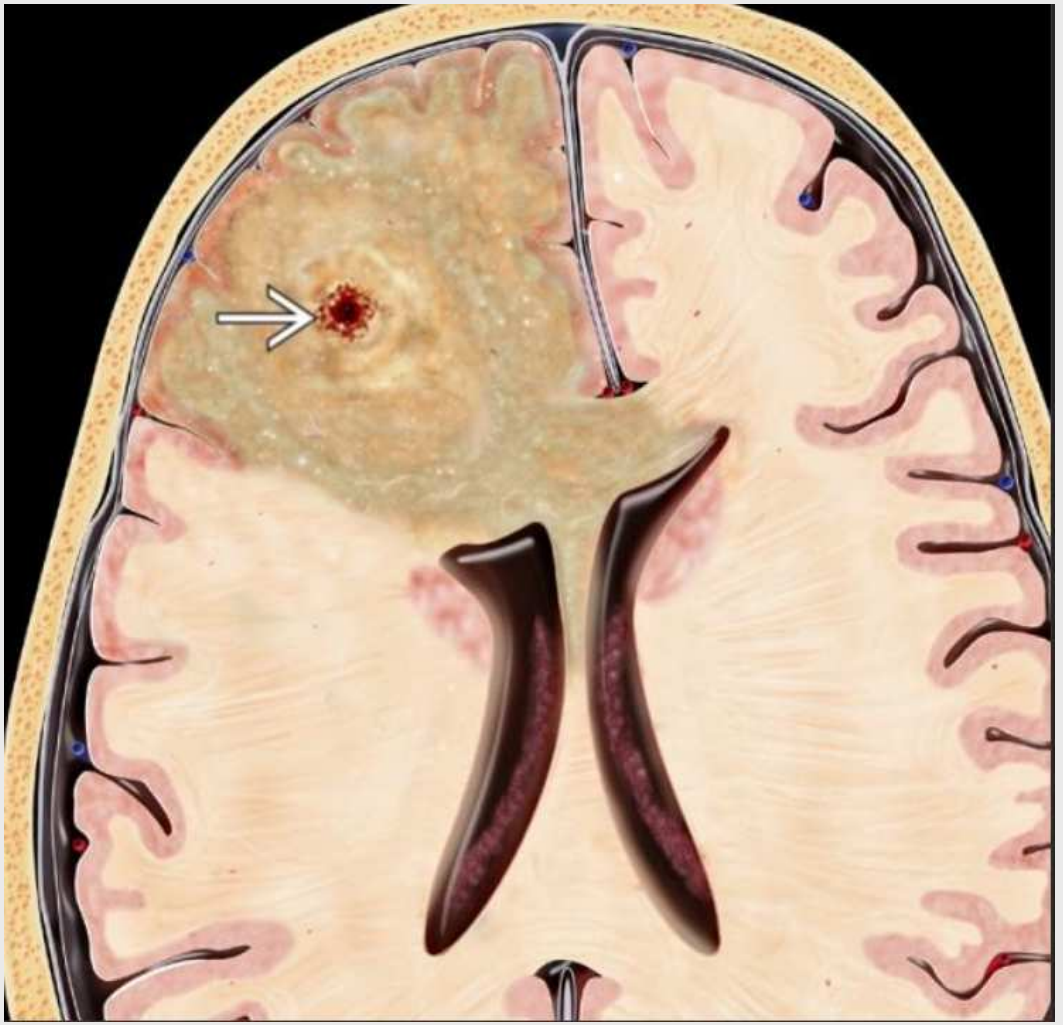
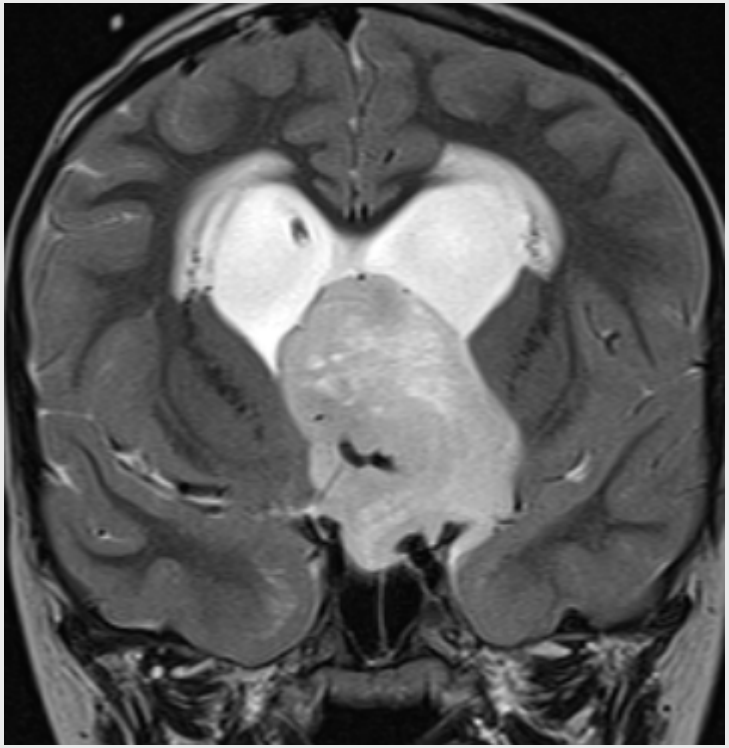
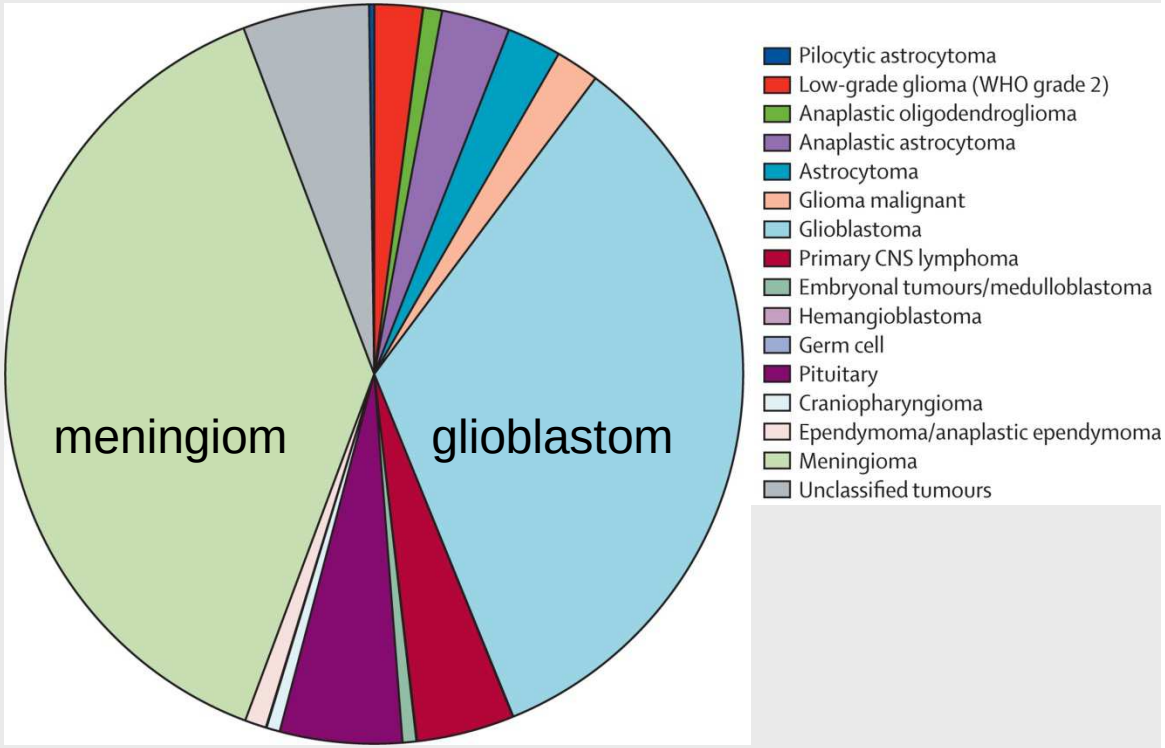
MR diagnostikk av hjernetumor

Kjell Arne Kvistad
seksjonsoverlege dr med
Klinikk for bildediagnostikk
St Olavs hospital



Tumortype

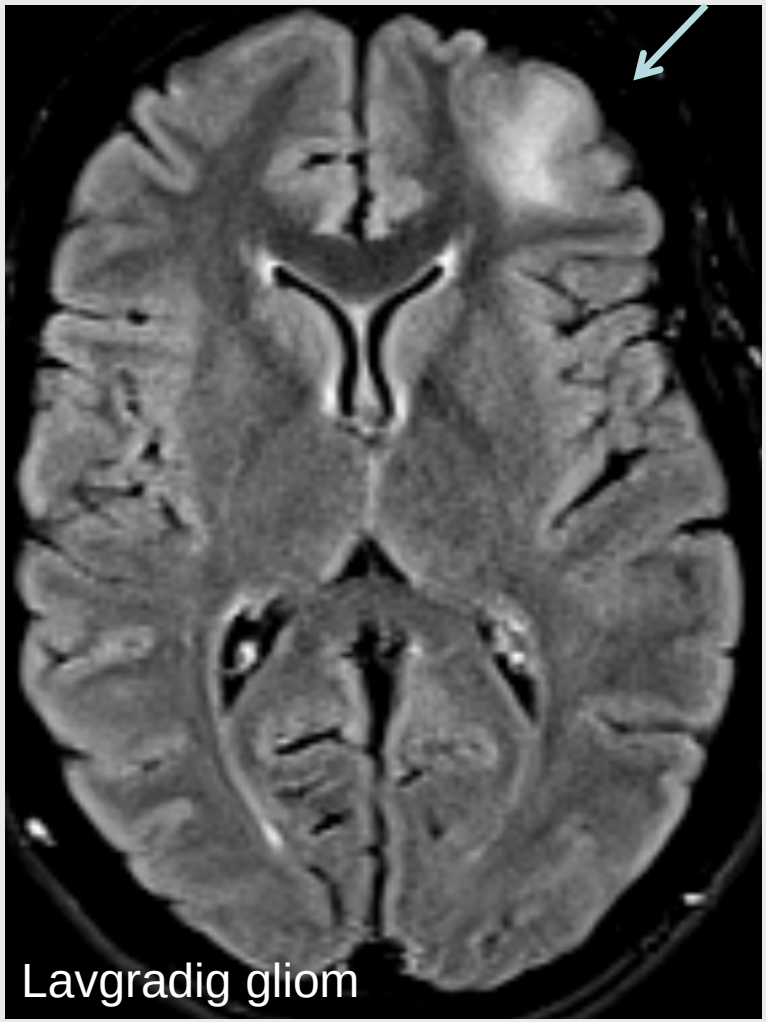


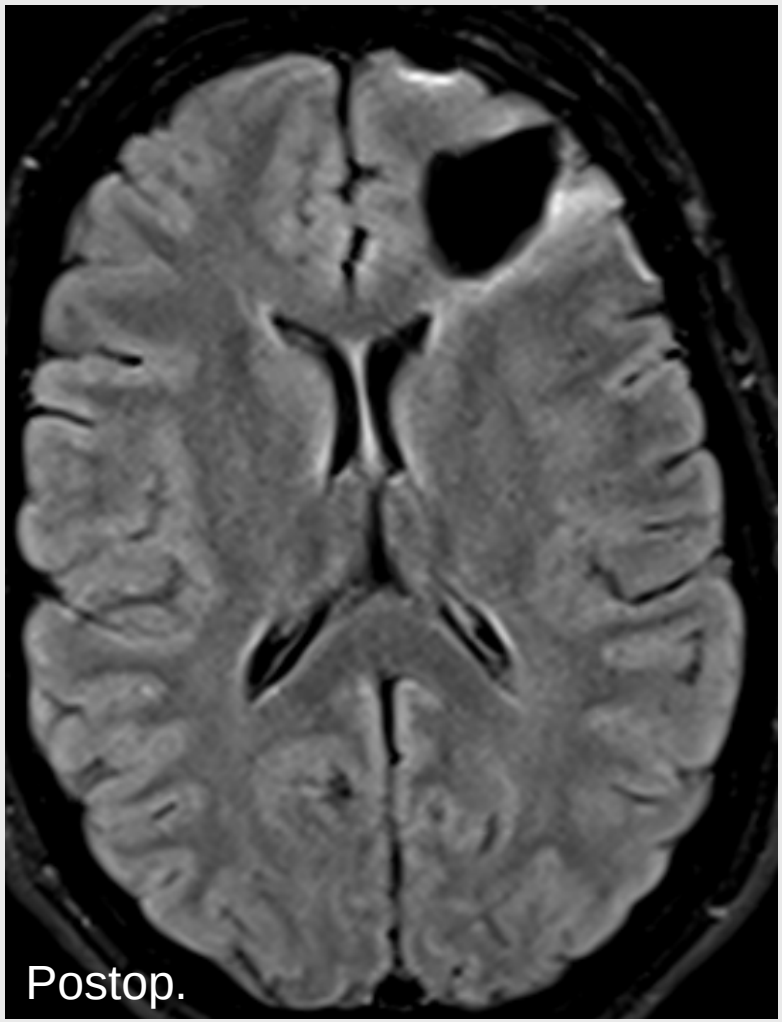


Insidens i Norge:

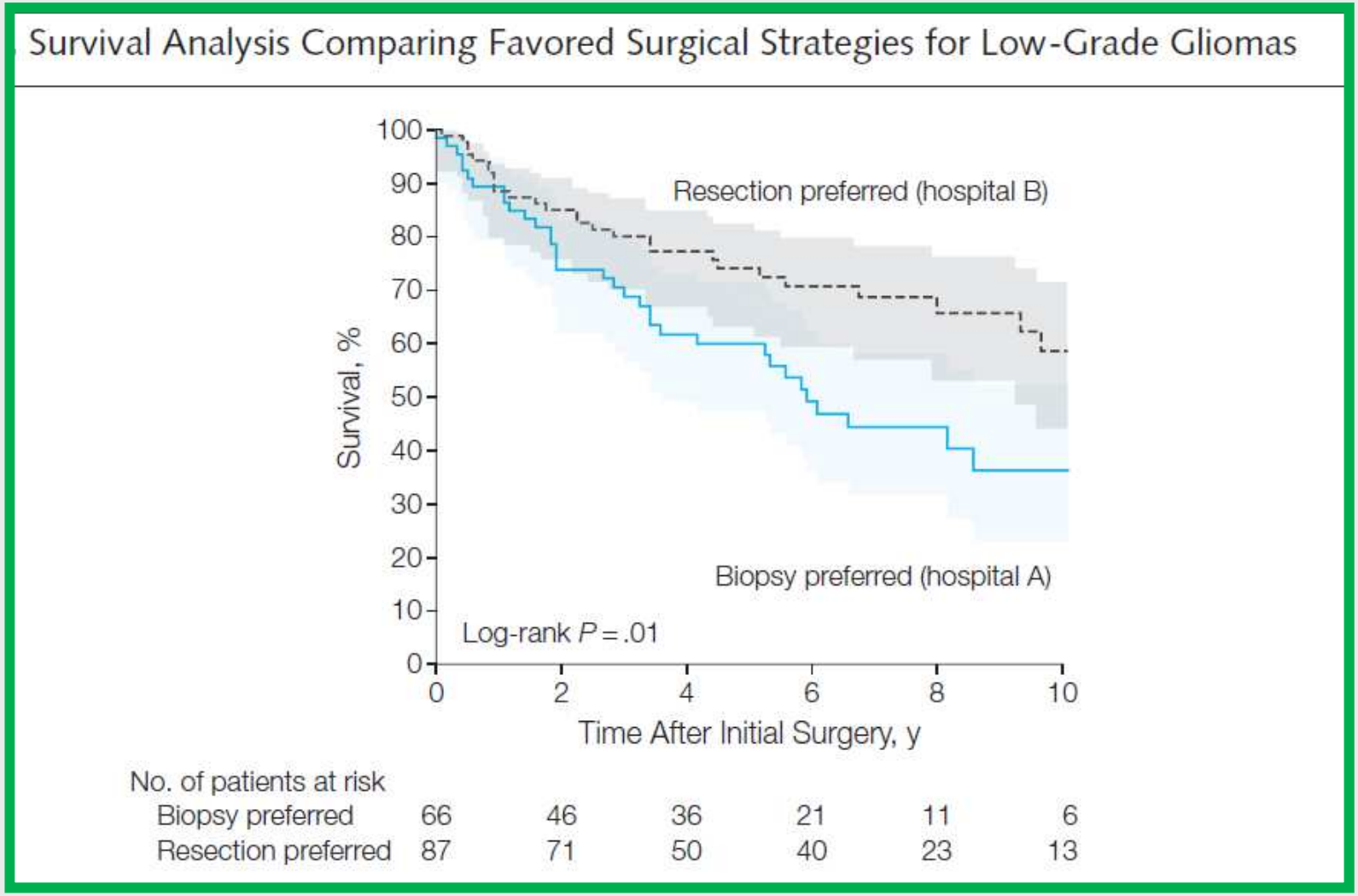
- 1100 primære CNS svulster (alle typer)
- 250 høygradig maligne gliomer (grad III-IV)/år
- 50 lavgradige gliomer (grad II)

Mindre vente og se, også lavgradige svulster bør fjernes


Lavgradig gliom

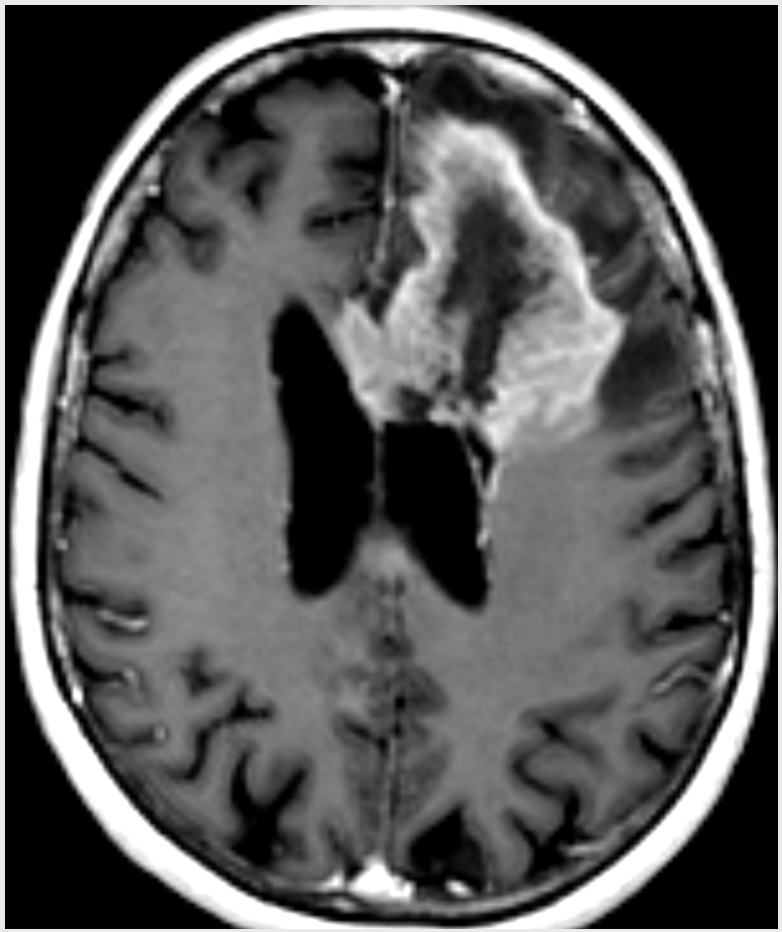

Postop.

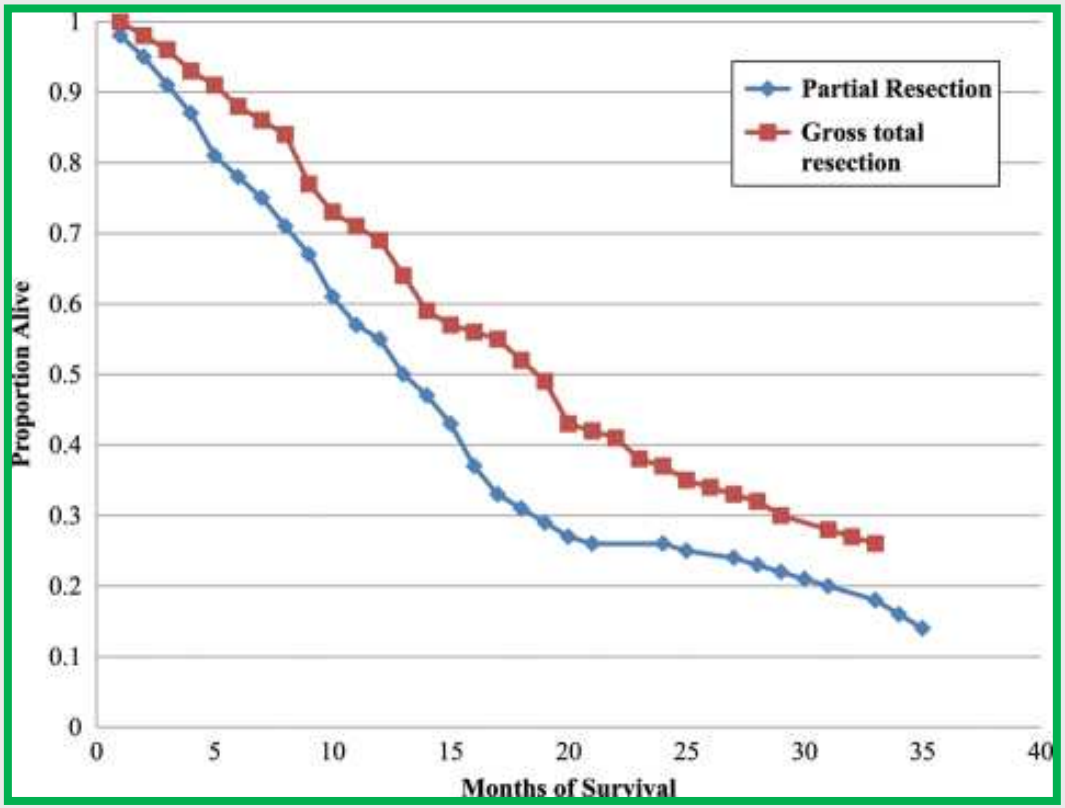
Mindre vente og se, også lavgradige svulster bør fjernes



Jakola et al, JAMA 2013

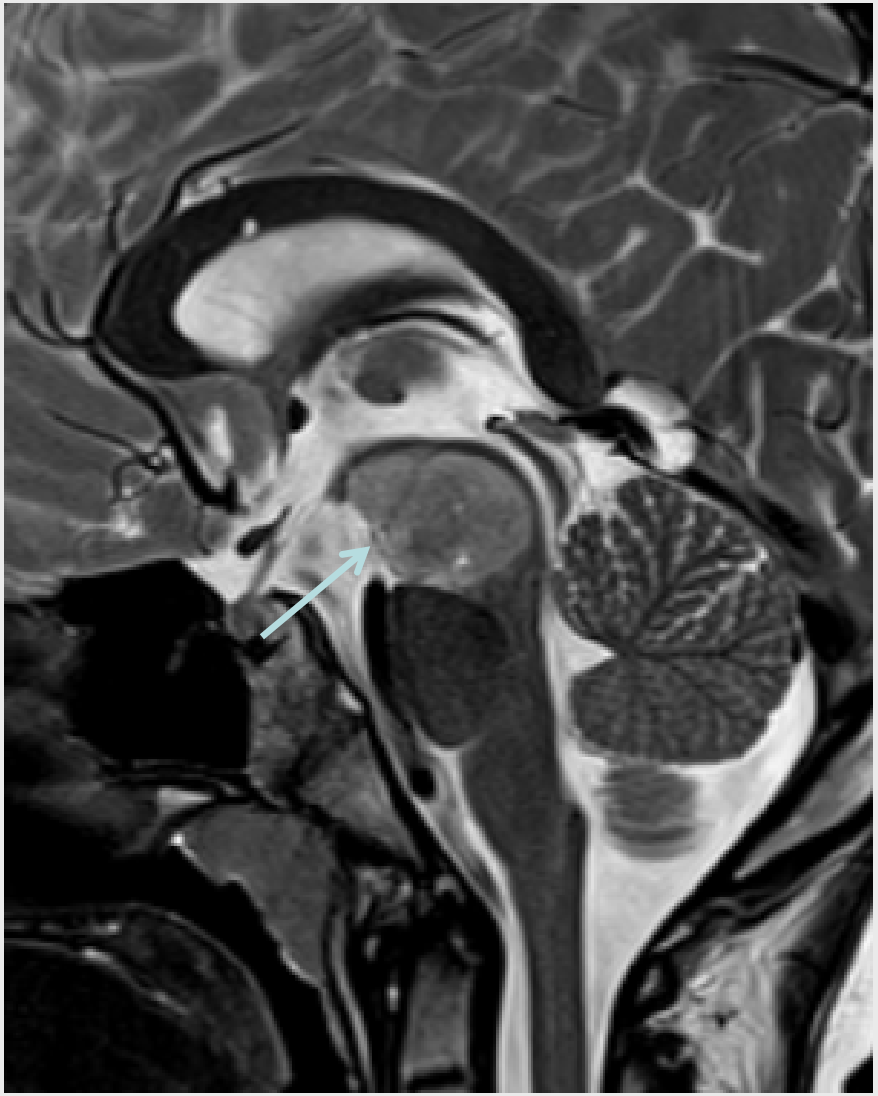
Høygradig maligne svulster: fjern så mye som mulig

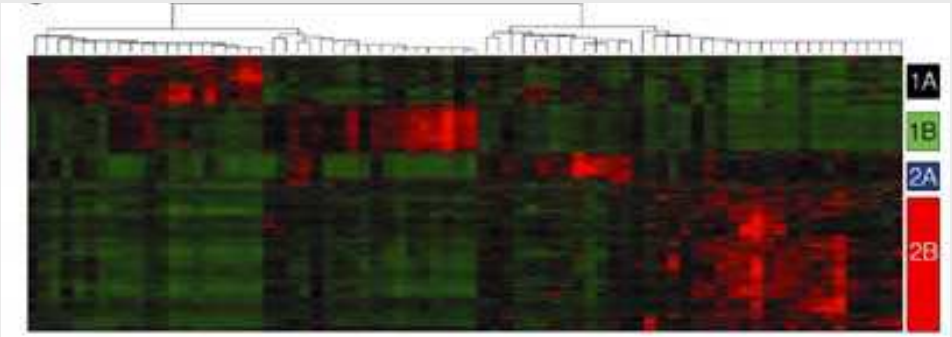




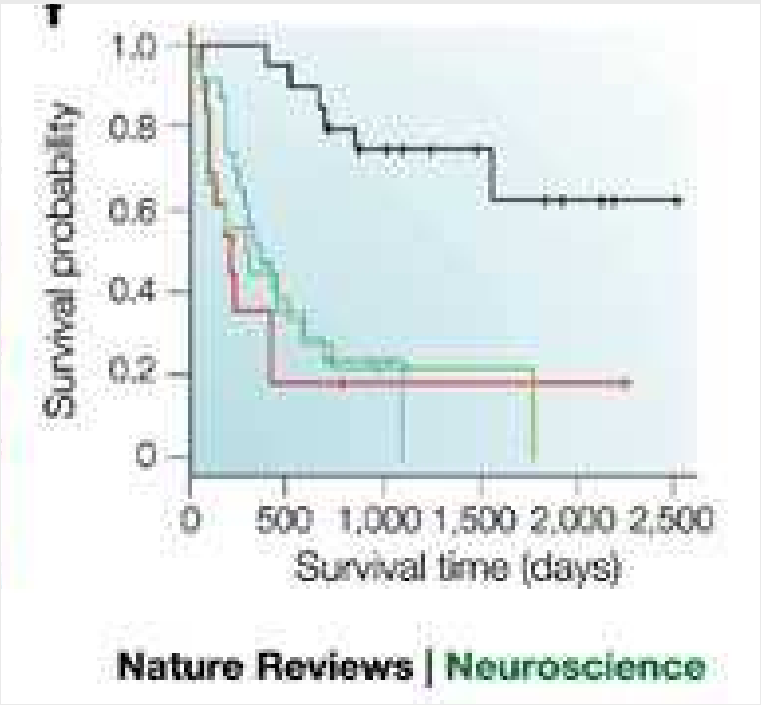
Yabroff et al Neuro Oncol 2012

Med få unntak vil tumortype bestemmes med histologi og immunhistokjemi



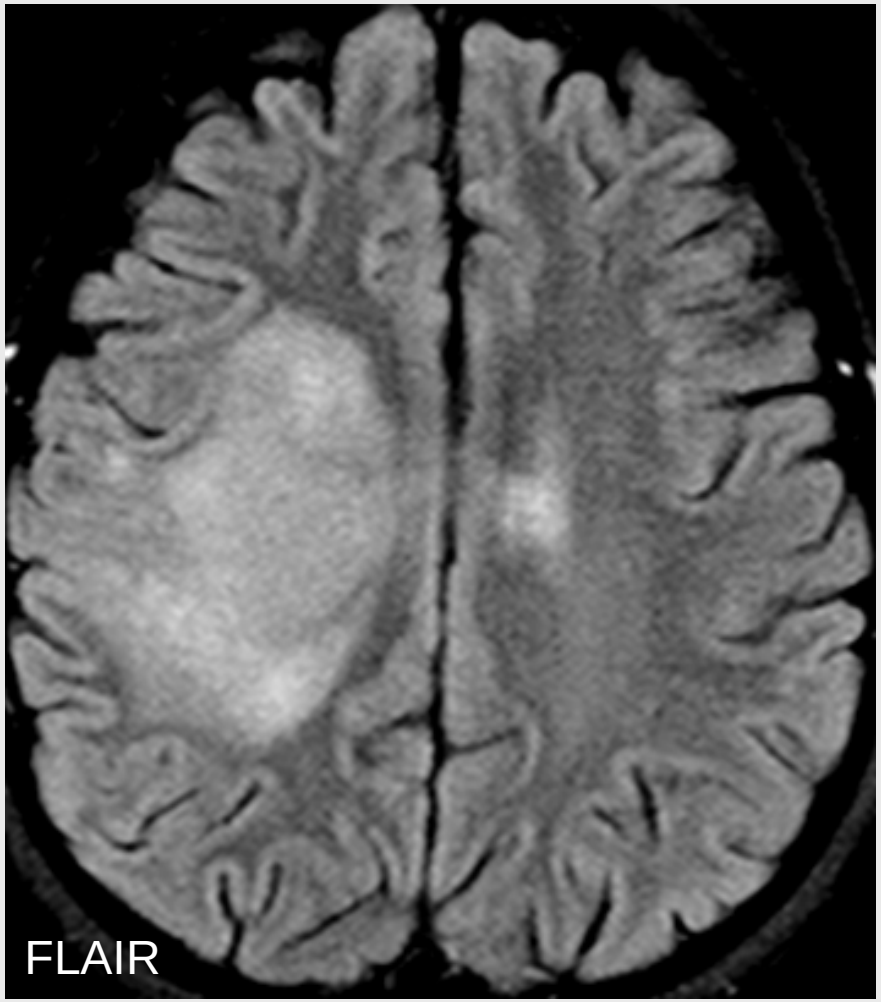


Genekspresjon i ulike hjernesvulster

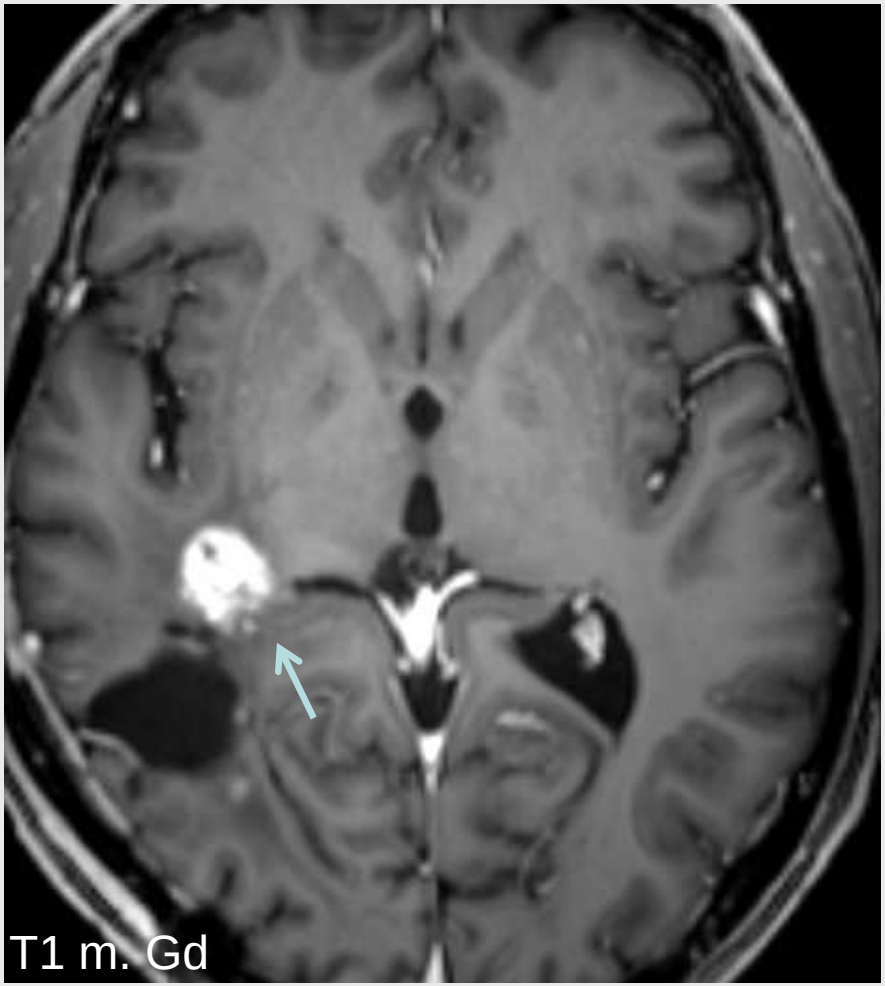


Mischel et al Nat Rev Neuro Sci 2004

De to mest sentrale spørsmål:



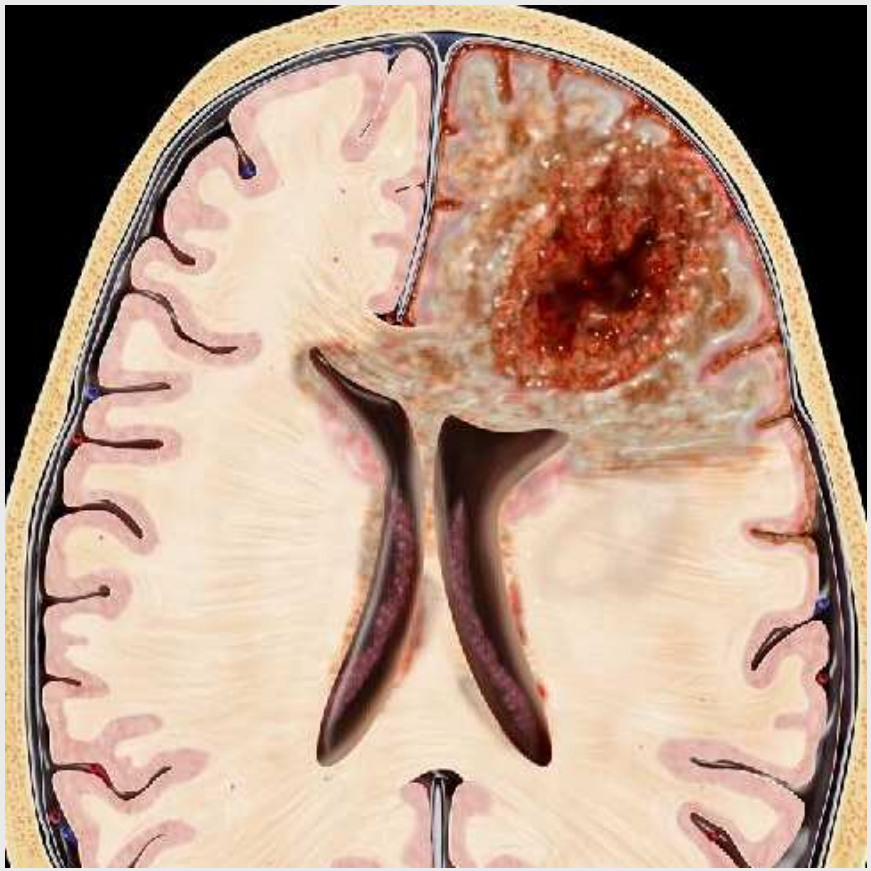
Er det tumor?



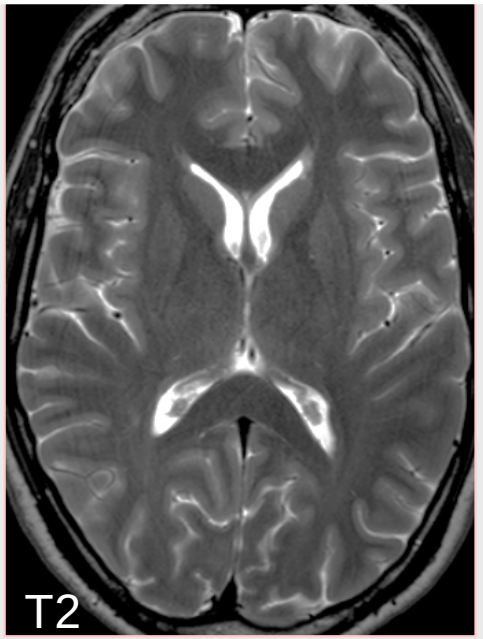
Er det tumorresidiv?

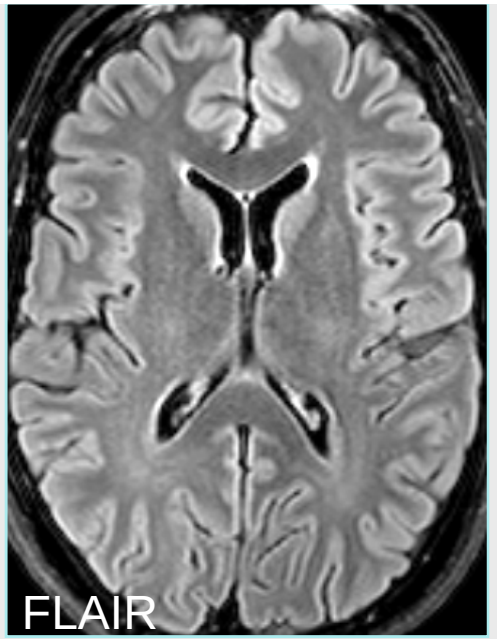
Er det tumor, eller… ??

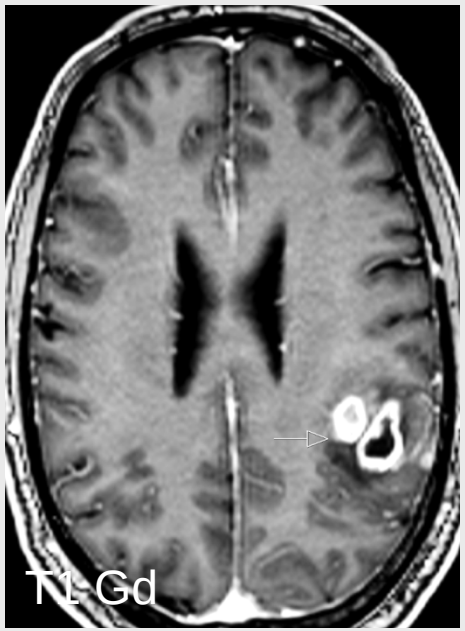
- Demyeliniserende sykdommer (tumefaktiv MS, ADEM)
- Infeksjoner (abscess, encefalitt)
- Subakutte infarkter

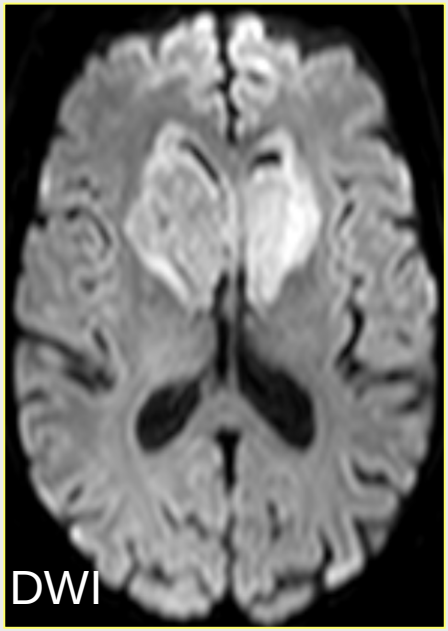


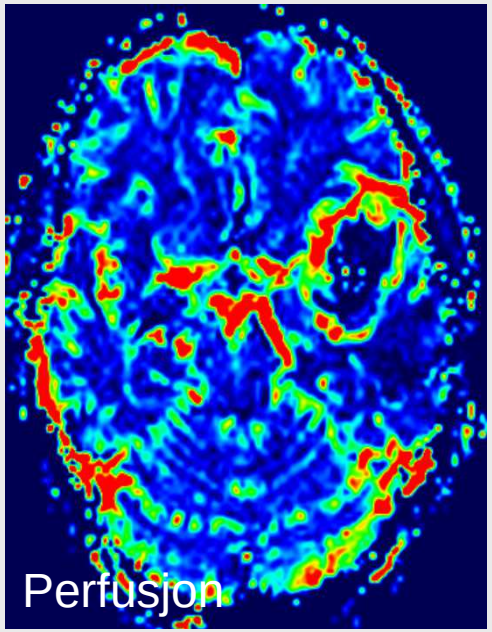
- Klinikk (alder, immunsuppresjon, kreftsykdom, utenlandsopphold)
- Blodprøver, CSF
- CT collum/thorax/abdomen

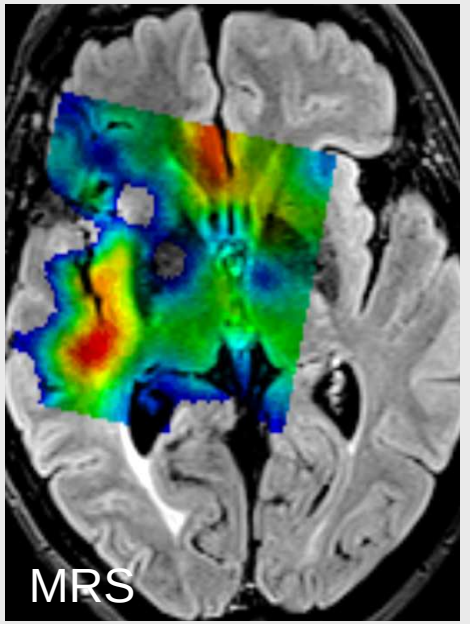




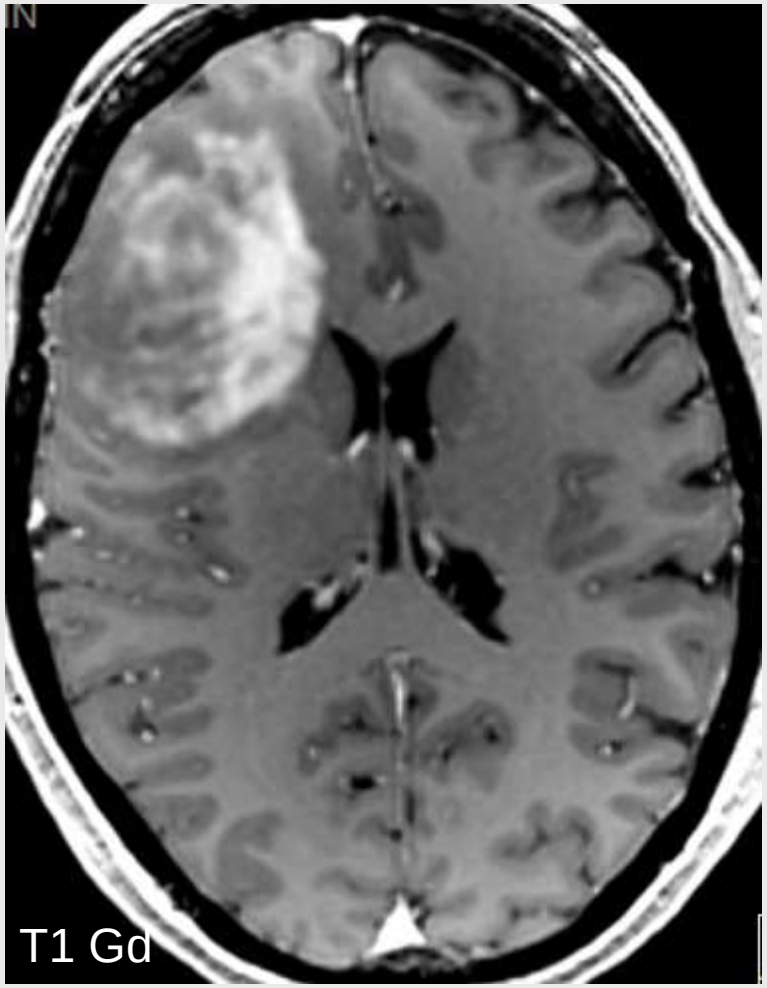


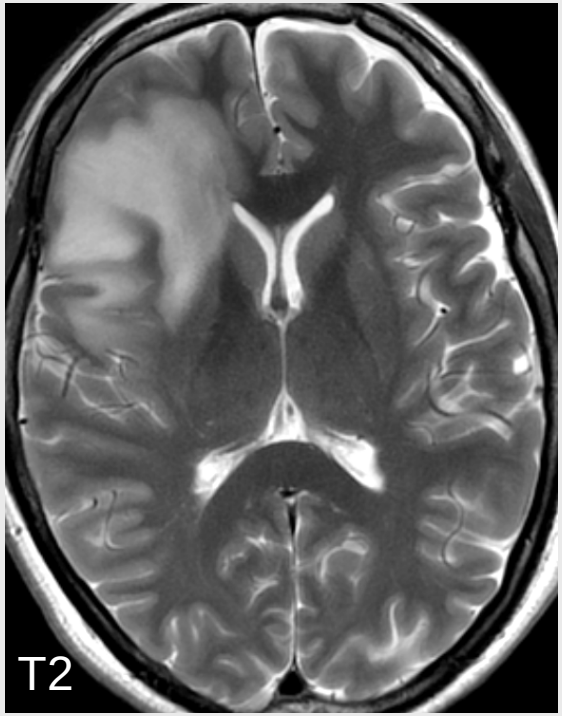




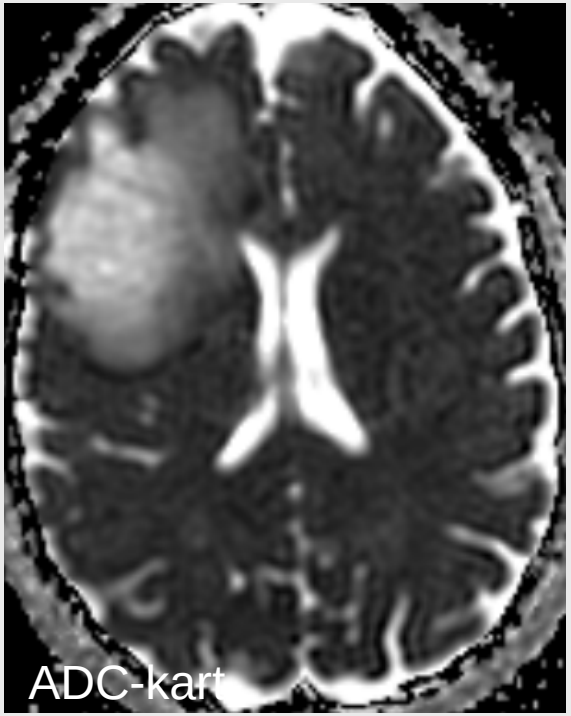


Hodepine og personlighetsforandringer over uker

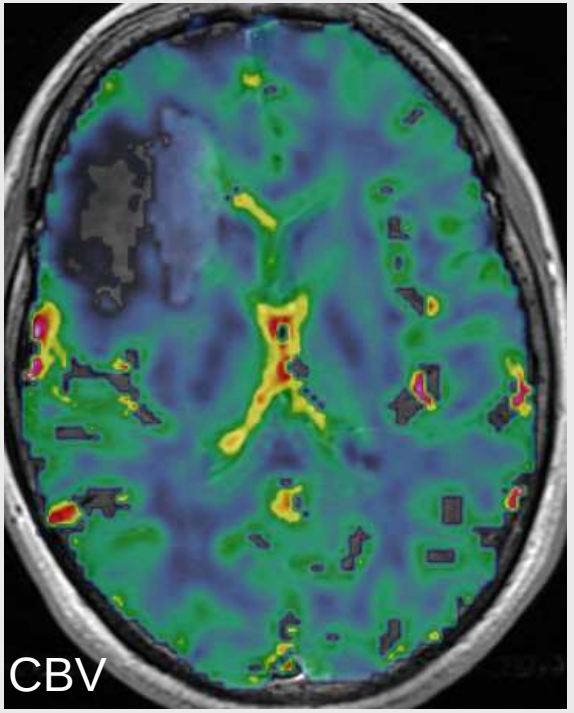




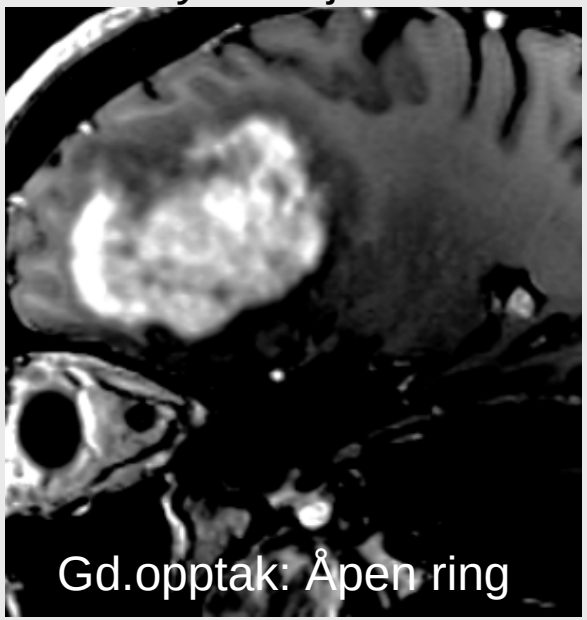
Manglende masseeffekt

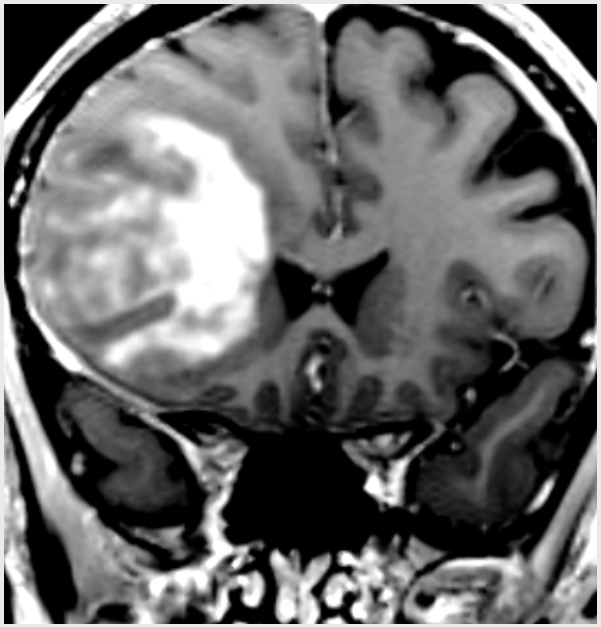


Høy diffusjon

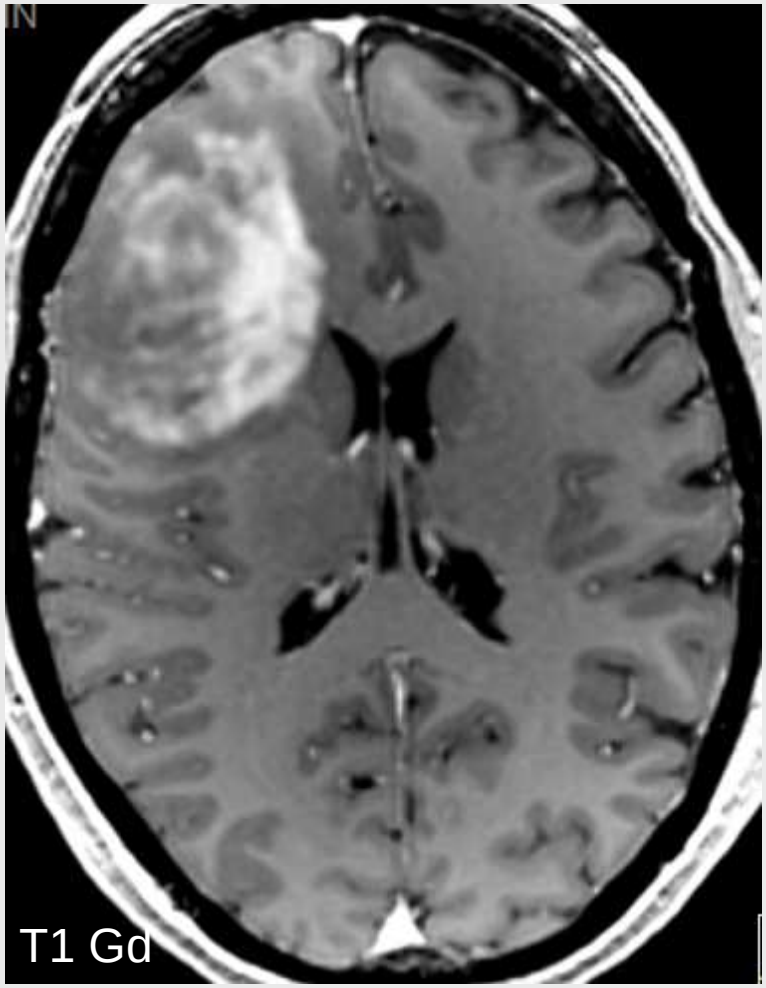


Lav CBV

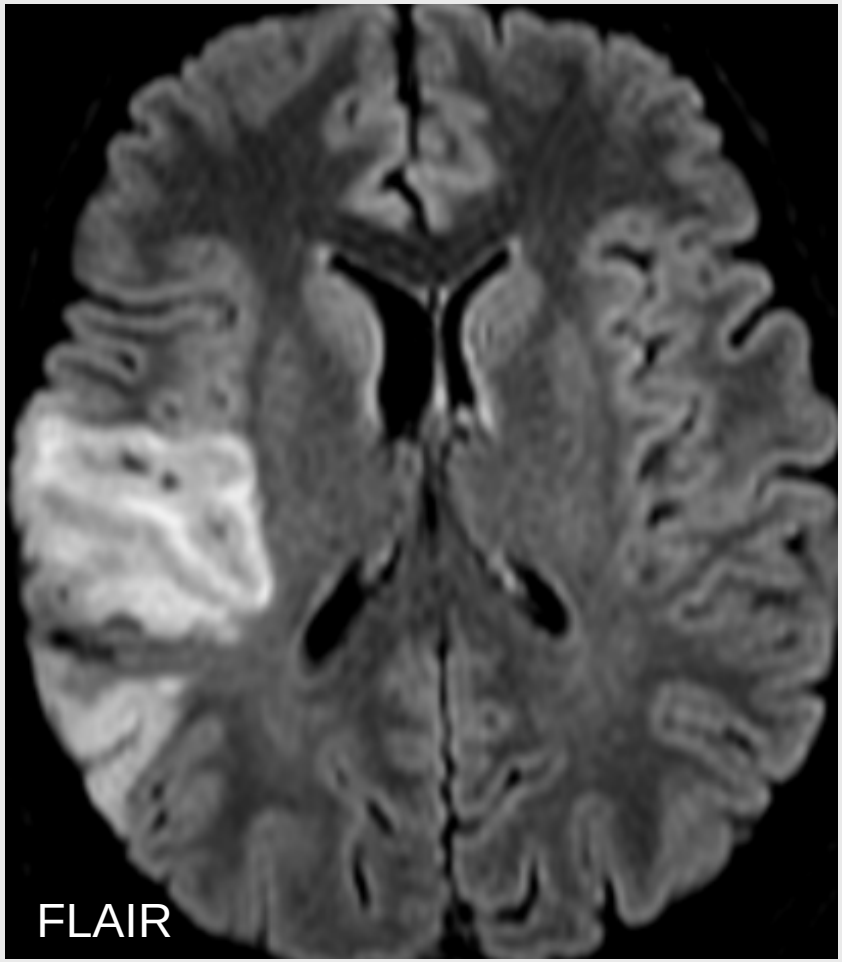


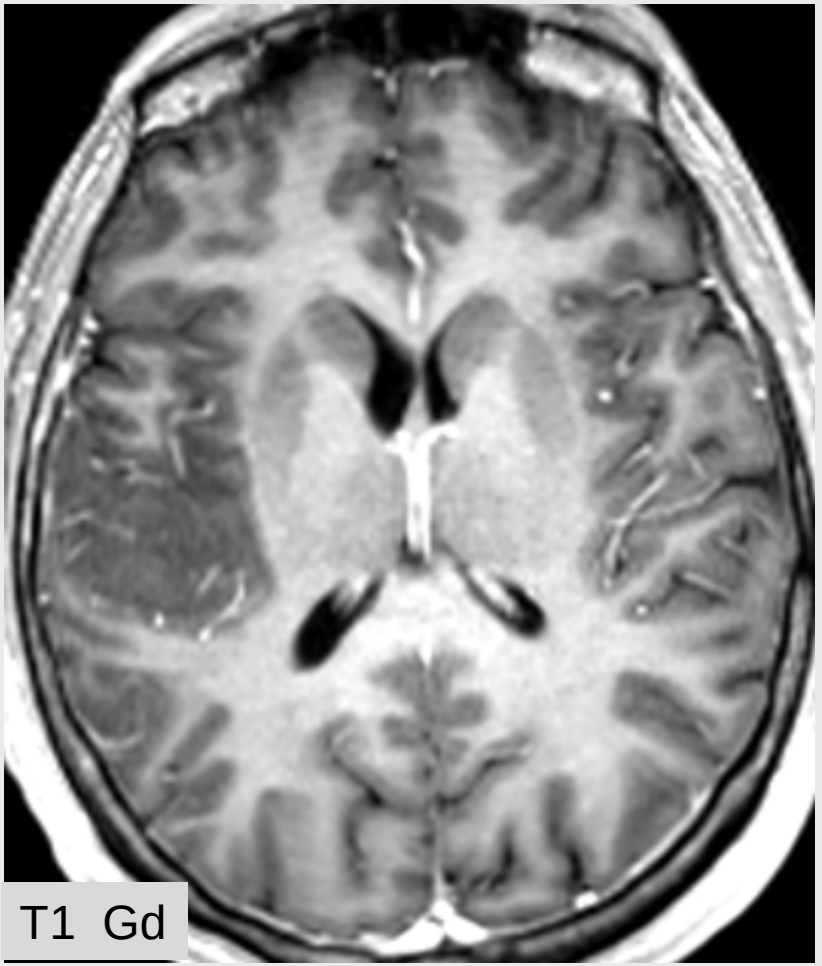


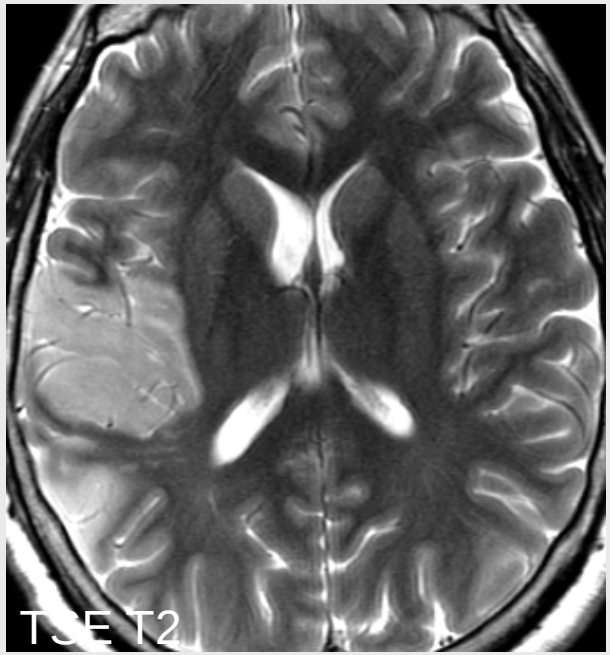
D: Tumefaktiv MS / ADEM (histologi)

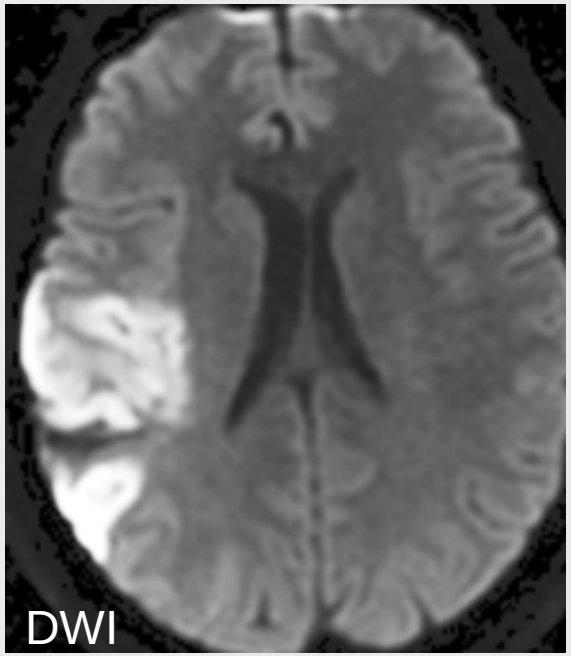


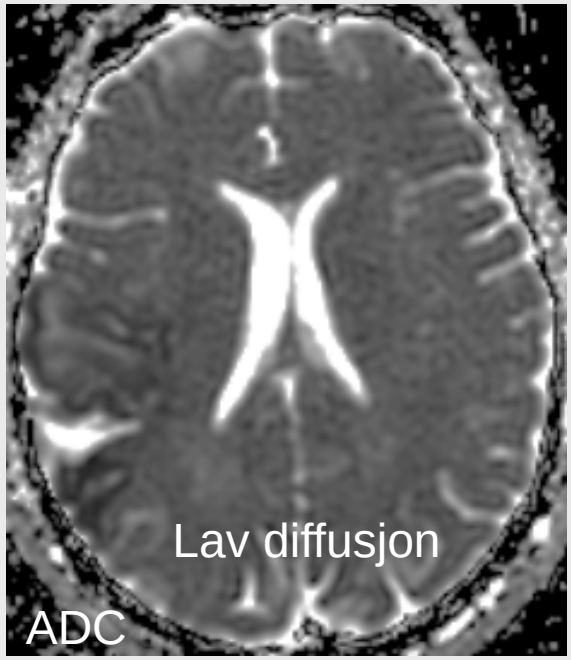
Hodepine og venstresidige parestesier de siste dagene

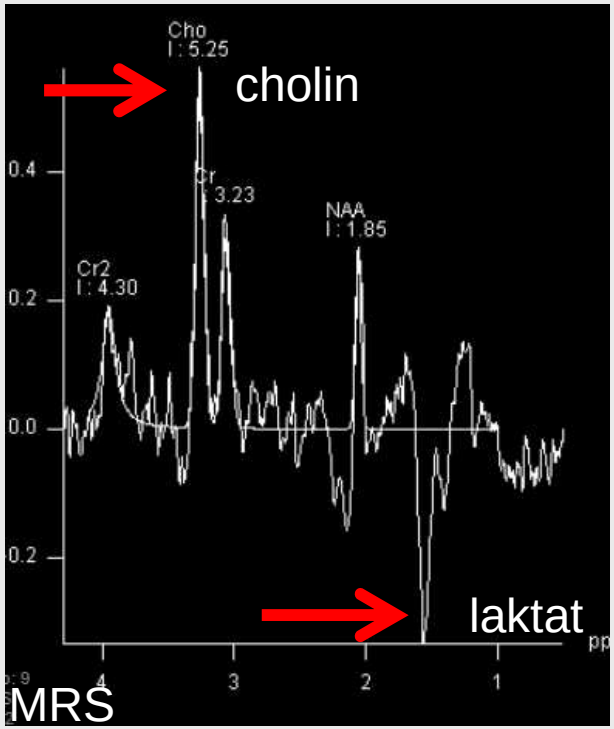


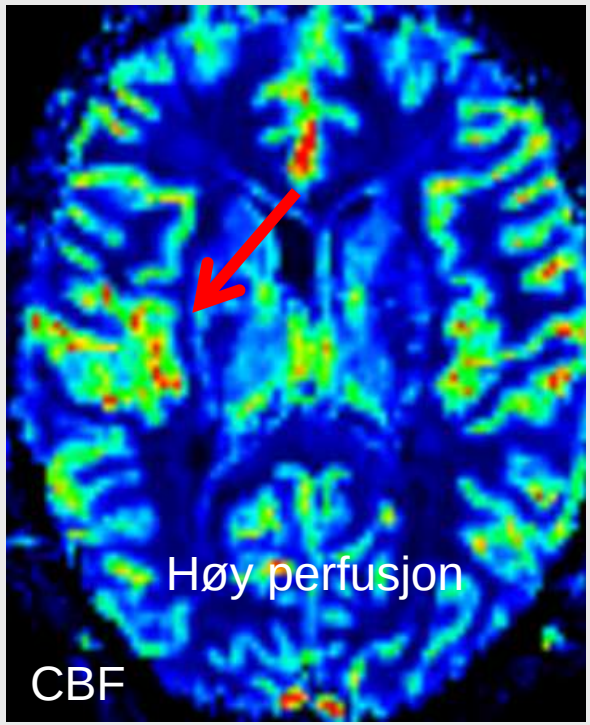


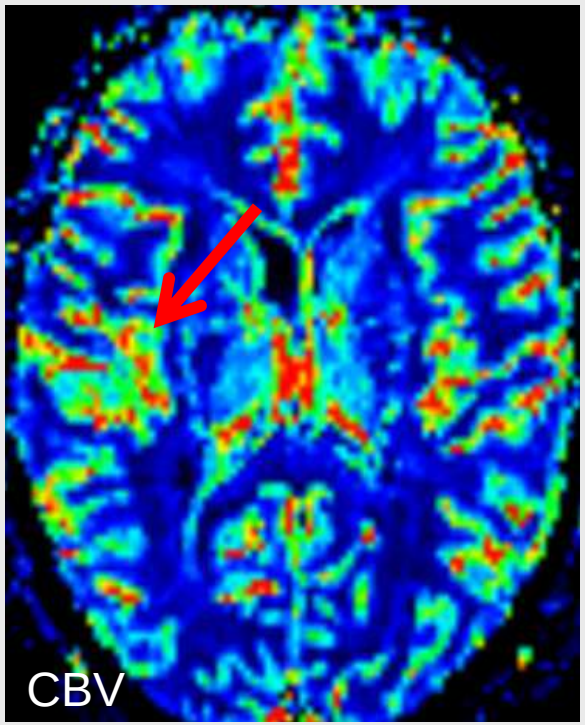

TSE T2


DWI

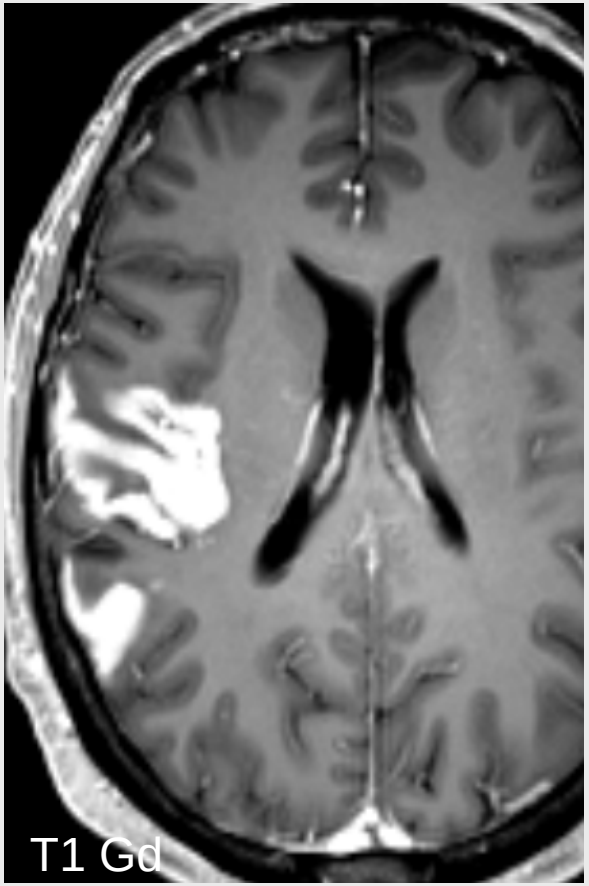

Lav diffusjon
ADC

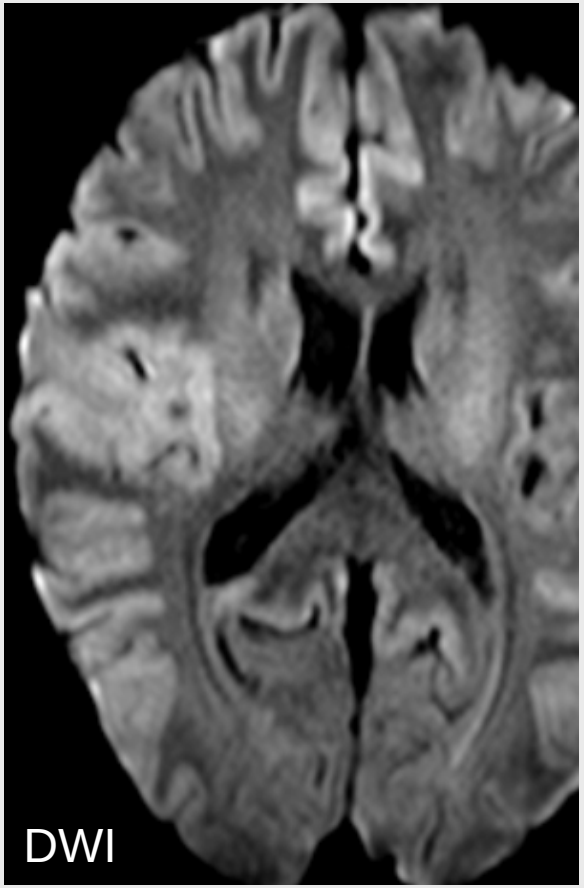

Cho
I: 5.25
cholin
Cr
3.23
NAA
I: 1.85
Cr2
I: 4.30
0.4
0.2
0.0
0.2
laktat
4
3
2
1
MRS

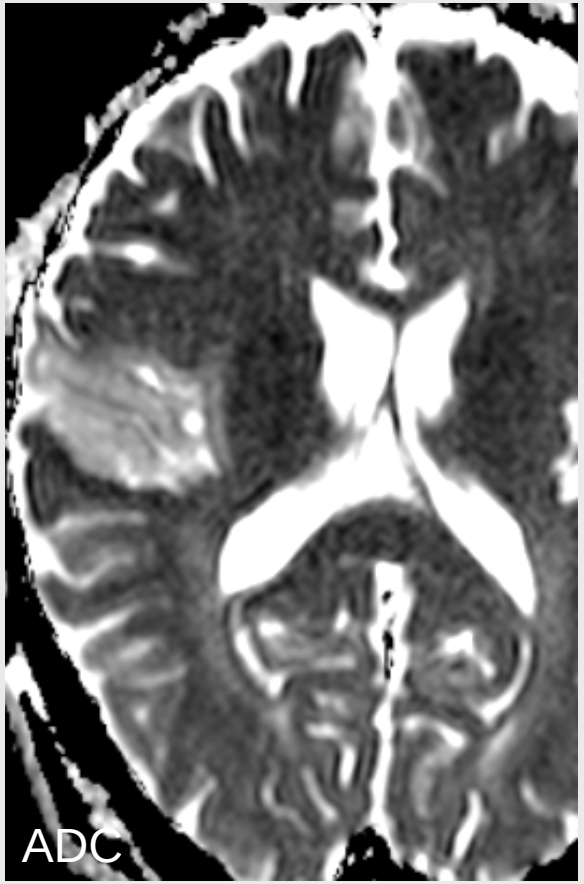

Høy perfusjon
CBF


CBV

1 uke senere

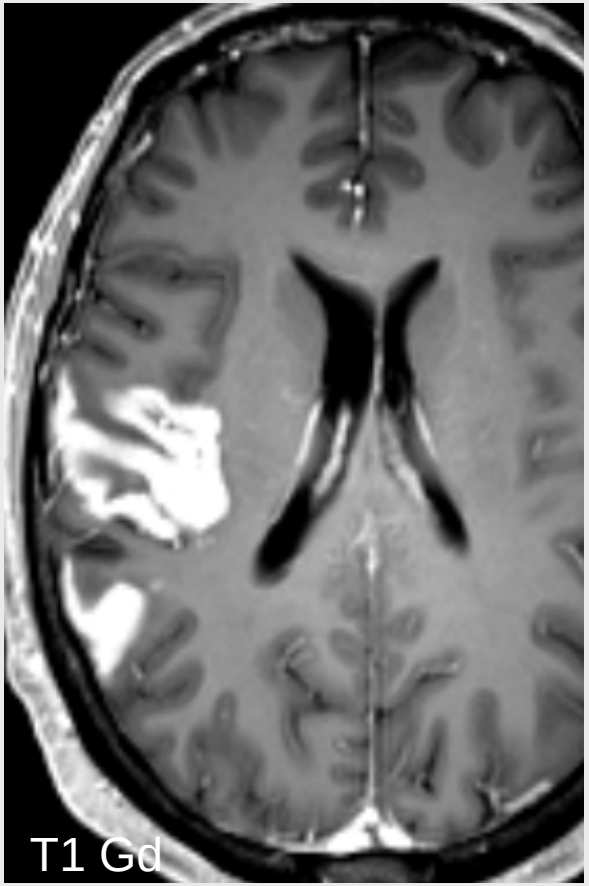


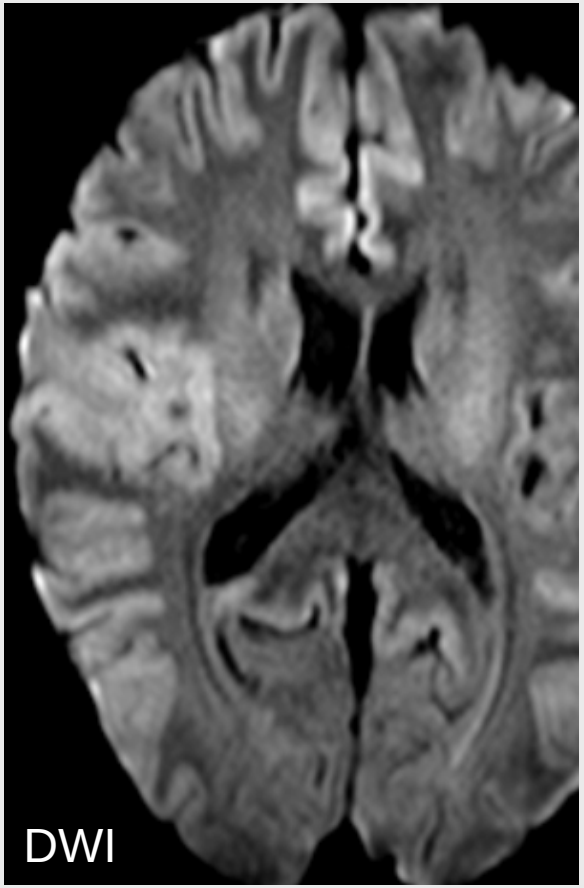


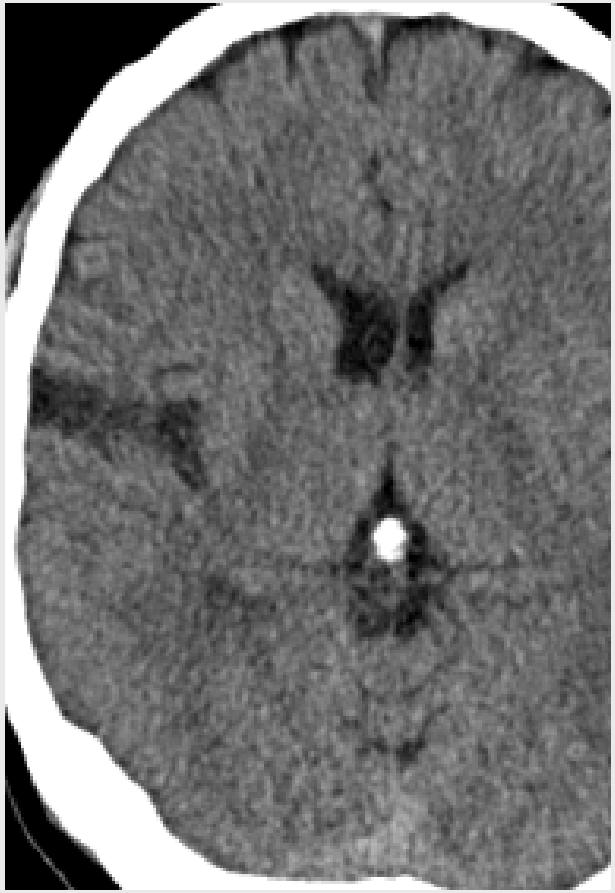


- Gd opptak i gyri
- Variabel DWI avhengig av alder
- Luksusperfusjon
- Raske endringer over tid

1 uke senere



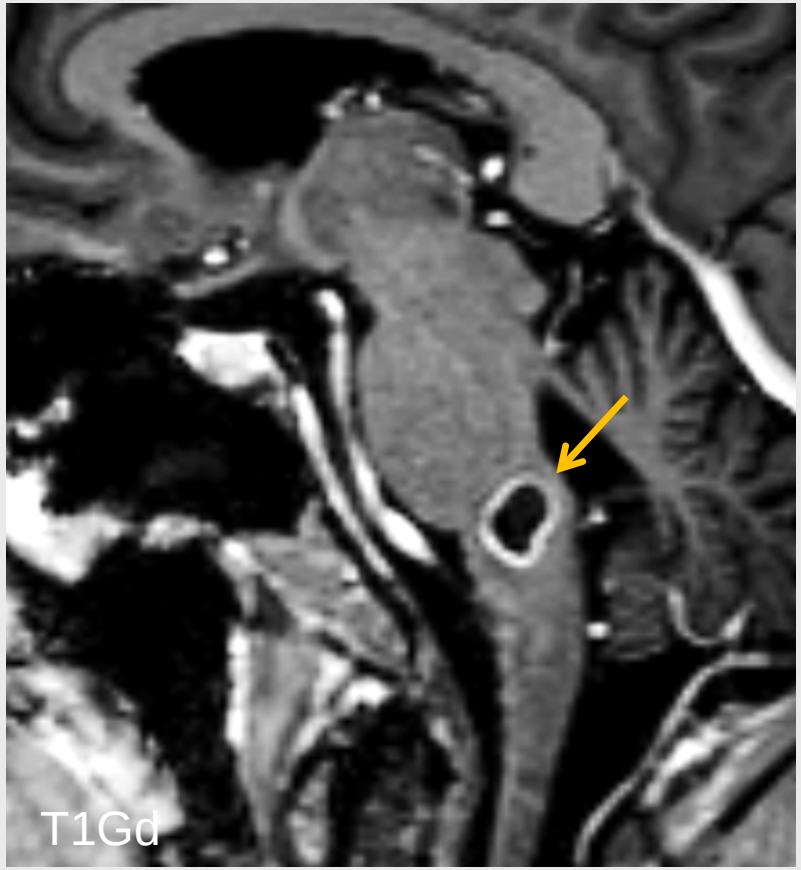


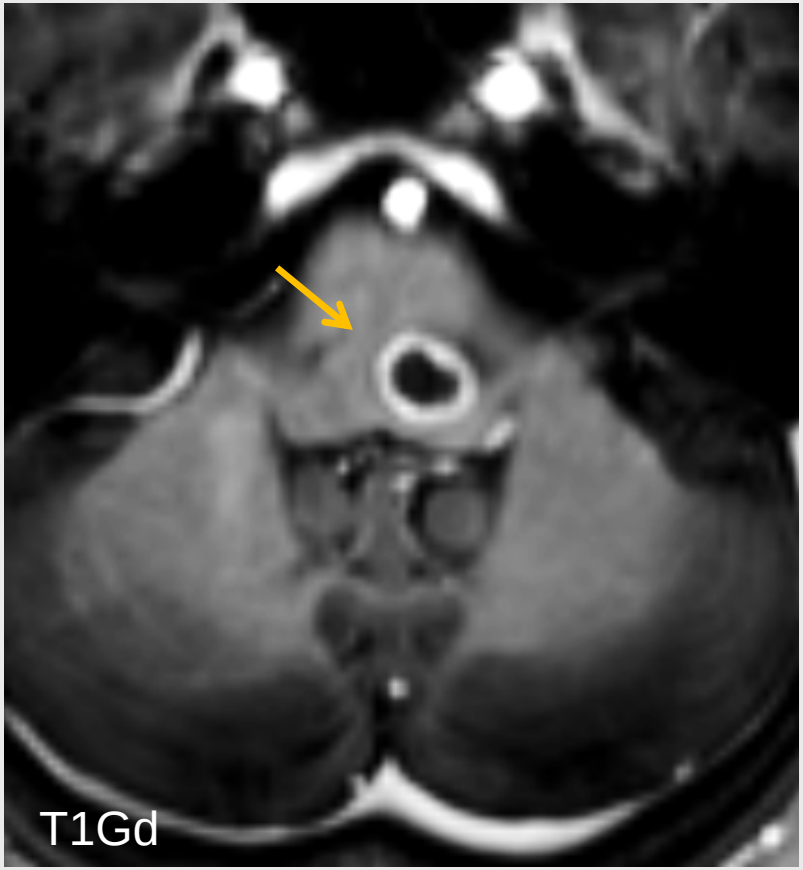


CT 1 mnd. senere

D: Subakutt infarkt

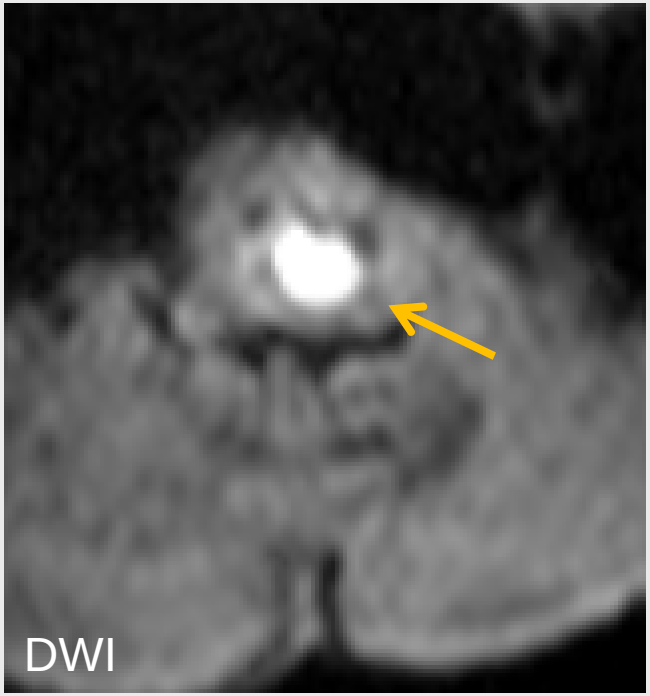
Venstresidig hemiparese.

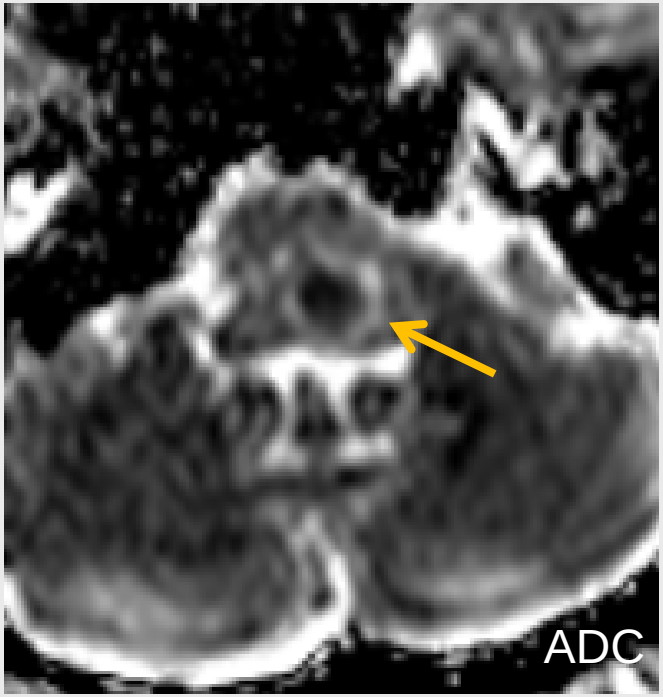


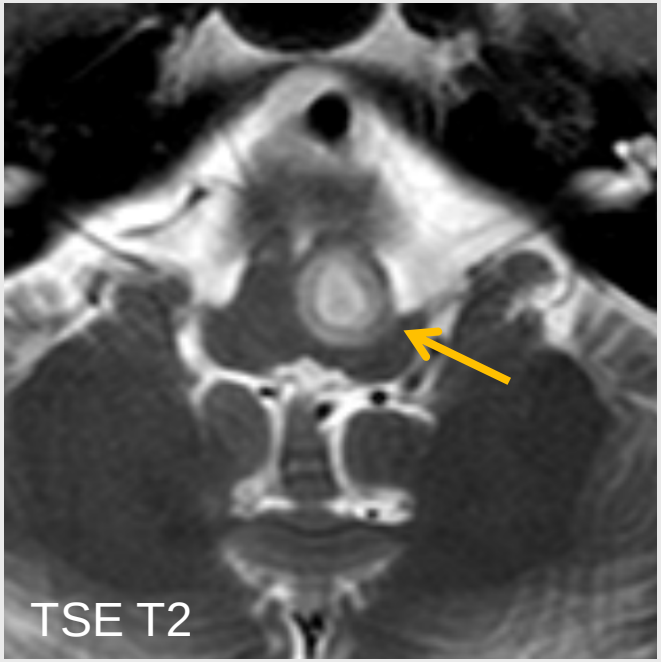


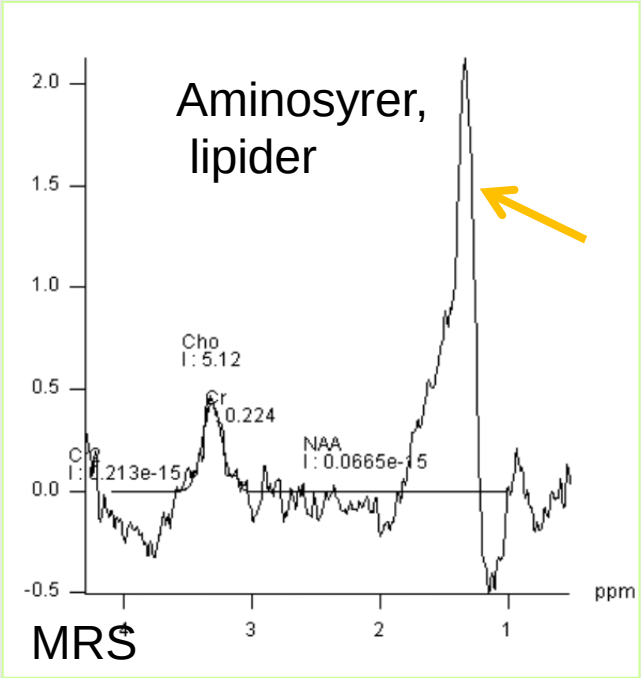
Abscess eller cystisk/nekrotisk tumor ?

- Ringformet, velavgrenset Gd opptak
- Lav diffusjon (ADC)
- Flere ringer på T2
- Aminosyrer og lipider

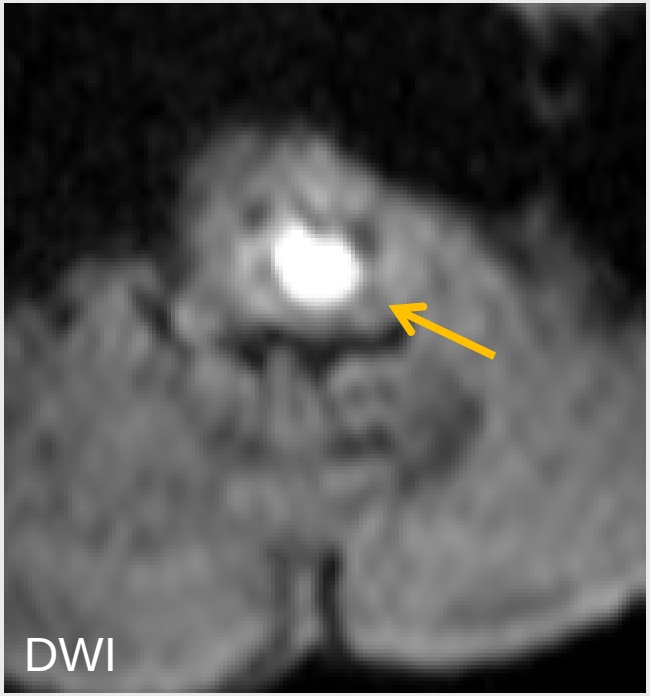


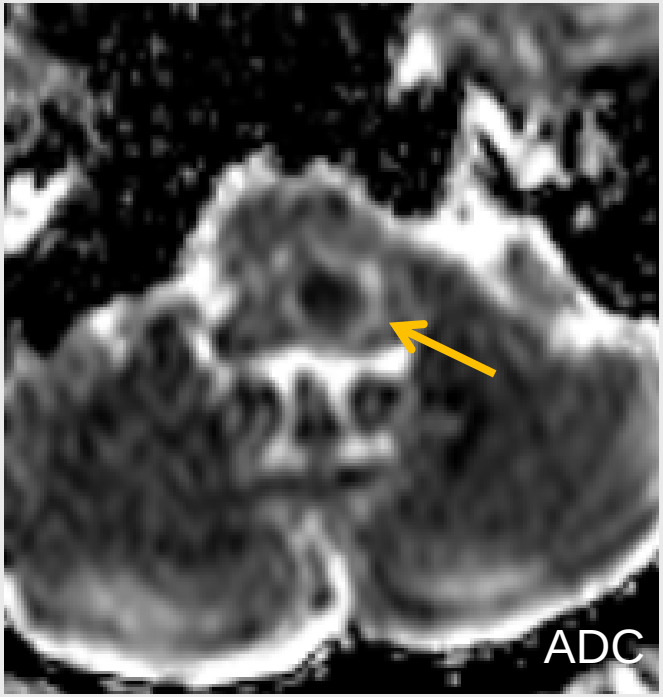


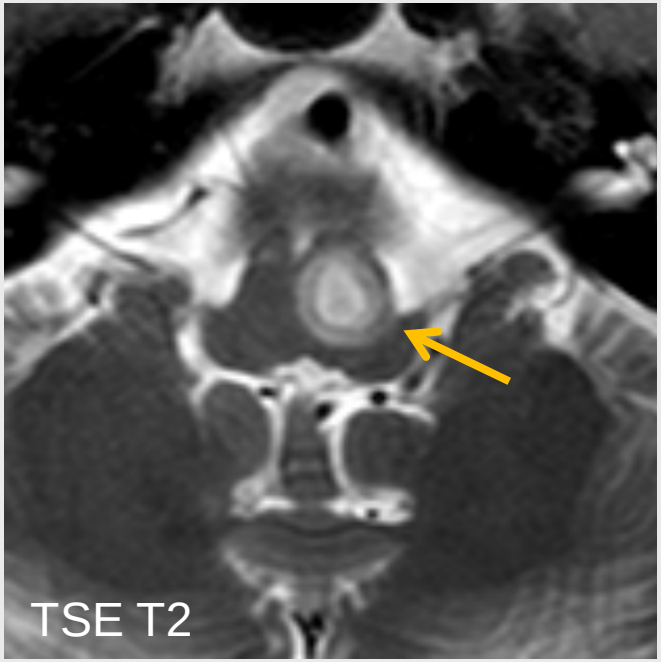


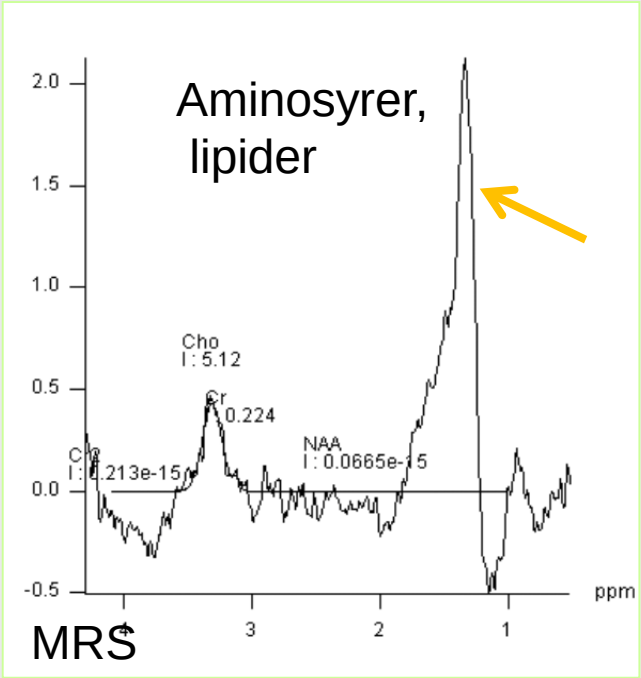


- Ringformet, velavgrenset Gd opptak
- Lav diffusjon (ADC)
- Flere ringer på T2
- Aminosyrer og lipider
- D: Abscess (nocardia)



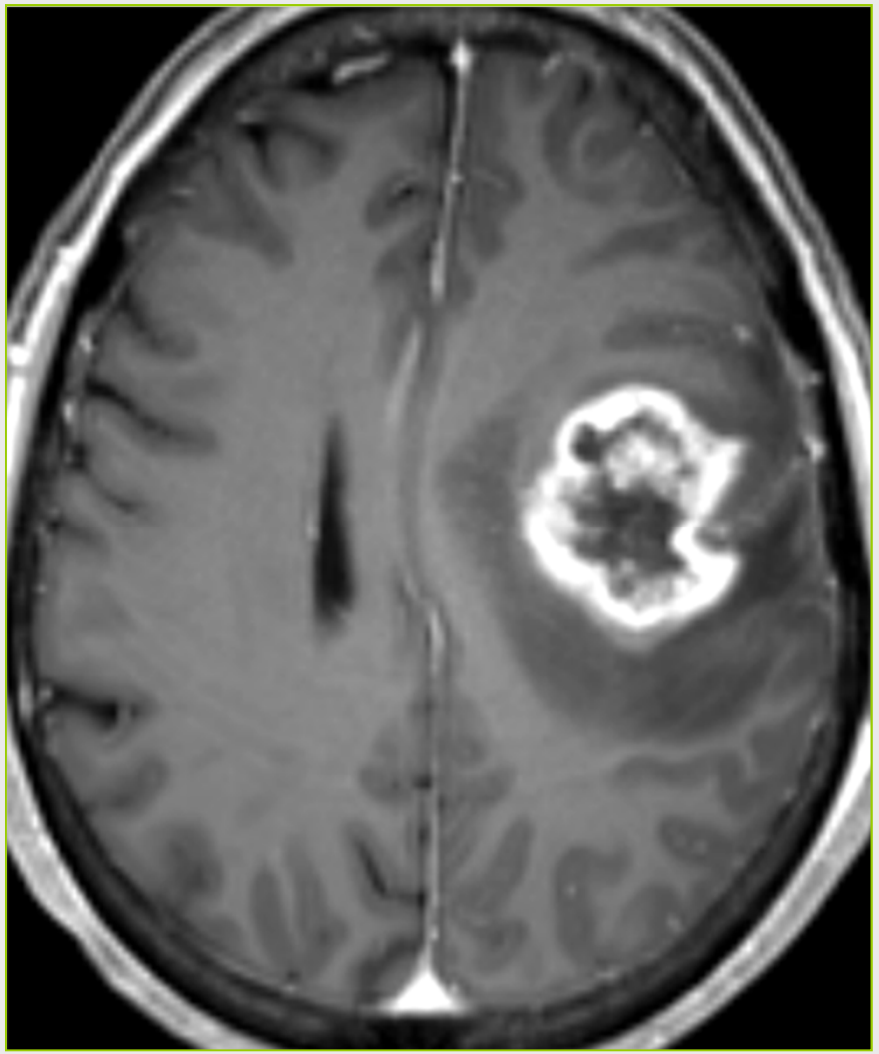






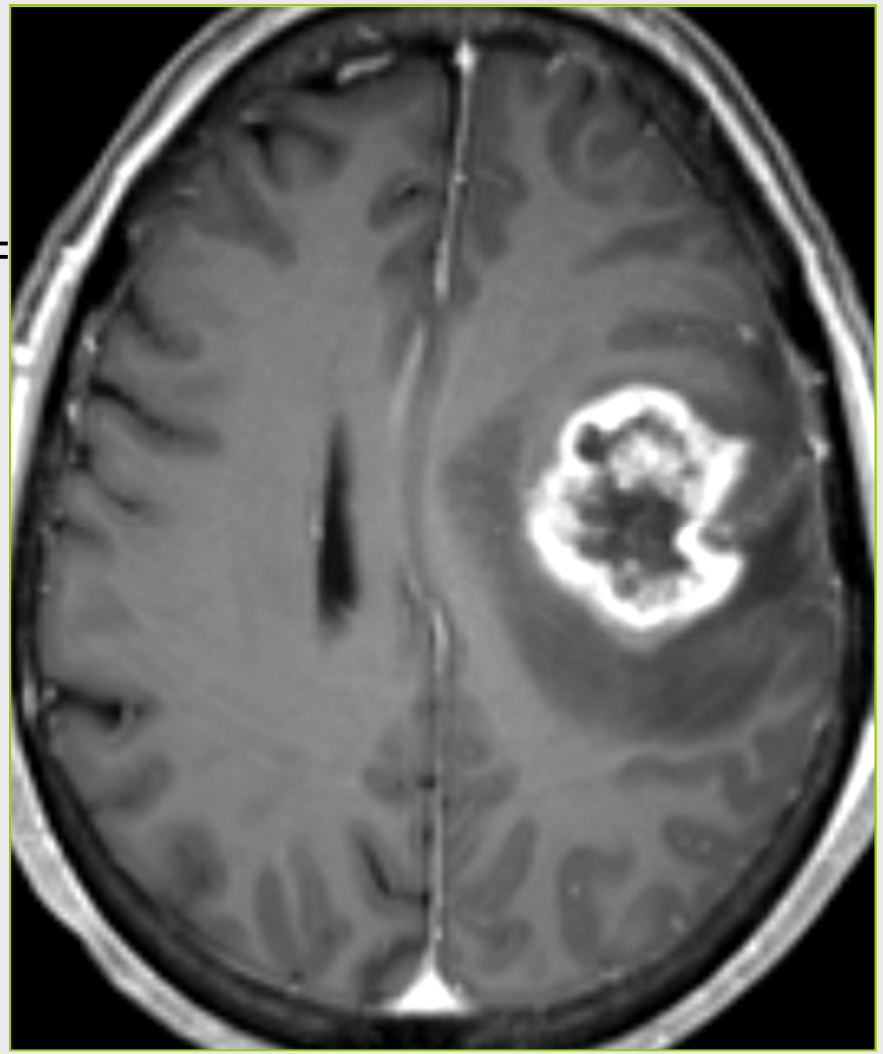
Er det tumorresidiv?

- Økende kontrastopptak og ødem etter kirurgi på malign hjernetumor = residiv



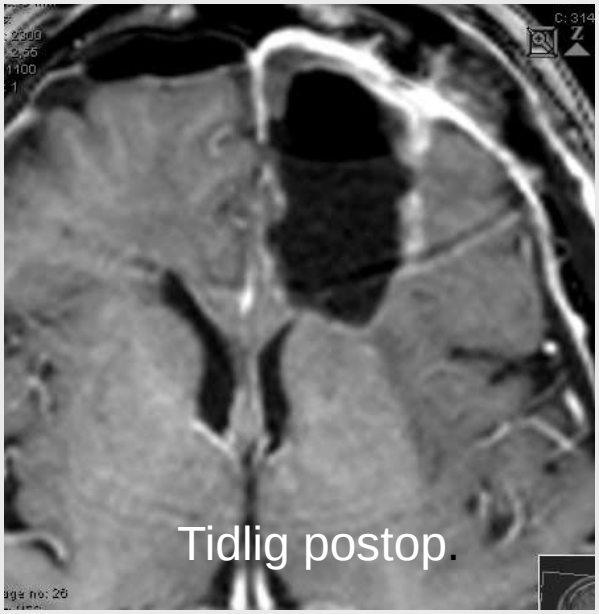
Er det tumorresidiv?

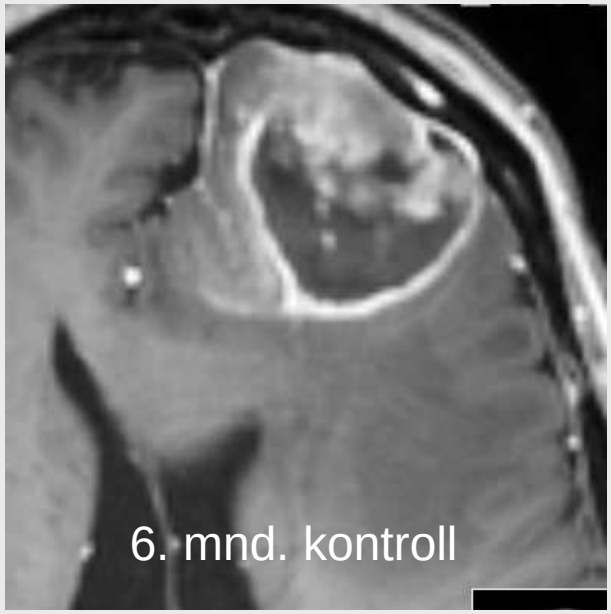
- Økende kontrastopptak og ødem etter kirurgi på malign hjernetumor = residiv
  - Postoperativ behandling av maligne gliomer er kombinasjon av kjemo- (Temodal) og stråleterapi
  - Ca. 30% får forandringer i karveggene som gir kontrastopptak og ødem = pseudoprogresjon
  - Pseudoprogresjon oppstår oftest i løpet av de første 3 mnd etter avsluttet radiokjemoterapi

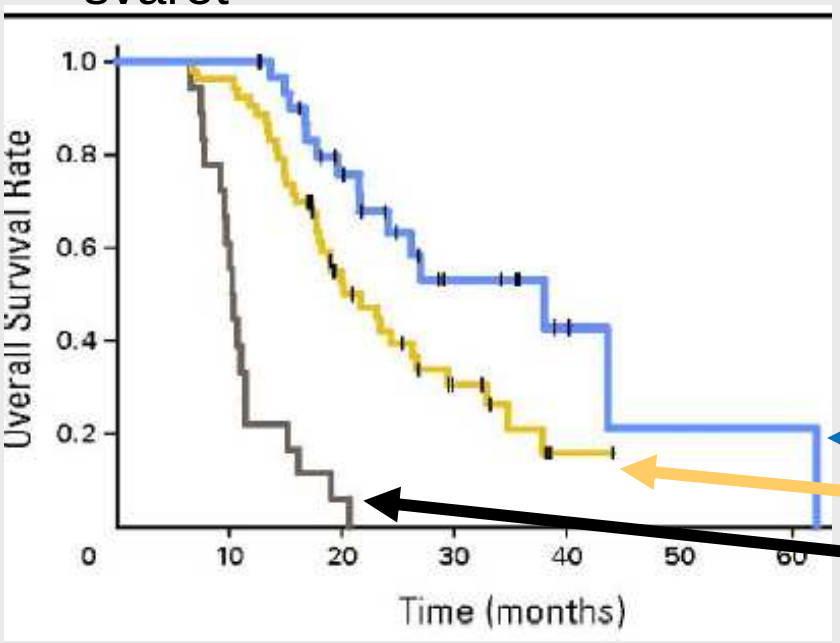


Hvorfor er det viktig?

- Pseudoprogresjon er behandlingseffekt
- Prognose ulik
- Behandling ulik
- Standard MR teknikker (FLAIR, T1 Gd) gir ikke svaret







pseudoprogresjon

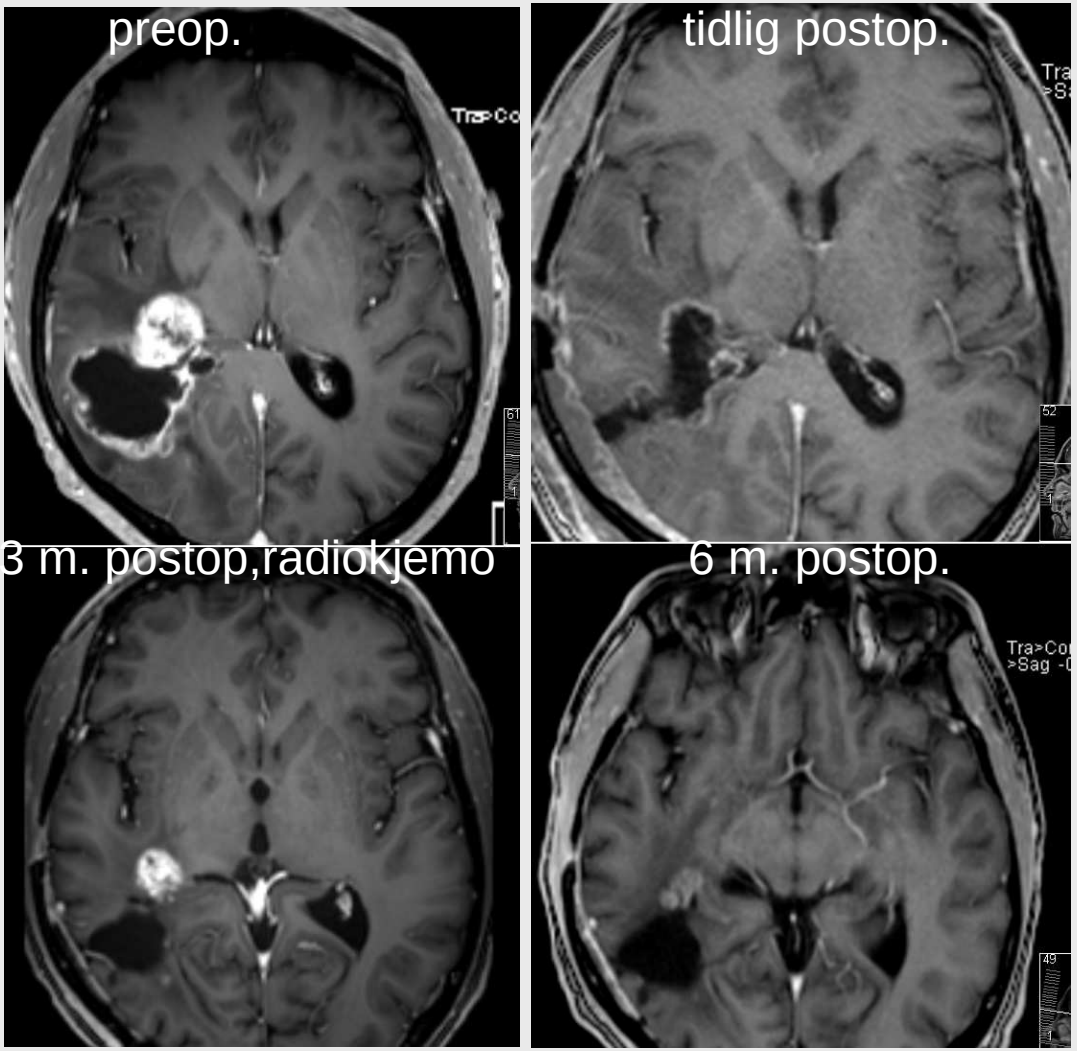
median overlevelse

reell tidlig progresjon

Brandes, JCO 2008

Hvordan differensiere mellom reell progresjon og pseudoprogresjon?

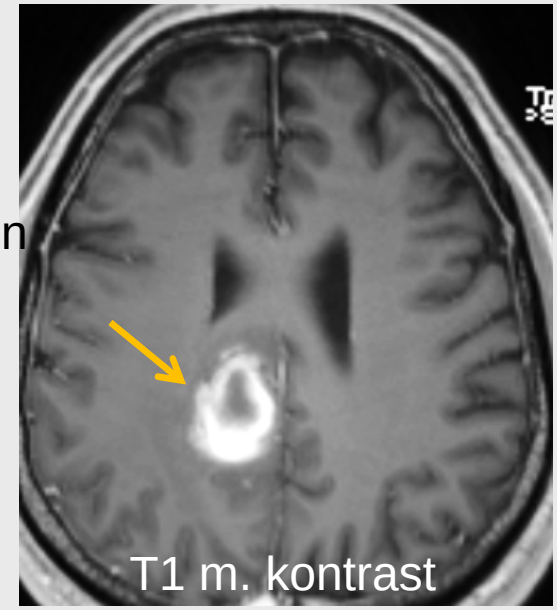
Tidsfaktoren

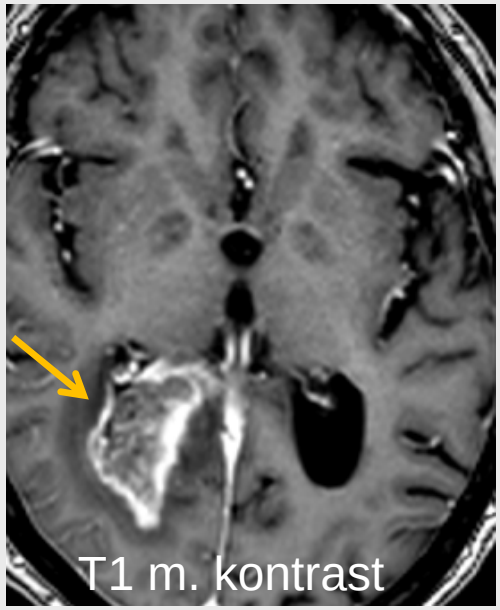


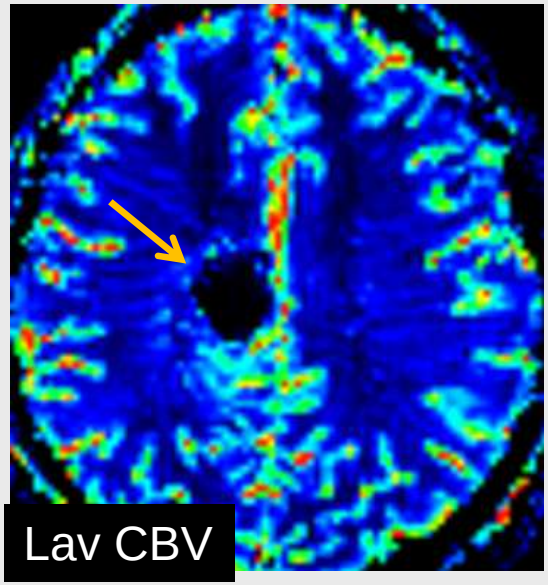
- Pseudoprogresjon typisk 1-3 mnd etter avsluttet radiokjemoterapi
- Reell progresjon vokser, pseudo- stabiliseres eller skrumper

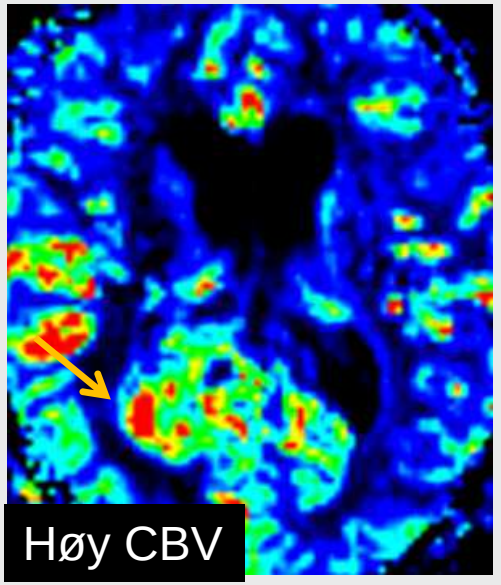
MR perfusjon

- CBV høy i tumor, lav i nekrose
- CBV ↓ 40% i pseudoprogresjon
- CBV ↑ 12% i reell progresjon





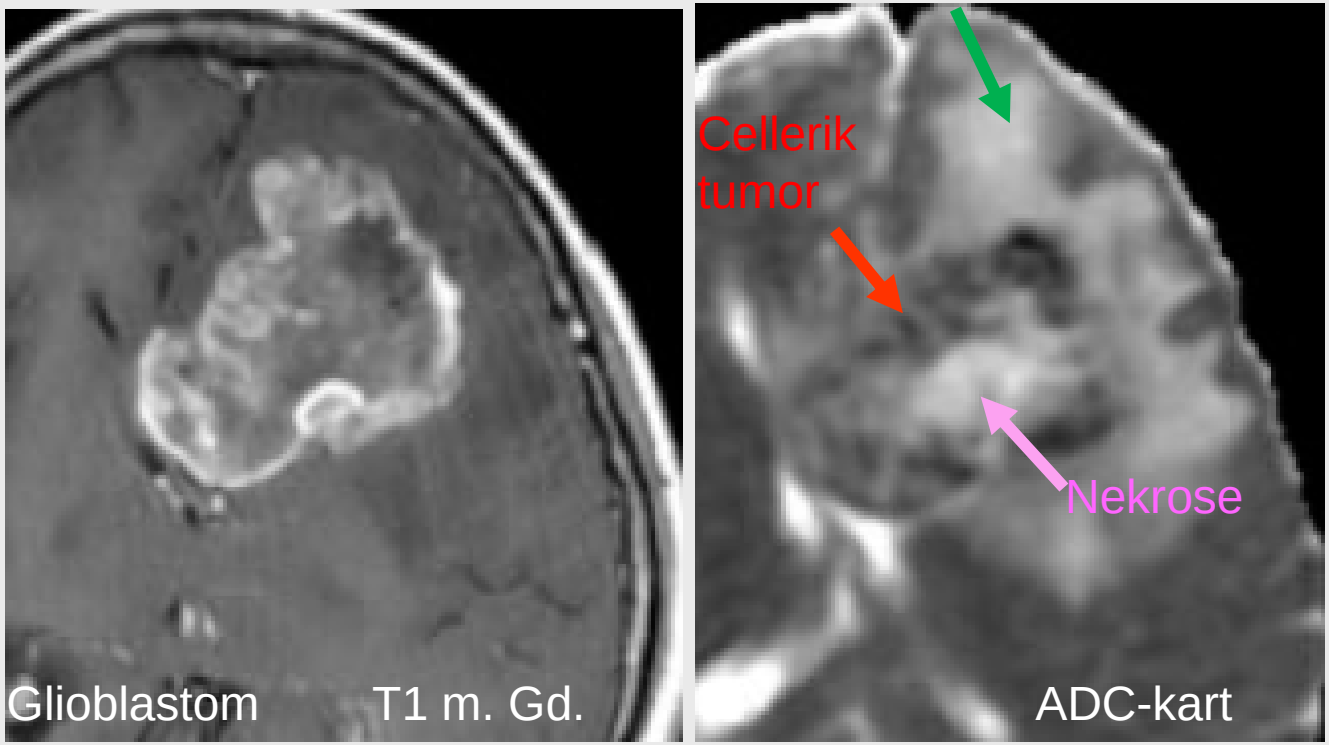




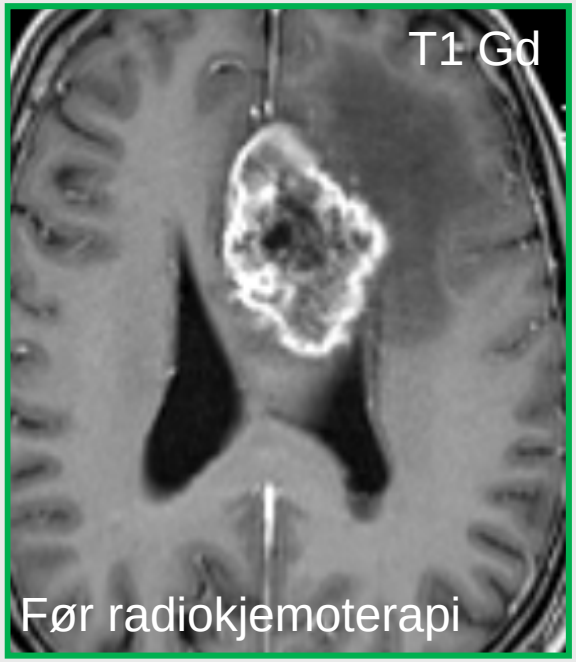
Mangla et al, Radiology 2010

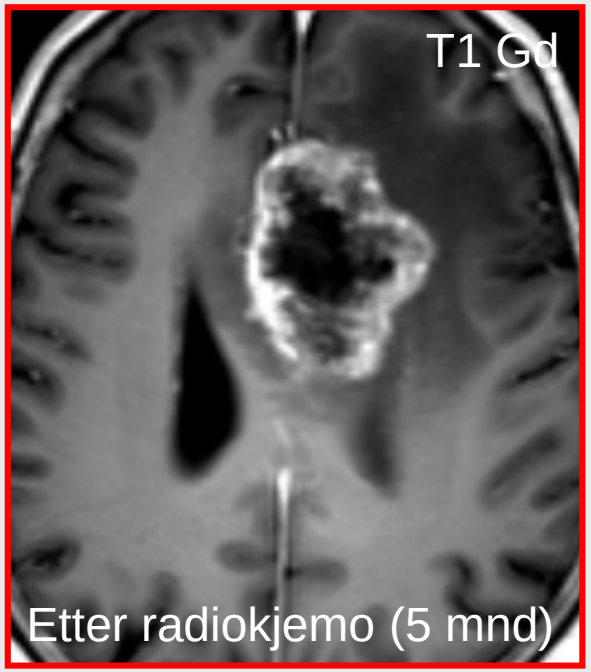
Diffusjon

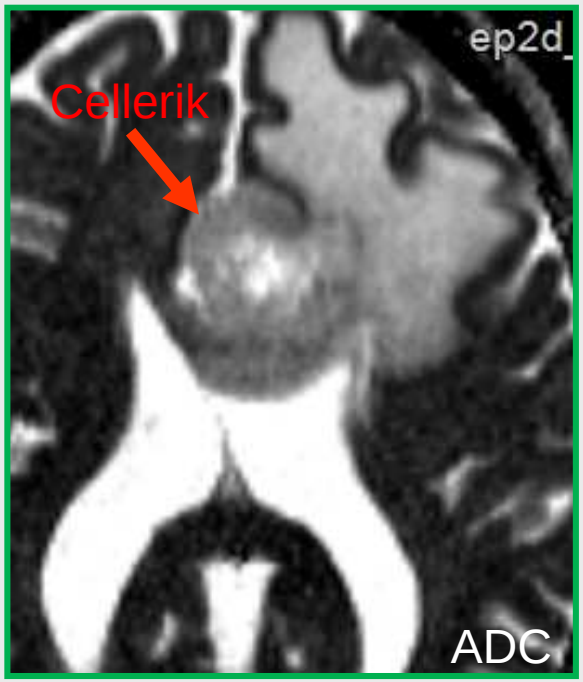
- Områder med høy cellularitet har lav diffusjon
- Peritumorødem (vasogent ødem) har høy diffusjon
- Nekrose har ofte høy diffusjon (avhengig av viskositet)

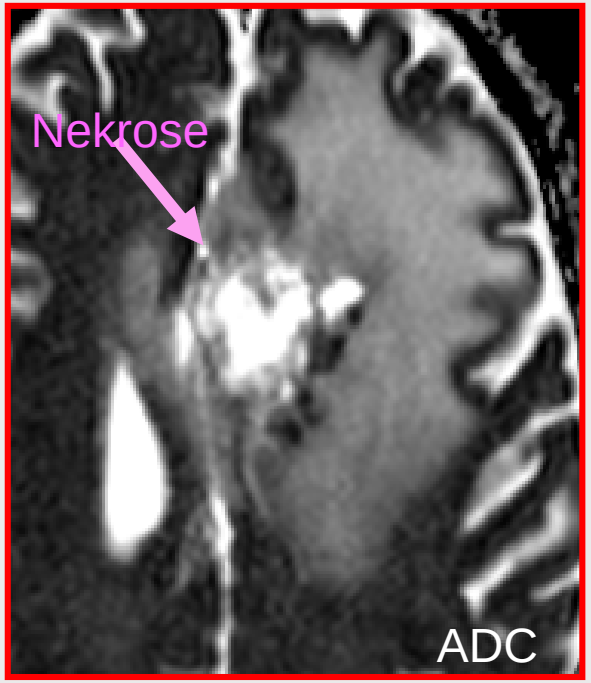


- Pseudoprogresjon har ofte høyere diffusjon enn reell progresjon pga lav celletetthet og nekrose









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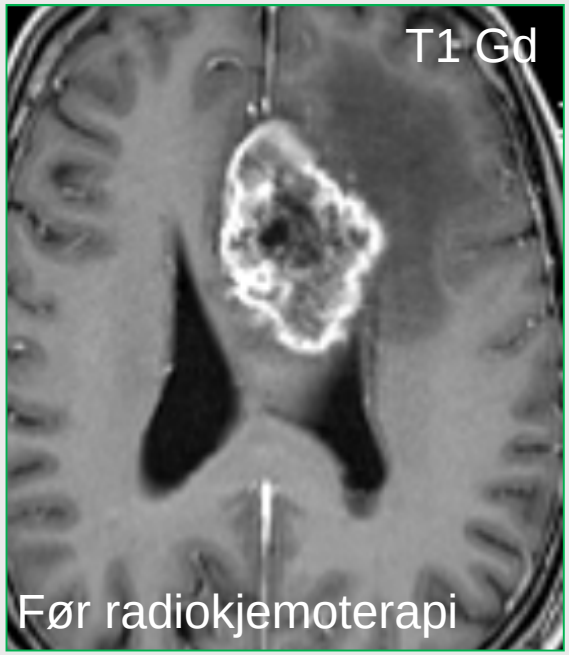
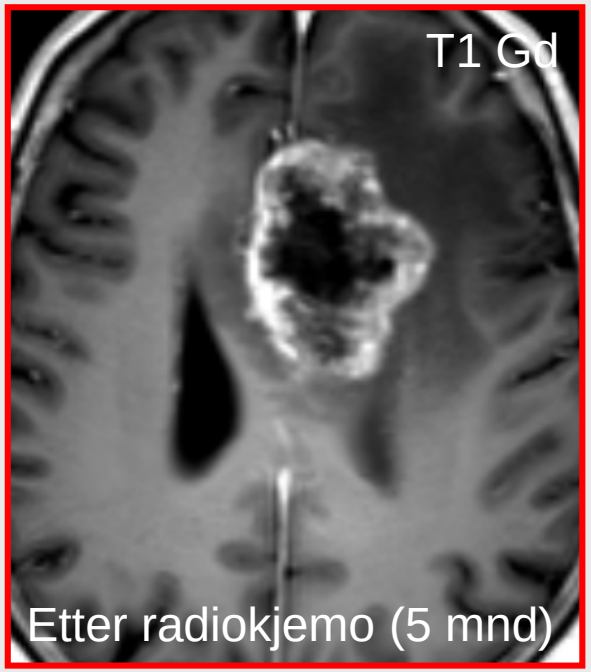
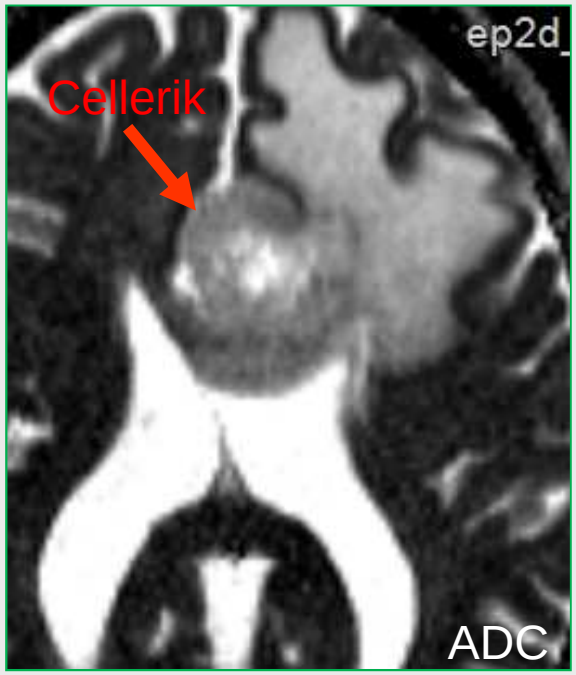
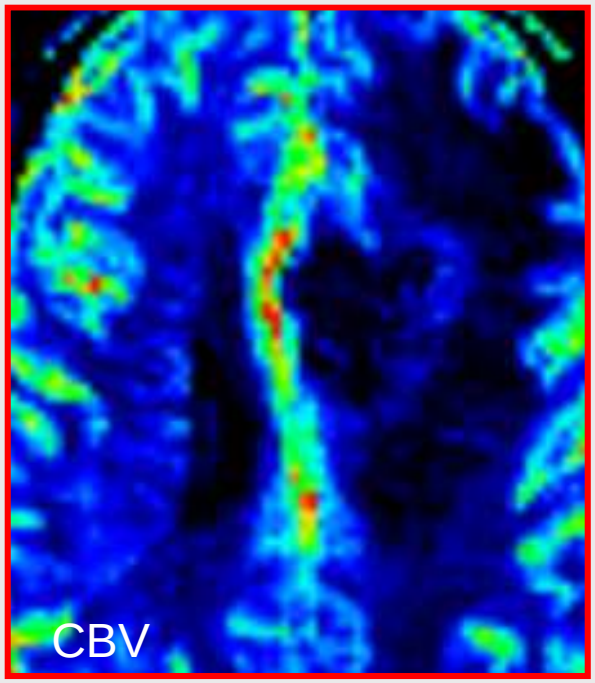








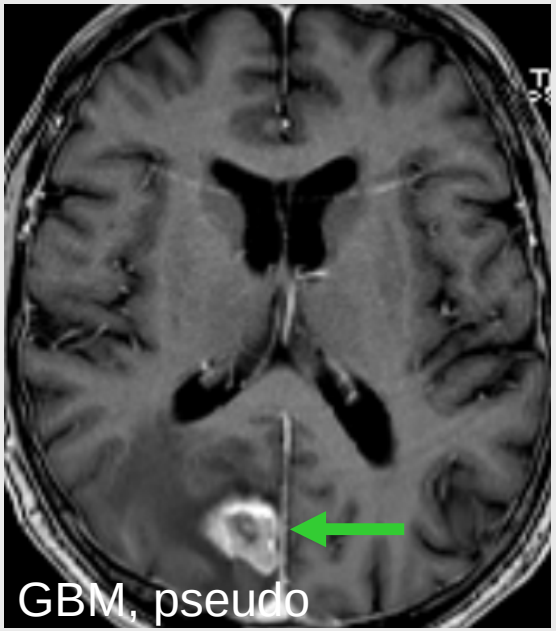
MR spektroskopi

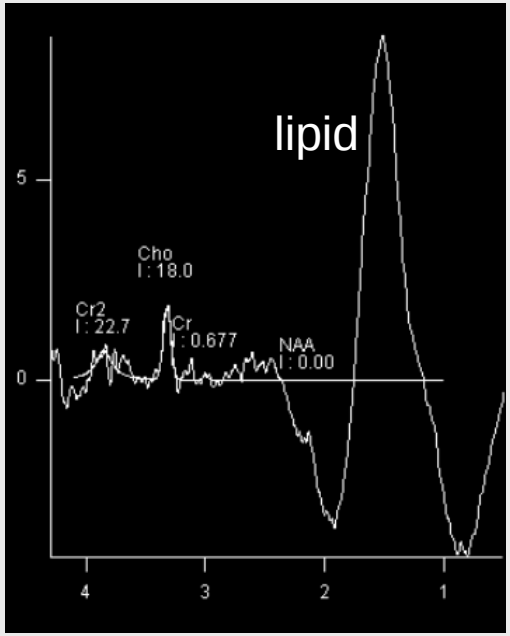
I teorien:

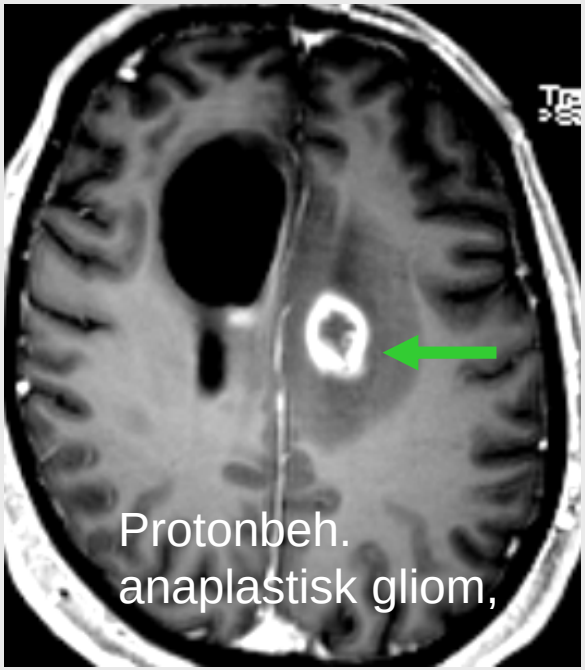
- Tumor gir høy cholintopp
- Nekrose gir høy lipid og laktat

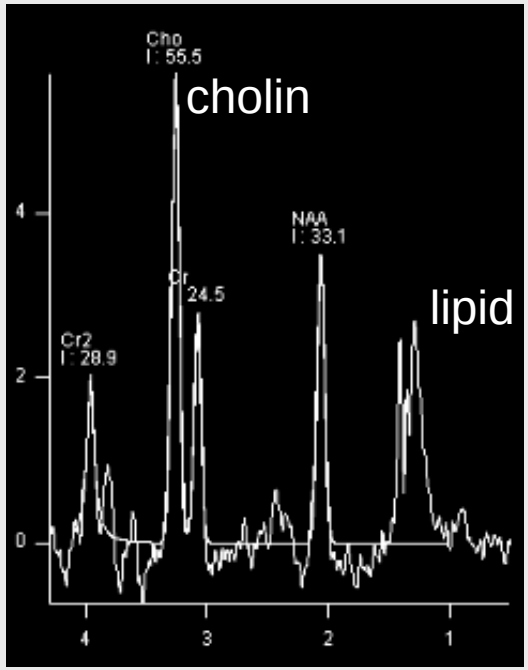
I virkeligheten:

Reell progresjon er en blanding av nekrose, inflammasjon og tumor som vanskelig lar seg skille fra pseudoprogresjon.









Oppsummering

- Mer aggressiv tumorkirurgi - histopatologisk diagnose hos de fleste
- Mindre behov for at radiologen skal gi en spesifikk tumordiagnose
- Det viktigste er **tumor** (kirurgi) eller **ikke-tumor** (medik.terapi /ekspektans)
- Det andre diagnostiske hovedproblemet er **tumorresidiv eller pseudoprogresjon**.
- Bruk flere MR teknikker, ikke stol for mye på en enkelt sekvens.