Dementia AUC

Dementia - Individual Articles

PMID Link Literature Type Level of Evidence Purpose Population Intervention and Outcome Measures Results/Recommendations Study Limitations


Level of Evidence
Randomized Control Study
Purpose
To evaluate the influence of single photon emission computed tomography (SPECT) of the dopamine transporter (123I-FP-CIT) on dementia diagnosis and treatment strategies in elderly patients with mild dementia.
Population
Consecutive proband patients who had 123I-FP-CIT SPECT for a suspicion of DLB. Clinical diagnoses before SPECT were compared with imaging results. 46 patients were included. Pre-imaging clinical hypotheses were probable DLB in 14, possible DLB in 21 and alternate diagnosis in 11.
Intervention and Outcome Measures
46 patients were included. Pre-imaging clinical hypotheses were probable DLB in 14, possible DLB in 21 and alternate diagnosis in 11.
Results/Recommendations
Raters of abnormal imaging were in these groups were respectively 75%, 45% and 78%. Overall, diagnoses were revised in 37% of the doses. Four patients with probable DLB had normal imaging. Their number of core criteria did not differ from the remainder (2.7±0.2 vs. 2±0.1; p=0.05). No hallucinations in patients were not well formed and detailed in usual DLB. Among 38 patients free of hallucinations, rates of abnormal scores were 36% in patients with questionable parkinsonism, 57% in definite parkinsonism, 67% in patients with no parkinsonism. Among patients of Lewy bodies, 6 had normal scores and avoparipine was stopped.
Study Limitations
The authors show a significant impact of 123I-FP-CIT SPECT on diagnosis, even in cases of definite parkinsonism or probable DLB. In the latter, scarcity of hallucinations, especially if there are not well formed and detailed, should prompt 123I-FP-CIT SPECT.


Purpose
To describe a new quantitative method to assess EVS (Equivalent Ventricular Space) on CT scan and to evaluate its prognostic value.

Population
105 patients (55 iNPH, 35 DLB, 15 AD) and 20 healthy controls. ADNI studies were included.
Results/Recommendations
The mean value of the SILVER index was 11.52±4.84 in the study group and 4.84±0.48 in the control group (p<0.0001). The area under the ROC curve was the SILVER index was 0.83 (0.76-0.89). A cut-off value for the SILVER index of 3.75 was extrapolated with a sensitivity and specificity of 0.828 and 0.962 respectively.

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Purpose
To investigate the clinical utility of amyloid PET in the differential diagnosis of idiopathic dementia cases and its impact on caregivers.

Population
Using the amyloid tracer 11C-Pittsburgh compound B, the authors prospectively scanned 28 patients (mean age 63.9 ± 5.1; mean MMSE 21.7 ± 6.0) with an idiopathic dementia syndrome. Following a comprehensive diagnostic work-up, a History, taking, neurological examination, blood tests, neuropsychological evaluation, MRI, and EEG PET, no certain diagnosis could be arrived at. AmyloidPET was then conducted and classified as positive or negative. Allowing physicians were asked to evaluate whether this resulted in a change in diagnosis or alternate management. They also reported their degree of confidence in the diagnosis. Caregivers were met after disclosure of amyloid PET results and completed a questionnaire to assess the impact of the scan.
Results/Recommendations
The authors' cohort was evenly divided between positive (14/28) and negative (14/28) 11C-Pittsburgh cases. AmyloidPET resulted in a diagnostic change in 12/28 cases (42.9%; 95% CI: 0.33-0.67). A cut-off value for the SILVER index of 3.75 was extrapolated with a sensitivity and specificity of 0.828 and 0.962 respectively.

Reference standard was adequate. The authors used an internally developed based on clinical criteria that was previously validated externally; Small sample size.


Purpose
To study the accuracy of a simplified callosal angle measure in differentiating iNPH from DLB and 40 using conventional brain MRI.

Population
32 patients (18 iNPH, 10 DLB, 2 AD) and 60 healthy subjects served as the healthy control group. The addNeuroMed and ADNI studies were included.
Results/Recommendations
None of the conventional MRI markers of iNPH was also evokated.

Raters were not blinded or no comment was made about the blinding of the readers; Single reader or no inter-reader reliability was calculated.

The SILVER index is a reliable tool to easily quantify DESH on CT scan and in patients with suspected IHP. Its high sensitivity and specificity should encourage further investigations in order to confirm its clinical utility.

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Prospective study To assess the accuracy of magnetic resonance spectroscopy (1H-MRS) and brain volumetry in mild cognitive impairment (MCI) to predict conversion to probable Alzheimer’s disease (AD).

Random forest and receiver operator characteristic curve analyses assessed the ability of MRI in classifying the two clinical syndromes. All patients showed a distribution pattern of brain alterations relative to controls. Compared to EOAD, bvFTD patients showed bilateral inferior parietal cortical thinning and decreased default mode network functional connectivity. Compared to EOAD, bvFTD patients showed bilateral orbitofrontal and temporal cortical thinning, and WM damage of the corpus callosum, bilateral accumbens fasciculi, and left superior longitudinal fasciculus.

Random forest analysis revealed that left inferior parietal cortical thickness (accuracy 0.78, specificity 0.76, sensitivity 0.81, and WM integrity of the right uncinate fasciculus (accuracy 0.83, specificity 0.66, sensitivity 0.42) were the best predictors of clinical diagnosis. The combination of cortical thickness and DTI MRI measures was able to distinguish between EOAD and bvFTD with accuracy 0.83, specificity 0.76, and sensitivity 0.84. The diagnostic ability of MRI models was confirmed in a subsample of patients with biomarker-based clinical diagnosis.

A total of 78 patients showed measurable improvement one year post shunt insertion (50%); 24 (31%) of these patients were DESH positive (64% were DESH negative (76%)). Therefore, the DESH sign had an estimated PPV of 77% and NPV of 25%.

DESH sign demonstrates a low negative predictive value. The authors conclude that DESH negative patients should still undergo pre- and postoperative tests for iNPH, such as an extended lumbar drainage protocol, and should not be excluded from shunt insertion.

A total of 103 probable INPH patients were included (31 were DESH positive (30%) and 72 were DESH negative (70%)).

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In single centre study of probable iNPH patients, who underwent centralizer-based (VF) shunt insertion. Shunt response iNPH patients were identified as those having improvement in their walking speed, neurological assessment and continence one year post-operatively. Prospective images were reviewed for DESH sign. Negative and Positive Predictive Values (NPV and PPV) of DESH sign were determined post-analysis. A total of 133 probable iNPH patients were included (51 were DESH positive (38%) and 72 were DESH negative (70%)).

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Multicenter Study

To evaluate long-term predictors of MCI progression to AD using 18F-FDG-PET and MRI in a multicenter study.

One-hundred and fifteen participants with MCI were followed for 5 years. They underwent clinical and neuropsychological examinations, 18F-FDG-PET, and MRI at baseline. PET images were visually classified into predefined dementia patterns. PET scores were calculated as a semi-quantitative index. For structural MRI, n-scores in medial temporal area were calculated by automated volume-based morphometry (VBM).

Overall, 71% patients with amnestic MCI progressed to AD during the 5-year follow-up. The diagnostic accuracy of PET scores over 5 years was 60% with 53% sensitivity and 84% specificity. Visual interpretation of PET images predicted conversion to AD with overall 82% diagnostic accuracy, 94% sensitivity, and 56% specificity. The accuracy of VBM analysis presented little fluctuation in 5 years and it was highest (72%) at the 5-year follow-up, with 79% sensitivity and 63% specificity. The best performance (87% diagnostic accuracy, 89% sensitivity, and 82% specificity) was with a combination identified using multivariate logistic regression analysis that included PET visual inspection, educational level, and neuropsychological tests as predictors.


Research Evidence

The model that used CA and EI demonstrated 90.9%-95.5% accuracy and average area-under-the-curve of 0.68 in differentiating patients with NPH from patients without NPH, which would allow for designation of patients for further volumetric assessment.

In order to assess the diagnostic performance of the Laskin angle (CA) and Dines index (EI) measures and to determine their role versus automated volumetric methods in clinical radiology, we assess the diagnostic performance of the Laskin angle (CA) and Dines index (EI) measures and to determine their role versus automated volumetric methods in clinical radiology.

Magnetic resonance (MR) examinations performed before surgery (within 1.5 months of the MRA examinations) in 36 share-reactive participants with normal pressure hydrocephalus (NPH; mean age, 75 years; range, 55-86 years; 26 women, 10 men) and MRA examinations of age- and sex-matched patients with Alzheimer's disease (n = 36) and healthy control volunteers (n = 36) were studied. Three blinded observers independently measured EI and CA for each patient. Meningeal segmentation of global gray matter, white matter, ventricles, and hippocampi was performed using software. These measures were tested by using multivariable logistic regression models to determine which combination of metrics is most accurate in diagnosis.

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