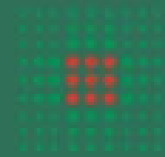


un evento promosso da



SERVIZIO SANITARIO REGIONALE
EMILIA-ROMAGNA

Istituto Romagnolo per lo Studio dei Tumori "Dino Amadori"
Servizio di Ricerca e Cura e Gestione Scientifica

ISTITUT
ROMAGN
PER LO
DEI TUM
DINO
AMADORI



Nuove frontiere del Next Generation Sequencing nella diagnostica oncologica ed ematologica

04 Novembre 2022

Centro Congressi FEDERICO II Napoli

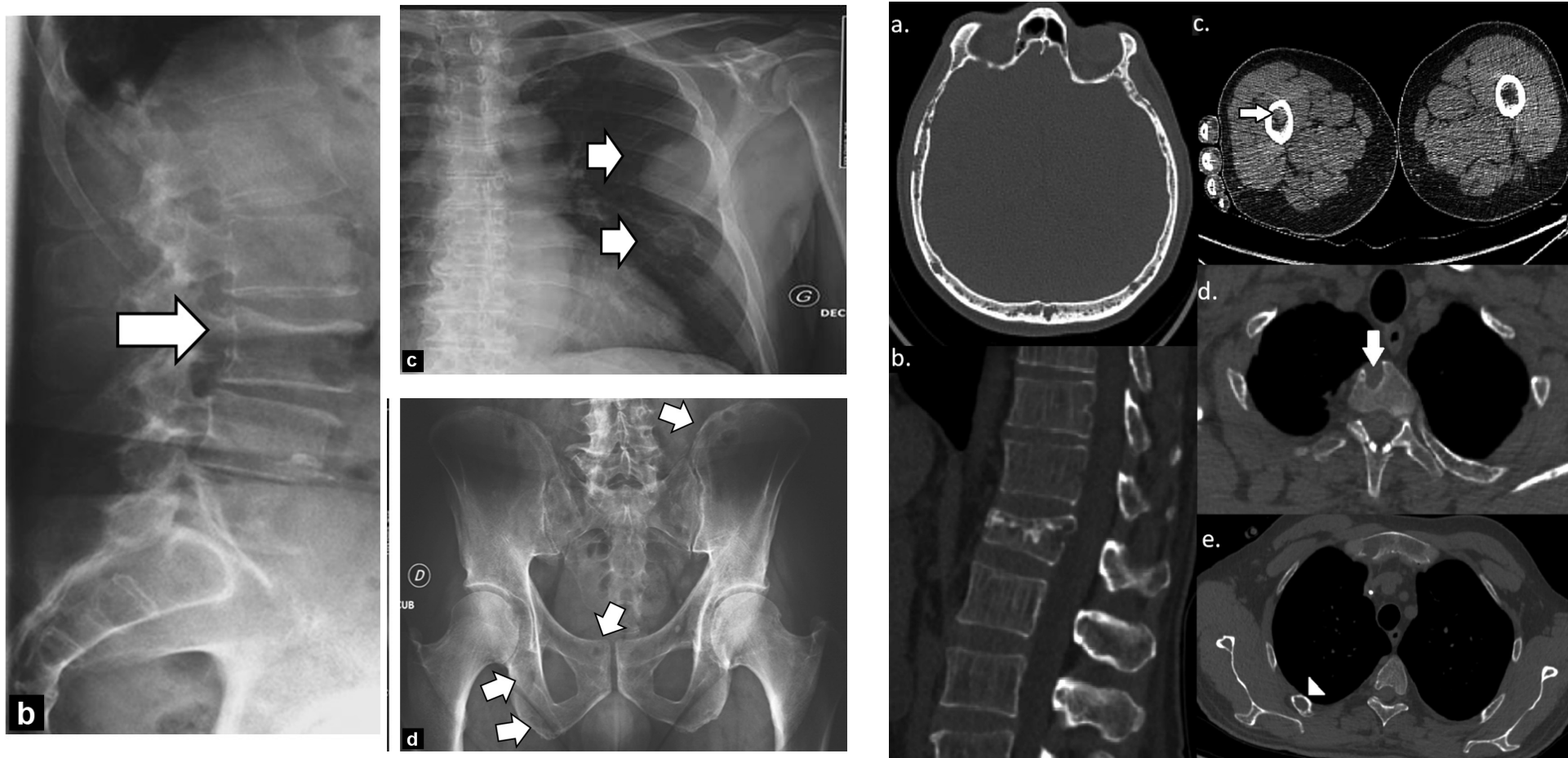
Dott. Giacomo Feliciani – Dott.ssa Alice Rossi

Istituto Romagnolo per lo Studio dei Tumori - Dino Amadori

**Imaging quantitativo e Radiomica nella Whole body
MRI nel Mieloma Multiplo**

Background: The radiologist's point of view

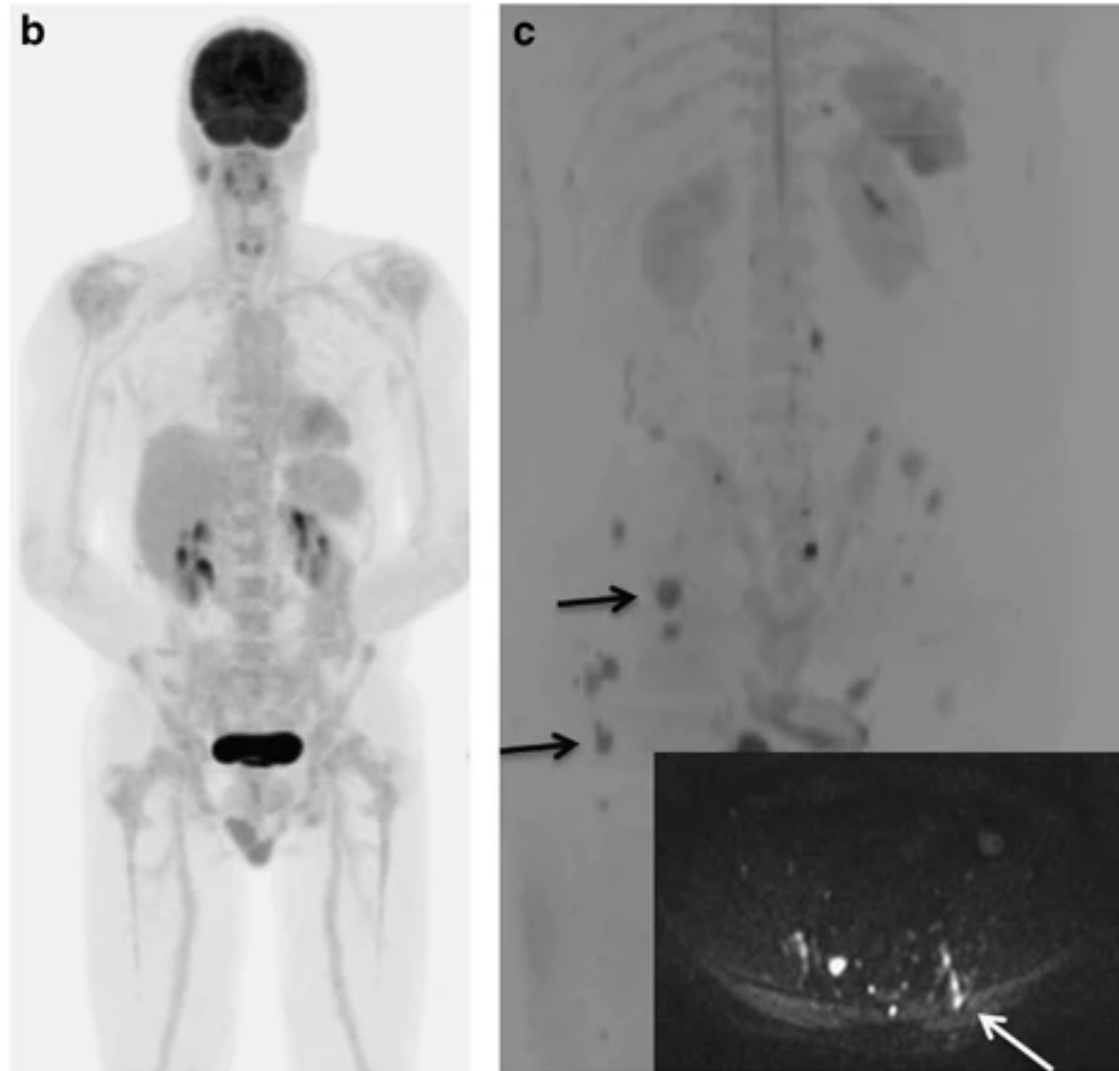
- a conventional radiographic skeletal survey was historically used for the assessment of bone lesions in patients with MM replaced by whole body low dose CT



Nuove frontiere del Next Generation Sequencing nella diagnostica oncologica ed ematologica

04 Novembre 2022, Napoli

Background: The radiologist's point of view



PET/CT, WB-MRI provide different and complementary information about disease activity and tumor burden

IMWG recommends

- WB-MRI for patients with a suspected diagnosis of SMM or MM or solitary bone plasmacytoma and in case of suspected relapse because of its superior sensitivity in identifying myeloma-defining events,
- FDG PET/CT is recommended as the modality of choice for assessing treatment response

Objectives:

1. Improving differential diagnosis of MM and SMM at staging

HOW?

Quantitative MRI (qMRI) and Radiomics

Radiomics: Decoding tumor phenotypes by extracting high throughput information from imaging data that capture tumor microenvironment

2. Understanding the differences between WB-qMRI and PET/CT

HOW?

Imaging Fusion techniques and Quantitative Imaging

Patients:

2020 – Ongoing: ~47 newly diagnosed patients

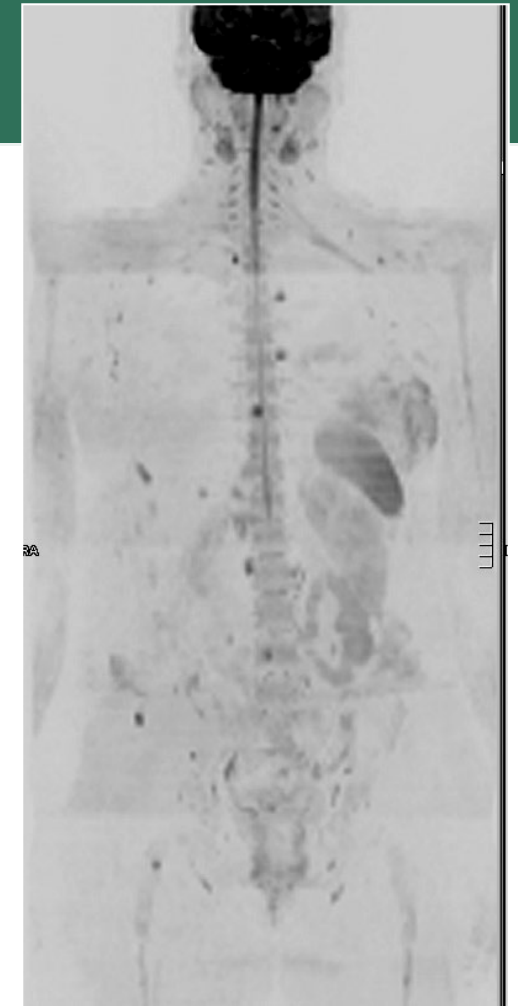
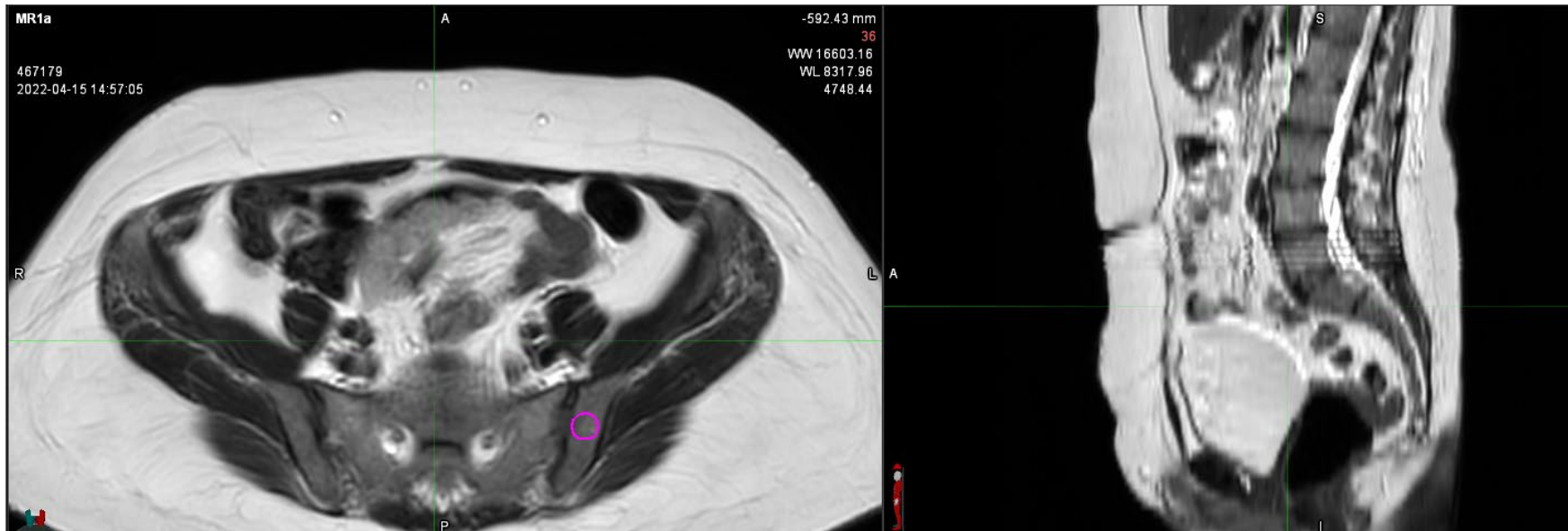
1. Patients affected by MM **(34)** will be enrolled and undergo imaging assessment as follows:
 - Baseline (within 1 months before starting therapy): WB-MRI and PET-CT
 - Follow-up (within 3 months after the end of therapy) : WB-MRI and PET-CT
 - Yearly follow-up until progression: WB-MRI alone or in association to PET-CT.
2. Patients affected by SMM **(13)** will be enrolled and undergo WB-MRI alone or in association to PET-CT in yearly follow-up

Nuove frontiere del Next Generation Sequencing nella diagnostica oncologica ed ematologica

04 Novembre 2022, Napoli

WB - qMRI

- Whole body Magnetic Resonance Imaging (WB-qMRI) with Diffusion Weighted Imaging (DWI) is a *radiation-free and contrast administration-free*, imaging method combining:
- *high quality morphological images with*

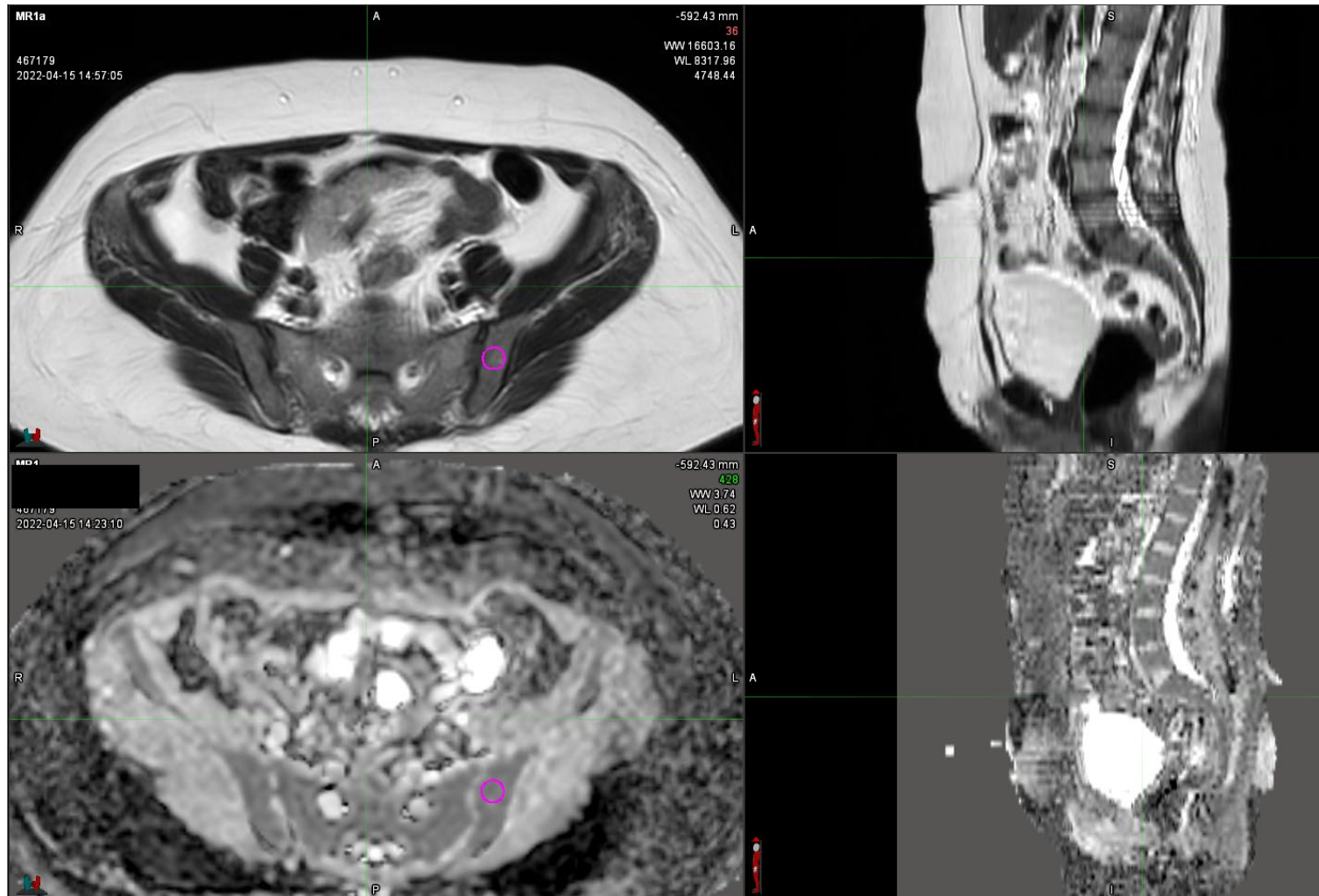


Dalili D et al Clin Oncol Imag 2017
Donners R et al; Magn Reson Imaging Clin N Am 2018
Petrulia G et al Magn Reson Imaging Clin N Am 2018
Tunariu N et al; Br J Radiol 2020
QIBA recommendations 2019
Koutoulidis V et al Radiology 2022

Nuove frontiere del Next Generation Sequencing nella diagnostica oncologica ed ematologica

04 Novembre 2022, Napoli

- “functional” information on **diffusivity of water molecules (DWI)** that mainly depends on tissue cellularity and cell viability (lesion-to-background contrast of about 5mm) for detecting bone and soft tissue pathology.



T2 weighted imaging

ADC – mm/sec

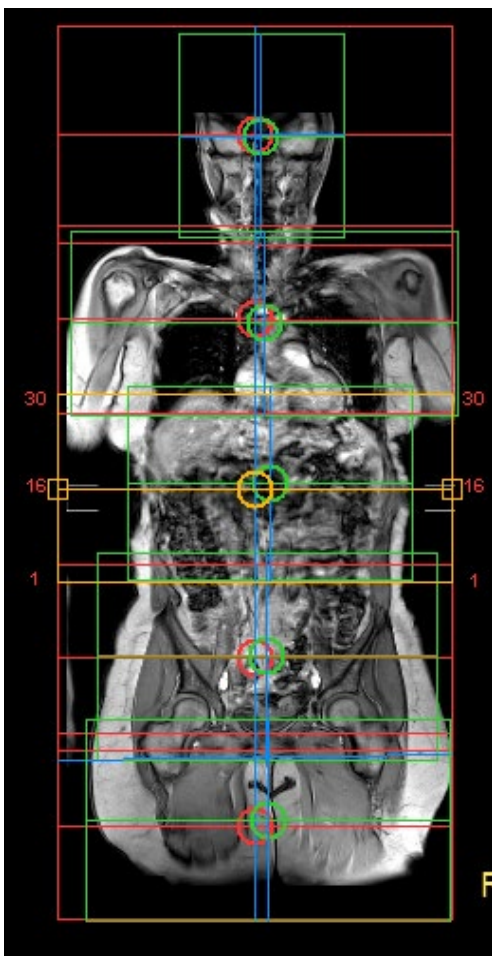
Nuove frontiere del Next Generation Sequencing nella diagnostica oncologica ed ematologica

04 Novembre 2022, Napoli

WB-MRI protocol

60 mins for basic adult protocol; 4000 images

FOV:



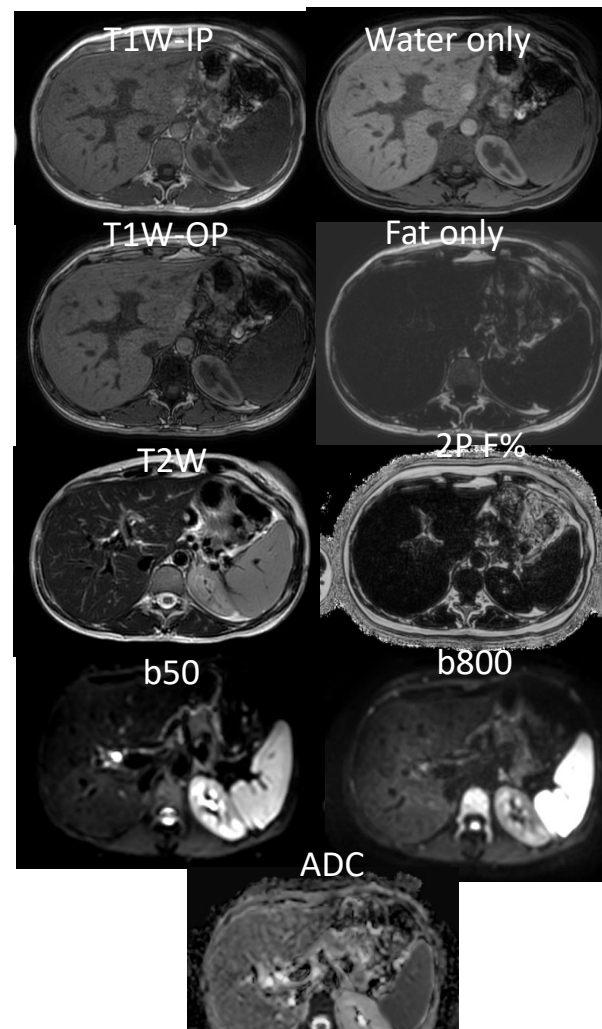
T1W



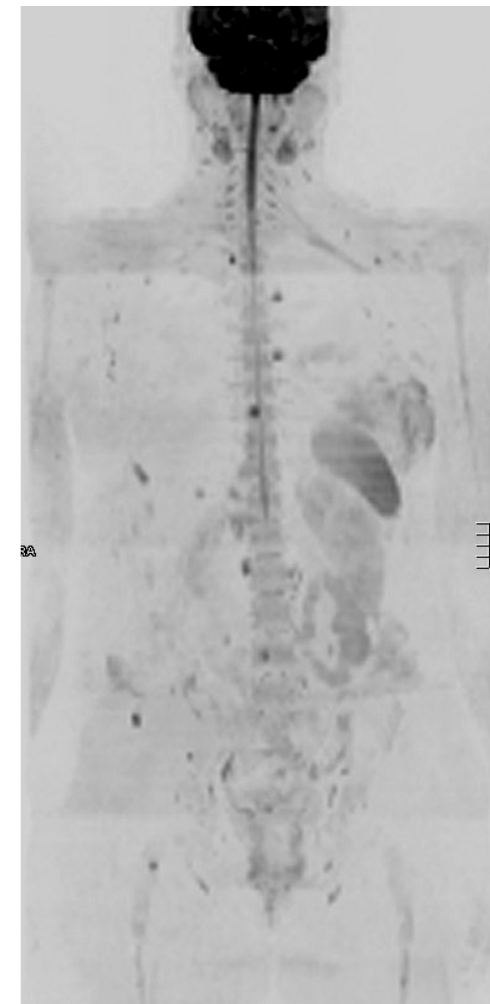
STIR



M-DIXON-T1



DWIBS



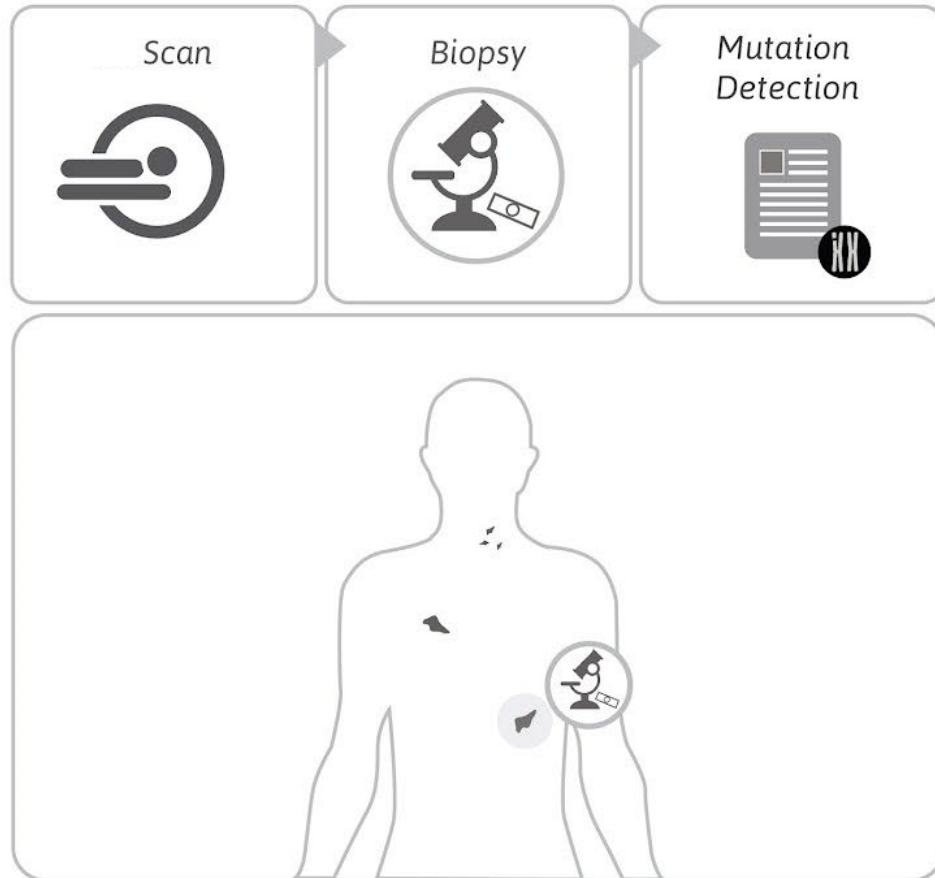
Nuove frontiere del Next Generation Sequencing nella diagnostica oncologica ed ematologica

04 Novembre 2022, Napoli

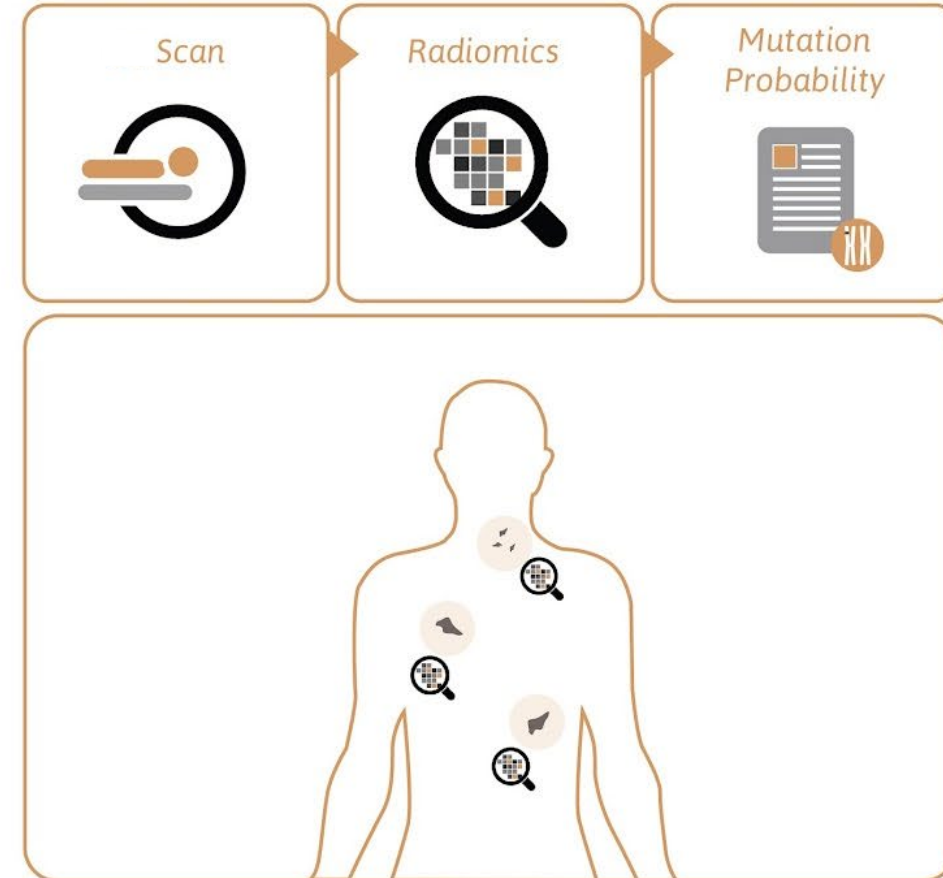
Quantitative imaging and Radiomics



Current model



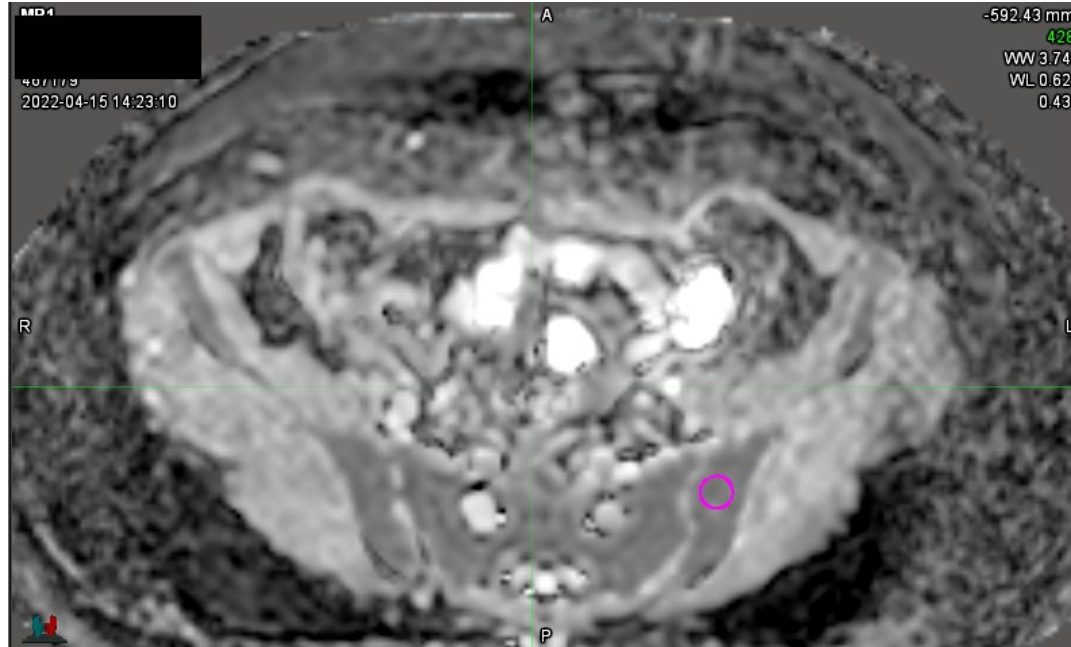
Radiomics model



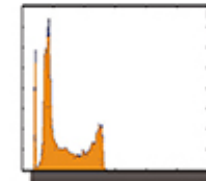
Nuove frontiere del Next Generation Sequencing nella diagnostica oncologica ed ematologica

04 Novembre 2022, Napoli

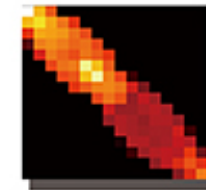
Biopsy – Genomics



Q imaging - Radiomics



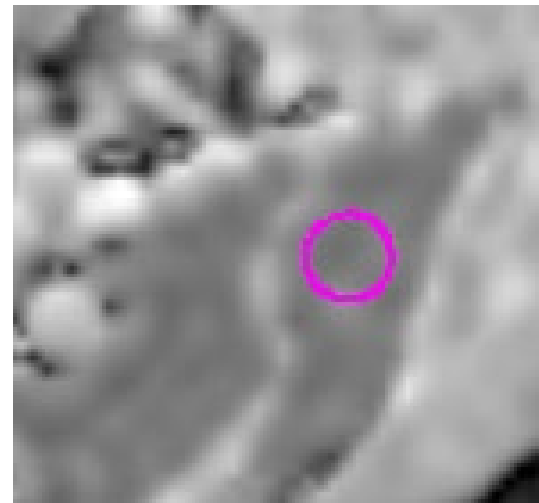
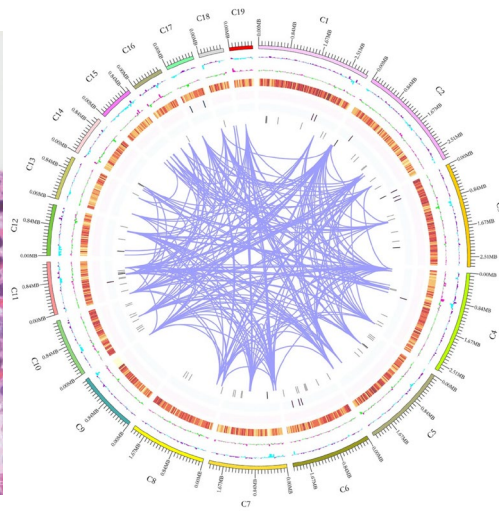
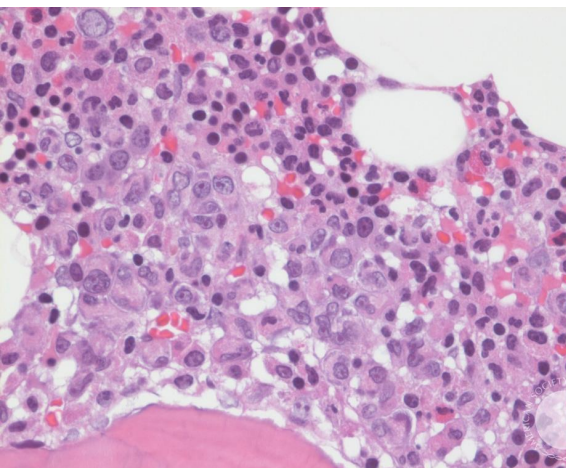
First order histogram features (n=42)



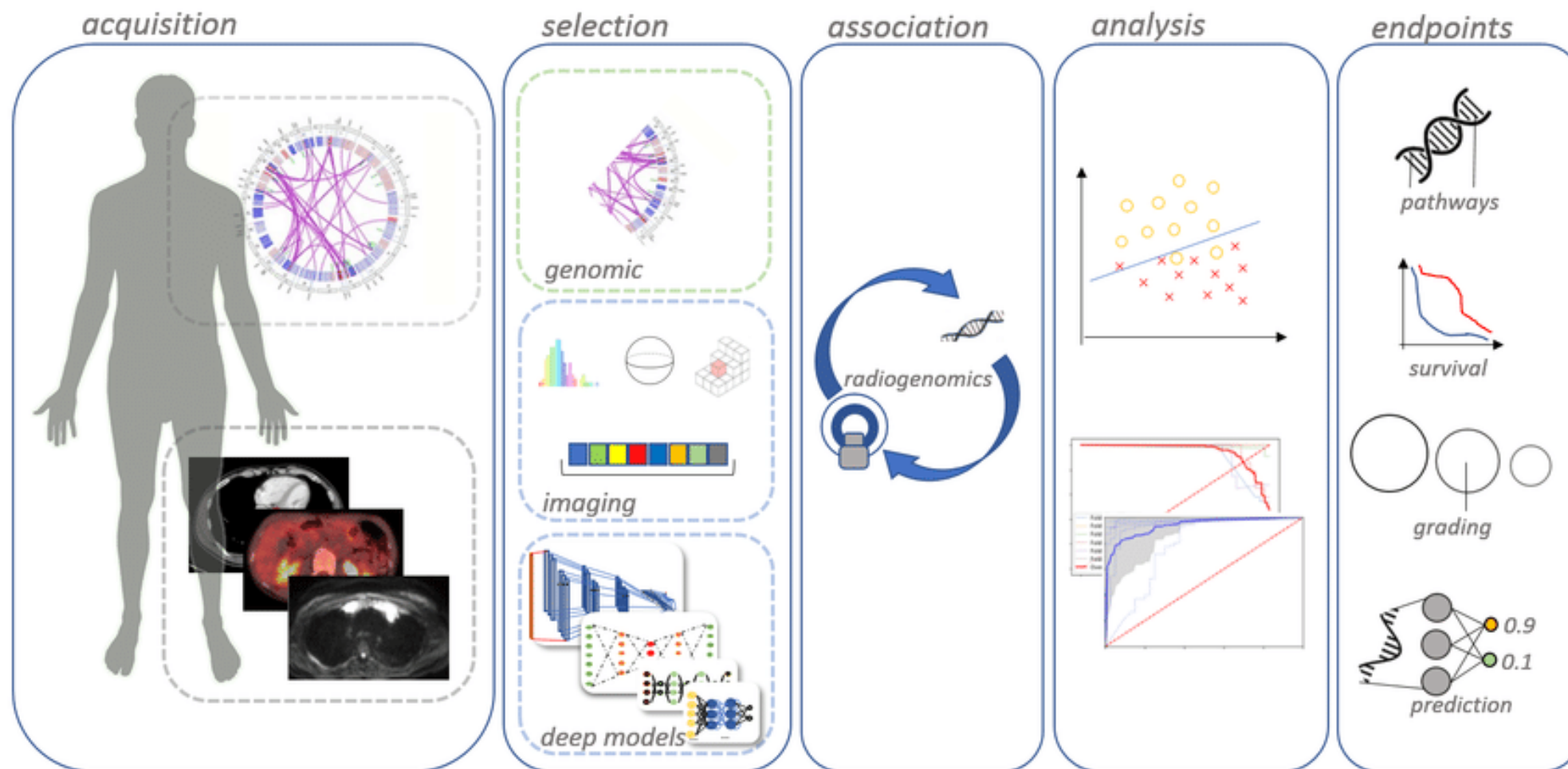
High order texture features (n=334)



Form factor and GLZSM features (n=20)



Quantitative imaging and Radiomics



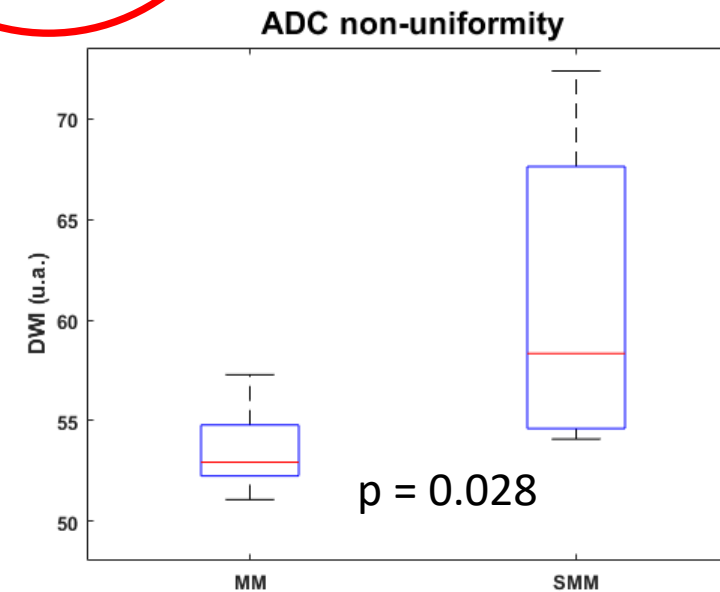
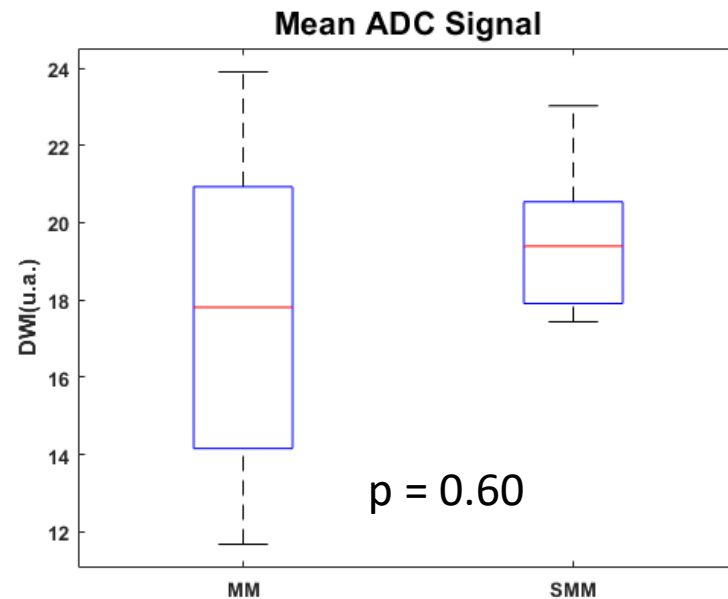
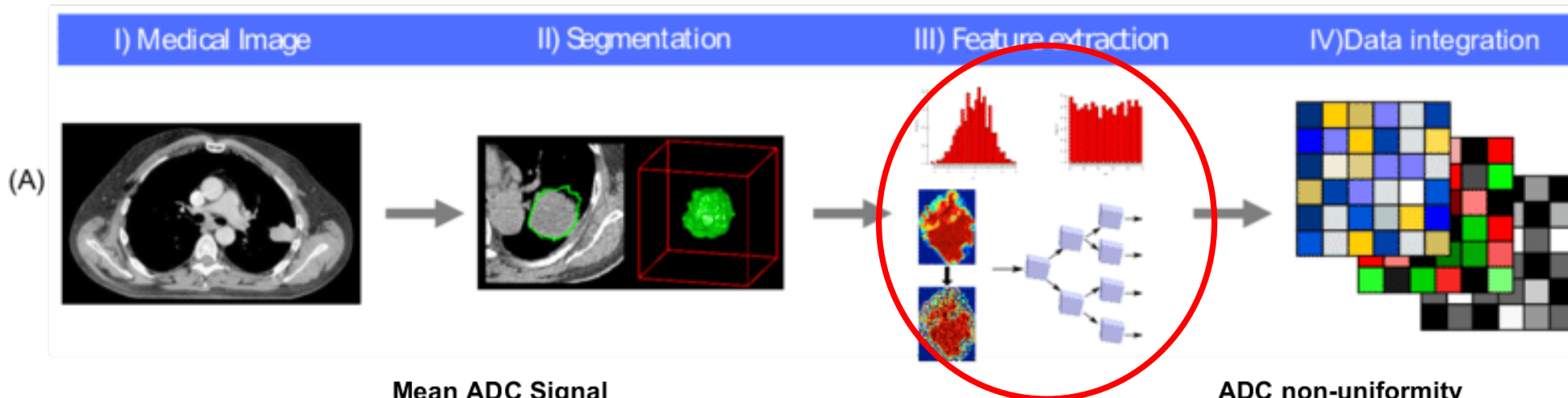
Nuove frontiere del Next Generation Sequencing nella diagnostica oncologica ed ematologica

04 Novembre 2022, Napoli

Preliminary results

10 patients

- 5 Multiple Myeloma
- 5 Smoldering



Conclusions

- Quantitative imaging and radiomics can help to better diagnose MM from SMM
- Radiomics can capture also variation during therapy at various timestep
- Radiomics data can be integrated with clinical and genomics data to create more comprehensive diagnostics and prognostic models

Nuove frontiere del Next Generation Sequencing nella diagnostica oncologica ed ematologica

04 Novembre 2022, Napoli



SERVIZIO SANITARIO REGIONALE
EMILIA-ROMAGNA

Istituto Romagnolo per lo Studio dei Tumori "Dino Amadori"
Istituto di Ricovero e Cura a Carattere Scientifico

ISTITUT
ROMAGNOLO
PER LO STUDIO
DEI TUMORI
DINO AMADORI



Grazie

per l'attenzione

