Highligts

SIOPE Brain Tumour Group: Imaging (June 11th and 12th)

ISPNO (June 13th - June 15th)

20th International Symposium On Pediatric Neuro-Oncology

F Frouin – LITO Group Meeting - July 6th 2022


Mut

SIOPE Brain Tumour Group : Imaging (and others)

- Guidelines for imaging in different subtypes of pediatric Brain Tumors
    - PET in addition to MRI
    - Theranostics
    - FLAIR after contrast
    - New sequences for spinal chord
    - Data available ! (always a problem)
    - Focus on Radiotherapy /Immunotherapy

SIOPE Brain Tumour Group : Imaging

European Journal of Nuclear Medicine and Molecular Imaging
https://doi.org/10.1007/s00259-022-05817-6

GUIDELINES

Joint EANM/SIOPE/RAPNO practice guidelines/SNMMI procedure standards for imaging of paediatric gliomas using PET with radiolabelled amino acids and [^{18}F]FDG: version 1.0

Arnoldo Piccardo[1] · Nathalie L. Albert[2] · Lise Borgwardt[3] · Frederic H. Fahey[4] · Darren Hargrave[5] · Norbert Galldiks[6,7] · Nina Jehanno[8] · Lars Kurch[9] · Ian Law[3] · Ruth Lim[10] · Egesta Lopci[11] · Lisbeth Marner[12] · Giovanni Morana[13] · Tina Young Poussaint[4] · Victor J. Seghers[14,15] · Barry L. Shulkin[16] · Katherine E. Warren[17] · Tatjana Traub-Weidinger[18] · Pietro Zucchetta[19]

Clinical Indication	Amino acid Radiopharmaceutical	Method	Threshold	Reference
Differentiation between neoplastic a non-neoplastic brain lesion	[^{18}F]FET	TBRmax	1.6	[71]
	[^{11}C]MET	TBR max	1–1.5	[56, 58, 102]
	[^{18}F]DOPA	TBRmax	1	[81, 82]
Tumour Grading	[^{18}F]FET	TAC curve shape	N.A	[72]
	[^{11}C]MET	N.R	N.R	
	[^{18}F]DOPA	TSRmax	1	[81, 82]
Prognostic value	[^{18}F]FET	TBR max and TAC curve shape	1.6	[71, 72]
	[^{11}C]MET	SUVmax	3	[65]
	[^{18}F]DOPA	TSRmax	1	[81, 82]
Tumour Relapse	[^{18}F]FET	TBRmax	1.6	[71]
	[^{11}C]MET	SUVmax	3	[65]
	[^{18}F]DOPA	Not available	Not available	Not available

- 18F-FDG – 11C-Methionine – 18F-FET : Some disappointing results
- Interesting results with 18F-DOPA
- Necessity of acquisition at baseline (not only during therapy)

Pet guidelines updated to 2021 WHO classification (HGG)

IVYSPRING INTERNATIONAL PUBLISHER

Theranostics

2020; 10(26): 11881-11891. doi: 10.7150/thno.50598

Research Paper

Correlation of multimodal ^{18}F-DOPA PET and conventional MRI with treatment response and survival in children with diffuse intrinsic pontine gliomas

n=19

Giovanni Morana[1,2]✉, Domenico Tortora[1], Gianluca Bottoni[3], Matteo Puntoni[4], Gianluca Piatelli[5], Federica

Results: DIPGs with a ^{18}F-DOPA uptake Tumor/Striatum (T/S) ratio >1 presented an OS ≤ 12 months and lower degree of tumor volume reduction following treatment (p = 0.001). On multivariate analysis, T/S (p = 0.001), ring enhancement (p = 0.01) and the degree of MRI tumor volume reduction (p = 0.01) independently correlated with OS. In all patients, areas of increased ^{18}F-DOPA uptake overlapped with regions demonstrating more prominent residual components/lack of response following treatment.

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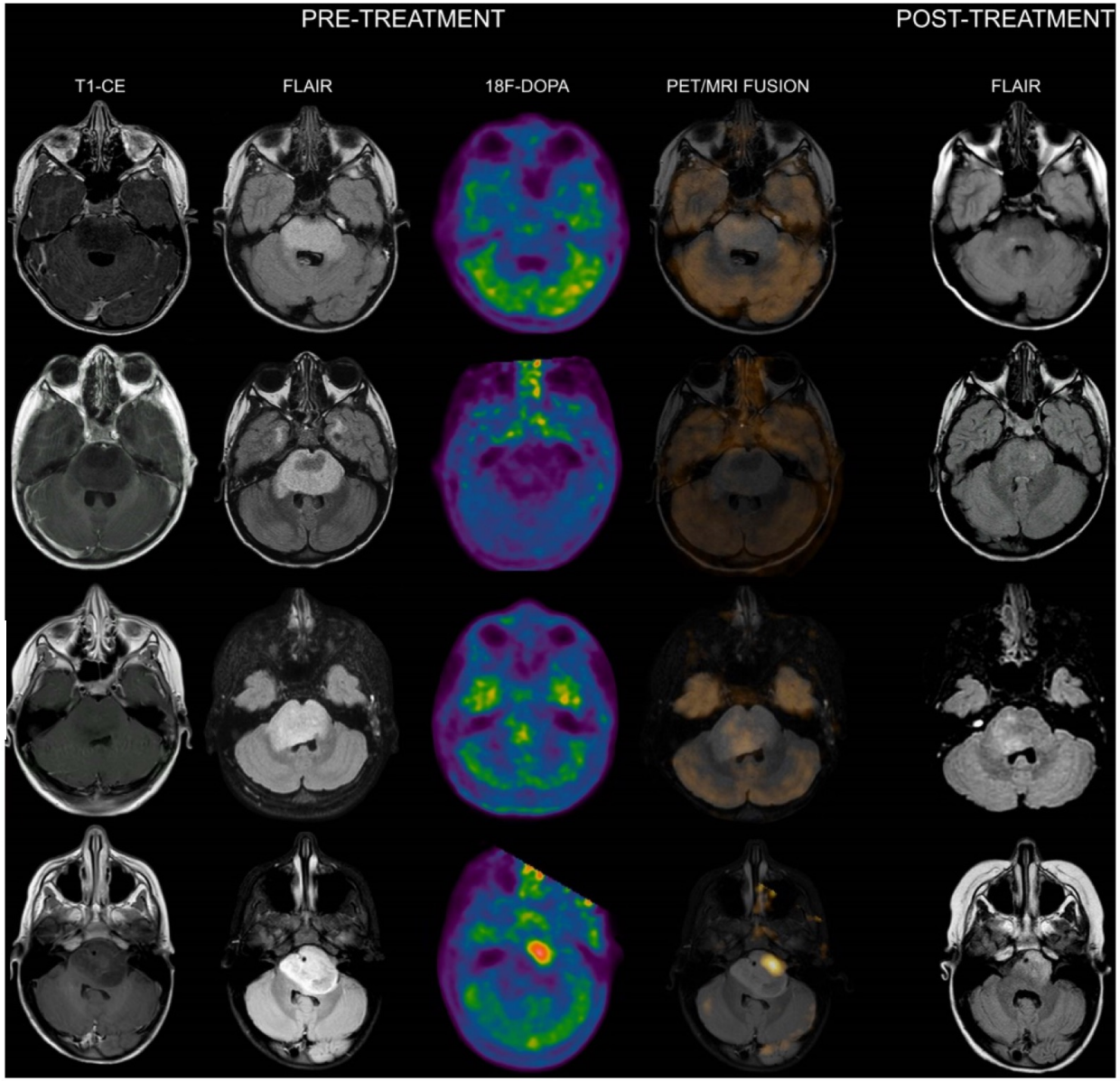


Figure 1. Co-registered and fused MRI and ^{18}F-DOPA PET images of DIPGs with T/S ≤ 1.

SIOPE Brain Tumour group : Imaging and HGG

Potential of PSMA (Prostate specific membrane antigen => not specific !) for HGG

Investigation in preclinical studies and in adults to have a rationale for children

ORIGINAL RESEARCH article
Front. Oncol., 17 November 2021
Sec.Cancer Imaging and Image-directed Interventions
https://doi.org/10.3389/fonc.2021.774017

PSMA PET Imaging in Glioblastoma: A Preclinical Evaluation and Theranostic Outlook

Maximilian A. Kirchner[1†], Adrien Holzgreve[1†], Matthias Brendel[1], Michael Orth[2], Viktoria C. Ruf[3], Katja Steiger[4], Dennis Pötter[1],

Figure 4

Figure 3

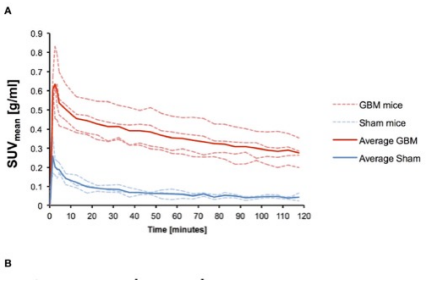


Figure 2

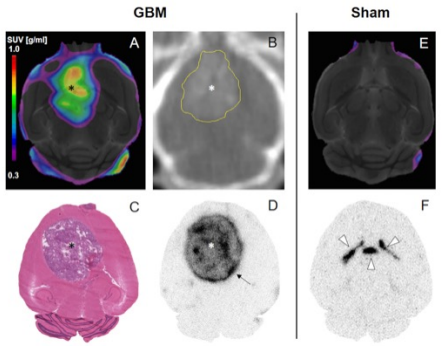


FIGURE 2 ^{18}F-PSMA-1007 PET (A, E), CT (B), H&E (C) and *ex vivo* ARG (D, F). PET images were fused onto an MRI template. Asterisk, tumor. Yellow delineation in (B) for better visibility. Arrow, Increased peripheral signal. Arrowheads, ventricles; circumventricular organs.

Sham mice showed no increased signal at the site of implantation compared to healthy brain tissue (p=0.858, see Figure 2E); the signal in sham mice was lower compared to GBM mice with TBR_{mean} 1.0 ± 0.1 (p=0.057), SUV_{max} 0.25 ± 0.06 g/ml (p=0.005), and SUV_{mean} 0.06 ± 0.01 g/ml (p=0.002).

the application of PSMA radioligand therapy. Presumably, a more detailed understanding of the pathophysiologic mechanisms for assumed specific and nonspecific PSMA uptake in GBM will be helpful when aiming for PSMA radioligand therapy. Although we were able to demonstrate that the GL261 model displays

SIOPE Brain Tumour group : Imaging and HGG

scientific reports

Check for

OPEN

Expression of glutamate carboxypeptidase II in the glial tumor recurrence evaluated in viv using radionuclide imaging

Jolanta Kunikowska[1], Rafał Czepczyński[2]✉, Dariusz Pawlak[3], Henryk Koziara[4], Kacper Pełka[1,5] & Leszek Królicki[1]

Glutamate carboxypeptidase II (GCP), also known as prostate specific membrane antigen (PSMA has been found to be expressed in glioma vasculature in in-vitro studies. GCP expression can be traced with the use of [^{68}Ga]Ga-PSMA-11 PET/CT used routinely for prostate cancer imaging. Th

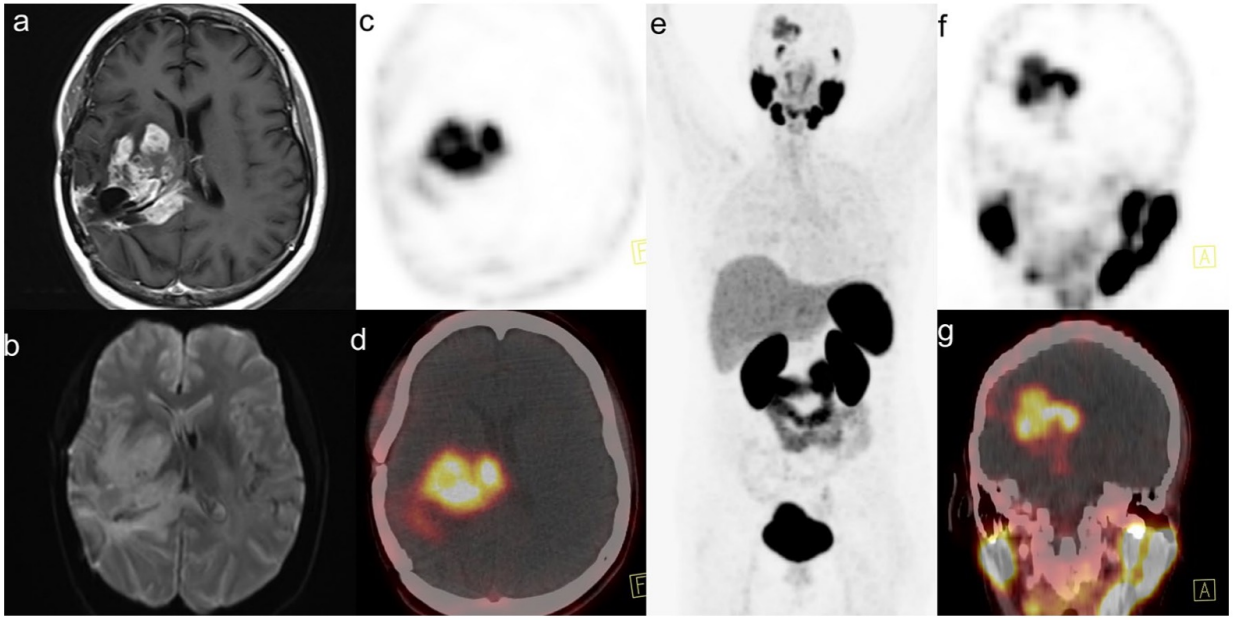


Figure 1. Male, 39 years, with a recurrent anaplastic astrocytoma IDH wildtype grade III in the right parieto-occipital lobe. Three years after surgery, and 15 months after local radionuclide therapy with [^{213}Bi]Bi-DOTA-SP, a contrast-enhanced mass around the surgical cavity was detected with MR. [^{68}Ga]Ga-PSMA-11 accumulation in the tumor was found with the SUV_{max} 4.9, SUV_{mean} 3.3, TBR 70 and TLR 0.8 (**a**—contrast-enhanced T1WI, **b**—DWI, **c**—PET transverse image, **d**—fused PET/CT transverse image, **e**—maximal intensity projection, **f**—PET sagittal image, **g**—fused PET/CT sagittal image).

SIOPE Brain Tumour Group : Clinical trials

- Point on definition of new clinical trial or ongoing clinical trials

- For instance call for

  -> High risk non WNT (wingless-activated) non SHH (Sonic Hedgehog) Medulloblastoma (C Dufour Gustave Roussy)

  ->Radiation Therapy /re- Radiation Therapy versus HDCT (High Dose Chemotherapy

SIOPE Brain Tumour Group : HGG

- DIPG/DMG inside HGG group
- Focus on general trials / BIOMEDE/ Immunotherapy
  Vaccines and CAR-T cells (multi-modal immunotherapy)
- BIOMEDE and BIOMEDE-2 par J Grill
- Radiation Therapy : Hypo fractionation in DMG

SIOPE Brain Tumour Group

- BIOMEDE :
  Stop some arms

Lessons learned from BIOMEDE

- BIOMEDE-2 : safe production of ONC-201 as compassional drug
- Clinical trial two arms Histone H3 mut TP53 mut
- Evolorimus versus Onc-201 in addition to RT

- TP53mutation -> radioresistance
- Prediction of metastases
- Double mutation DMG -> intermediate profiles

ISPNO – Sessions plénières sinon 2 sessions en parallèle

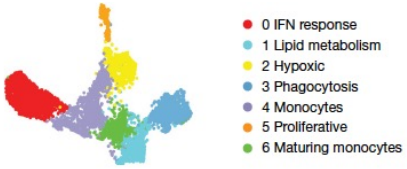
- Oral <-> Une grosse publication (IF +++)

Article

GD2-CAR T cell therapy for H3K27M-mutated diffuse midline gliomas

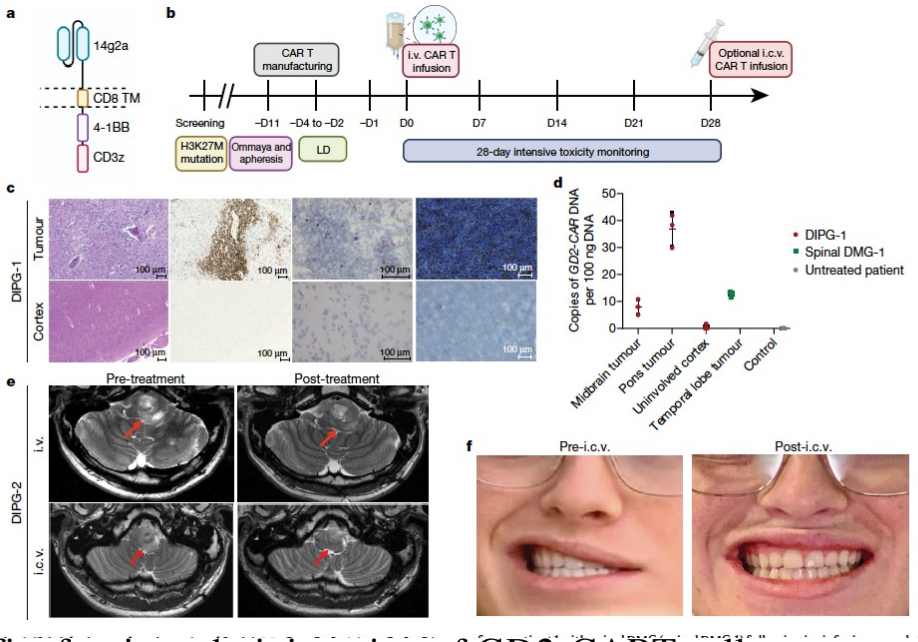
https://doi.org/10.1038/s41586-022-04489-4
Received: 2 August 2021
Accepted: 28 January 2022
Published online: 7 February 2022
Open access
Check for updates

Robbie G. Majzner[1,2,3,13], Sneha Ramakrishna[1,2,13], Kristen W. Yeom[4], Shabnum Patel[1], Harshini Chinnasamy[1], Liora M. Schultz[1,2], Rebecca M. Richards[1,2], Li Jiang[5], Valentin Barsan[1,2], Rebecca Mancusi[6], Anna C. Geraghty[6], Zinaida Good[1,3,7], Aaron Y. Mochizuki[6], Shawn M. Gillespie[6], Angus Martin Shaw Toland[8], Jasia Mahdi[6], Agnes Reschke[1,2], Esther H. Nie[6], Isabelle J. Chau[6], Maria Caterina Rotiroti[2], Christopher W. Mount[6], Christina Baggott[1], Sharon Mavroukakis[1], Emily Egeler[1], Jennifer Moon[1], Courtney Erickson[1], Sean Green[2], Michael Kunicki[1,2], Michelle Fujimoto[1,2], Zach Ehlinger[2], Warren Reynolds[2], Sreevidya Kurra[2], Katherine E. Warren[5], Snehit Prabhu[1], Hannes Vogel[8], Lindsey Rasmussen[9], Timothy T. Cornell[9], Sonia Partap[6], Paul G. Fisher[6], Cynthia J. Campen[6], Mariella G. Filbin[5], Gerald Grant[10], Bita Sahaf[1,2], Kara L. Davis[1,2], Steven A. Feldman[1], Crystal L. Mackall[1,2,3,11,14] ✉ & Michelle Monje[1,2,6,8,10,12,14] ✉



CSF sample single-cell RNA sequencing was filtered to isolate myeloid cells. Clustering was conducted after data integration by Harmony. n = 6,497 myeloid cells

Diffuse intrinsic pontine glioma (DIPG) and other H3K27M-mutated diffuse midline gliomas (DMGs) are universally lethal paediatric tumours of the central nervous system[1]. We have previously shown that the disialoganglioside GD2 is highly expressed on H3K27M-mutated glioma cells and have demonstrated promising preclinical efficacy of GD2-directed chimeric antigen receptor (CAR) T cells[2], providing the rationale for a first-in-human phase I clinical trial (NCT04196413). Because CAR T cell-induced brainstem inflammation can result in obstructive hydrocephalus, increased intracranial pressure and dangerous tissue shifts, neurocritical care precautions were incorporated. Here we present the clinical experience from the first four patients with H3K27M-mutated DIPG or spinal



Three of four patients derived radiographic and clinical benefit after i.v. administration of GD2-CART cells.