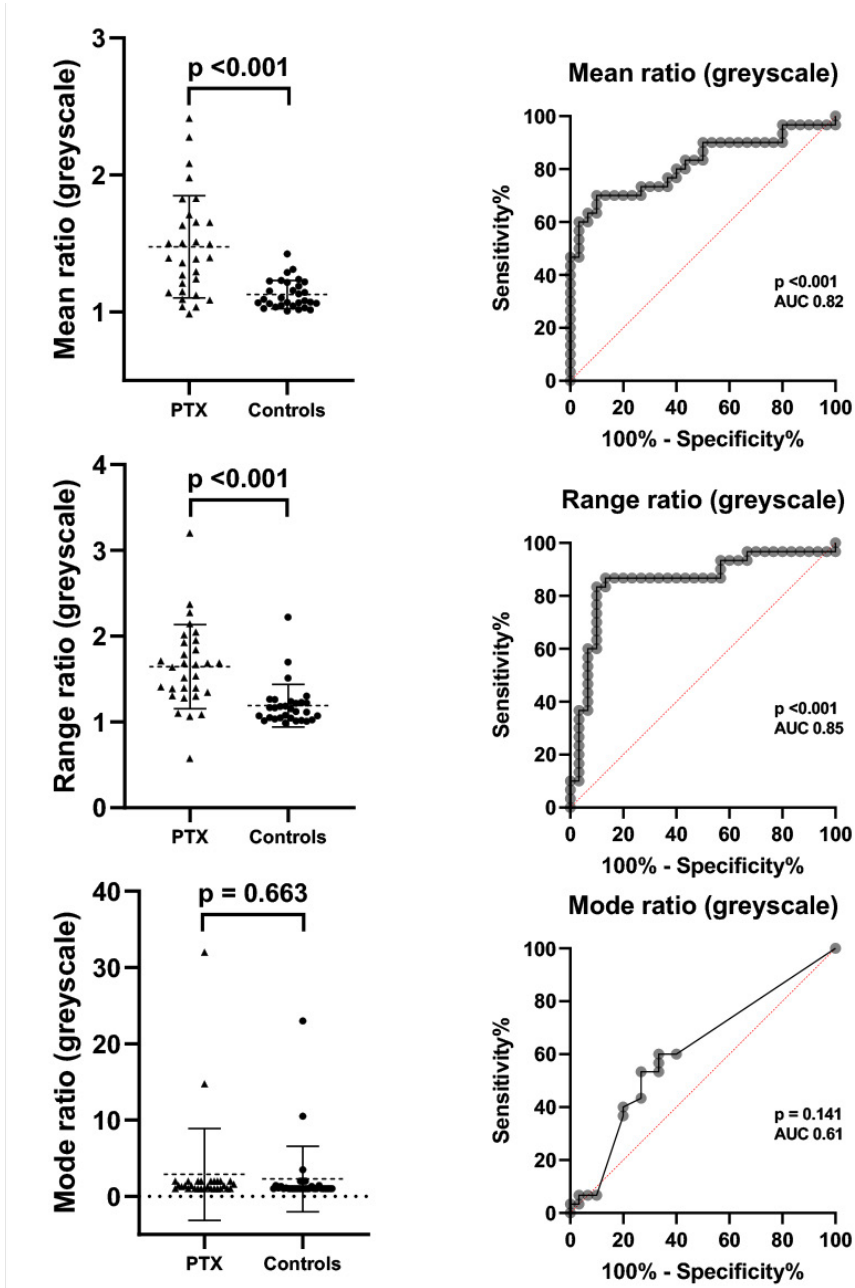

Fig. S8. Objective "global" sub-analysis. Comparison between cases and controls with ImageJ. PTX – pneumothorax. AUC – area under curve

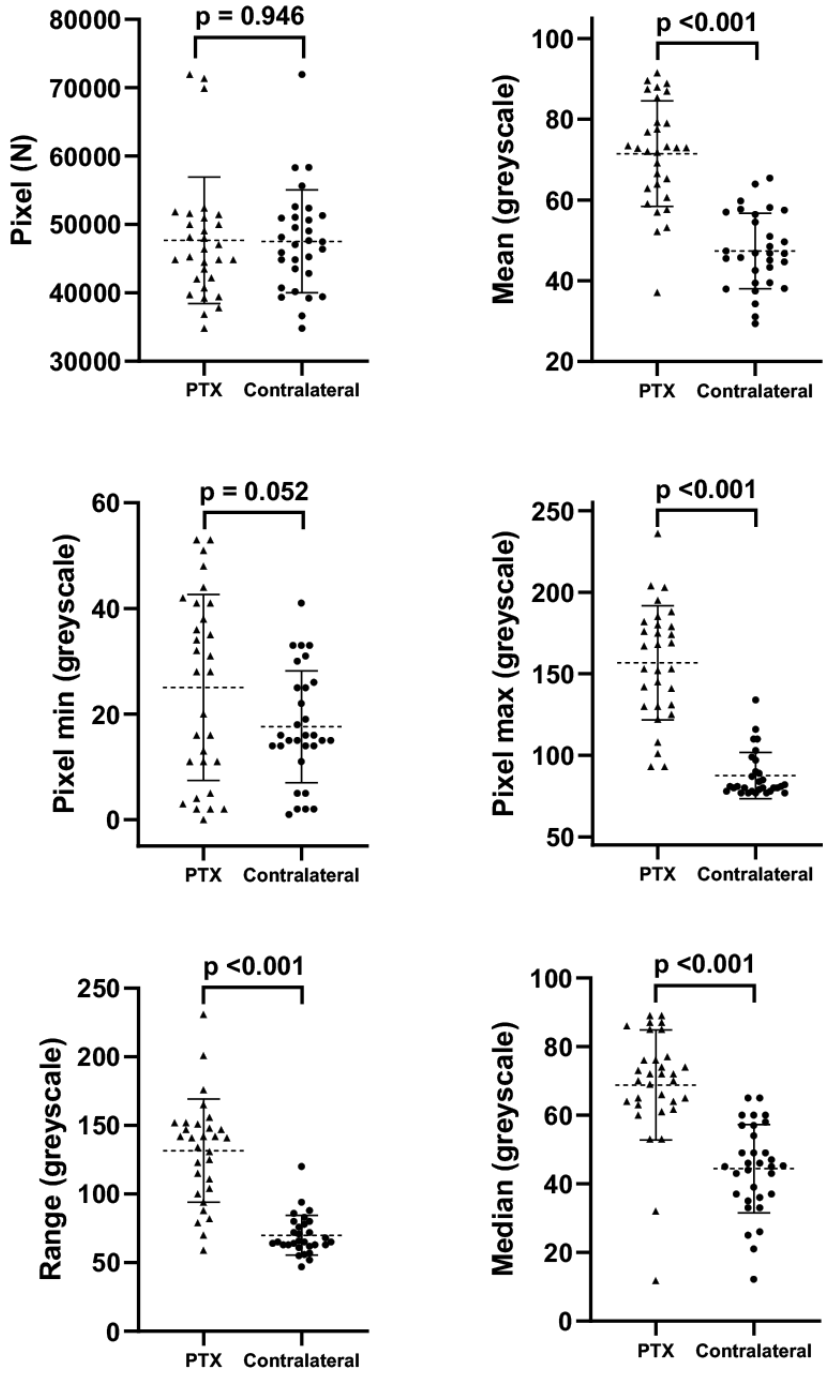

Fig. S9. Objective "targeted" sub-analysis. Comparison between pneumothorax side vs. contralateral side (cases, Adobe Photoshop). PTX – pneumothorax

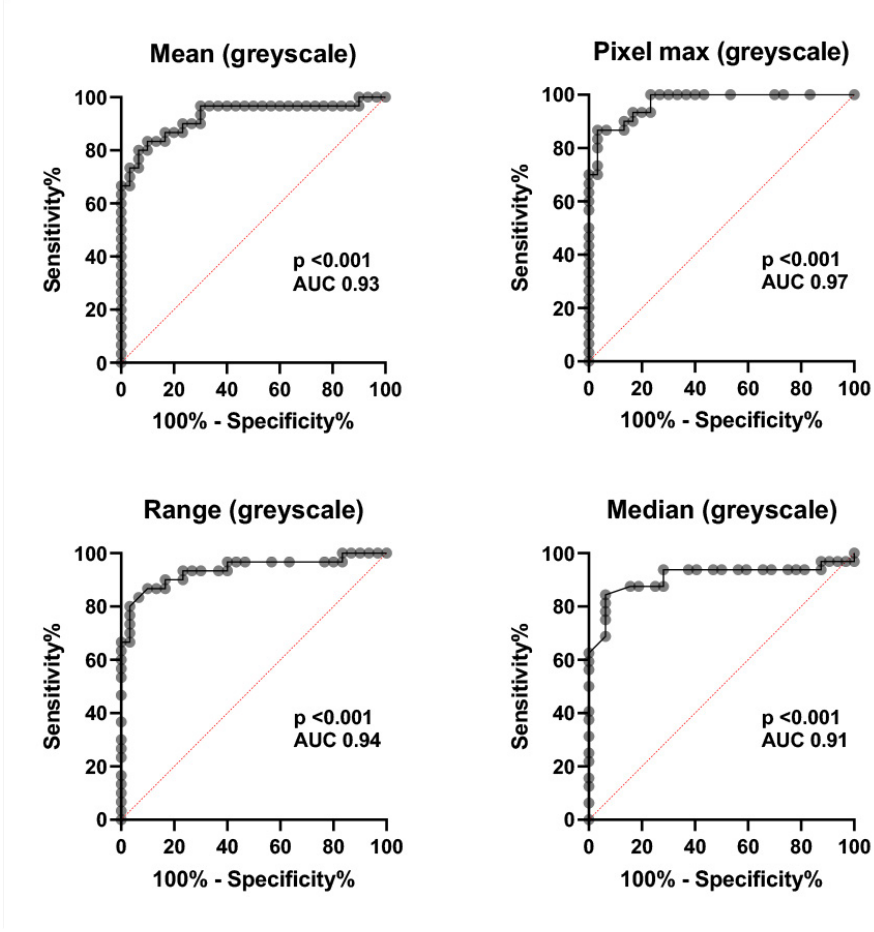

Fig. S10. Objective "targeted" sub-analysis. Receiver operating characteristics curves for pneumothorax group (cases, Adobe Photoshop). AUC – area under curve

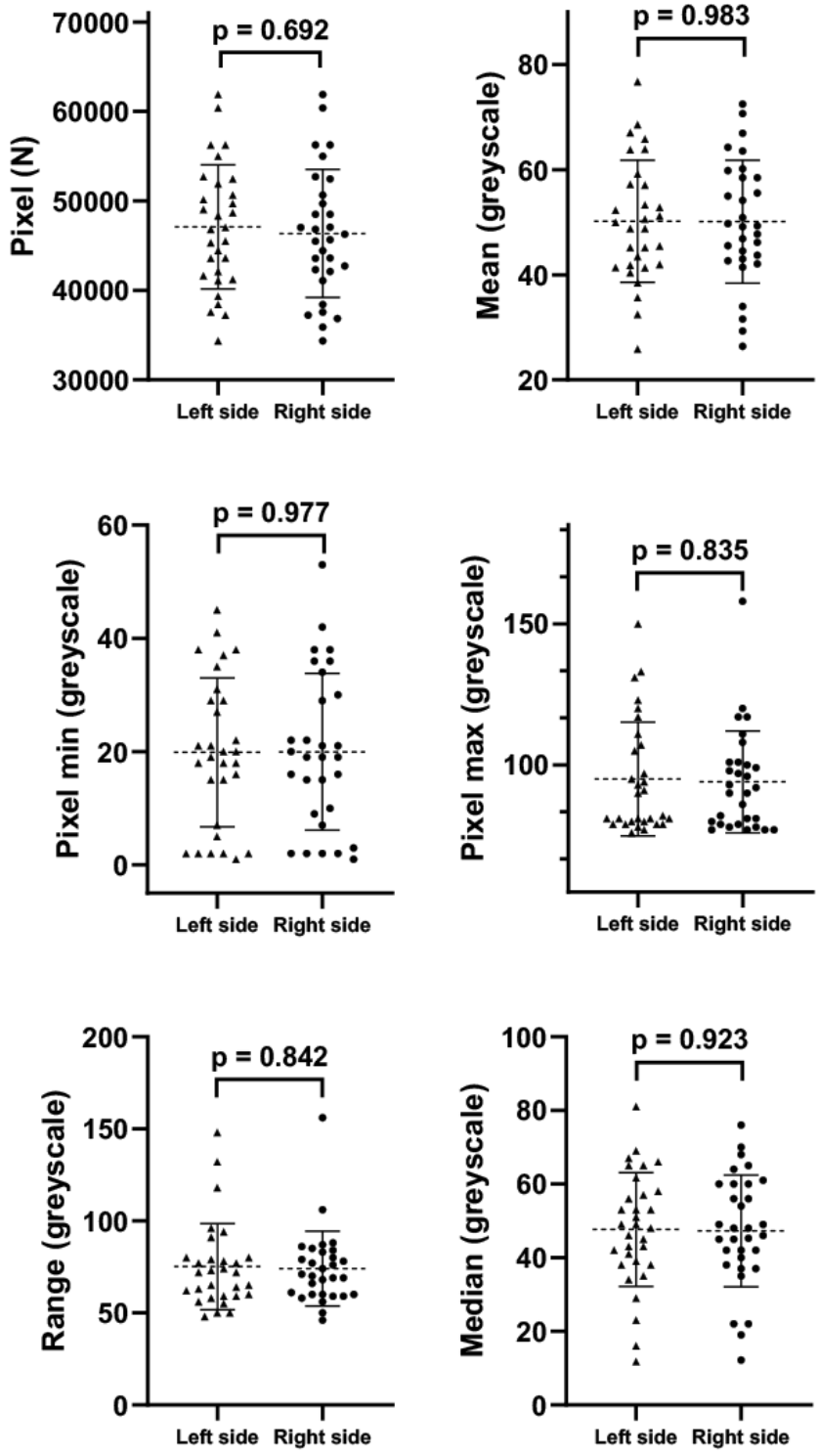

Fig. S11. Objective "targeted" sub-analysis. Comparison between left side vs. right side (controls, Adobe Photoshop)

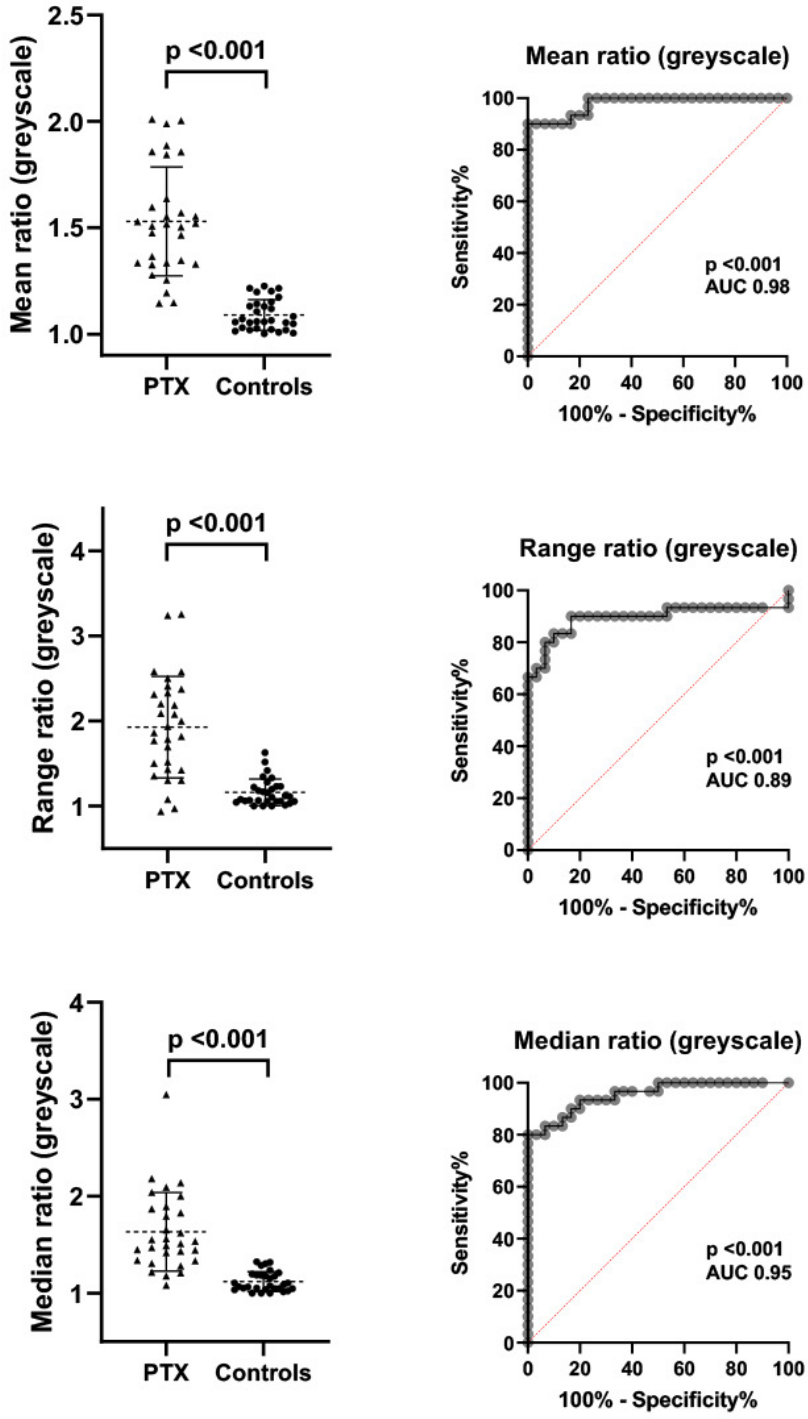

Fig. S12. Objective "targeted" sub-analysis. Comparison between cases and controls with Adobe Photoshop. PTX: pneumothorax. AUC: area under curve

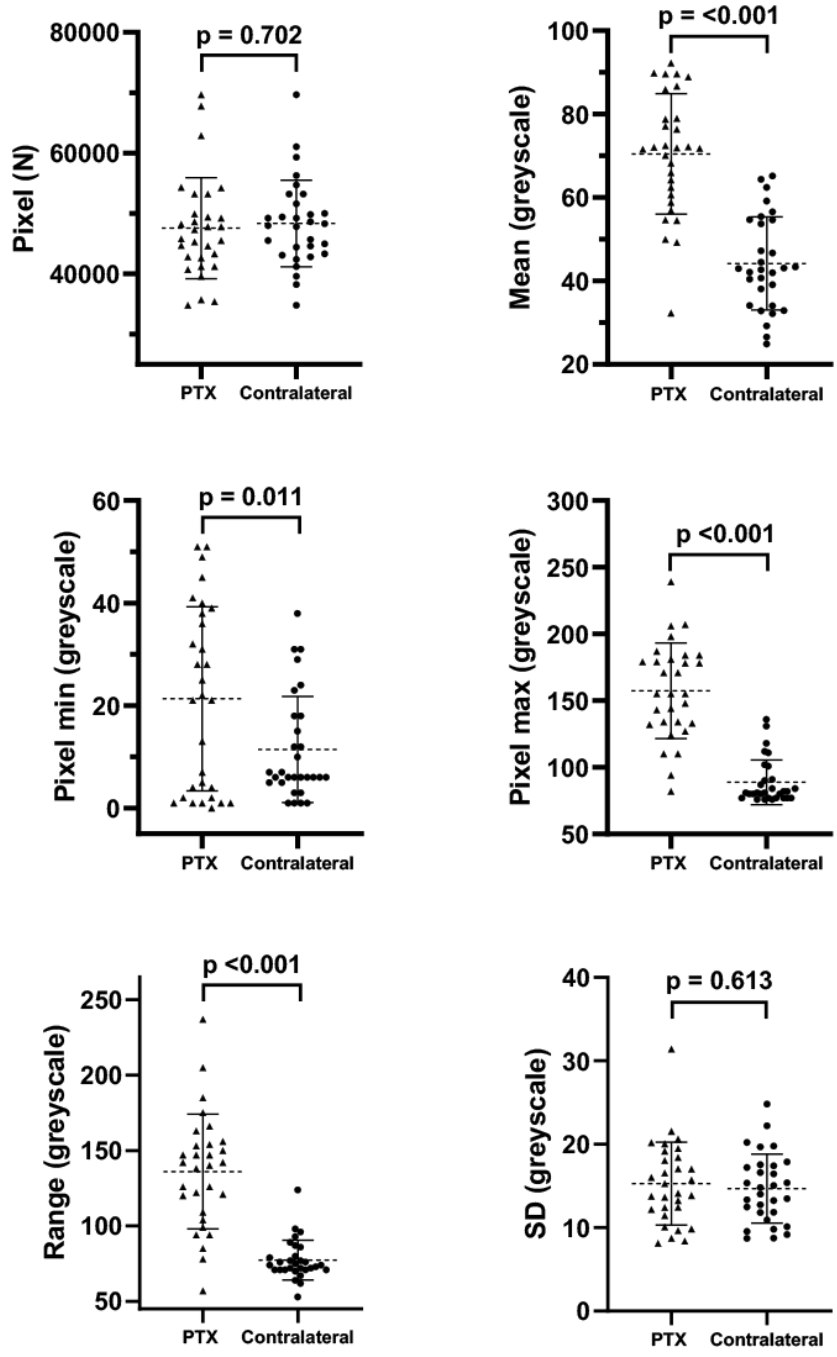

Fig. S13. Objective "targeted" sub-analysis. Comparison between pneumothorax side vs. contralateral side (cases, ImageJ). PTX – pneumothorax

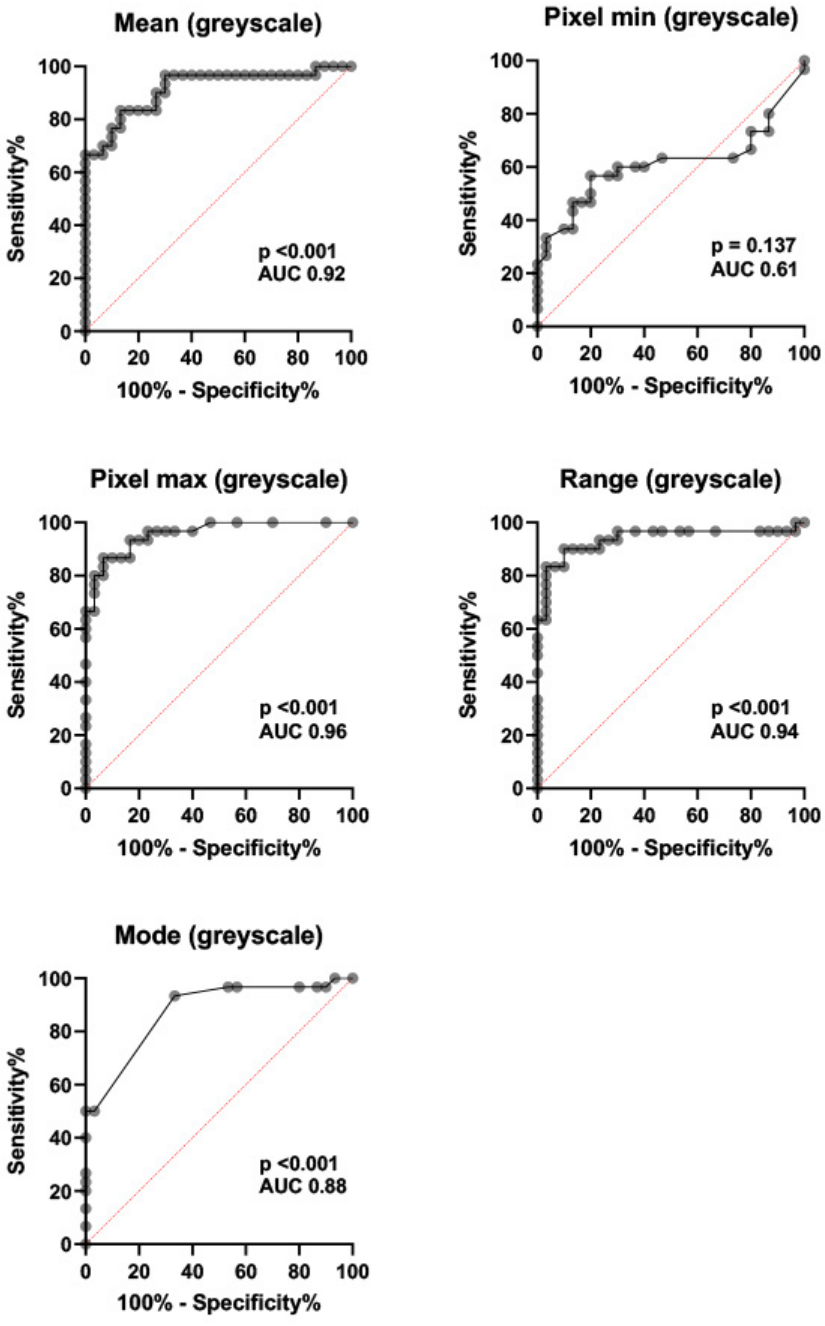

Fig. S14. Objective "targeted" sub-analysis. Receiver operating characteristics curves for pneumothorax group (cases, ImageJ). AUC – area under curve

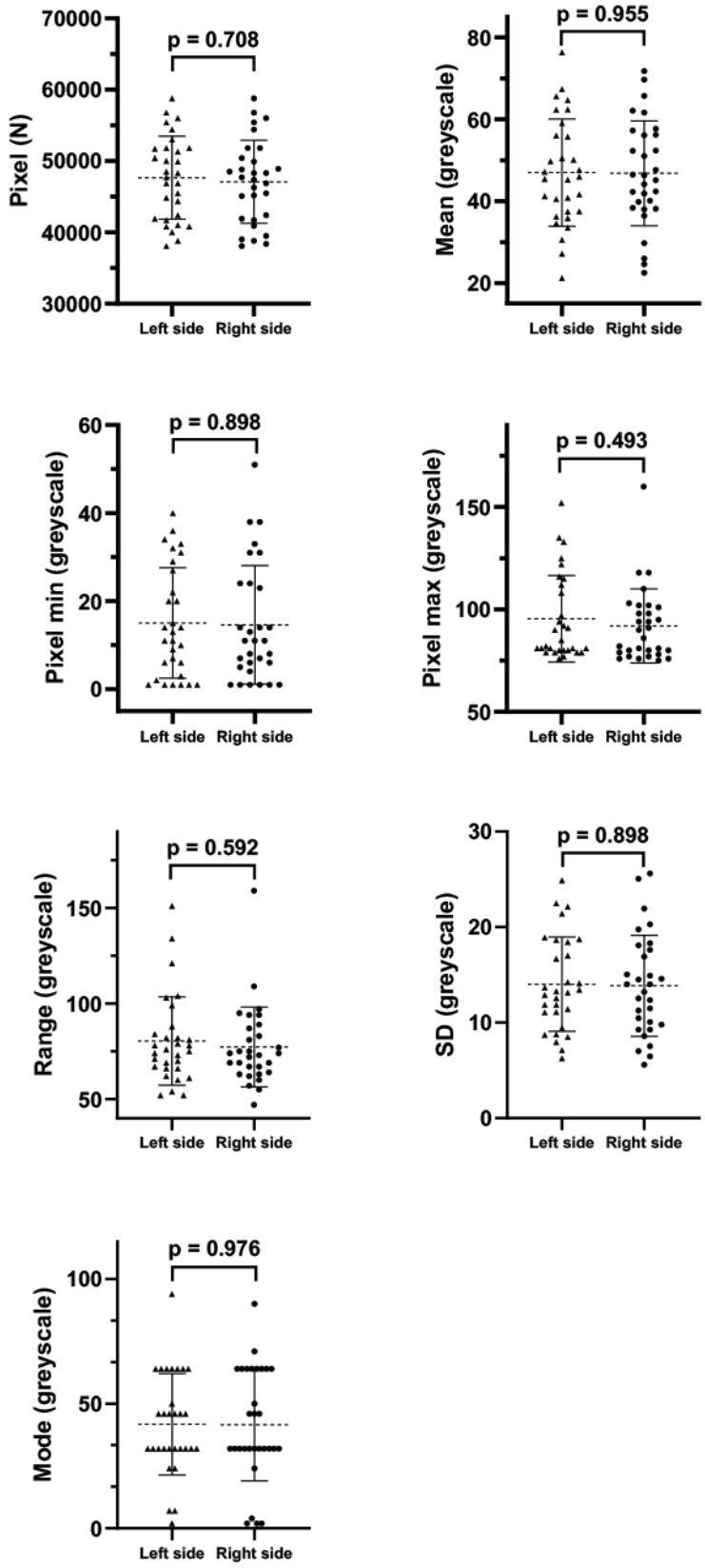

Fig. S15. Objective "targeted" sub-analysis. Comparison between left side vs. right side (controls, ImageJ)

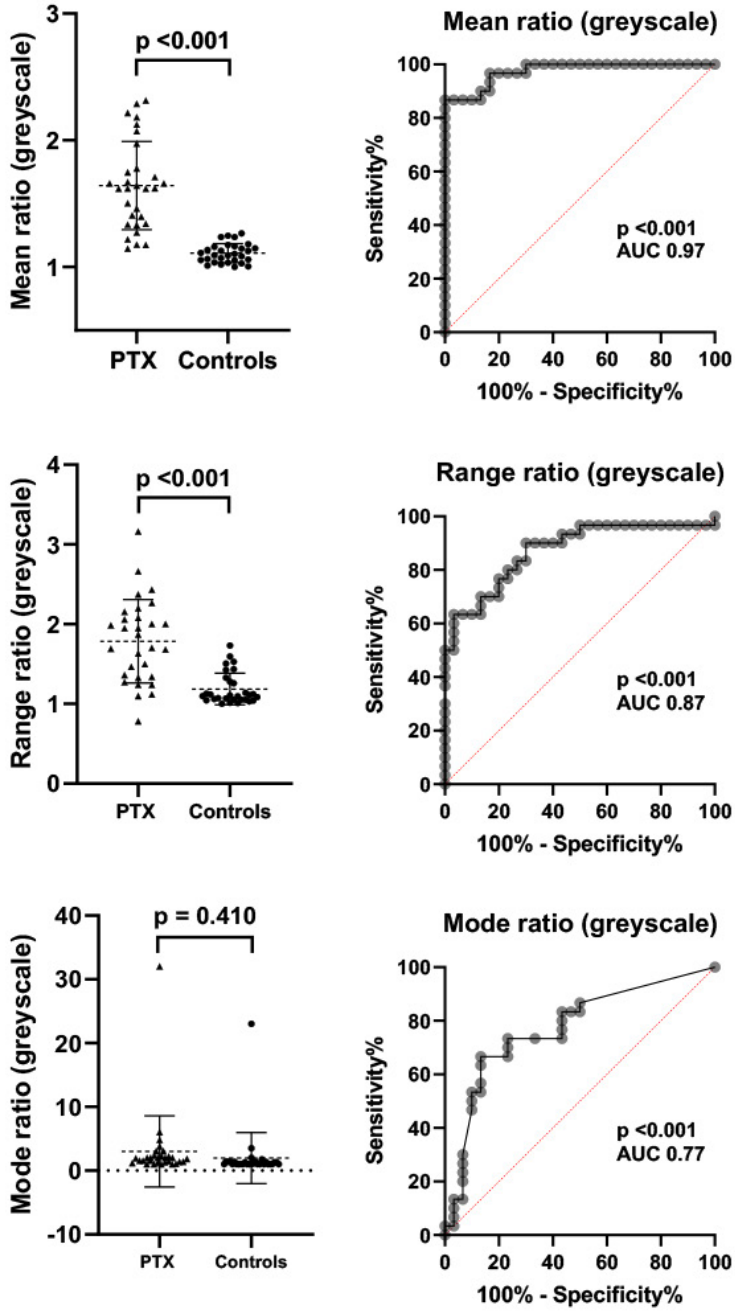

Fig. S16. Objective "targeted" sub-analysis. Comparison between cases and controls with ImageJ. PTX: pneumothorax. AUC – area under curve

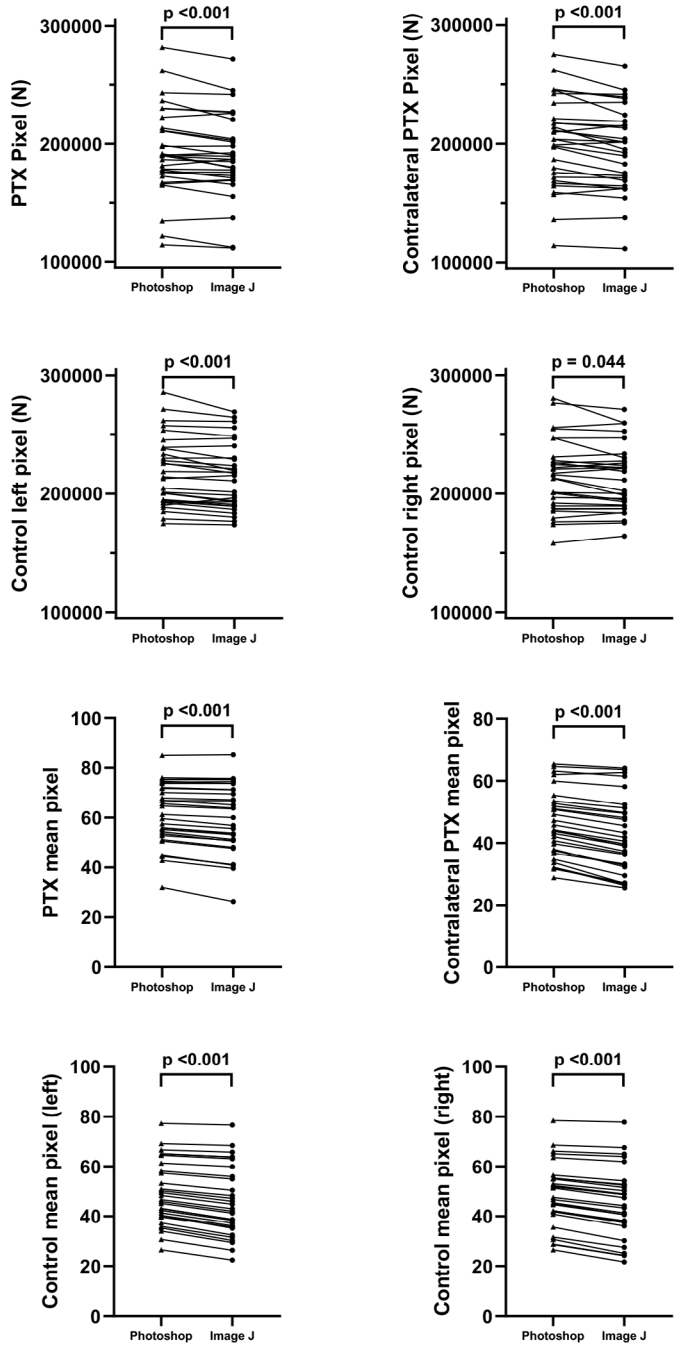

Fig. S17.A. Objective "global" sub-analysis. Comparison between results obtained with Adobe Photoshop and ImageJ. PTX – pneumothorax

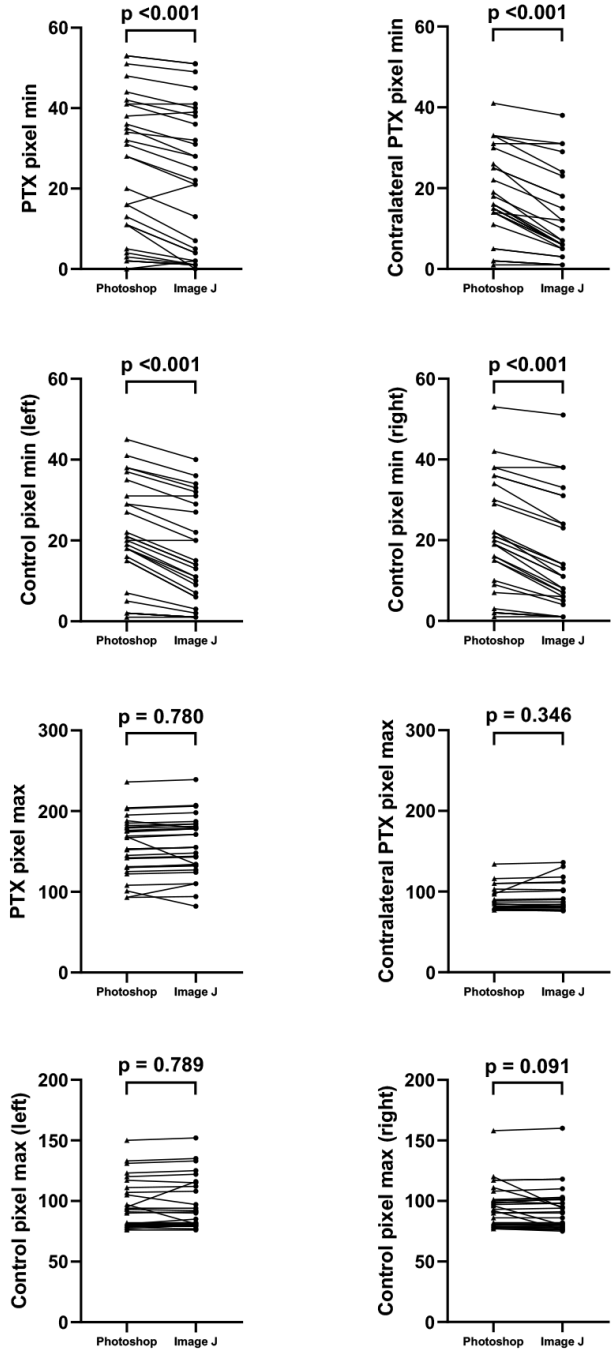

Fig. S17.B. Objective "global" sub-analysis. Comparison between results obtained with Adobe Photoshop and ImageJ. PTX – pneumothorax

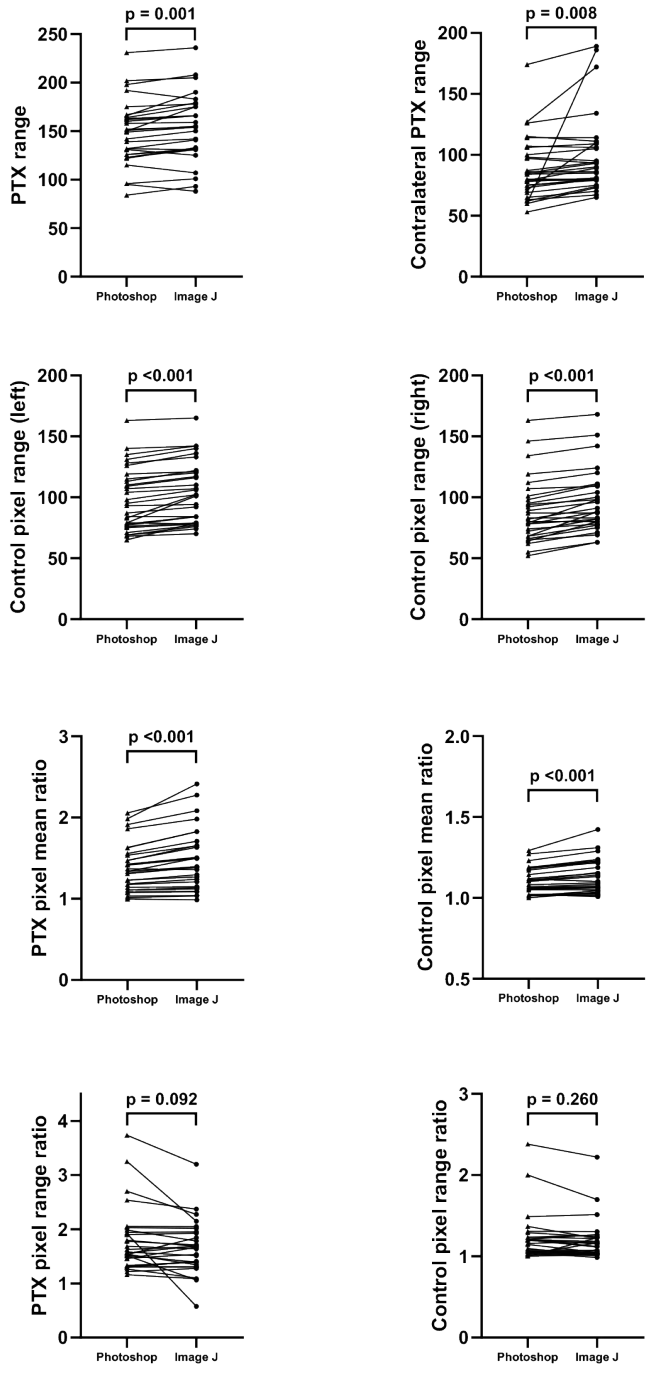

Fig. S17.C. Objective "global" sub-analysis. Comparison between results obtained with Adobe Photoshop and ImageJ. PTX – pneumothorax

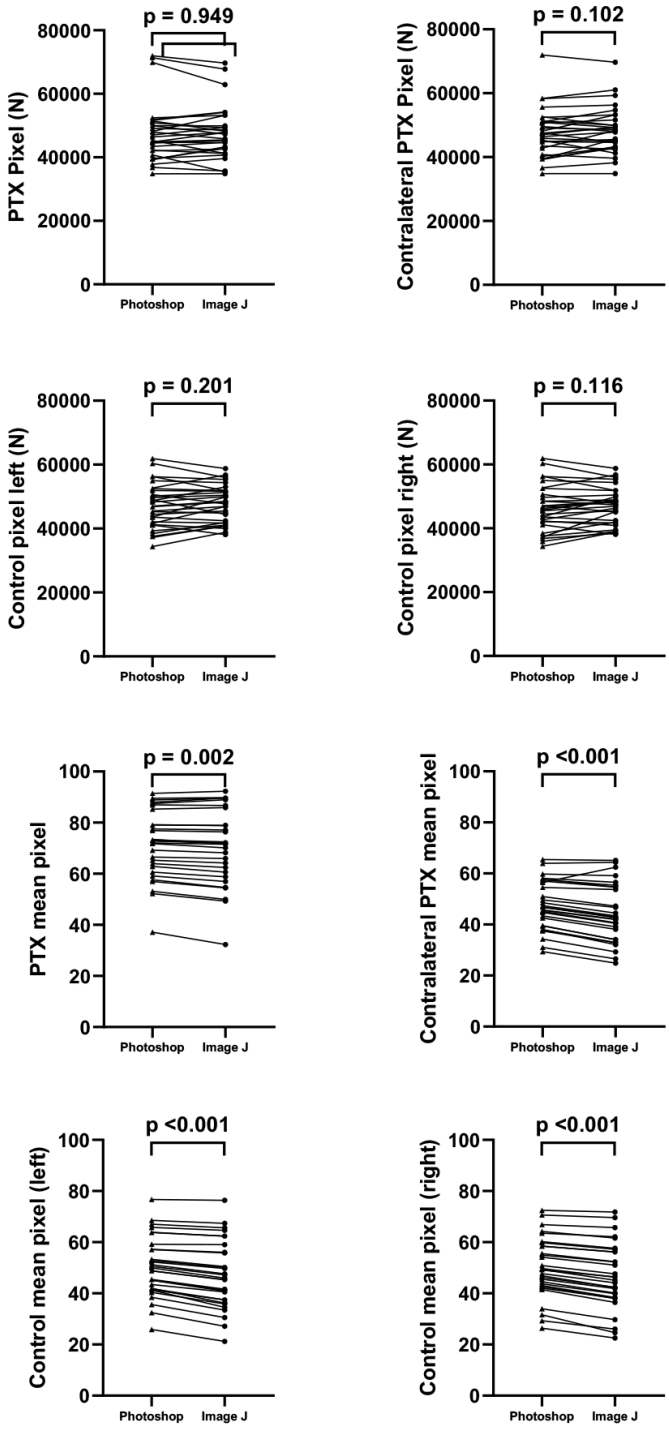

Fig. S18.A. Objective "targeted" sub-analysis. Comparison between results obtained with Adobe Photoshop and ImageJ. PTX – pneumothorax

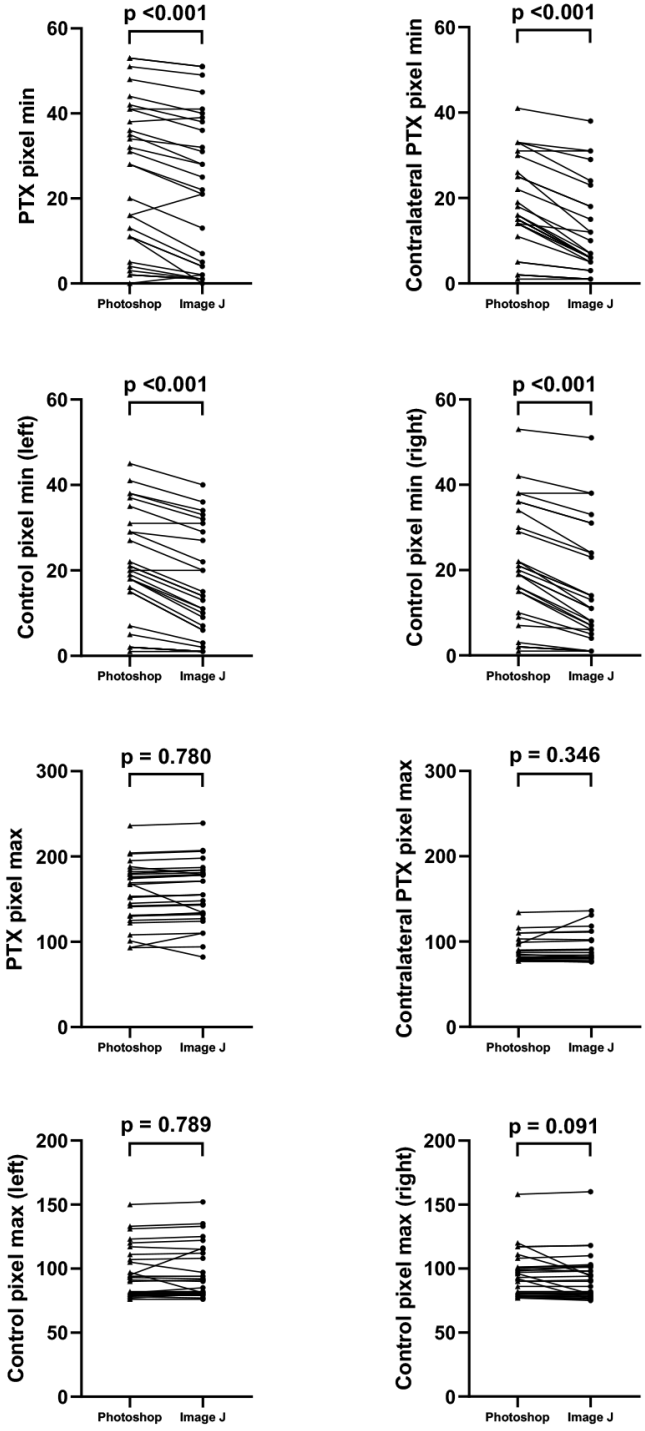

Fig. S18.B. Objective "targeted" sub-analysis. Comparison between results obtained with Adobe Photoshop and ImageJ. PTX – pneumothorax

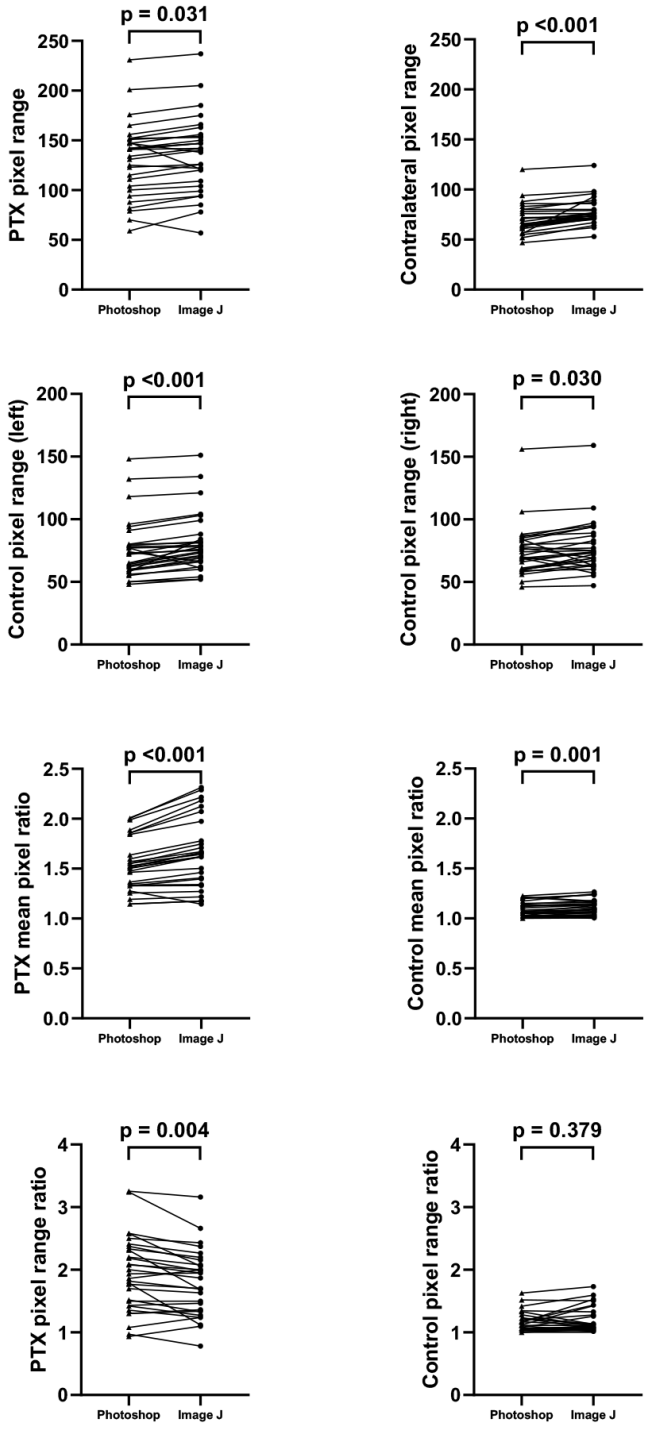

Fig. S18.C. Objective "targeted" sub-analysis. Comparison between results obtained with Adobe Photoshop and ImageJ. PTX – pneumothorax