K. Eristavi National Centre of Surgery: Potential Partnership.

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J.S.C. “K. Eristavi National Centre of Surgery”

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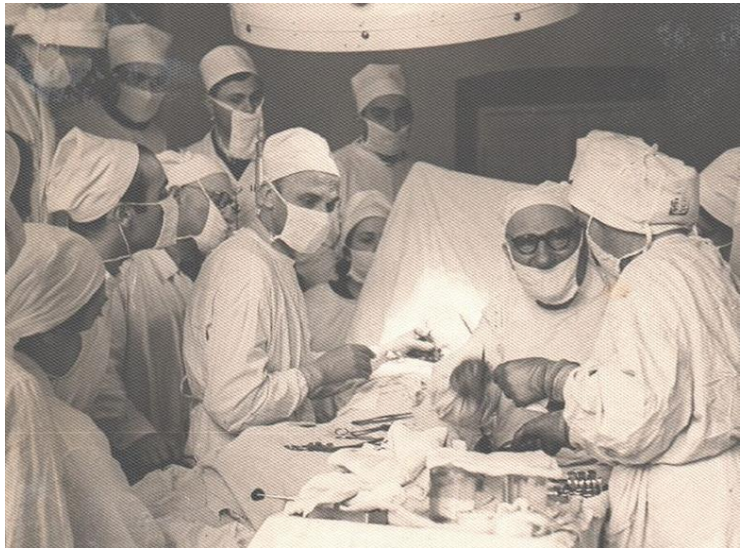
26 – June 2023

Outlook

- Introduction about “K. Eristavi National Centre of Surgery”
- High-tech equipment;
- Nuclear Medicine Department;
- Results;
- Future plans…;
- Discussion;

K. Eristavi National Center of Surgery



The Scientific Research Institute of Experimental and Clinical Surgery of Georgia was founded in 1946.
After the collapse of the Soviet Union and due to the political and social events taking place in Georgia in the 1990s, the infrastructure of the clinic was dismantled - the staff was cut.

In 2011, when the Institute of Surgery practically could no longer function, the "Aversi" corporation was acquired and its restoration and renewal began at the fastest pace.

K. Eristavi National Center of Surgery

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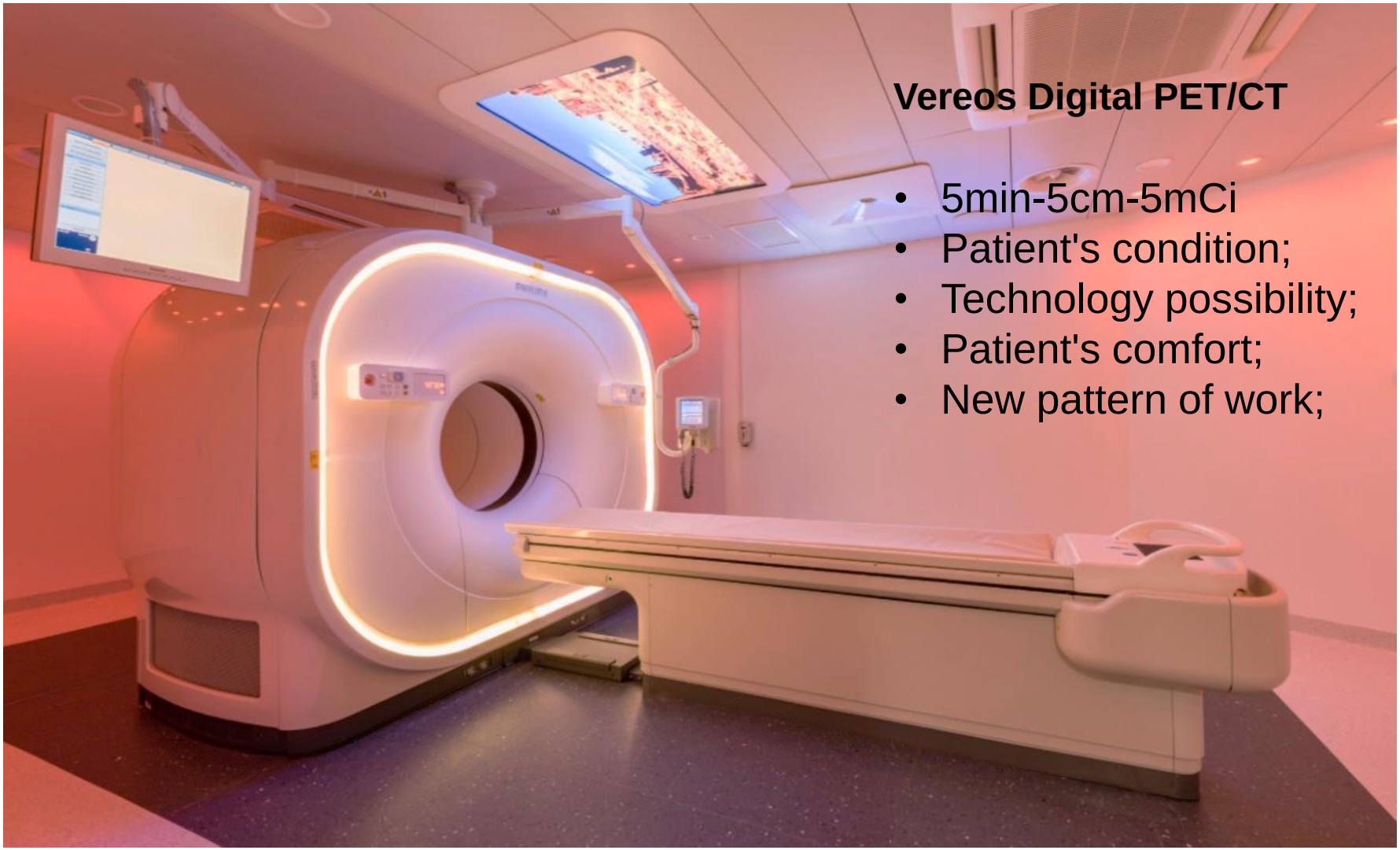

Vereos Digital PET/CT

- 5min-5cm-5mCi
- Patient's condition;
- Technology possibility;
- Patient's comfort;
- New pattern of work;

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3 Tesla MRI PHILIPS INGENIA ELITION X

- • 16 types of flexible coils. including the breast coil;
- • Spectroscopy and FiberTrak modes; O-MAR reconstruction to reduce metal artifacts.
- Speed:
- • Compressed Sense technology, which gives the device high speed and allows us to get the highest quality image;
- • In 80% of studies, we can use Smart Exam technology, Auto Start technology, which automatically starts the specified study as soon as the door is closed;
- • In the DWI program, research is opened 30% faster;
- • Scan Wise technology - in the case of implants admissible for MRI, it automatically analyzes the protocol, takes it quickly and safely.
- • Via Vital Eye: we no longer have to wear a belt to control our breathing, instead we use sensors;
- In the case of movement, we no longer have to stop research and start again;
- Comfort: wide tunnel - 71 cm;
- short magnet; Comfort Plus. 60 mm;
- Upper limit of weight - **250** kg;
- COMFORTONE - full audio-video support;

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Aquilion Lightning SP/ CT

Proven technology – a wise investment.

The system is distinguished: with high performance and economy with an increased degree of patient safety with maximum clinical capabilities

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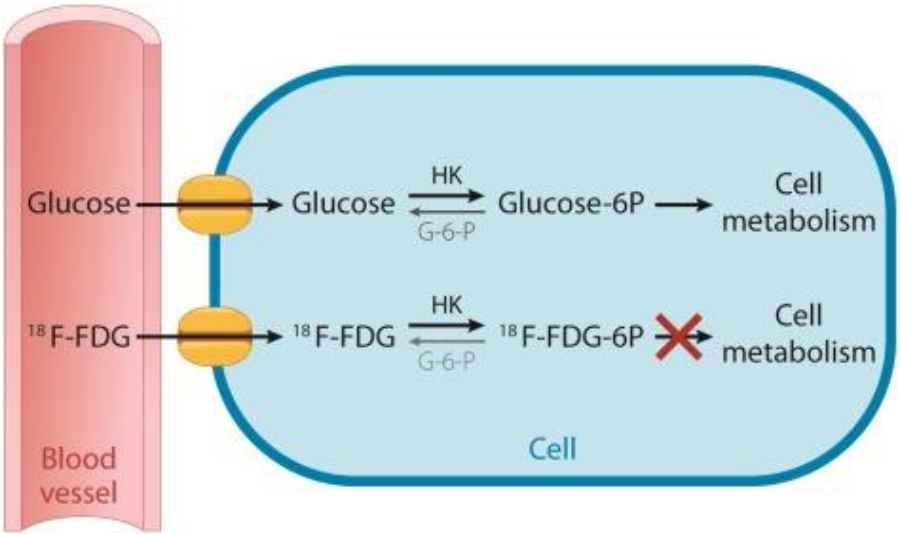
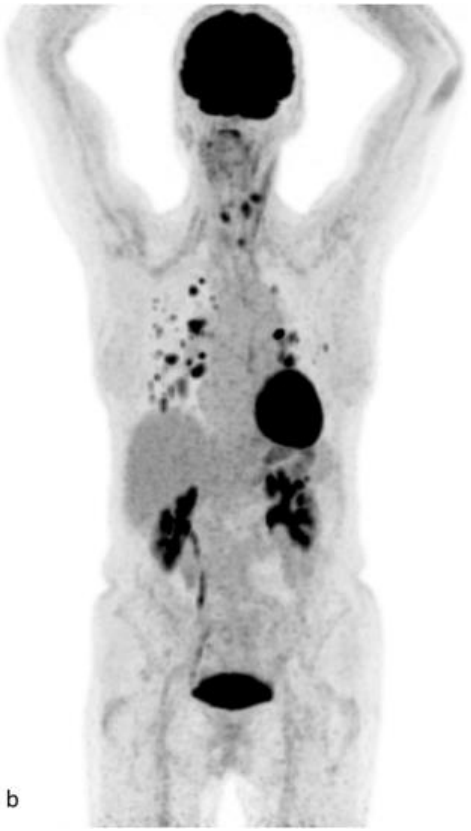
OLYMPUS EVIS X1 CV-1500 -ME3

Nuclear Medicine department

^{18}FDG PET/CT

- Metabolic evaluation on cellular level.
- ^{18}FDG: Glucose analog.





Nuclear Medicine department

FDG PET/CT: EANM procedure guidelines for tumour imaging: version 2.0

Ronald Boellaard · Roberto Delgado-Bolton · Wim J. G. Oyen · Francesco Giammarile · Klaus Tatsch · Wolfgang Eschner · Fred J. Verzijlbergen · Sally F. Barrington · Lucy C. Pike · Wolfgang A. Weber · Sigrid Stroobants · Dominique Delbeke · Kevin J. Donohoe · Scott Holbrook · Michael M. Graham · Giorgio Testanera · Otto S. Hoekstra · Josee Zijlstra · Eric Visser · Corneline J. Hoekstra · Jan Pruim · Antoon Willemsen · Bertjan Arends · Jörg Kotzerke · Andreas Bockisch · Thomas Beyer · Arturo Chiti · Bernd J. Krause

- Differentiation of benign from malignant lesions.
- Searching for an unknown primary tumor.
- Staging patients with known malignancies.
- Monitoring the effect of therapy on known malignancies.
- Following post treatment fibrosis or necrosis.
- Detecting tumor recurrence, especially in the presence of elevated tumor markers.
- Selection of the region for biopsy.
- Guiding radiation therapy planning.

Results:

Fig. 11. Animation of patient with multiple bone metastasis. Patient physical data: 97kg, prescribed activity 197MBq (5.2mCi)

Results:

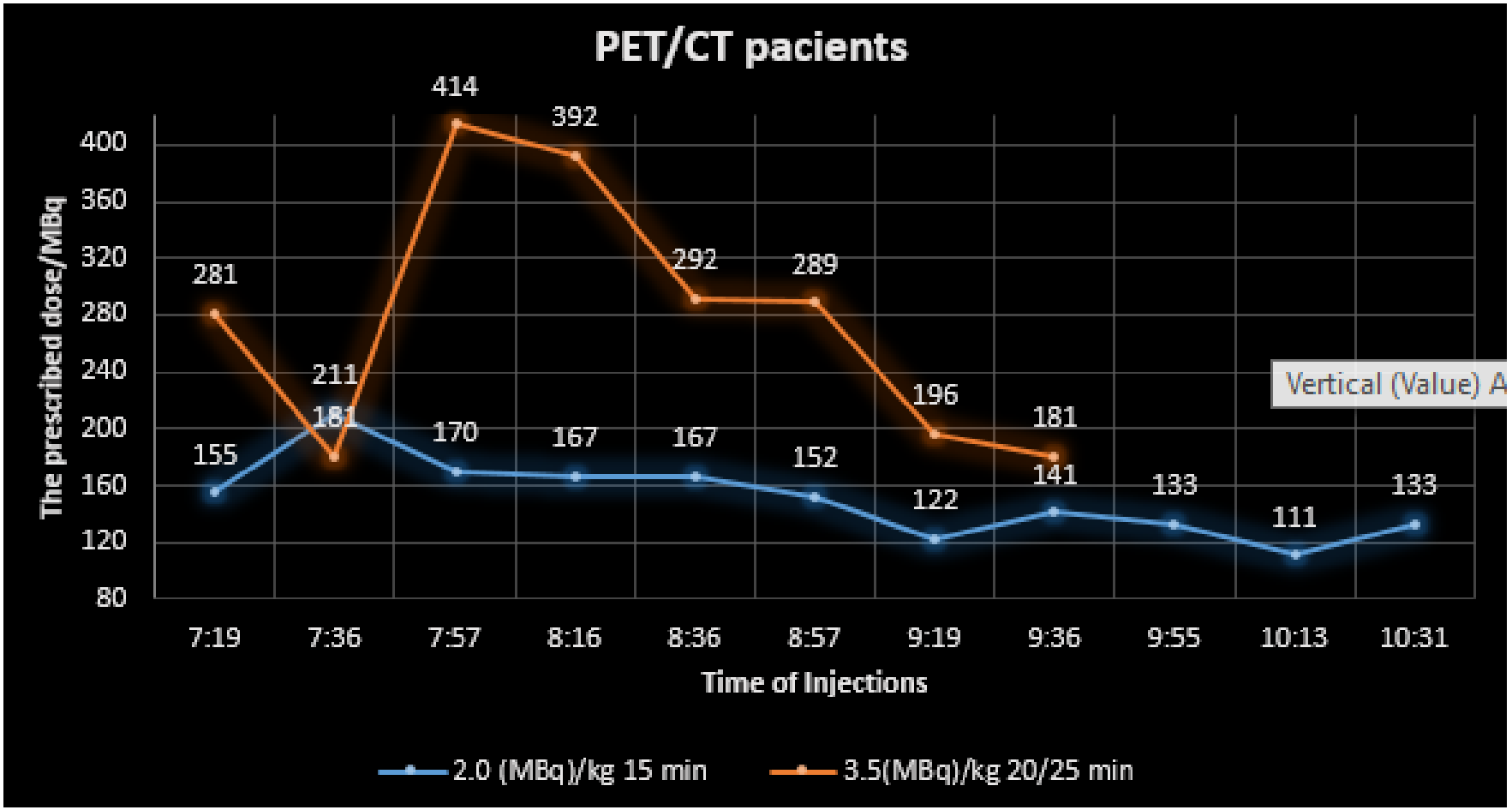


Fig. 8. Plots of real data between injections and injected activity. Figure describes two different protocols, that was developed by PET/CT group. Reduced radiopharmaceutical doses and time per bed position.

Results:

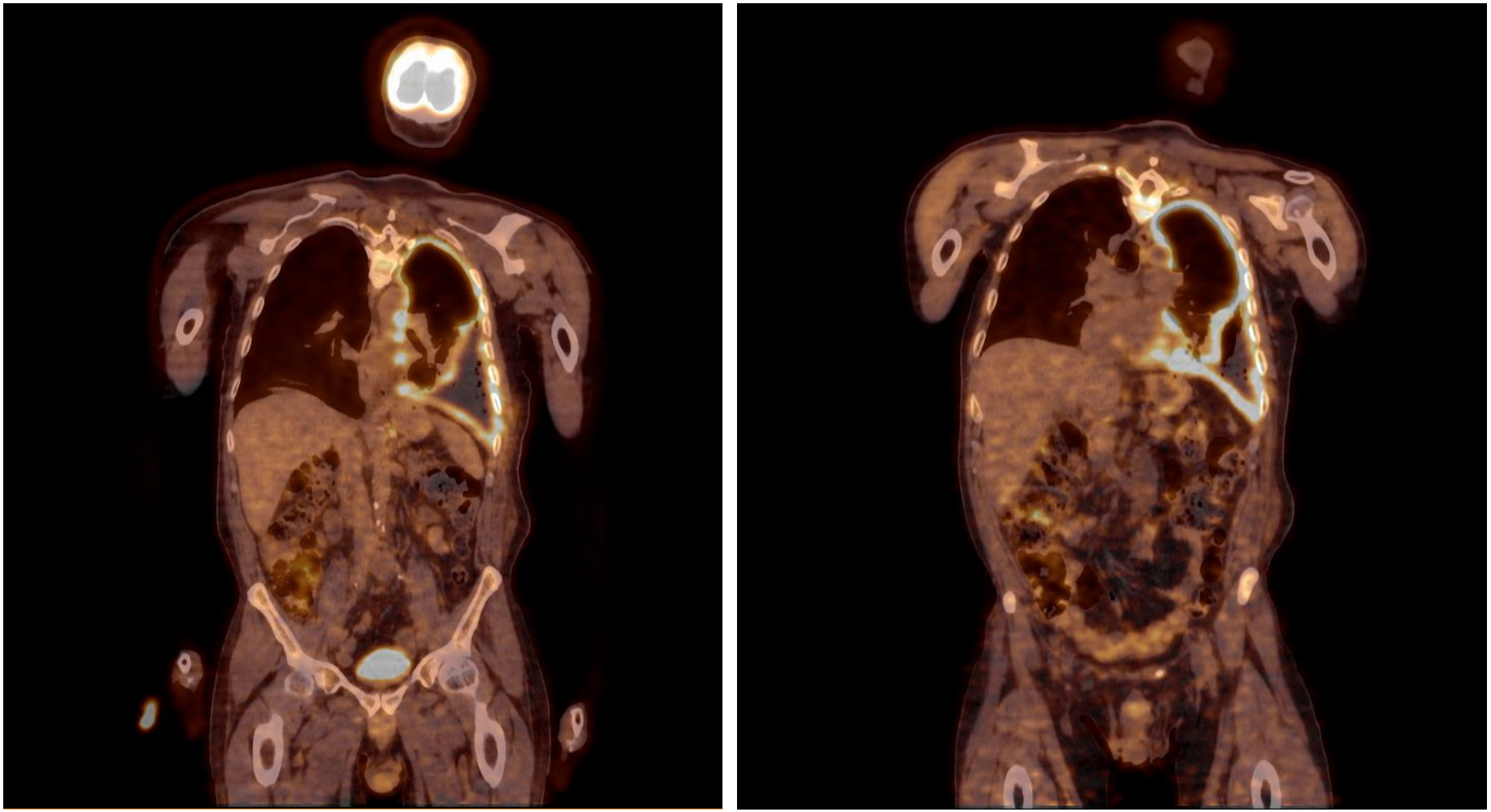


Fig. 10. Total body PET/CT 59 y, M 1.73m, 81kg (left 9:53 scan time- right 11:36 repeat scan time), prescribed dose 7.7mCi, injection time 8:47.

Another possibilities: experts opinions?!

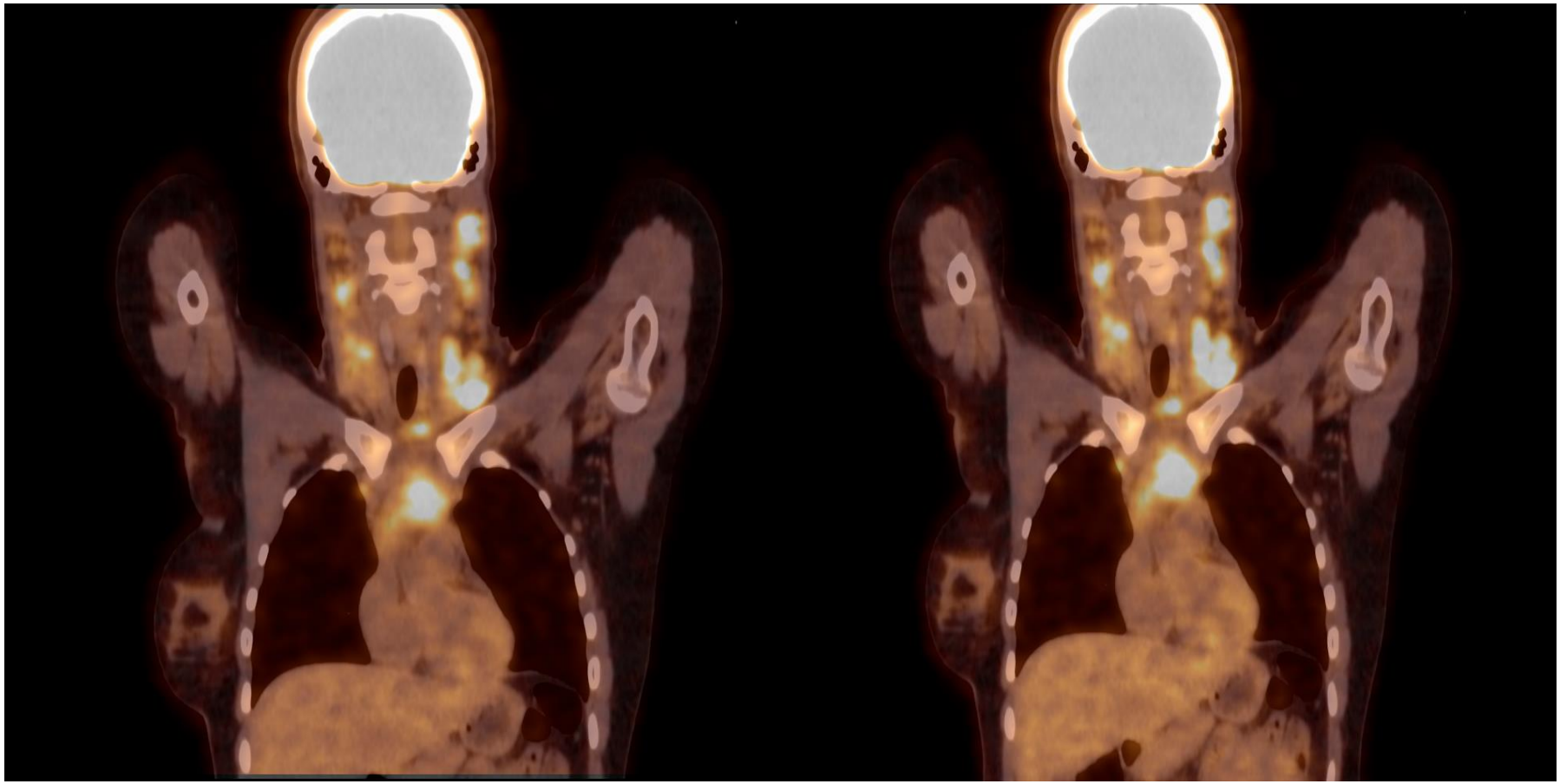
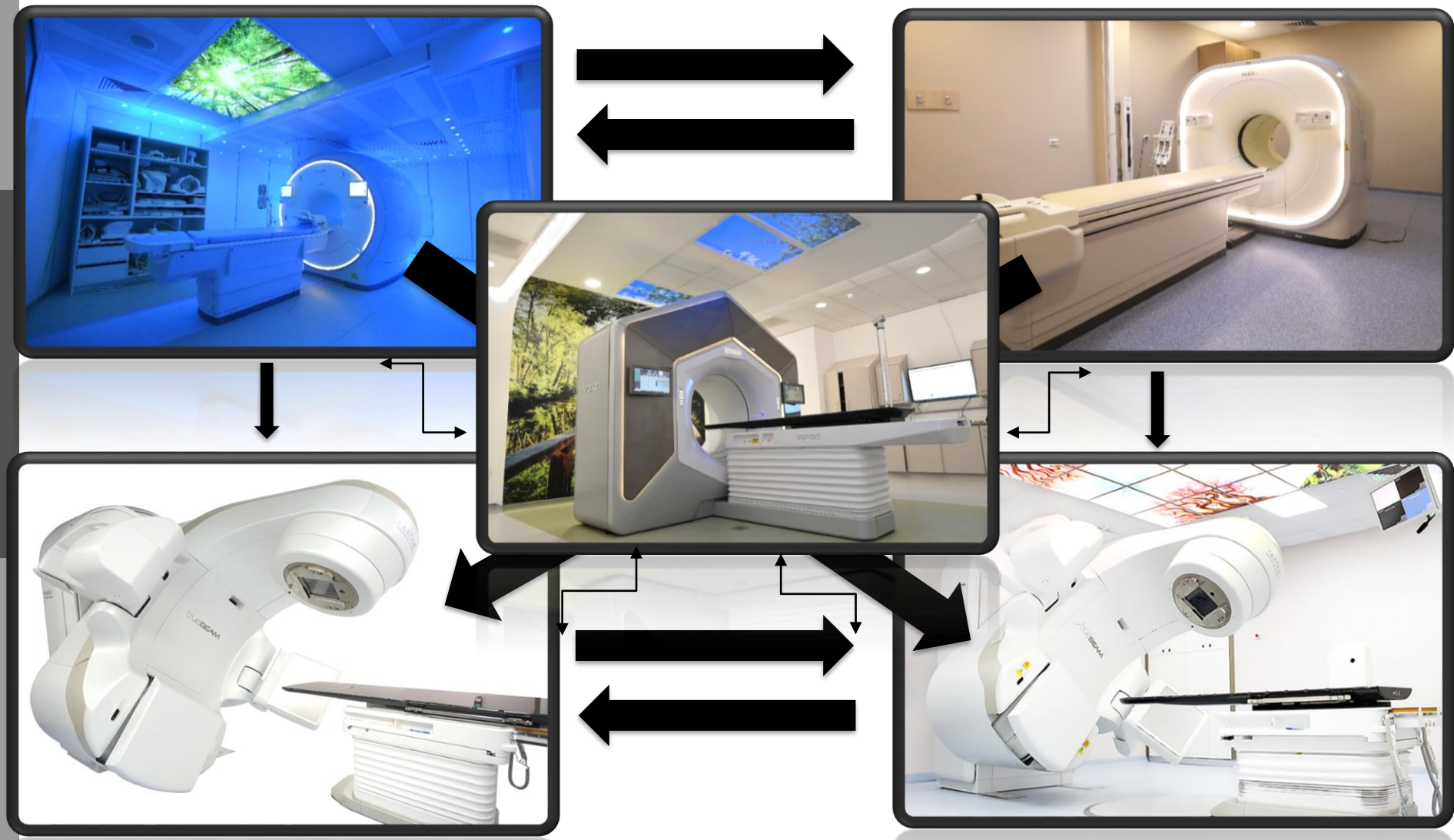


Fig. 12. Reconstructions: 25 y, F, 1.64 cm, 66kg, left real image right reconstructed with different injection dose.

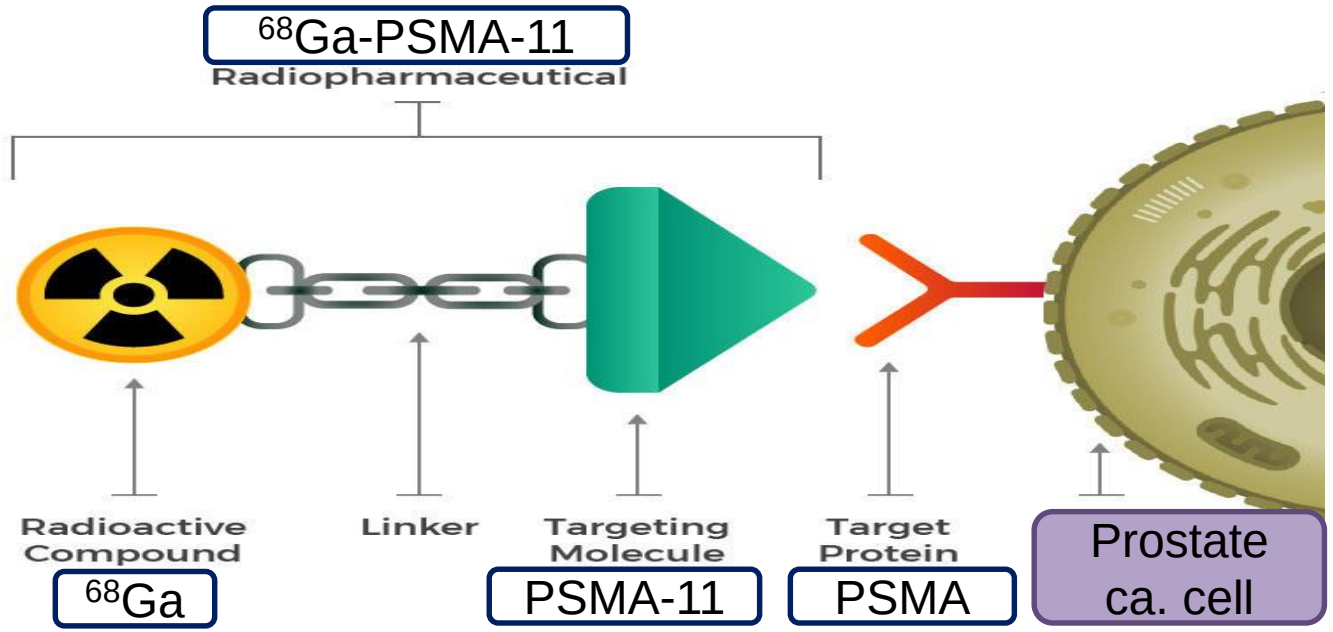
Smart Fusion…



Future Plans. . .

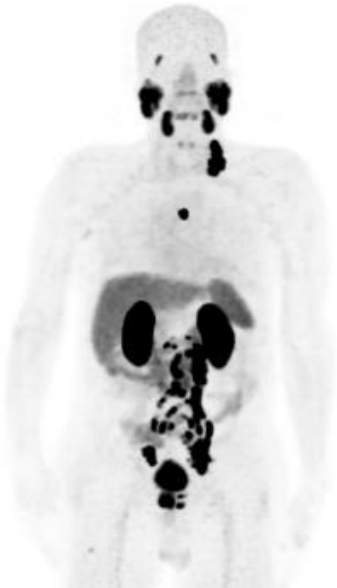
^{68}Ga-PSMA-11

- **Prostate cancer:** Staging, evaluation of treatment response, re-staging / recurrence detection
- **PSMA:** Prostate Specific Membrane Antigen (Glutamate carboxypeptidase II
- **PSMA-11:** PSMA targenting peptide

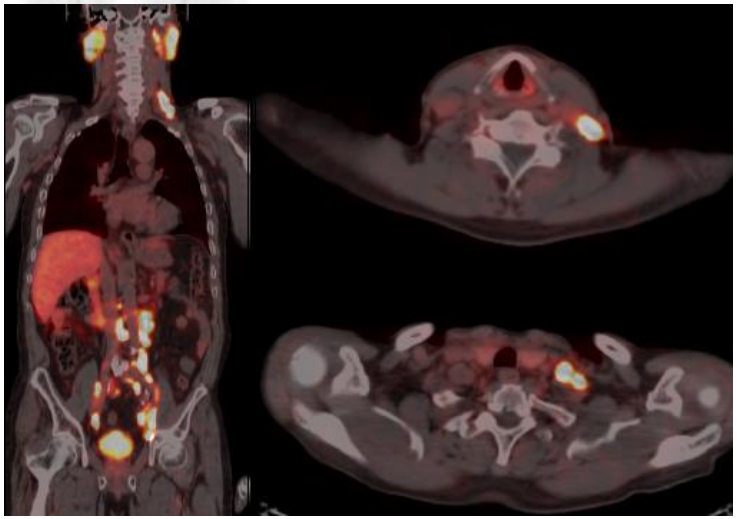


Future Plans. . .

- Primary staging in high-risk disease before surgical procedures or planning external beam radiation
- Localization of tumor tissue in recurrent prostate cancer
- Targeted biopsy after previous negative biopsy in patients with high suspicion of prostate cancer
- Monitoring of systemic treatment in metastatic prostate cancer
- **Staging before and during PSMA-directed radiotherapy (mainly in metastatic castration-resistant prostate cancer)**



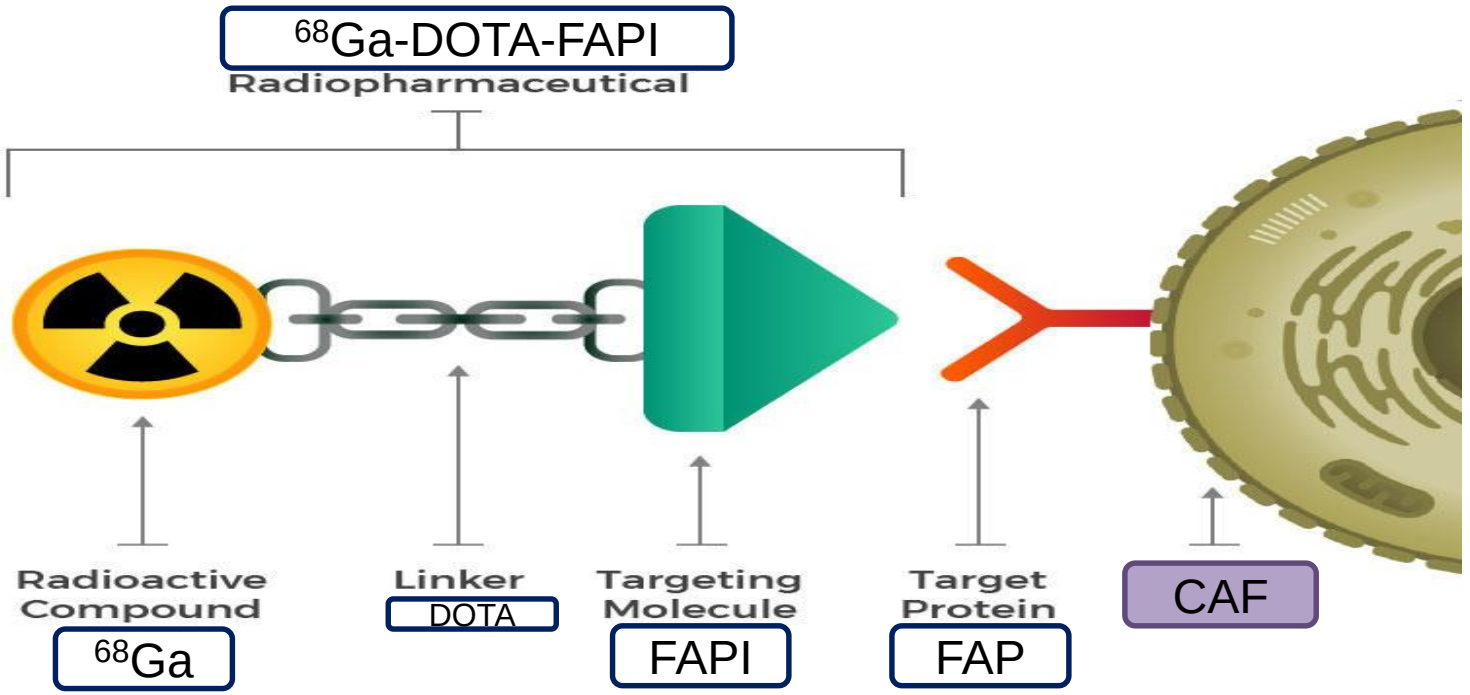
Mapping of PSMA Expression



Future Plans. . .

^{68}Ga-FAPI PET/CT Rationale

- FAPI: Quinolone-based FAP Inhibitor
- Relatively specific FAP expression of CAFs compared to normal tissues enables targeted radiopharmaceutical applications with FAPI.



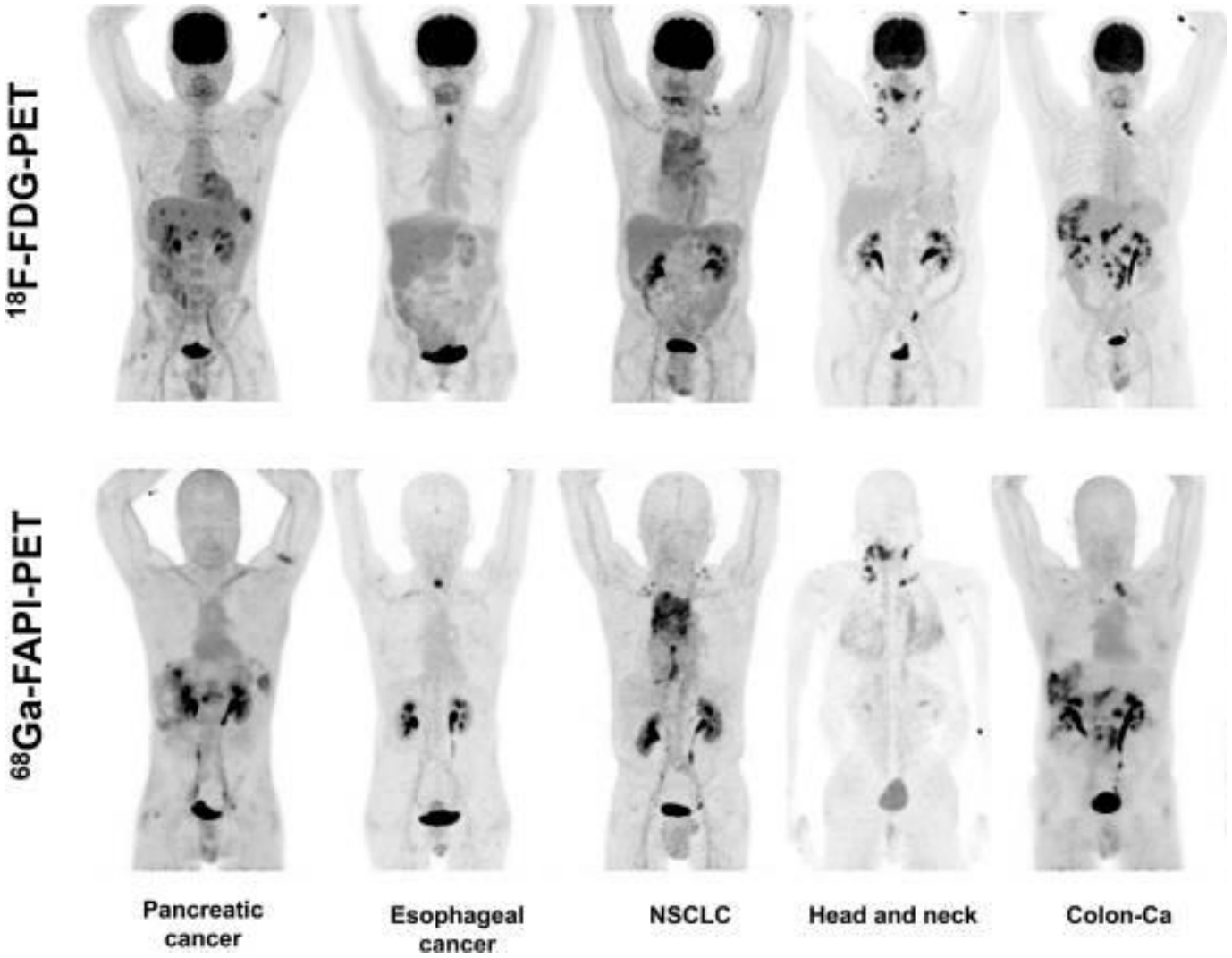
Future Plans. . .

Advantages of ^{68}Ga-FAPI Compared to the ^{18}FDG

- **Application:**
- Does not require fasting before imaging
- Imaging could take place 10 min to 1 h following injection
- Relatively low activity injection (2,7mCi-10mCi)
- **Biodistrubution:**
- Fast plasma clearence and fast tumoral retention
- High tumoral activity retention with extended plato phase
- **Imaging:**
- High tumor to background activity ratio
- Relatively high activity retention in various cancer
- Minimum physiological retention
- Detection of metastatic focus up to 1 cm in the liver
- **Theranostic potential**

- Loktev et al. J Nucl Med. 2018; Giesel et al. J Nucl Med. 2019; Kratochwil et al. *J Nucl Med*. 2019; Koerber et al. *J Nucl Med*. 2020; Syed et al. *Eur J Nucl Med Mol Imaging*. 2020.

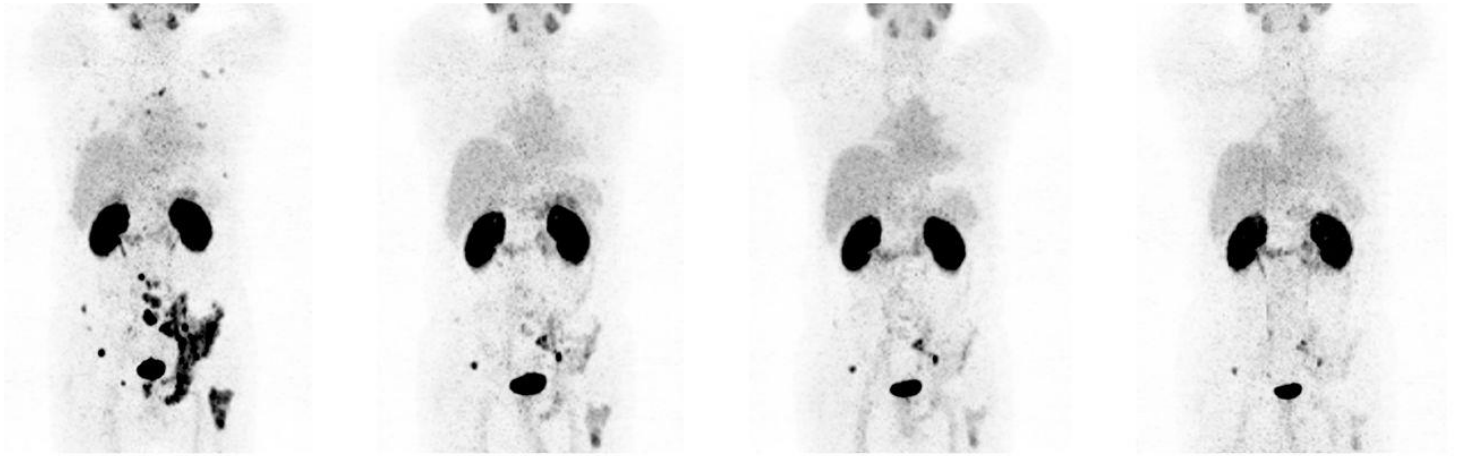
Future Plans. . .



- Giesel et al. J Nucl Med. 2019

Future Plans. . .

^{177}Lu- Theranostics (Diagnostic and Treatment)



Baseline | 8 weeks after 1st cycle of ^{177}Lu-EB-PSMA | 8 weeks after 2nd cycle of ^{177}Lu-EB-PSMA | 8 weeks after 3rd cycle of ^{177}Lu-EB-PSMA

Lutetium-177-PSMA-617 for Metastatic Castration-Resistant Prostate Cancer

Oliver Sartor [1], Johann de Bono [1], Kim N Chi [1], Karim Fizazi [1], Ken Herrmann [1], Kambiz Rahbar [1], Scott T Tagawa [1], Luke T Nordquist [1], Nitin Vaishampayan [1], Ghassan El-Haddad [1], Chandler H Park [1], Tomasz M Beer [1], Alison Armour [1], Wendy J Pérez-Contreras [1], Michelle DeSilvio [1], Euloge Kpamegan [1], Germo Gericke [1], Richard A Messmann [1], Michael J Morris [1], Bernd J Krause [1], VISION Investigators

Discussion

- Analog is approximate. Digital is specific. Therein lies the fundamental difference between digital PET and its analog cousin.

- Alternatively, the digital PET/CT might maintain image quality achieved over a substantially reduced scan time, as low as one-third or less of the typical 10 to 15 minutes. Or, physicians — exercising their knowledge and expertise to practice medicine — might choose a third option: to maintain image quality and scan time but reduce the dose of radiopharmaceutical injected into the patient.

- ***Future plans…***

- ***Future collaboration…***

Open for Future Colaboration...

Acknowledgements

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Dr. Ezequiel Farrher

Mr. Lasha Bazadze
Mrs. Lali Ivanishvili

PET/CT group, we have…

Thank you for your attention

DEDICATED WITH LOVE…

Results:

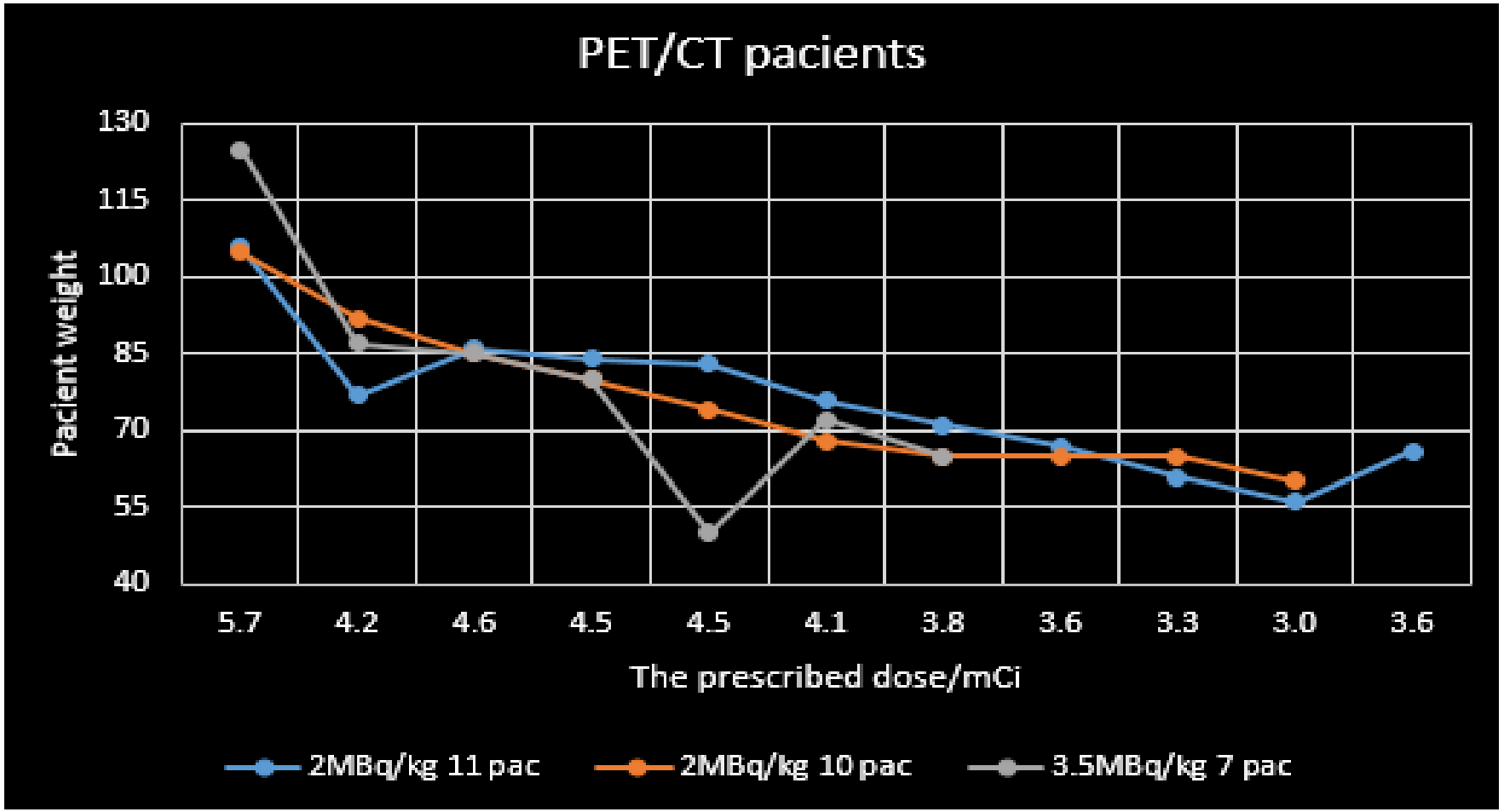

Fig. 9. Plots of real time data between prescribed doses and patients weight. Figure describes two different protocols, results how it increases patient number.

Results:

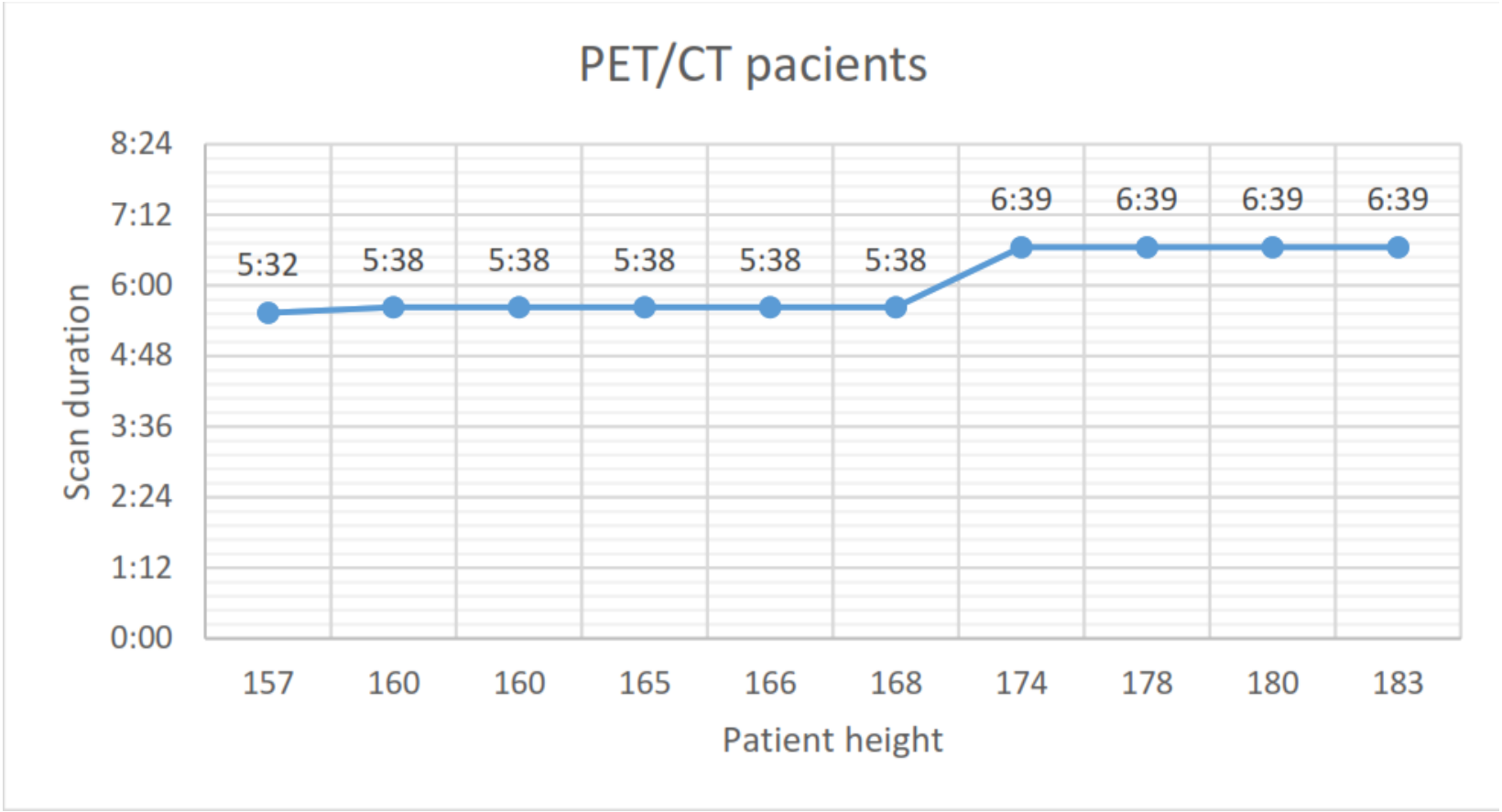

Fig. 7. Correlation between patient height and scan duration. Approximation