Neuroradiology (2023) 65 (Suppl 1):S1–S146
https://doi.org/10.1007/s00234-023-03203-z

ABSTRACTS

ESNR 2023

EUROPEAN SOCIETY OF NEURORADIOLOGY
Diagnostic and Interventional
46th ANNUAL MEETING
20th – 24th September 2023
Vienna, Austria

SCIENTIFIC COMMITTEE

Majda Thurnher
Pedro Vilela
Meike Vernooij
Naci Koçer
Katarina Surlan Popovic
Chen Hoffmann
Luigi Manfrè
Fabrice Bonneville

PRESIDENT'S ADVISORY BOARD

Jasmina Boban
Ian Craven
Rui Duarte Armindo
Myriam Edjali – Goujon
Ivan Jovanovic
Patrick Thurner
Sofie Van Cauter

one of the internal carotid arteries (ICAs) and its proximal branches with formation of characteristic abnormal vascular networks at the base of the brain. Although the underlying pathological process is well understood, the vessel wall changes are not uniformly described. Therefore, HRVWI (High-resolution intracranial vessel wall imaging) has recently been developed as a dependable modality to discriminate MMD from other vascular pathologies like atherosclerosis involving intracranial vessels. The goal of this study to precisely determine the vessel wall changes in patients with MMD in Indian subgroup of Asian population.

Methods: This is a single time observational study carried out on patients with MMD prior to any surgical interventions. The cases were done in 3T MRI systems and in addition to routine MRI sequences, TOF MRA and pre & post contrast sequences of VWI were done. Total of 11 vascular segments (B/L supraclinoid and terminus ICA, B/L ACA, MCA, PCA and distal basilar artery) were assessed in each patient for steno-occlusive changes on TOF MRA and for presence of vessel wall thickening and enhancement on HRVWI.

Results: 30 cases of were included with age group from 18 months to 46 years. 29 patients had presented with infarcts predominantly in multiterritorial distribution and only one patient had presented with intracerebral haemorrhage. All of the 30 cases included in our study showed vessel wall changes in at least 1-3 vascular segments. Out of total (n=330) vascular segments assessed, 39.6% (n=131) segments were stenotic, 27.8% (n=92) segments were occluded. Out of 131 stenotic segments, 90% (n=118) and out of 92 occluded segments, 85.8% (n=79) showed concentric vessel wall thickening and enhancement.

Discussion: Concentric thickening and enhancement of vessel wall is found in all cases with significant association ($p<0.001$) between the presence of steno-occlusive changes on MRA and vessel wall enhancement with most frequent involvement of terminus and supraclinoid ICA followed by MCA and ACA. Furthermore, some of the vascular segments appearing normal on MRA also showed vessel wall enhancement, indicating the disease activity in otherwise normal appearing vessels.

Conclusion: This study helps establish VWI findings in patients with MMD and shows valuable role of VWI in assessment of pattern and extent of vascular involvement which may serve as an important diagnostic tool for determination of severity of disease and help in further management.

1-O22

CHEMOBRAIN - MRI VOLUMETRY AS AN IMAGING BIOMARKER. A PILOT STUDY

Nikola Andjelic[1,2], Dusko Kozic[1,2], Jelena Ostojic[1], Aleksandra Kovac[1,3], Jasmina Boban[1,2]
1Faculty of Medicine, University in Novi Sad, Novi Sad, Serbia. [2]Department for Radiology Diagnostics, Oncology Institute of Vojvodina, Sremska Kamenica, Serbia. [3]Physical Medicine, Rehabilitation and EMNG Diagnostics Department, Oncology Institute of Vojvodina, Sremska Kamenica, Serbia

Introduction: Chemobrain is a syndrome of cognitive dysfunction that occurs in patients during and after chemotherapy. Risk factors include primary and secondary brain malignancies, radiotherapy, and both targeted and systemic chemotherapy. Known pathophysiological mechanisms include neuroinflammation, neuronal apoptosis, and oxidative stress induced by the generation of free radicals. Although chemotherapeutic agents generally do not cross the blood-brain barrier, it is permeable to inflammatory cytokines released during the systemic inflammatory response to chemotherapy, including interleukins 1 and 6, and tumor necrosis factor alpha (TNFα). The aim of this study was to investigate the impact of cytostatic therapy on brain volumes in breast cancer patients using magnetic resonance volumetry (MRV).

Methods: Brain volumes of 22 female patients with an average age of 56.90 years (SD = 11.23), diagnosed with breast cancer, were compared before initiation of therapy and after 12.24 months (2-24), i.e., after completing the AC protocol therapy (doxorubicin-cyclophosphamide). All patients underwent a routine MRI brain scan with a T1 MPRAGE sequence, which was used for volumetric analysis using the VolBrain software tool for automated segmentation of typical brain structure volumes. Paired t-tests were used to compare the volumes of brain structures before and after chemotherapy. Statistical significance was indicated by $p < 0.05$.

Results: A statistically significant reduction in volume was observed for the right nucleus accumbens on the follow-up examination ($p < 0.01$), while no statistically significant changes in volume were observed for other measured brain structures. A statistically significant increase ($p < 0.05$) in the total volume of cerebrospinal fluid in the intracranial space was observed.

Discussion & Conclusion: The increase in the volume of extracerebral and ventricular cerebrospinal fluid spaces indicates the presence of accelerated global brain atrophy as a consequence of cytostatic therapy. The reduction in the volume of the nucleus accumbens potentially correlates with

disturbances in volition and affect, which are the leading subjective symptoms observed in these patients.

1-O23

GRASP DCE-MRI CONCOMITENT WITH DSC-MRI DIFFERENTIATE TUMOR PROGRESSION FROM PSEUDOPROGRESSION IN PATIENTS WITH GLIOBLASTOMA

Vichyat Var[1], Severina Maria Leu[2,3], Johanna Maria Lieb[1], Nikki Rommers[4,3], Kai Tobias Block[5], Marios-Nikos Psychogios[1,3], Dominik Cordier[2], Ramona-Alexandra Todea[1,3]

1Department of Neuroradiology, Clinic of Radiology and Nuclear Medicine, University Hospital of Basel, Basel, Switzerland. [2]Department of Neurosurgery, University Hospital of Basel, Basel, Switzerland. [3]University of Basel, Basel, Switzerland. [4]Department of Clinical research, University Hospital of Basel, Basel, Switzerland. [5]Department of Radiology, NYU Langone Health Medical Center, New York University, New York, USA

Background: After resection and radiochemotherapy patients with glioblastoma might present new or enlarging contrast-enhancing lesion indeterminate of true tumor-progression (PD) or pseudoprogression (PsP). An accurate differentiation between the two entities is crucial in deciding further management.
Golden-angle radial sparse parallel dynamic contrast-enhanced MRI (GRASP DCE-MRI) concomitant with the dynamic susceptibility MRI (DSC-MRI) might distinguish PD from PsP.

Purpose: to identify a cut-off value of GRASP DCE-MRI and of DSC-MRI parameters to distinguish pseudoprogression from progressive disease in glioblastoma patients.

Methods: We retrospectively analyzed patients with histologic proven glioblastoma between 01/2017-12/2021, after surgical resection and combined radiochemotherapy who developed new or increasing enhancing lesion(s) indeterminate for pseudoprogression or progression and who benefitted of multimodal imaging with GRASP DCE-MRI and DSC-MRI.
We measured the diagnostic accuracy of the best cut-off value of the perfusion parameters: plasma volume (VP), extravascular extracellular space (VE), time dependent leakage constant (Ktrans) and relative cerebral blood volume (rCBV) to discriminate between PD and PsP groups in the 12 weeks and ≥ 12 weeks after ending of radio-chemotherapy (RCT). Lesion outcome (PD vs. PsP) was confirmed with biopsy, on follow-up MRI or with FET-PET CT.
To determine the diagnostic accuracy a receiver operating characteristic analysis was performed.

Results: We analyzed 83 patients with glioblastoma with multiple MRI visits and perfusion studies (n= 415 DCE-MRI and DSC-MRI) and divided them according to the contrast-enhancing lesion outcome in two groups the PD group (n=62) and the PsP group (n=21).
The best cut-off to differentiate the two groups was: Ktrans: 0.12 (Sensitivity 73.5 [61.2, 85.7]), VE 0.31 (Sensitivity 75.5 [63.3, 85.7]), VP:0.06 (Sensitivity 77.6 [65.3, 87.8]) and rCBV: 2.87 (Sensitivity 69 [54.8, 81]).
The diagnostic performance of the four parameters for distinguishing PD and PsP was performed using a ROC curve with a minimum 60% sensitivity for the progressive disease.

Discussion: The GRASP technique for DCE-MRI with high spatial and temporal resolution and the parameters derived from it: Ktrans, Ve, Vp together with the rCBV accurately differentiate true tumour progression from pseudoprogression in glioblastoma patients, in case of new or increasing enhancing lesion, independant of the time of the measurements after the ending of the combined radiochemotherapy.

Conclusion: GRASP DCE-MRI combined with DSC-MRI differentiate true tumor progression from pseudoprogression in patients with glioblastoma before and at the Baseline MRI (< and ≥ 12 weeks after combined RCT)

Keywords: Glioblastoma, Progression vs. Pseudoprogression, GRASP DCE-MRI and DSC-MRI

Concomitent analysis of the double perfusion parameters GRASP DCE-MRI and DSCMRI: rCBV (relative cerebral blood volume), VP (plasma volume), VE (volume of the extracellular extravascular space), Ktrans (transfer constant)

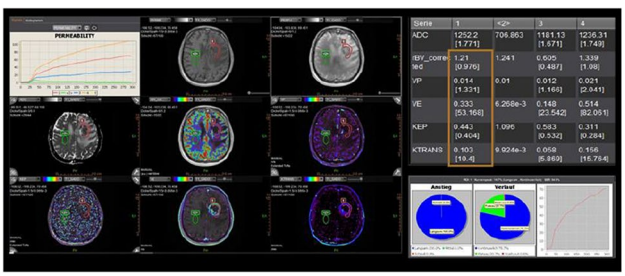

Figure 1. Exemple 1. A case of pseudoprogression.

On the left-up corner – Type I Signal intensity curve over time with continuous increase without wash-in or wash-out typical of treatment related changes or pseudoprogression.
On right upper corner the threshold of the perfusion parameters indicating pseudoprogression.
In the middle the color coded maps of rCBV, VP, VE, Ktrans.