Kliiniline küsimus nr.4
Kas kõikidele dementsussündroomi kahtlusega patsientidele teha haiguse diferentsiaaldiagnostikaks strukturaalsed visualiseerimisuuringud (magnetresonantstomograafia (MRT), MRT volumeetriline analüüs, kompuutertomograafia) üks kord vs. vajadusel korduvalt vs. mitte teha?
<u>Tulemusnäitajad:</u> ravitavate dementsuste diagnoosimine, teiste dementsussündroomi põhjustavate haiguste välistamine.
Soovitused:
1. **Kõigil haigetel, kel kahtlustatakse Alzheimeri tõbe, tuleks teha kompuutertomograafiline (KT) või magnetresonantstomograafiline (MRT) uuring, välistamaks vaskulaarset dementsust või potentsiaalselt ravitavat dementsust.**
2. **MRT uuring on eelistatud KT-uuringu ees.**
3. **Korduva uuringu tegemine võib aidata jälgida haiguse kulgu ja progressiooni, kuid tõenduspõhisus selle vajalikkuse osas on nõrk (pigem mitte teha?).**

Kokkuvõte:
<u>Ravijuhendid:</u> Kõigil haigetel, kel kahtlustakse AT, tuleks teha vähemalt üks kord visualiseeriv uuring (KT või MRT). Toetamaks kliinilist diagnoosi või kasutada mitmekihi (*multislice*) KT-l ja koronaarsel MRT-l hippokampuse atroofia hindamist (Leveb B soovitus). Eelistada MRT uuringut, kuna see on sensitiivsem vaskulaarsetele muutustele ja diferentsimaks teistest haigustest nagu nt. multiipelne skleroos, jne. MRT peaks tegema vähemalt koronaarse T1 ja aksiaalse T2 kujutise või tuleks kasutada fluid-attenuated inversion recovery sequences (FLAIR). Kontrastaine kasutamine ei ole vajalik. MRT on kasulik ka monitoorimaks muutusi ajas ja aitab klinitsitil haiguse kulgu jälgida (*good practice point*) (EFNS, 2010).
Ka APA Watch, 2014.a ravijuhend soovitab kas KT või MRT-uuringut esmase kliinilise hindamise käigus. Tuuakse välja, et eriti oluline on neurovisualiseerimine, kui sümptomite algus on enne 65. eluaastat, esinevad vaskulaarsed riskifaktorid, mis viitavad tserebrovaskulaarsele haigusele. Ei toodud välja korduva uuringu vajadust ega esmaselt hilises staadiumis dementsete haigete neurovisualiseerimise vajalikkust.
CCCDTD4, 2012 ravijuhendi järgi ei ole vajalik kõigile kognitsioonihäiretega haigetele teha uuringuid, vaid neile, kel jääb kahtlus tserebrovaskulaarsele või potentsiaalselt ravitavatele dementsustele. MRT uuring on eelistatud KT-uuringu ees. Tuuakse välja kindlad kriteeriumid, millal KT või MRT-uuringut teha. 2014.aastal uuendatud Canada ravijuhendis tuuakse välja, et KT või KRT tuleks teha, kui see muudab kliinilist käsitlust.
NICE ravijuhendi alusel soovitatakse samuti teha KT või MRT uuring, eelistatud on MRT.
<u>Süstemaatilised ülevaated:</u>
Metodoloogiliselt hästi tehtud Health Quality Ontario ülevaates tuuakse välja, et võib aidata arstil leida dementsuse põhjust, kuid pole täpselt selge, millistele patsientidele ja mis tüüpi uuringut teha. Leiti, et uuringutest on enam kasu, kui patsiendil on kombinatsioon erinevatest dementsuse tüüpidest (nt. Alzheimeri tõbi + vaskulaarne) ja kliiniliselt on ebaselgus diagnoosis isegi pikema jälgimisaja möödudes (nt. 2 aastat). Toodi välja, et ei ole piisavalt tõenduspõhisust, mis ütleks, et MRT on parem KT uuringust eristamaks vaskulaarset dementsust. Samas on MRT uuring sensitiivsem harvem esinevate dementsuste diagnostikas, kuigi nende esinemissagedus on madal (<10%). Tõenduspõhisus on nõrk soovitamaks neurovisualiseerivaid uuringuid patsientidele, kellel vaskulaarne dementsus on kliiniliselt välistatud või kelle Alzheimeri tõve diagnoos on kinnitunud kliiniliselt pikema (1 aasta) jälgimisperioodi vältel (1)
McGhee et. al süstemaatilises ülevaates uuriti erinevaid biomarkereid hindamaks Alzheimeri tõve diagnoosi. Uuringu alusel ei ole piisavalt tõenduspõhisust, mis lubaks soovitada korduvad MRT uuringud jälgimaks haiguse progressiooni (2).
Ryan et. Al süstemaatilises ülevaates uuriti AT varajaseid diagnostilisi ja progresiooni määravaid biomarkereid. MRT aitab varem diagnoosida (MCI -> AD) ja hinnata haiguse progressiooni. AT diagnoos on kliiniline, uuringud aitavad välistada teisi dementsuse põhjuseid (nt. vaskulaarne), tulevad kasuks atüüpilistel ja ebaselgetel juhtudel (3).
Gifford et al uuringu alusel ei peaks neurovisualiseerivaid uuringuid tegema kõigile kognitsioonihäiretega patsientidele. Oluline on üles leida haiged, kellel on pöörduv dementsuse põhjus(nt. Normaalrõhu hüdrotseefalus, tuumor, kr. SDH, jne). Veel tuuakse välja, et rutiinses olukorras ei pruugi MRT olla eelistatum KT ees (5). Ka Beynon et. Al süstemaatilises analüüsis tuuakse välja, et ei ole piisavalt tugevat tõenduspõhisust, et MRT oleks parem kui KT eristamaks AT, vaskulaarset dementsust ja segatüüpi dementsust (7).

Koikkalainen et al. On case-control study, kus võrreldi 504 patsienti, kellel oli Alzheimeri tõbi, Lewy kehakeste dementsus, frontotemporaalne dementsus, vaskulaarne dementsus ja terveid kontrolle strukturaalse MRT uuringu alusel. MRT alusel (T1, FLAIR) saab 70,6% juhtudest neid haiguseid omavahel eristada (6).

Süstemaatilised ülevaated
1.Health Quality Ontario. The appropriate use of neuroimaging in the diagnostic work-up of dementia: an evidencebased analysis. Ont Health Technol Assess Ser [Internet]. 2014 February;14(1):1–64.
AMSTAR: 11/11
Brain imaging, using computed tomography (CT) or magnetic resonance imaging (MRI) scans, may help in the diagnosis by allowing doctors to see changes in brain structure or function that explain the dementia. Unfortunately, it is not well understood which patients will most likely benefit from a brain scan and which type of scan works best to diagnose dementia.
The study found that relying on specific symptoms to decide who should have a brain scan, rather than imaging all dementia patients, is unreliable and can miss some potentially treatable conditions. The study also found that scans have most value when doctors are uncertain as to the type of dementia despite monitoring the patient for a while (e.g., 2 years) or when the patient may have a combination of dementia types. Brain scans are often less helpful in the diagnosis of Alzheimer disease, and doctors can often use clinical assessment to rule out vascular dementia (another common type of dementia, related to cerebrovascular disease). The evidence also shows that MRI is not better than CT in detecting vascular dementia as a contributing cause. For Alzheimer disease, Creutzfeldt-Jakob disease, and clinically ambiguous dementias, both CT and MRI are highly accurate in correctly ruling out these diagnoses, but both types of scans have only low to moderate ability to correctly identify patients with any of these conditions. Importantly, the quality of the evidence available for this study was limited by considerable differences in research and analysis methods.
Brain radiological features in Alzheimer's disease (MRI, CT): Global atrophy, especially medial temporal lobe (hippocampus and parahippocampal gyrus.
A standard CT scan of the brain as a supporting component to the clinical diagnosis of dementia would typically include a noncontrast image. The radiation exposure during a head CT is typically in the order of 2 to 4 millisieverts (mSv). CT examinations are preferable for patients who are claustrophobic or unable to remain still for longer durations, as is required for MRI imaging.
Structural magnetic resonance imaging (MRI) can provide similar structural information as CT. However, MRI provides higher resolution and greater sensitivity to underlying tissue structure and water content, which allows for the detection of subtle anatomical and vascular changes associated with cognitive impairment and dementia.
Conclusions:
- With the exception of dementia related to vascular disease, prevalence of potentially treatable dementias is low (< 10%), and improvement after treatment of the underlying condition is less than 1% (GRADE: Very low).
- Prediction rules and individual clinical indications do not reliably predict abnormalities or influence diagnosis or treatment (GRADE: Very low).
- The clinical utility of structural neuroimaging is:
 - high for patients with potentially mixed dementia
 - high for patients where there is uncertainty for 2 years or more about the type of dementia
 - low for patients with Alzheimer disease clinically diagnosed by follow-up over time (e.g., 1 year)   - low for patients where vascular dementia has been clinically excluded (GRADE: Low)
- For the detection of a vascular component to dementia, there is a lack of evidence that MRI is superior to CT (GRADE: Low).
- In terms of diagnostic accuracy, structural neuroimaging has low to moderate sensitivity and high specificity for discriminating Alzheimer disease, Creutzfeldt-Jakob disease, and clinically ambiguous cases (GRADE: Low to Very low).

Table 16: Existing Guidelines for the Use of Neuroimaging in the Evaluation of Dementia

Guideline, Year	Recommendation			Cited Reason(s)	
	Image All	Selective Imaging	MRI Preferred	Detect PRCs	Determine Subtype
4th Canadian Consensus Conference on Diagnosis and Treatment of Dementia (CCCDTD4), 2012 (57)		✓	✓		✓
European Federation of Neurological Societies (EFNS) Task Force on Imaging in Dementia, 2012 (58)	✓		✓	✓	✓
National Institute for Health and Clinical Excellence (NICE), 2006 (59)	✓		✓	✓	✓
Scottish Intercollegiate Guidelines Network (SIGN), 2005 (60)	✓			NR	NR
American Academy of Neurology (AAN), 2004 (61)	✓				✓

Abbreviations: MRI, magnetic resonance imaging; NR, not reported; PRC, potentially reversible causes of dementia.

2.McGhee DJM, Ritchie CW, Thompson PA, Wright DE, Zajicek JP, et al. (2014) A Systematic Review of Biomarkers for Disease Progression in Alzheimer's Disease. PLoS ONE 9(2): e88854. doi:10.1371/journal.pone.0088854

AMSTAR:9/11

This extensive systematic review found insufficient evidence to recommend the use of any biomarker for measuring disease progression in Alzheimer's disease clinical trials. However, further examination of the efficacy of MRI measurements of ventricular volume and whole brain volume as biomarkers of disease progression in Alzheimer's disease does appear to be merited. We found methodological, statistical and reporting flaws in studies examining disease progression in Alzheimer's disease.

3.Ruan, Qingwei et al. Potential neuroimaging biomarkers of pathologic brain changes in Mild Cognitive Impairment and Alzheimer's disease: a systematic review. BMC Geriatrics (2016) 16:104.

AMSTAR: 8/11

Biomarkers (e.g., CSF protein levels, neuroimaging) may be used to rule out other causes of dementia (e.g., vascular) and to support the AD diagnosis in cases with unclear or atypical presentations.

Medial temporal and hippocampal atrophy were the most common structural MRI (sMRI) markers of progression to AD.

The use in clinical practice of neuroimaging biomarkers of brain pathological processes could permit to perform an early diagnosis and to estimate the disease progression. Some neuroimaging-biomarkers have been widely used in clinical diagnosis of AD. MRI imaging might be a more practical clinical biomarker for early detection of AD.

4.Cash et al. Imaging endpoints for clinical trials in Alzheimer's disease. Alzheimer's Research & Therapy 2014, 6:87

AMSTAR : 6/11

The most commonly used imaging modality in the study of AD has been volumetric T1-weighted magnetic resonance imaging (MRI). These images provide high-resolution (~1 mm) structural images with good tissue contrast. Longitudinal natural history cohort studies have demonstrated changes in global measures based on T1 images, such as whole brain volume or ventricular volume, as well as regional measures, particularly the hippocampus, that are several times higher in AD patients than in age-matched cognitively intact individuals.

5.Gifford et al. Systematic Review of Clinical Prediction Rules for Neuroimaging in the Evaluation of Dementia. Arch Intern Med. 2000;160(18):2855-2862

AMSTAR: 7/11

Neurovisualiseerivad meetodid on olulised eristamaks pöörduvaid dementsusi (nt. normaalrõhu hüdrotseefalus, sübduraalne hematoom, tuumorid), kuid need esinevad väga harva (1%). Uuring ei leia, et kõigile kognitisoonihäiretega patsientidele peaks tegema neurovisualiseerivad uuringud.

Ei ole selge, kas MRT on rutiinses hindamises eelistatum KT ees.

6.Koikkalainen et. Al. Differential diagnosis of neurodegenerative diseases using structural MRI data. NeuroImage: Clinical 11 (2016) 435–449.

Case control study

Vascular dementia patients could be detected with high sensitivity (96%) using features from FLAIR images. Controls (sensitivity 82%) and Alzheimer's disease patients (sensitivity 74%) could be accurately classified using T1-based features, whereas the most difficult group was the dementia with Lewy bodies (sensitivity 32%). These results were notable better than the classification accuracies obtained with visual MRI ratings (accuracy 44.6%, balanced accuracy 51.6%). Different quantification methods provided complementary information, and consequently, the best results were obtained by utilizing several quantification methods.

Characteristic structural pathologies in AD include atrophy of the medial temporal lobe. The atrophy patterns can be detected with T1-weighted images. Cortical and lacunar infarcts and white matter changes that are typical to vascular dementia are identified on T1-weighted images and T2-weighted, dualecho Turbo Spin Echo (TSE) or Fluid-Attenuated Inversion Recovery (FLAIR) images.

Early and accurate differential diagnostics of neurodegenerative diseases is essential for two reasons. First, it has been shown that early diagnosis combined with current treatments can delay hospitalization (Feldman et al., 2009), and the importance of the early diagnosis will dramatically increase as soon as disease-modifying drugs become available (Siemers et al., 2015). Second, developing new treatments requires early and accurate identification of correct target populations.

In this paper, the differential diagnostics of the four most common neurodegenerative diseases causing dementia, AD, FTD, VaD, and DLB, and patients with SCD, which were regarded as the control subjects, was studied with a large dataset and multiple quantification methods using T1-weighted and FLAIR MR images. The results show that these diseases can be differentiated with a high accuracy of 70.6% using only imaging data.

7.Beynon et al. Is MRI better than CT for detecting a vascular component to dementia? A systematic review and meta-analysis? BMC Neurology 2012, 12:33

AMSTAR:10/11

Neuroimaging is increasingly regarded as an essential part of the diagnostic work-up of a patient with dementia. Magnetic Resonance Imaging (MRI) has been advocated as the preferred imaging method in clinical guidelines [6], despite being more costly and (in some health systems) less readily available than computed tomography (CT).

Previously, neuroimaging was used to exclude abnormalities such as normal pressure hydrocephalus, tumours and subdural hematoma [7], but it is increasingly used to identify features consistent with the pathology of dementia subtypes such as cerebrovascular changes. The accuracy of MRI and CT, and whether MRI is superior to CT, in detecting a vascular component to dementia in clinical cohorts of patients with VaD, combined AD and VaD ("mixed dementia"), and AD remain unclear.

Comparative analyses suggested that MRI may be more accurate than CT for distinguishing vascular or mixed dementia from Alzheimer's disease and other conditions, but confidence intervals on estimated ratios of diagnostic odds ratios were wide.

This comprehensive, systematic literature review has shown that, despite its longstanding and widespread use, there is no strong evidence to suggest that MRI is more accurate than CT in identifying cerebrovascular changes in autopsy-confirmed and clinical cohorts of VaD, AD, and 'mixed dementia'. There is a need for new, large, high quality studies comparing state of the art CT with MRI in patients with symptoms of early dementia.

Viited

Kokkuvõtte (abstract või kokkuvõtlikum info)	Viide kirjandusallikale
1.A literature search was performed using Ovid MEDLINE, Ovid MEDLINE In-Process and Other NonIndexed Citations, Ovid Embase, the Wiley Cochrane Library, and the Centre for Reviews and Dissemination database, for studies published between 2000 and 2013. 15 studies were included. This analysis sought to determine the appropriate use of neuroimaging during the diagnostic work-up of dementia, including indications for neuroimaging and comparative accuracy of alternative technologies. There is a lack of evidence that MRI is superior to CT in detecting a vascular	1.Health Quality Ontario. The appropriate use of neuroimaging in the diagnostic work-up of dementia: an evidencebased analysis. Ont Health Technol Assess Ser [Internet]. 2014 February;14(1):1–64.

component to dementia. Accuracy of structural imaging is moderate to high for discriminating different types of dementia. There was significant heterogeneity in estimates of diagnostic accuracy, which often prohibited a statistical summary of findings. Conclusion: A diagnosis of reversible dementia is rare. Imaging has the most clinical utility in cases where there is potentially mixed dementia or ambiguity as to the type of dementia despite prolonged follow-up (e.g., 2 years or more). Both CT and MRI are useful for detecting a vascular component of dementia.	
2.MEDLINE and Embase (1950–2011) were searched using five search strategies. : Fifty-nine studies were finally included. The commonest biomarker modality examined was brain MRI (17/59, 29% of included studies). Median follow-up in included studies was only 1.0 (IQR 0.8–1.7) year and most studies only measured the putative biomarker and clinical measure twice. Included studies were generally of poor quality with small numbers of participants (median 31 (IQR 17 to 64)), applied excessively restrictive study entry criteria, had flawed methodologies and conducted overly simplistic statistical analyses without adjusting for confounding factors. Conclusions: We found insufficient evidence to recommend the use of any biomarker as an outcome measure for disease progression in Alzheimer's disease trials. However, further investigation into the efficacy of using MRI measurements of ventricular volume and whole brain volume appeared to be merited. A provisional 'roadmap' to improve the quality of future disease progression biomarker studies is presented.	2.: McGhee DJM, Ritchie CW, Thompson PA, Wright DE, Zajicek JP, et al. (2014) A Systematic Review of Biomarkers for Disease Progression in Alzheimer's Disease. PLoS ONE 9(2): e88854. doi:10.1371/journal.pone.0088854
3.Literature searches were conducted over MEDLINE (2000 to June 2015) and Pubmed (2000 to June 2015), using the OVID search interface. Seventy-two articles were included in the review. Conclusions: The panel of noninvasive neuroimaging-biomarkers reviewed provides a set methods to measure brain structural and functional pathophysiological changes in vivo, which are closely associated with preclinical AD, MCI and non-AD dementia. The dynamic measures of these imaging biomarkers are used to predict the disease progression in the early stages and improve the assessment of therapeutic efficacy in these diseases in future clinical trials.	3.Ruan, Qingwei et al. Potential neuroimaging biomarkers of pathologic brain changes in Mild Cognitive Impairment and Alzheimer's disease: a systematic review. BMC Geriatrics (2016) 16:104.
4.The data search was completed on 15 May 2014 using the PubMed and ClinicalTrials.gov databases. We start with trials in mild to moderate AD, where imaging (largely magnetic resonance imaging (MRI)) has long played a role in inclusion and exclusion criteria; more recently, MRI has been used to identify adverse events and to measure rates of brain atrophy. Imaging has particularly important roles, alongside other biomarkers, in assessing efficacy because conventional clinical outcomes may have limited ability to detect treatment effects in these early stages.	4.Cash et al. Imaging endpoints for clinical trials in Alzheimer's disease. Alzheimer's Research & Therapy 2014, 6:87
5.Otsiti MEDLINE andmebaasist, kaasati 7 uuringut. Clinical practice guidelines for dementia do not recommend routine neuroimaging but vary in their recommended clinical prediction rules to identify patients who should undergo neuroimaging for potentially reversible causes of dementia. There is considerable uncertainty in the evidence underlying clinical prediction rules to identify which patients with	5.Gifford et al. Systematic Review of Clinical Prediction Rules for Neuroimaging in the Evaluation of Dementia. *Arch Intern Med.* 2000;160(18):2855-2862

dementia should undergo neuroimaging. Application of these rules may miss patients with potentially reversible causes of dementia	
6.We study a total of 504 patients from the Amsterdam Dementia Cohort who had visited the Alzheimer center of the VU University Medical Center between 2004 and 2014. Here we studied which features in structural magnetic resonance imaging (MRI) scans could best distinguish four types of dementia, Alzheimer's disease, frontotemporal dementia, vascular dementia, and dementia with Lewy bodies, and control subjects. We extracted an extensive set of features quantifying volumetric and morphometric characteristics from T1 images, and vascular characteristics from FLAIR image. The results prove that automatic quantification methods and computerized decision support methods are feasible for clinical practice and provide comprehensive information that may help clinicians in the diagnosis making.	6.Koikkalainen et. Al. Differential diagnosis of neurodegenerative diseases using structural MRI data. NeuroImage: Clinical 11 (2016) 435–449.
7.We searched eight databases and screened reference lists to identify studies addressing the review question (MEDLINE, EMBASE, BIOSIS, Science Citation Index, ZETOC, NTIS, Dissertation Abstracts, and the GrayLit networkfrom database inception to February 2011 for published and unpublished studies). We included 7 autopsy and 31 non-autopsy studies. Conclusion: There is insufficient evidence to suggest that MRI is superior to CT with respect to identifying cerebrovascular changes in autopsy-confirmed and clinical cohorts of VaD, AD, and 'mixed dementia'.	7.Beynon et al. Is MRI better than CT for detecting a vascular component to dementia? A systematic review and meta-analysis? BMC Neurology 2012, 12:33

Ravijuhendid

1.EFNS guidelines for the diagnosis and management of Alzheimer's disease. J. Horta, J. T. OBrienb, G. Gainottic, T. Pirttilad,, B. O. Popescue, I. Rektorovaf, S. Sorbig and P. Scheltensh on behalf of the EFNS Scientist Panel on Dementia

CT and MRI may be used to exclude treatable causes of dementia. Multislice CT and coronal MRI may be used to assess hippocampal atrophy to support a clinical diagnosis of AD (Level B).

Follow up with serial MRI is useful in a clinical setting to document disease progression (good practice point).

Structural imaging in the diagnostic work up of AD serves two purposes: exclude other, potentially surgically treatable diseases and include specific findings for AD. For the former CT and MRI perform as well and most current guidelines agree that such an imaging procedure should be carried out once in every patient. However, MRI is more sensitive to subtle vascular changes (strategic infarcts for instance) and to changes that may indicate specific conditions such as multiple sclerosis, PSP, multiple-system atrophy, CBD, prion disease, FTLD. For practice purposes a standard MR protocol involving at least coronal T1 and axial T2 or fluid-attenuated inversion recovery sequences should be used. Contrast is not indicated. Of note, vascular changes seen on CT or MRI need not preclude a diagnosis of AD, especially in older age, but should prompt adequate evaluation and treatment of cardiovascular risk factors. Hippocampal atrophy is best seen on MRI but may also be visualized on the more modern type CT scanne and yields sensitivity and specificity values between 80 and 90% in most studies (II). Since the previous guideline only one prospective study has been performed examining the added value of hippocampal atrophy on MRI in the diagnosis of AD with postmortem verification. However, being a single center, small study, in a selected population, it just fails class I evidence. AD patients with early age of onset often present with complaints and cognitive deficits other than memory impairment. Several structural MRI studies localize the pattern of the atrophy in early-onset AD to more posterior regions with prominent involvement of the precuneus and posterior cingulate cortex. In addition, MRI may also be useful to monitor changes over time and may aid the clinician in following the disease process and explaining it to the patient (good practice point).

2. Guideline watch (OCTOBER 2014): practice guideline for treatment of patients with Alzheimer`s disease and other dementias.

The use of a structural neuroimaging study, such as computerized tomography or magnetic resonance imaging (MRI) scan, is generally recommended as part of an initial evaluation, although

clinical practice varies. Imaging is particularly important for those with a subacute onset (less than 1 year), symptom onset before age 65, vascular risk factors suggesting a higher likelihood of cerebrovascular involvement in their dementia, or a history or neurological examination findings suggesting a possible focal lesion. Nonetheless, clinically important lesions may be found on neuroimaging in the absence of these indications. The value of imaging in patients with late-stage disease who have not been previously evaluated has not been established.

3. Recommendations of the 4th Canadian Consensus Conference on the Diagnosis and Treatment of Dementia (CCCDTD4)

The issue of whether all patients with dementia should have structural imaging is debated at every CCCDTD conference, with the opinion that it is not required in all patients, but rather for those who have special clinical features.

Participants voted against the recommendation that at least one structural imaging procedure should be done to establish the presence of clinically unsuspected cerebrovascular disease and to rule out potentially reversible structural etiologies in persons with cognitive impairment (26%).

The practical message is that structural imaging is not required in all (although will be indicated in most) persons with cognitive impairment. Although more costly and less available, MRI is preferable to CT.

Pea KT on näidustatud:
- age less than 60 years
- rapid (e.g., 1 or 2 months) unexplained decline in cognition or function
- "short" duration of dementia (less than 2 years)
- recent and significant head trauma
- unexplained neurological symptoms (e.g. new onset of severe headache or seizures)
- history of cancer (especially in sites and types that metastasize to the brain)
- use of anticoagulants or history of bleeding disorder
- history of urinary incontinence and gait disorder early in the course of dementia (as may be found in normal pressure hydrocephalus)
- any new localizing sign (e.g., hemiparesis or a Babinski reflex)
- unusual or atypical cognitive symptoms or presentation (e.g. progressive aphasia)
- gait disturbance

Pea MRT on näidustatud:
- We recommend a head MRI when a radiologist/neuroradiologist and/or a cognitive specialist (neurologist, geriatrician, or geriatric psychiatrist) can interpret patterns of atrophy and other features that may provide added diagnostic and predictive value as deemed appropriate by the specialist (Grade 2B).
- Standardization of clinical acquisition of core MRI dementia sequences is recommended in Canadian Centers that have radiologists and cognitive specialists with expertise in assessing cognitive disorders, particularly when repeat MRI images can provide additional diagnostic, prognostic and safety information (Grade 2B).
- In addition to previously listed indications for structural imaging, a CT or MRI should be undertaken in the assessment of a person with cognitive impairment if the presence of unsuspected cerebrovascular disease would change the clinical management.
- When available in the clinic, we recommend that cognition specialists use the computer images of the brain to educate persons with cognitive impairment about changes in the brain. This knowledge may reinforce adherence to vascular risk factors management and to life style modifications to improve brain health (Grade 3C).

4.Fourth Canadian Consensus Conference on the Diagnosis and Treatment of Dementia: recommendations for family physicians (2014)

A computed tomography scan or magnetic resonance imaging should be undertaken in the assessment of a person with cognitive impairment and unsuspected cerebrovascular disease, if it would change the clinical management.

Although neuroimaging is not required in all persons with cognitive impairment, consistent with previous recommendations, it is indicated in many patients presenting to family practitoners. Of relevance to familiy practitoners is the additional indication for structural neuroimaging: a computed tomography scan or magnetic resonance imaging is indicated in the assessment of a person with cognitive impairment if the presence of unsuspected cerebrovascular disease would change clinical management.

5. Dementia: supporting people with dementia and their carers in health and social care Clinical guideline, NICE. Published: 22 November 2006 (viimane ülevaatamine 2015 märtsis).

Structural imaging should be used in the assessment of people with suspected dementia to exclude other cerebral pathologies and to help establish the subtype diagnosis. Magnetic resonance imaging (MRI) is the preferred modality to assist with early diagnosis and detect subcortical vascular changes, although computed tomography (CT) scanning could be used. Specialist advice should be taken when interpreting scans in people with learning disabilities.