resected before either SRS or WBRT. Comprehensive Meta-Analysis (CMA) software was used to calculate pooled effect estimates using fixed-effects and random-effect models for local recurrence, distant recurrence, and patient survival time. RESULTS: Out of 9,098 studies, only 9 retrospective cohort studies with 776 patients (474 with WBRT versus 302 with SRS) satisfied inclusion criteria and were included in the final analysis. For local recurrence, the overall crude risk ratio of five studies comparing WBRT to SRS was 0.79 (95%-CI: 0.48-1.29, I^2 : 49.4%, p -heterogeneity=0.34). For distant recurrence, the overall risk ratio of four studies was 1.16 (95%-CI: 0.87-1.53, I^2 : 30.2%, p -heterogeneity = 0.23) comparing WBRT to SRS. Median survival time for patients treated with adjuvant WBRT ranged from 6.81 to 22.9 months versus 7 to 24 months for patients treated with SRS. One study reported an increased incidence of leukoencephalopathy following adjuvant WBRT, but increased radiation necrosis after adjuvant SRS. CONCLUSION: SRS of the resection cavity of brain metastases offers comparable survival and similar local and distant control as adjuvant WBRT. Future research on SRS should focus on achieving a better understanding of the various factors that may favour SRS over WBRT.

P14.23 THICKENING OF CEREBRAL MENINGES - A PROOF OF NEOPLASTIC MENINGITIS?

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BACKGROUND: Abnormal contrast enhancement and thickening of the cerebral meninges in MRI is frequent in, but not exclusively characteristic for neoplastic meningitis (NM). The introduction of contrast enhanced (CE) mp-rage sequences into routine MR-imaging resulted in a more prominent appearance of the meninges. We asked here if the visual assessment of meningeal thickening by the radiologist is reproducible by measurement in imaging software, and if this radiological parameter is suitable to distinguish between conditions and diseases affecting the meninges. METHODS: The reports on approx. 7500 MRI examinations were scanned for the terms "meninges" and "thick" or "enlarged". 298 cases could be detected, of which 108 could be completely analysed with the radiological "PACS" analysis software and clinical records were available for analysis. The diameter of the meninges in coronal orientation of CE T1 or CE mp-rage sequences were measured with the integrated measurement tool at the level of the Sylvian fissure and in axial orientation at the central sulcus bilaterally. For comparison, 121 cases with normal appearing meninges were assessed accordingly. The intraindividual reliability was analysed with a second measurement of 39 cases after 2 months. The clinical records of the patients were reviewed to recognise the underlying diseases. RESULTS: The diameters of the meninges differed significantly ($p<0.001$) between normal and pathological appearing cases: the mp-rage mean coronal diameter was dextral 2.21mm (SD 0.415, $N=88$) vs. control 1.44 (SD 0.188, $N=121$); the mp-rage mean axial diameter sinistral was 2.13 (SD 0.683, $N=88$) vs. control 1.49 (SD 0.184, $N=106$). The variability of the measurements, however, was relatively high (range from 1.3mm to 7.5mm over all locations). Underlying diseases were neoplastic, such as neoplastic meningitis ($n=16$), but also solid metastases without CSF involvement ($n=7$); inflammatory diseases like bacterial and viral meningitis ($n=14$); mechanic alterations like trepanation ($n=42$), previous lumbar puncture ($n=11$) and low CSF pressure syndrome ($n=4$; rare conditions not given). CONCLUSION: Not only neoplastic meningitis, but also a number of other diseases and conditions such as inflammation or alterations of CSF pressure can cause thickening of the leptomeninges and should be considered as differential diagnoses. Measurement of the meningeal diameter with the routine radiological analysis software is feasible for achieving numeric values that distinguish significantly between normal and abnormal meningeal thickness. The intraindividual variability of the measurements, however, was higher than expected.

P14.24 ARE LATERAL CERVICAL PUNCTURES UNDER-UTILIZED?

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OBJECTIVE: To investigate the safety and utility of fluoroscopy guided lateral cervical punctures in current neuro-oncologic practice. BACKGROUND: CSF examination is indicated in various neurological disorders including infection, inflammation, and malignancy. Suspicion of leptomeningeal metastases may require multiple lumbar punctures before a definitive diagnosis is reached. Despite multiple lumbar punctures, a diagnosis oftentimes remains elusive. Although the classic cisternal puncture is associated with morbid risks of medullary hemorrhage, fluoroscopy guided lateral cervical puncture has been noted to be safe alternative in obtaining CSF from a high cervical level. Evidence for the utility of cervical puncture after non-diagnostic lumbar punctures remains lacking. METHODS: Single institution retrospective review of fluoroscopy guided lateral cervical

punctures performed at Memorial Sloan Kettering Cancer Center from 12/2009 to 1/2016. RESULTS: CSF samples were obtained from 3193 patients between 12/2009 and 1/2016. Fluoroscopy guided lateral cervical puncture was used to obtain CSF from 52 of these patients. Previous lumbar puncture was non-diagnostic in 37 patients. In 15 patients, no prior lumbar puncture was done. Fluoroscopy guided lateral cervical punctures were performed for both therapeutic ($n=2$) and diagnostic ($n=50$) indications. Diagnostic lateral cervical punctures were undertaken in 50 patients to evaluate suspected leptomeningeal metastases ($n=47$) and CNS infection ($n=3$). Analysis of CSF from these cervical punctures altered clinical management in 15 patients (32%): 10 began chemotherapy, 1 received IVIG for confirmed paraneoplastic syndrome, CNS infection was ruled out in 2 patients; 2 others were treated for confirmed CNS infections. In 5 out of 37 patients with prior non-diagnostic lumbar punctures, leptomeningeal metastasis was diagnosed by subsequent cervical punctures. There were no immediate or delayed complications related to the fluoroscopy guided lateral cervical puncture procedures. CONCLUSIONS: Fluoroscopy guided lateral cervical puncture is both diagnostically and therapeutically useful in both malignant and non-malignant CNS disease. The procedure is well-tolerated and can alter clinical management. Fluoroscopy guided lateral cervical puncture should be considered in patients for whom LP is contraindicated or non-diagnostic.

P14.25 18F-FLUORODESOXYGLUCOSE POSITRON EMISSION TOMOGRAPHY (FDG-PET/CT) THE DETECTION OF THE PRIMARY LESION AND STAGING IN BRAIN METASTASIS (BM) PATIENTS WITH CANCER OF UNKNOWN PRIMARY SITE (CUPS)

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BACKGROUND: In 30% of patients with brain metastasis (BM), BM are the first clinical manifestation of systemic malignancy, referred to as BM from cancer of unknown primary site (BM-CUPS). The value of ¹⁸F-fluorodesoxyglucose positron emission tomography (FDG-PET)/CT in the work-up of BM-CUPS patients remains to be defined. PATIENTS AND METHODS: We screened 566 patients operated for BM at the University Hospital Zurich between 2004 and 2014 and identified 127 BM-CUPS patients. Two validation cohorts ($n=100$ and 120 patients) from independent centers were available. RESULTS: FDG-PET/CT was not superior to CT in localizing the primary lesion as CT (FDG-PET/CT: 73/78, 93.6%; CT: $n=70/78$, 89.7%; $p=0.25$, McNemar's test). Thirty-six of 64 patients (56.3%) showed the same result in spotting the primary tumor and other extracranial lesions. FDG-PET/CT identified additional lesions suspicious for extracranial metastases in 28 patients (43.7%). The graded prognostic assessment (GPA) score was determined post-hoc to objectify clinical relevance of additional findings. Information from CT alone or FDG-PET/CT was used to assess extracranial metastases. Median GPA was 3 for CT vs. 2.5 for PET/CT ($p=3.8 \times 10^{-5}$), resulting in a predicted survival of 5.3 vs. 3.8 months ($p=6.1 \times 10^{-5}$; Wilcoxon's test). Sensitivity of CT and FDG-PET/CT and staging capabilities were comparable in all cohorts. CONCLUSIONS: FDG-PET/CT shows similar sensitivity to detect the primary tumor in BM-CUPS patients as CT, but improves the accuracy of staging. GPA scores and predicted survival differ significantly when calculated based on CT versus FDG-PET/CT. FDG-PET/CT should be prioritized for planning the diagnostic algorithm of BM-CUPS patients and redundant CT imaging should be avoided. Further, randomized trials on BM patients should consider stratification for the respective staging methods when employing GPA scores.

P15 PRIMARY CENTRAL NERVOUS SYSTEM LYMPHOMA (PCNSL)

P15.01 CLINICAL UTILITY OF FDG-PET/CT FOR DIAGNOSIS AND STAGING IN PATIENTS WITH PRIMARY CENTRAL NERVOUS SYSTEM LYMPHOMA: PROSPECTIVE SINGLE ARM STUDY
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