ACIBADEM
MEHMET ALİ AYDINLAR ÜNİVERSİTESİ

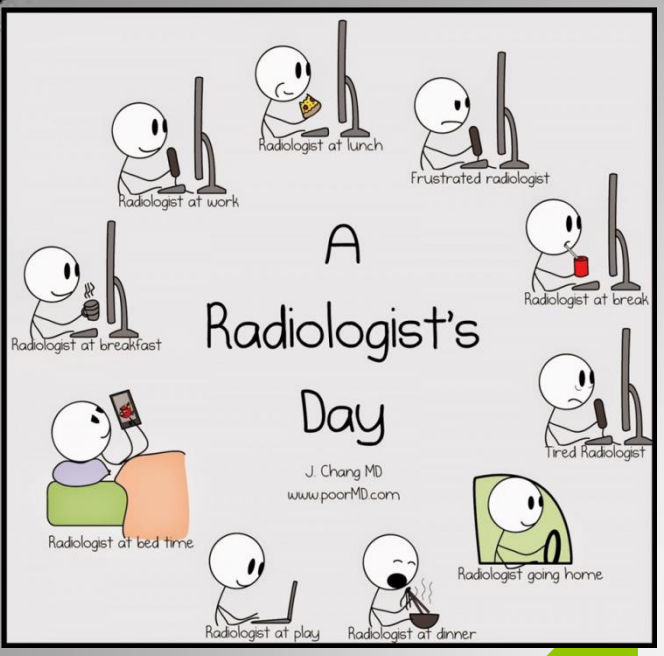
RADYOLOJİDE YAPAY ZEKA VE KARAR DESTEK SİSTEMLERİ

Dr Ercan KARAARSLAN

Maslak Acıbadem Hastanesi

YÜKSEK TEKNOLOJİ RADYOLOJİNİN DOSTUMU?

- İnceleme ve kesit sayılarında artış
- Artan multiparametrik incelemelere bağlı inceleme ve raporlama sürelerinde artış
- Radyasyon dozu
- Çok merkezli ve çok cihazlı kuruluşlarda uzaktan çalışmanın yönetimi
- Herbir firmada farklı, hızla değişen inceleme protokolleri ve görüntü işleyici analiz programları
- Sofistike inceleme/deneyimli uzman oranı



YÜKSEK TEKNOLOJİ

YÜKSEK VOLÜMLÜ MULTİPARAMETRİK İNCELEMELER

UZUN İNCELEME VE RAPORLAMA SÜRELERİ

DAHA ÇOK ÇALIŞMA ,

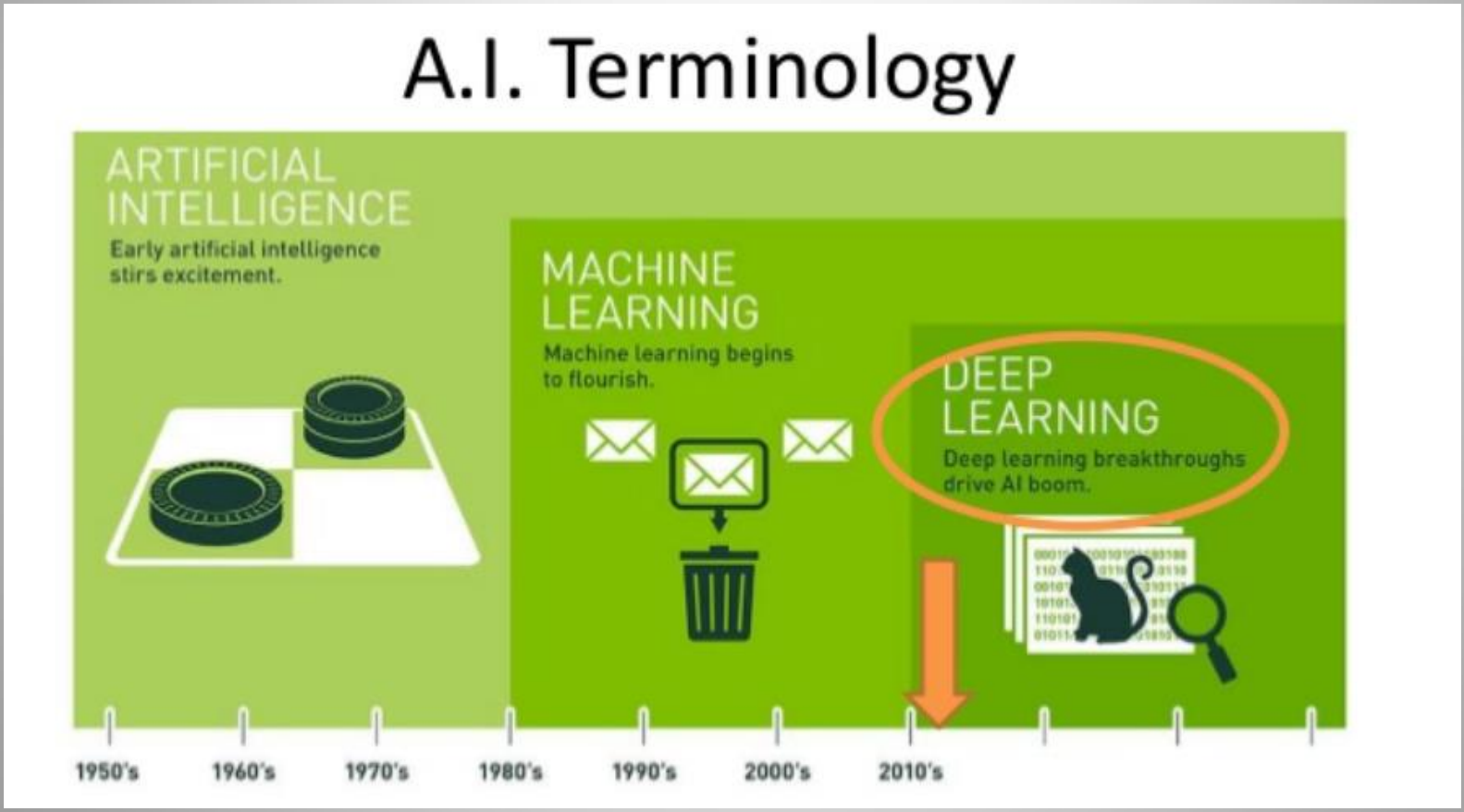
DAHA FAZLA SORUMLULUK

RADYOLOJİDE DEĞERLENDİRME SÜRESİ-HATA ORAN İLİŞKİSİ

Yorumlama süresinde	Hata payında
% 50 azalma	% 16 ARTIŞ

HATALI RADYOLOJİ RAPOR ORANI % 4
(Örn. 400/10.OOO yıl)

RADYOLOJİDE VERİMLİLİĞİ ARTIRMA



AI: NE BEKLİYORUZ

- Doğru tanı oranını artırmak
- Hata oranını azaltmak
- Verimliliği artırmak
- Radyolog desteği ve kesintisiz servis

AI:NE SUNUYOR

- İnceleme ve yorumlama sürelerini kısaltma
- Kantitative inceleme araçları
- Bilgisayar destekli tanı (CAD)
- Yapay zeka yardımlı radyoloji karar destek araçları

AI; AVANTAJLARI

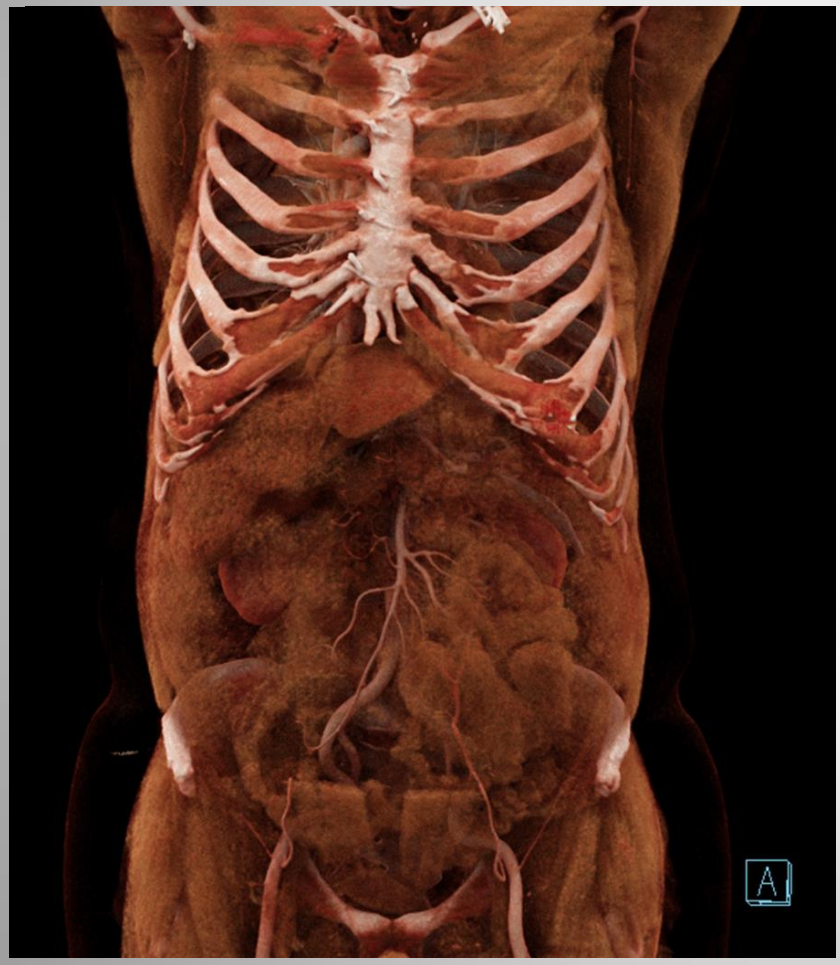
- Yorgunluk, konsantrasyon eksikliği gibi insani hatalardan bağımsızdır
- Kesintisiz hızlı çalışma
- Kantitatif inceleme yöntemleri ile değişikliklerin erkenden saptanması
- Otomatik ikinci görüş

AI; VERİMLİLİK ARTIRMA

- Kullanıcı tercihlerine uygun kullanım kolaylığı
- Otomatik lezyon saptama
- Otomatik reformat, isimlendirme ve ölçüm
- Eski filmler ile kantitatif karşılaştırma
- Tümör tip tayini (RADIOMICS) ve prognoz belirleme
- Lezyon klasifikasyonu ve otomatik rapor formatı hazırlama

BT; YENİ UYGULAMA ÖRNEKLERI

VR ve CINEMATIC RENDERING –BT

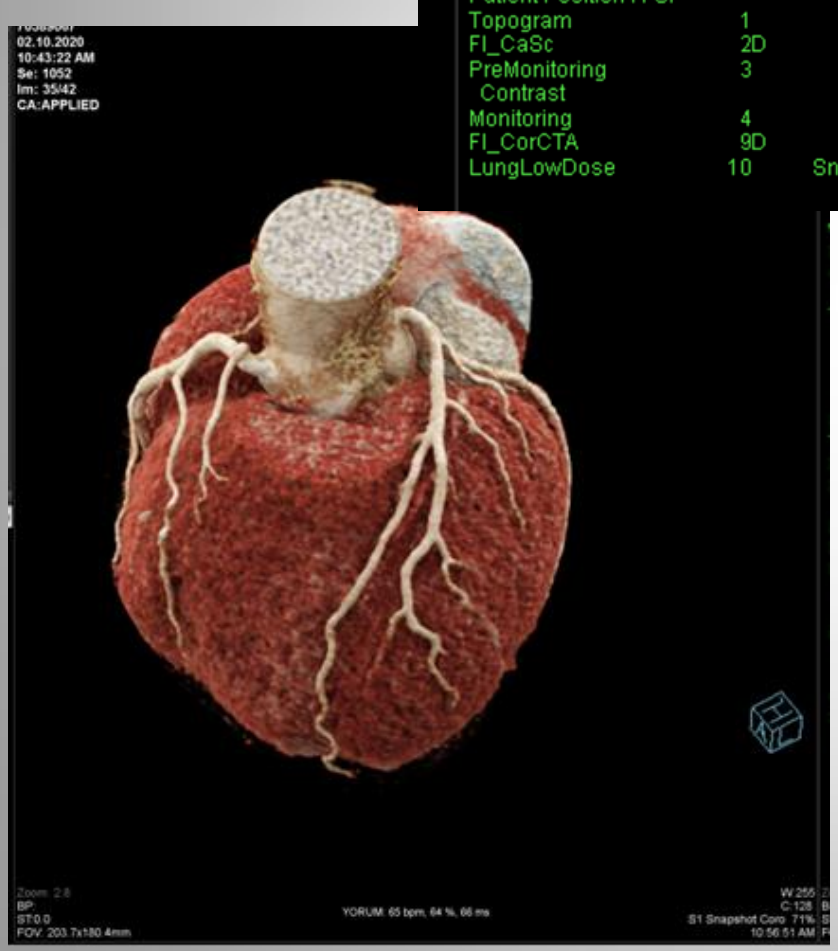


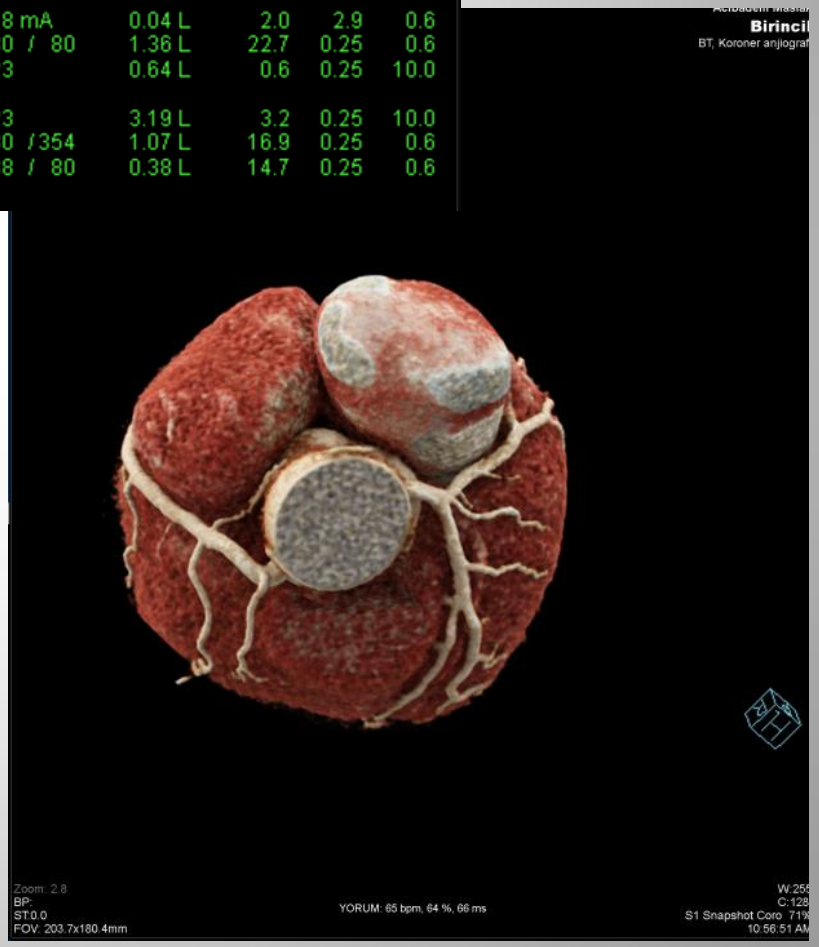


DÜŞÜK RADYASYON DOZU

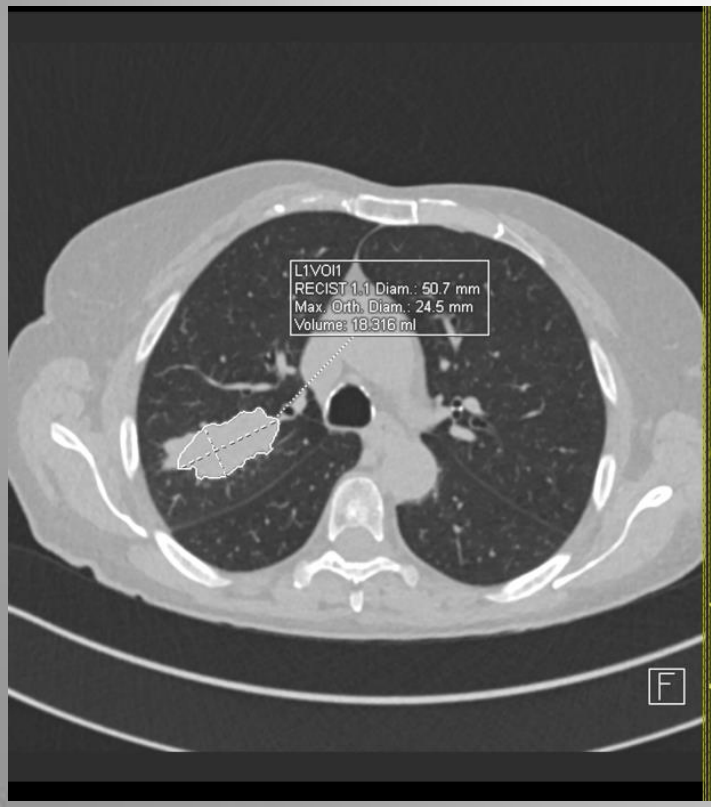
Total mAs 1415 Total DLP 60 mGycm

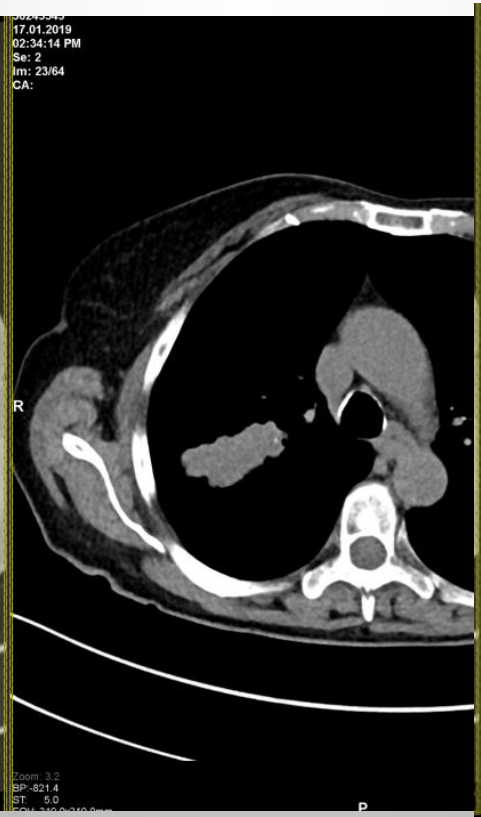
	Scan	kV	mAs / ref.	CTDIvol* mGy	DLP mGycm	TI s	cSL mm
Patient Position H-SP							
Topogram	1	120	18 mA	0.04 L	2.0	2.9	0.6
FI_CaSc	2D	120	80 / 80	1.36 L	22.7	0.25	0.6
PreMonitoring	3	100	23	0.64 L	0.6	0.25	10.0
Contrast							
Monitoring	4	100	23	3.19 L	3.2	0.25	10.0
FI_CorCTA	9D	70	380 / 354	1.07 L	16.9	0.25	0.6
LungLowDose	10	Sn100	88 / 80	0.38 L	14.7	0.25	0.6

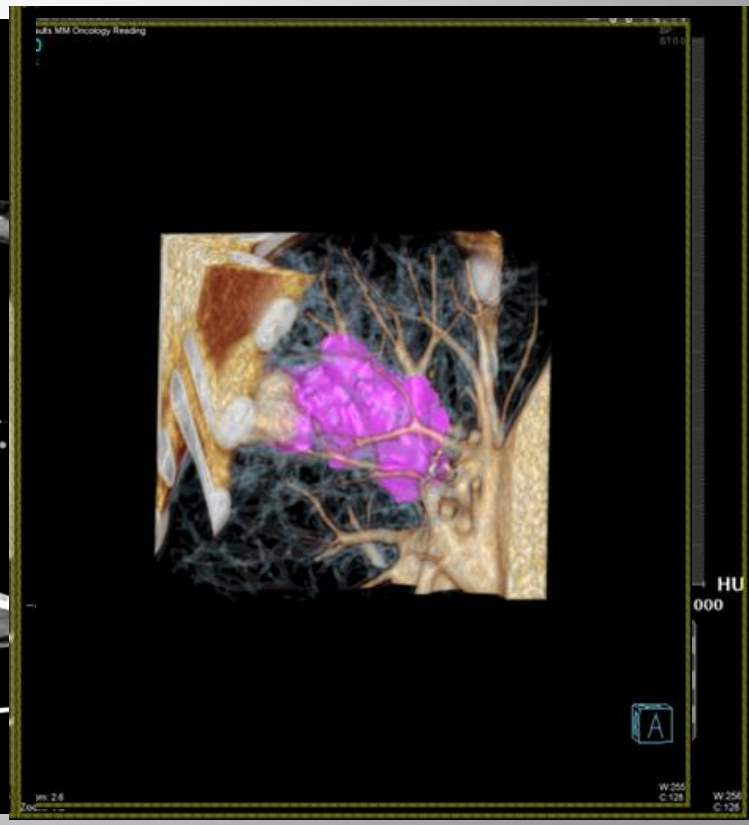




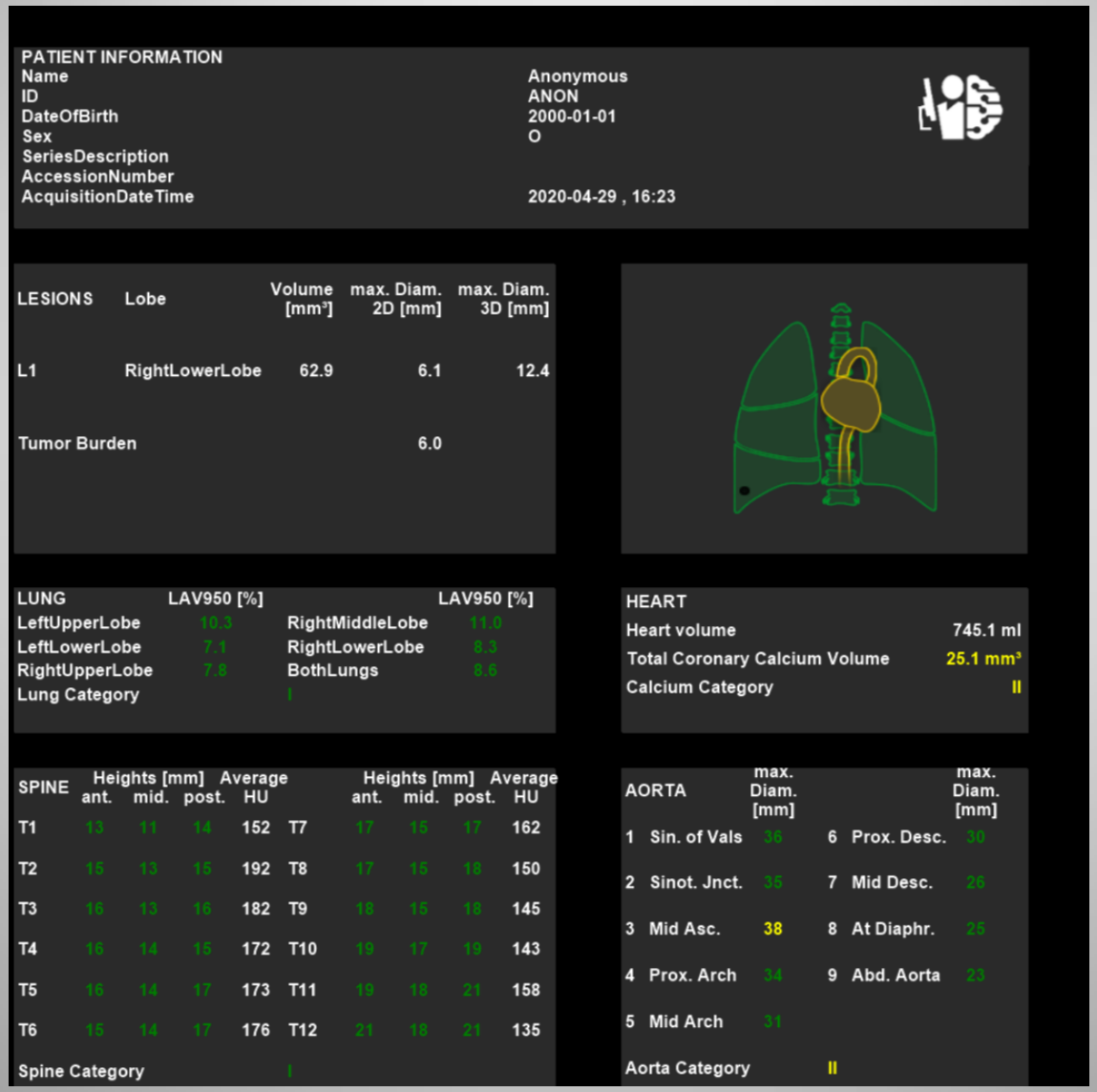
CAD:AKCİĞER NODÜL TARAMA







AI RAD Companion



PATIENT INFORMATION

Name	Anonymous
ID	ANON
DateOfBirth	2000-01-01
Sex	O
SeriesDescription	
AccessionNumber	
AcquisitionDateTime	2020-04-29 , 16:23

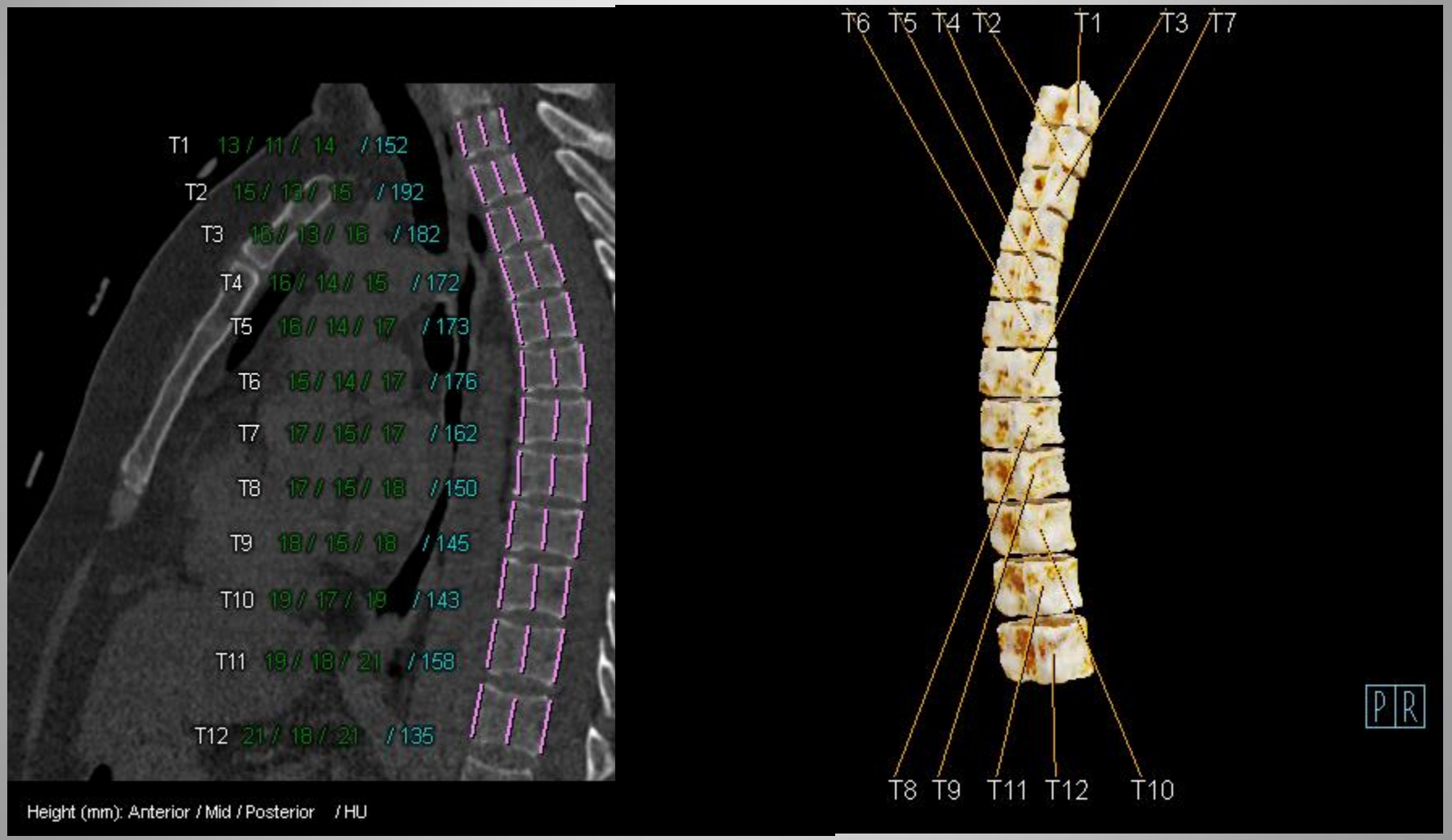
LESIONS	Lobe	Volume [mm³]	max. Diam. 2D [mm]	max. Diam. 3D [mm]
L1	RightLowerLobe	62.9	6.1	12.4
Tumor Burden			6.0	

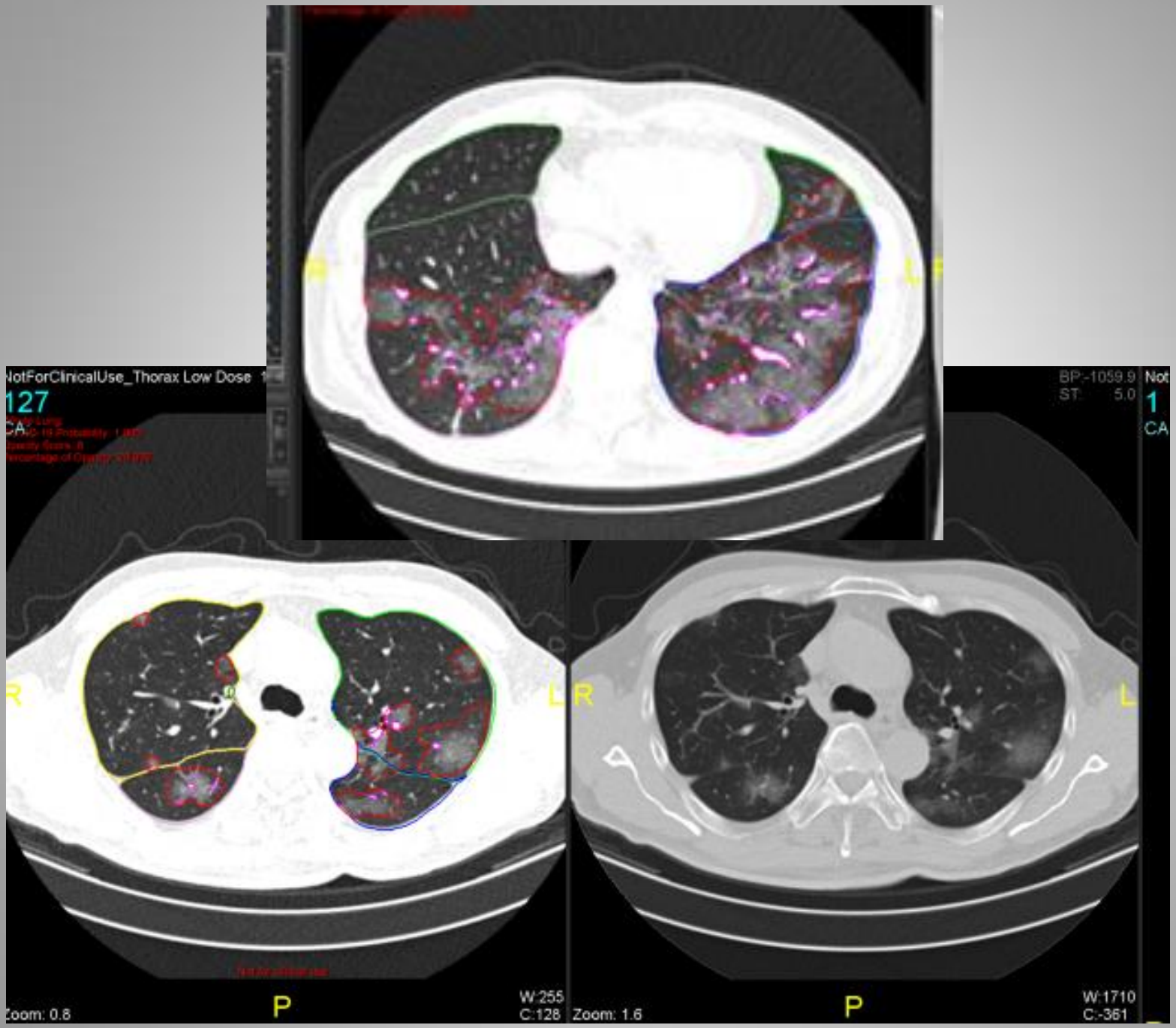
LUNG	LAV950 [%]		LAV950 [%]
LeftUpperLobe	10.3	RightMiddleLobe	11.0
LeftLowerLobe	7.1	RightLowerLobe	8.3
RightUpperLobe	7.8	BothLungs	8.6
Lung Category		I	

HEART	
Heart volume	745.1 ml
Total Coronary Calcium Volume	25.1 mm³
Calcium Category	II

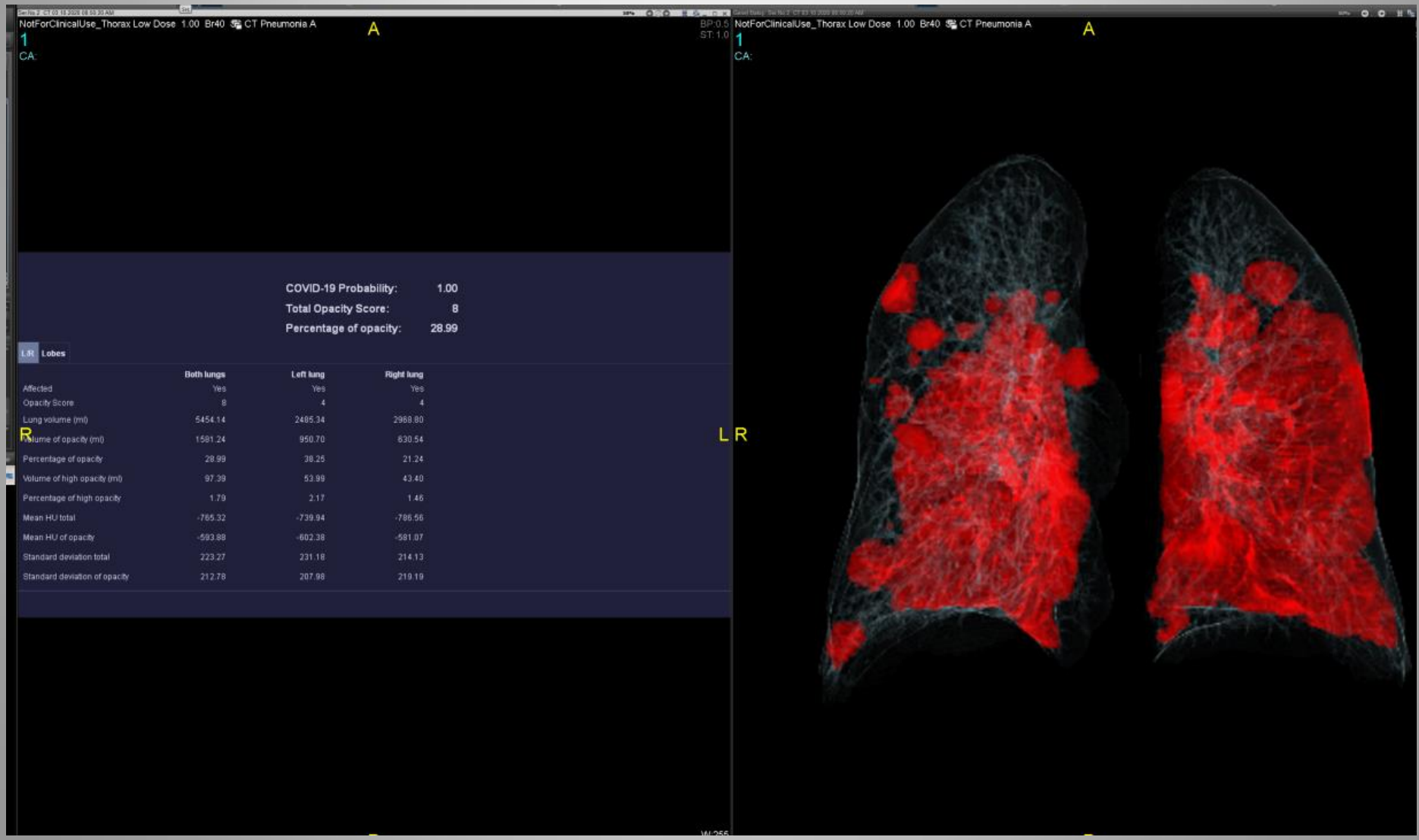
SPINE	Heights [mm] ant.	mid.	post.	Average HU		Heights [mm] ant.	mid.	post.	Average HU
T1	13	11	14	152	T7	17	15	17	162
T2	15	13	15	192	T8	17	15	18	150
T3	16	13	16	182	T9	18	15	18	145
T4	16	14	15	172	T10	19	17	19	143
T5	16	14	17	173	T11	19	18	21	158
T6	15	14	17	176	T12	21	18	21	135
Spine Category				I					

AORTA	max. Diam. [mm]		max. Diam. [mm]
1 Sin. of Vals	36	6 Prox. Desc.	30
2 Sinot. Jnct.	35	7 Mid Desc.	26
3 Mid Asc.	38	8 At Diaphr.	25
4 Prox. Arch	34	9 Abd. Aorta	23
5 Mid Arch	31		
Aorta Category	II		


T1 13 / 11 / 14 / 152
T2 15 / 13 / 15 / 192
T3 16 / 13 / 16 / 182
T4 16 / 14 / 15 / 172
T5 16 / 14 / 17 / 173
T6 15 / 14 / 17 / 176
T7 17 / 15 / 17 / 162
T8 17 / 15 / 18 / 150
T9 18 / 15 / 18 / 145
T10 19 / 17 / 19 / 143
T11 19 / 18 / 21 / 158
T12 21 / 18 / 21 / 135
Height (mm): Anterior / Mid / Posterior / HU
T6 T5 T4 T2 T1 T3 T7
T8 T9 T11 T12 T10
P R

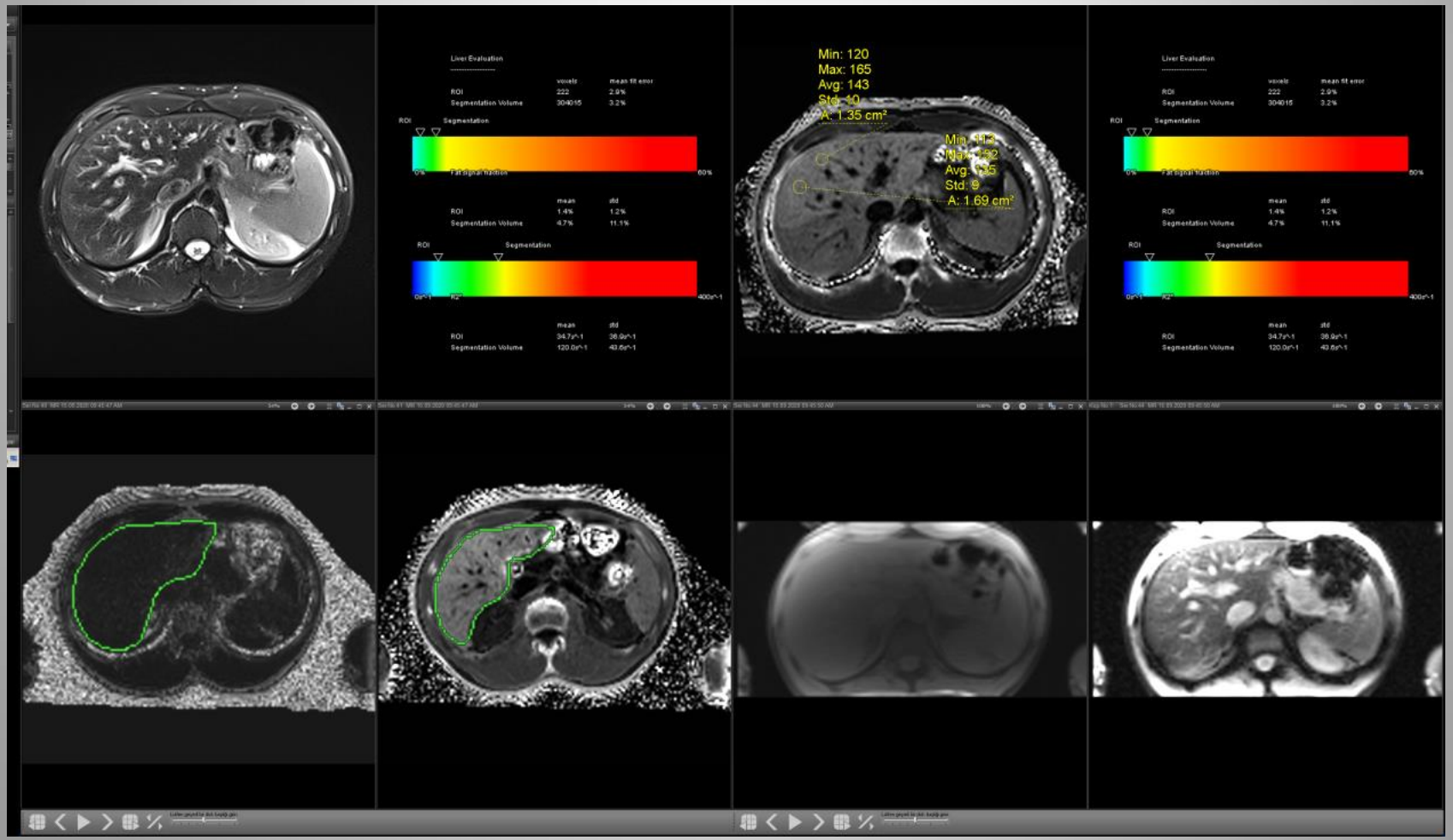

NotForClinicalUse_Thorax Low Dose
127
CA
BP:-1059.9
ST: 5.0
Not
1
CA
R
L
P
Zoom: 0.8
W:255
C:128
Zoom: 1.6
W:1710
C:-361

COVID -19 PROGRAMI

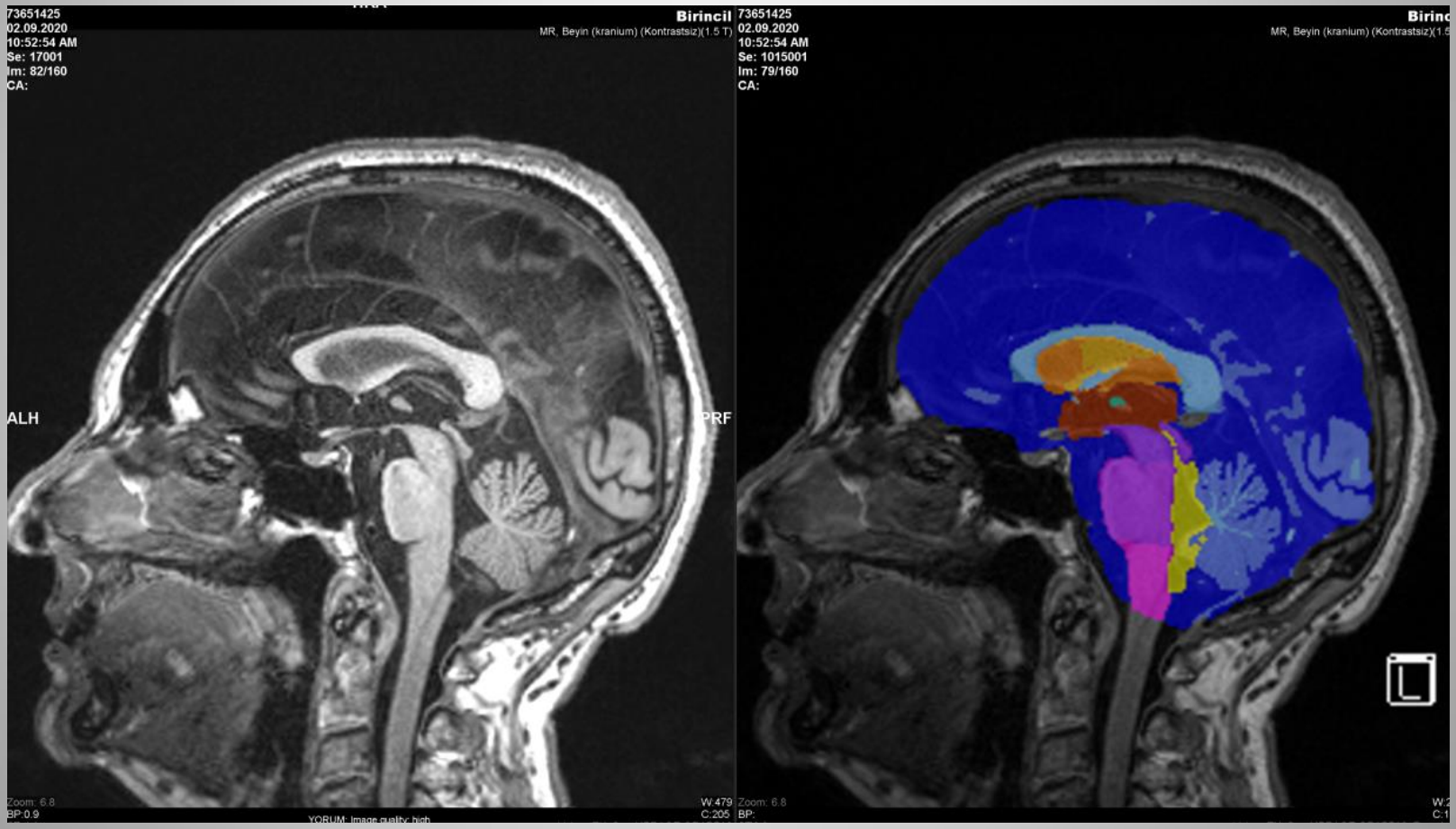


MR ; YENİ UYGULAMA ÖRNEKLERI

KARACİĞER VOLÜM, YAĞ FRAKSİYONU VE DEMİR ANALİZİ



BEYİN MORFOMETRİ





Brain Morphometry Report - 1/6 syngo.via VB30A_HF07.36

Input Data	DIS3D_ND_t1_mprage_tra_p2_iso		
Patient Demographics	65yrs	Male	
	Comments	Values	Acceptable Range
Image Quality	not assessed	n.a.	n.a.
Segmentation Quality	acceptable	0.73	[0.70 - 1.00]

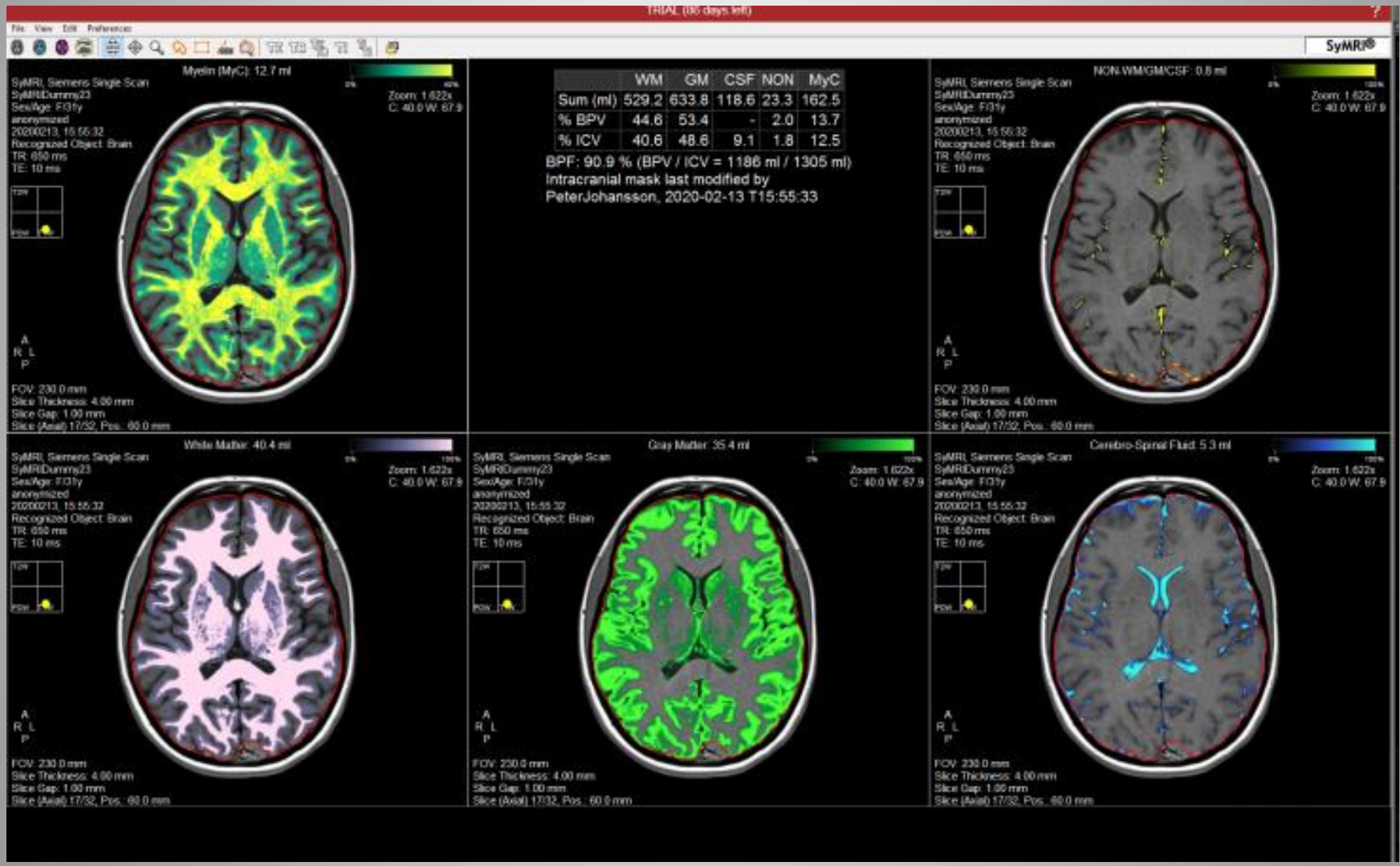
General Info
Input data not consistent with the morphometry protocol guideline. Please check validity of the volumetric results.

Tissue	Absolute[ml]	Normalized^[%]	Normative Range^^[%]
TIV	1364.9		
Brain	926.7	* 67.9	[68.6 - 76.5]
GM	576.9	42.3	[39.5 - 45.9]
Cortical GM	450.3	33.0	[29.9 - 35.4]
WM	349.8	* 25.6	[27.0 - 32.6]
WMAb	9.1	0.7	
CSF	438.1	* 32.1	[23.2 - 30.8]

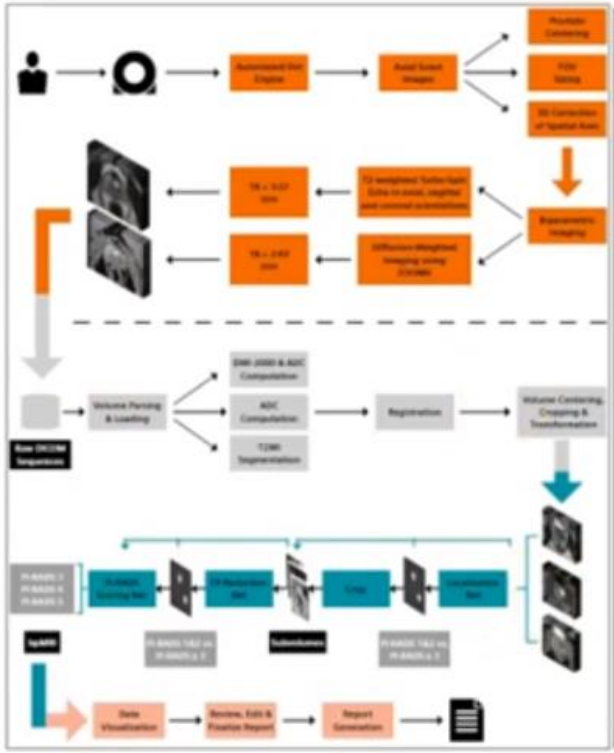
^ Percentage of TIV (Total Intracranial Volume)
^^10th and 90th percentiles of healthy age-/gender-matched population
* Below/above usual normal range volumes

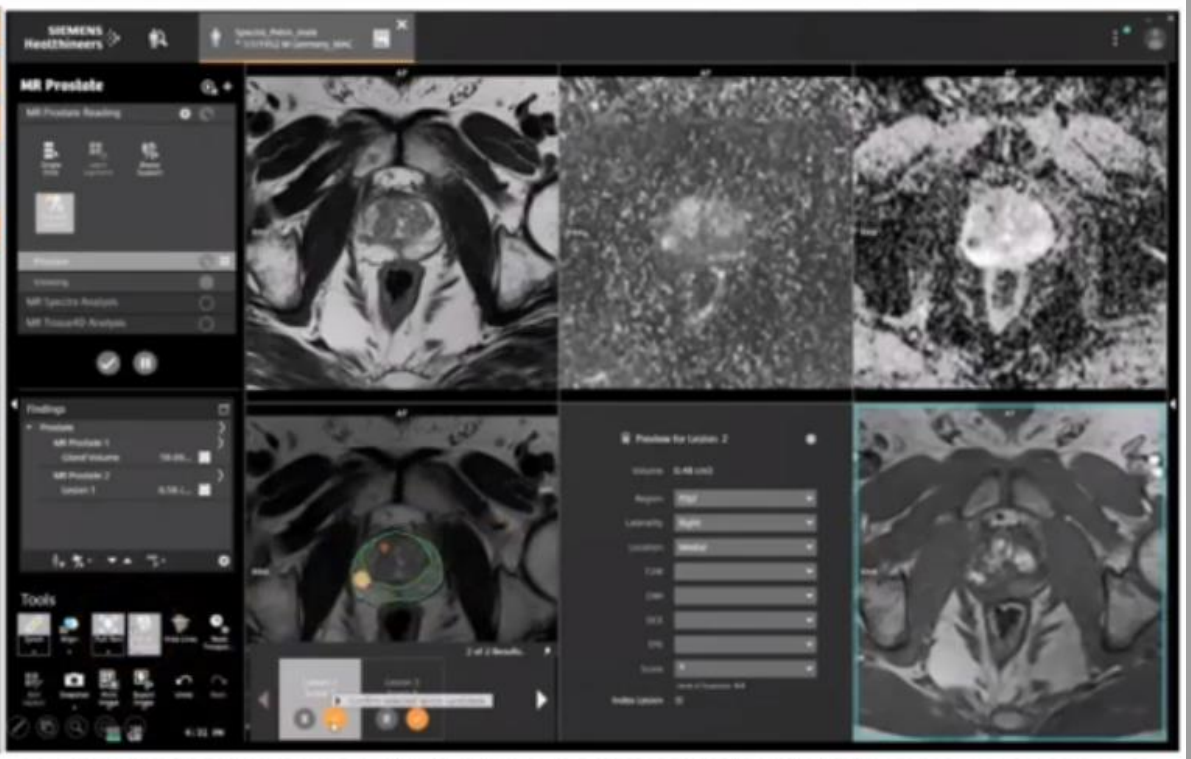
Report based on automated processing! Include original data for diagnosis.

SENTETİK MR


SyMRI®
Myelin (MyC): 12.7 ml
NON-WM/GM/CSF: 0.8 ml
White Matter: 40.4 ml
Gray Matter: 35.4 ml
Cerebro-Spinal Fluid: 5.3 ml
SyMRI, Siemens Single Scan
SyMRIDummy23
Sex/Age: F/31y
anonymized
20200213, 15:55:32
Recognized Object: Brain
TR: 650 ms
TE: 10 ms
Zoom: 1.622x
C: 40.0 W: 67.9
FOV: 230.0 mm
Slice Thickness: 4.00 mm
Slice Gap: 1.00 mm
Slice (Axial) 17/32, Pos.: 60.0 mm
A
R L
P
WM GM CSF NON MyC
Sum (ml) 529.2 633.8 118.6 23.3 162.5
% BPV 44.6 53.4 - 2.0 13.7
% ICV 40.6 48.6 9.1 1.8 12.5
BPF: 90.9 % (BPV / ICV = 1186 ml / 1305 ml)
Intracranial mask last modified by
PeterJohansson, 2020-02-13 T15:55:33

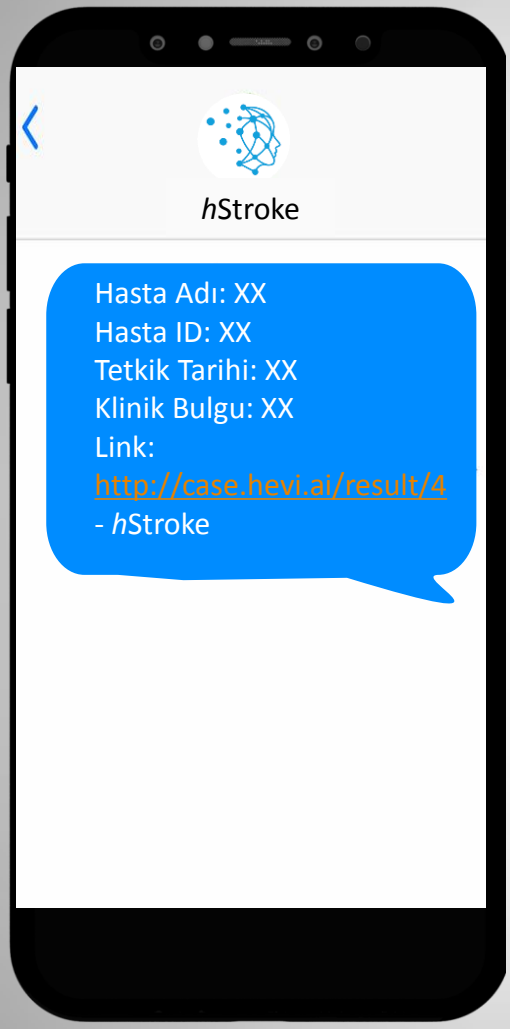
AI Prostat

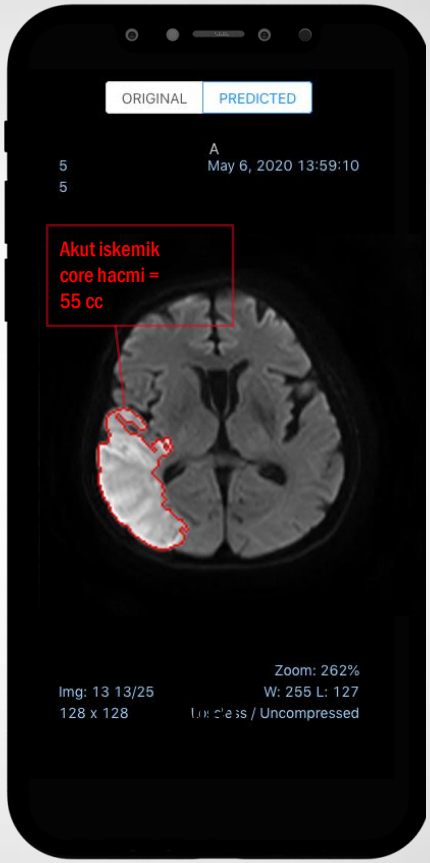




A Fully Automated, End-to-End Prostate MRI Workflow Solution Incorporating Dot, Ultrashort Biparametric Imaging and Deep-Learning-based Detection, Classification, and Reporting. David J. Winkel, M.D.et al. Magnetom FLASH 2020; 76(1): 78-83

hStroke HEVI AI – ACIBADEM İŞBİRLİĞİ





MRI



CT

hevi ai

SINEMATIK SUNU (CINEMATIC RENDERING-MR)




15
1
60 F/s


SIEMENS Healthineers
AI-Rad Companion
Dummy
Patient Information
Dummy
1900-01-01 Female
TRA Thorax 1.0 I40f3
Scan Date/Time: 2018-05-22 08:41
Findings Overview
Not for diagnostic use*
*) Colors are based on institutional settings and are no indication of or recommendations for treatment.
Results
Lung Lesions
Lung Parenchyma
Cardio
Vascular
Musculoskeletal
Suspend
Send to PACS
6 / 12
Contour
Lung
Bone
Soft Tissue
C -672 W 1004 | Z -1111.8
Accept
Remeasure
Decline
L1
L2
Lesion
Lobe
Max. 2D Ø [mm]
Max. 3D Ø [mm]
Volume [mm³]
State
L1 Left Upper 10.5 10.6 190.2 Accepted
L2 Right Lower 6.4 7.1 68.0 Accepted
Tumor Burden 16.9
Accept All
Decline All