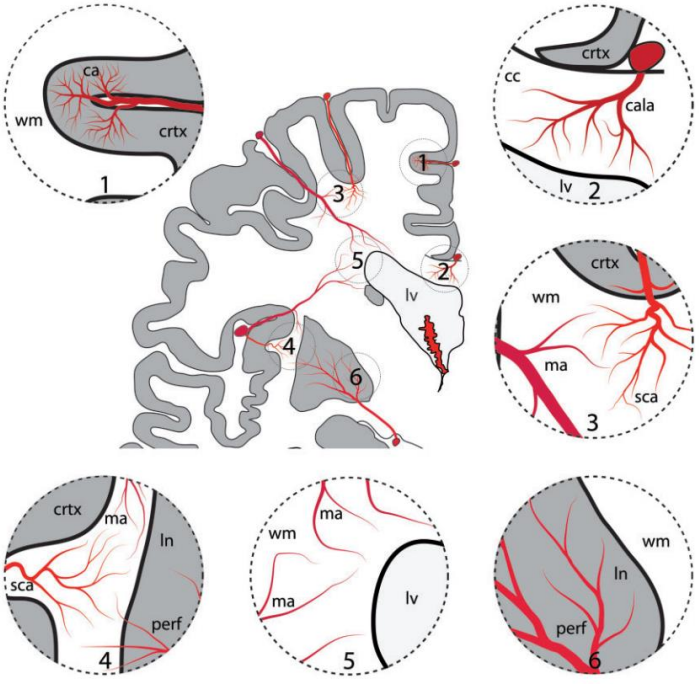
1

Smirnov M, et al. Cerebral white matter vasculature: still uncharted? Brain 2021:144;3561–75.



Type 1: Arterial vascularization of the cortex depends on short arterioles originating from the same pial vessels (single source juxtaposed(並列) supply).
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cc = corpus callosum; crtx = cortex; ln = lentiform nucleus; lv = lateral ventricle; ma = medullary artery; perf = perforating artery; sca = subcortical artery; wm = white matter.

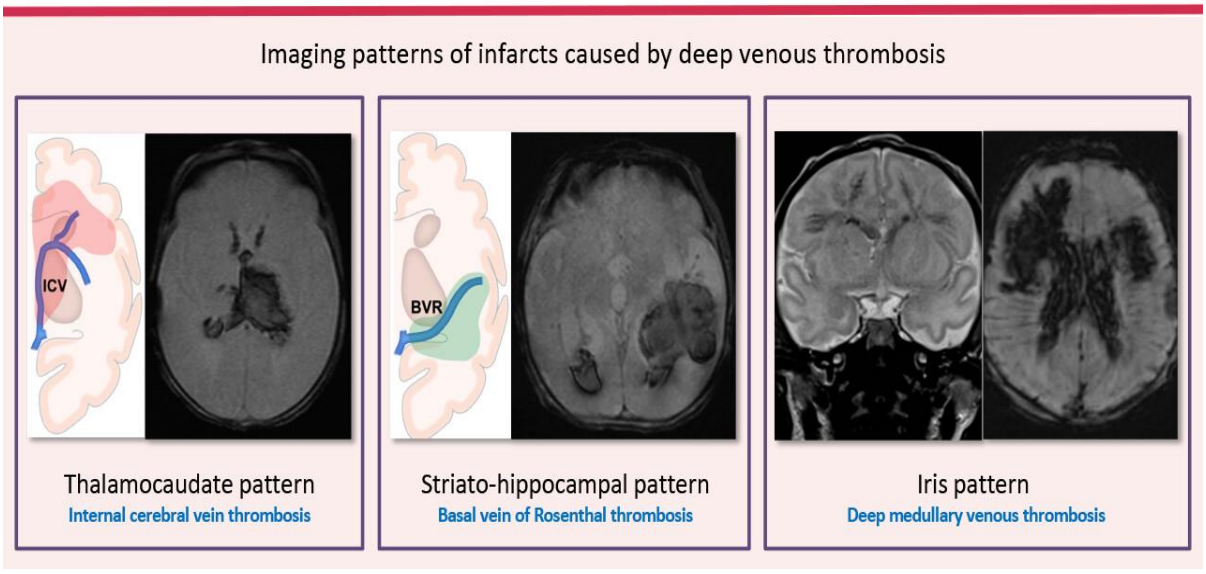
Type 1~4：外部型脳低血流障害
Type 5~6：内部型脳低血流障害
Type 1~6：全脳型脳低血流障害

2

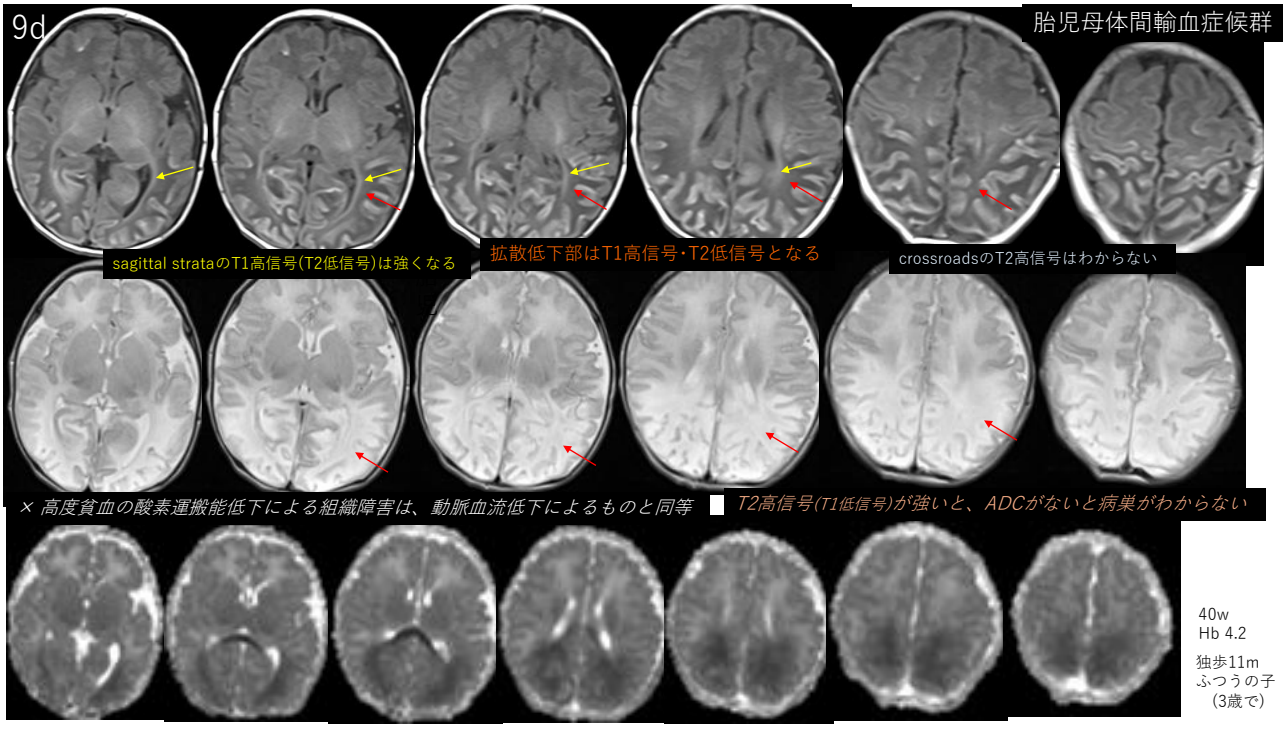
Lai LM, et al. Neuroimaging of Neonatal Stroke: Venous Focus. Radiographics 2024;44:e230117.

RadioGraphics

Neuroimaging of Neonatal Stroke: Venous Focus



3



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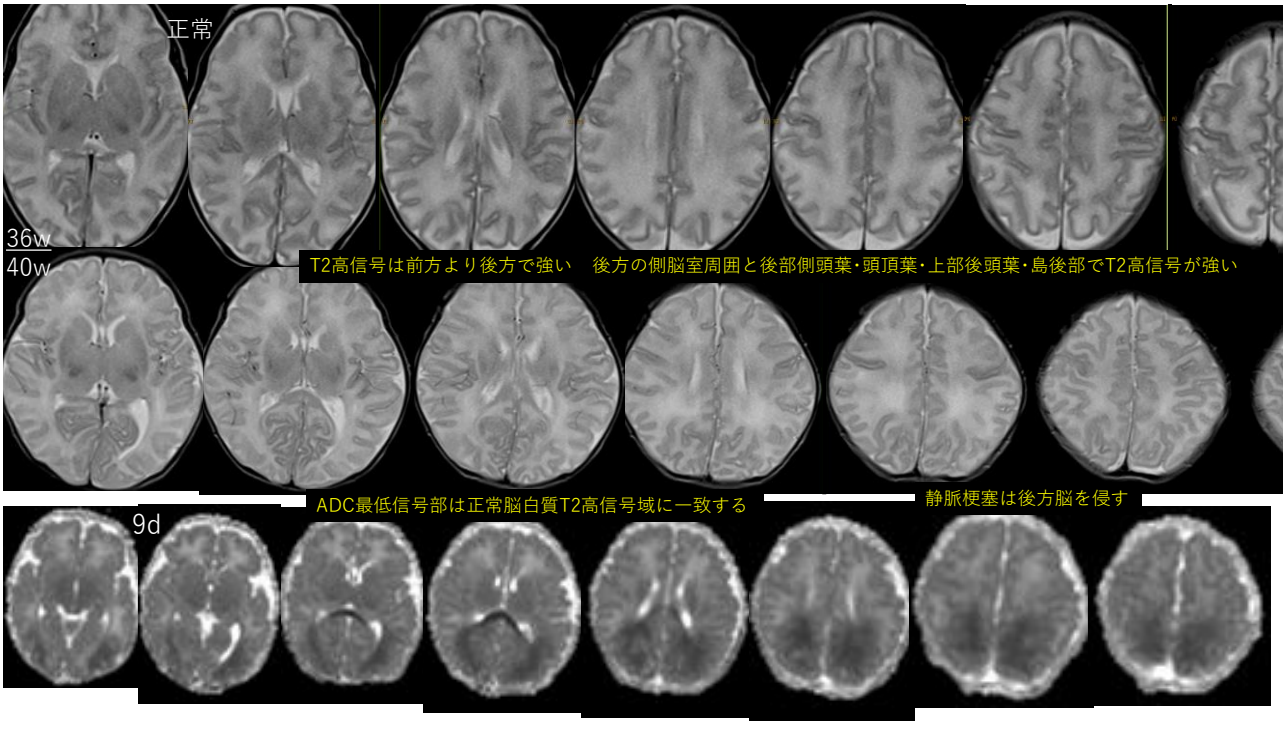

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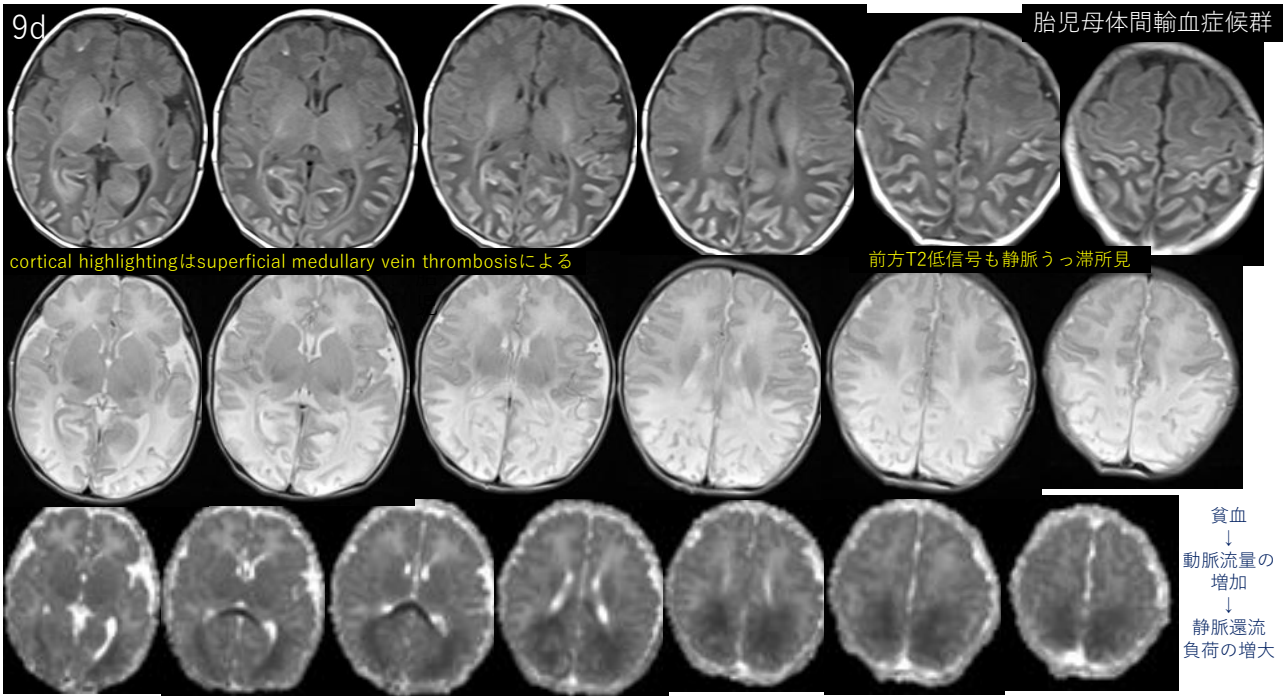
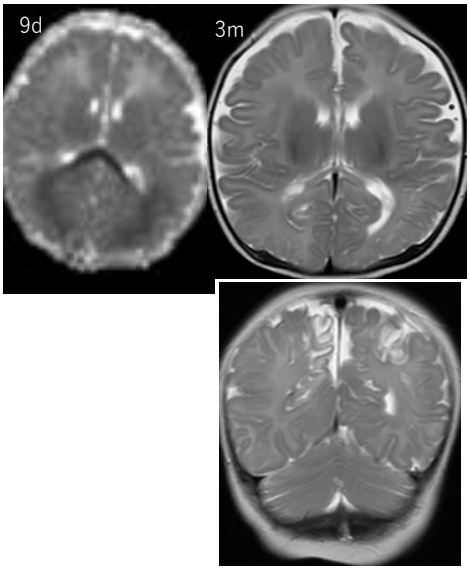
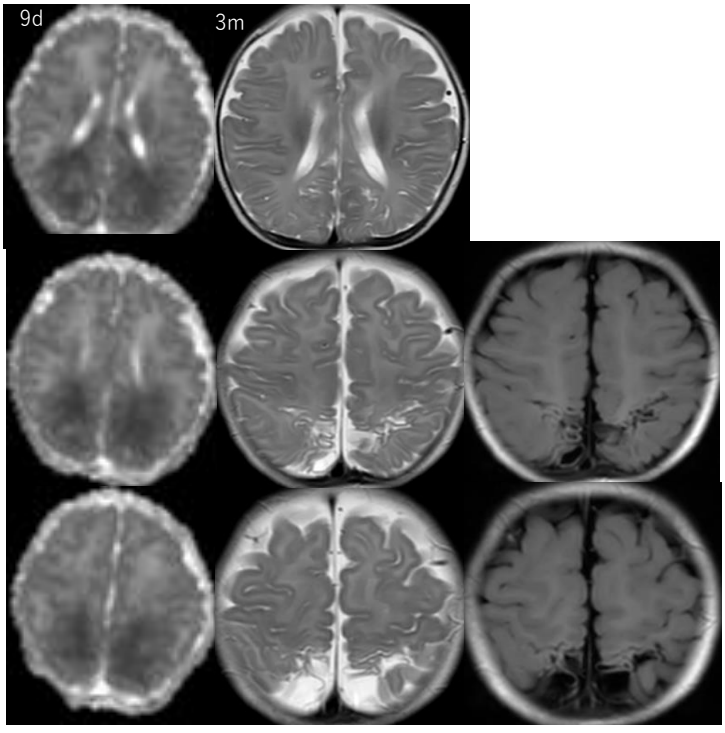


deep medullary vein thrombosisとsuperficial medullary vein thrombosisの併存

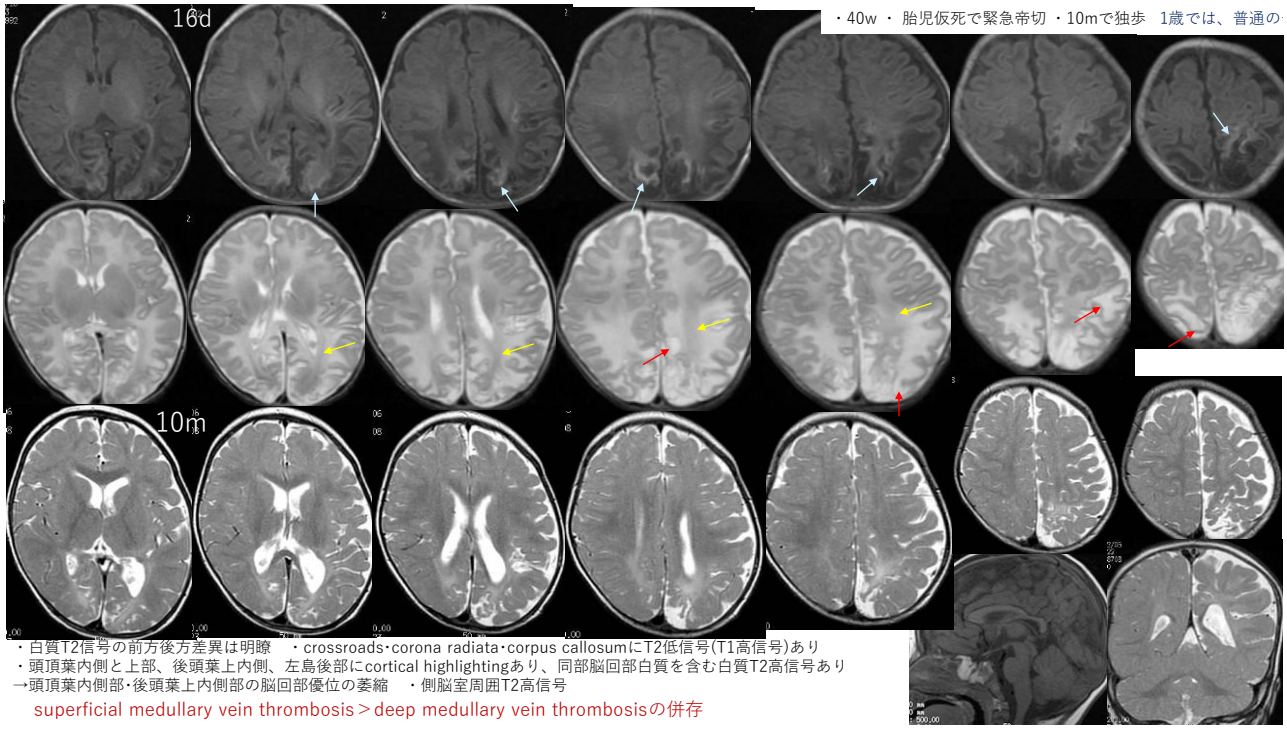
6





- ADC低信号部は萎縮
- 頭頂葉脳表の脳溝拡大と脳回白質部嚢胞

7

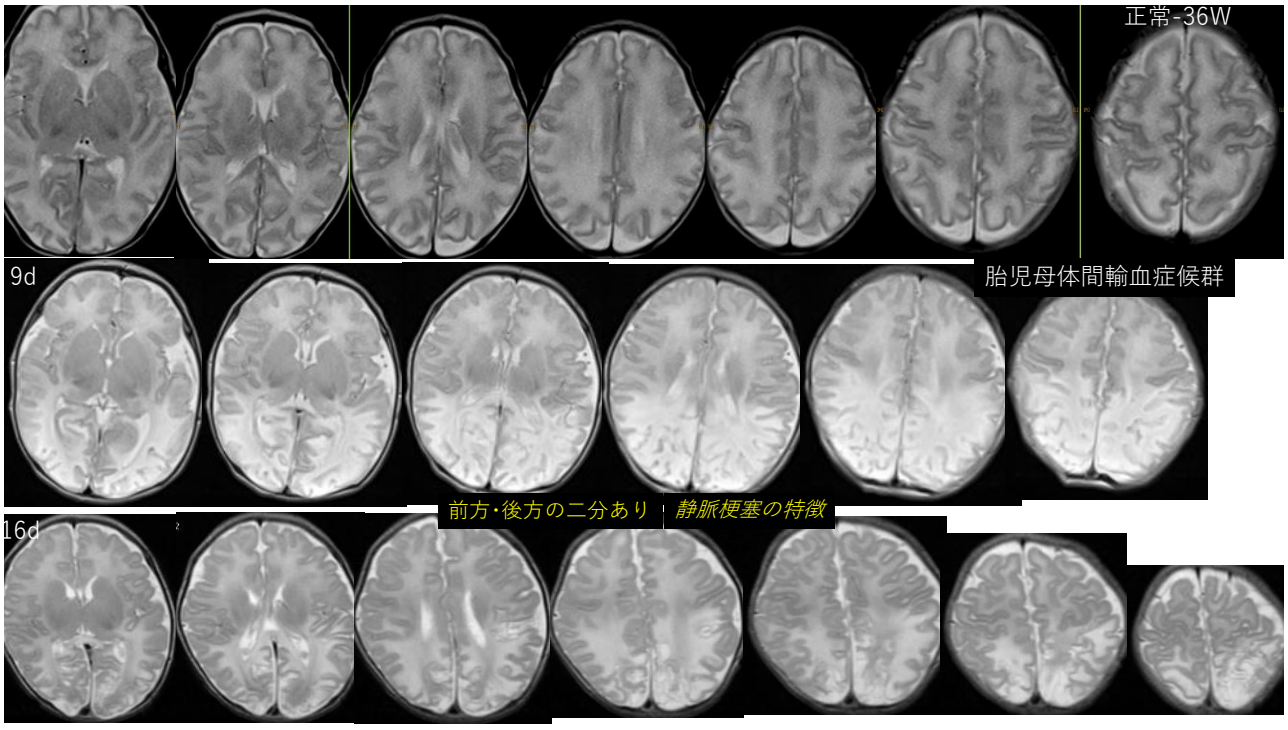


・40w ・ 胎児仮死で緊急帝切 ・10mで独歩 1歳では、普通の

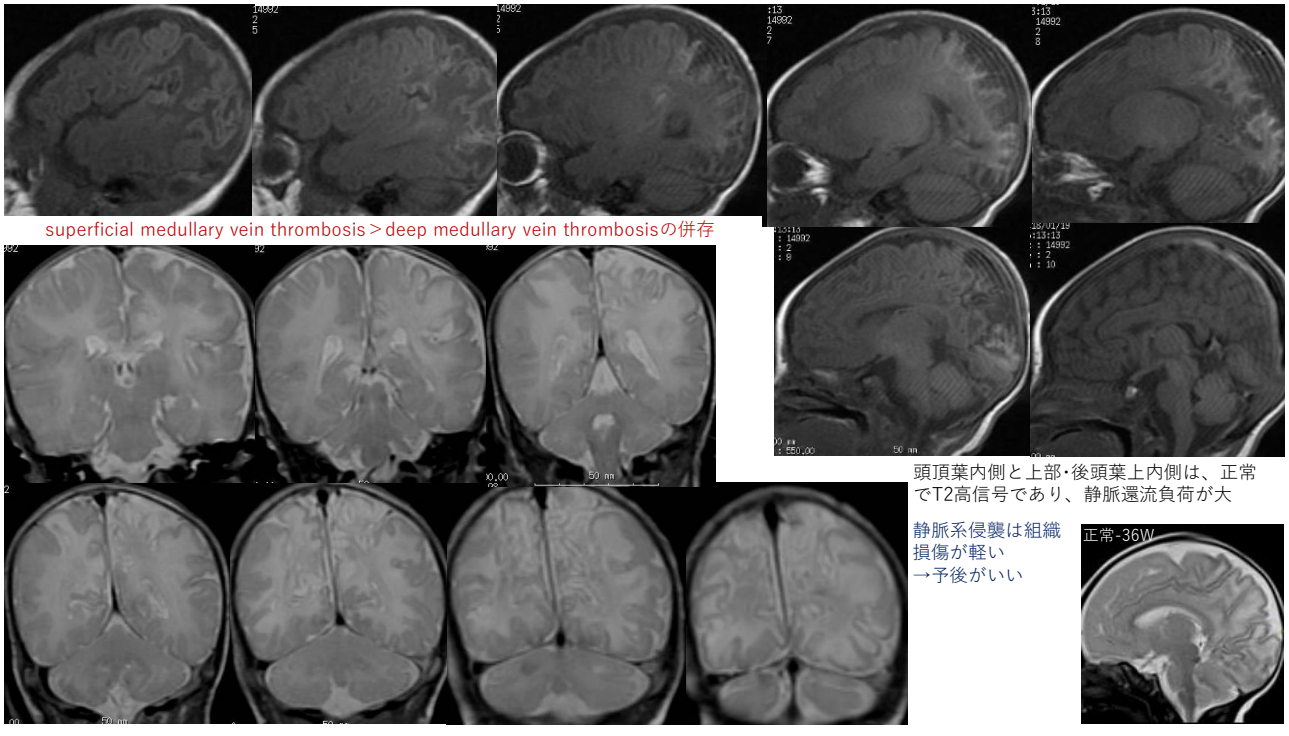
・白質T2信号の前方後方差異は明瞭 ・crossroads･corona radiata･corpus callosumにT2低信号(T1高信号)あり
・頭頂葉内側と上部、後頭葉上内側、左島後部にcortical highlightingあり、同部脳回部白質を含む白質T2高信号あり
→頭頂葉内側部･後頭葉上内側部の脳回部優位の萎縮 ・側脳室周囲T2高信号

superficial medullary vein thrombosis＞deep medullary vein thrombosisの併存

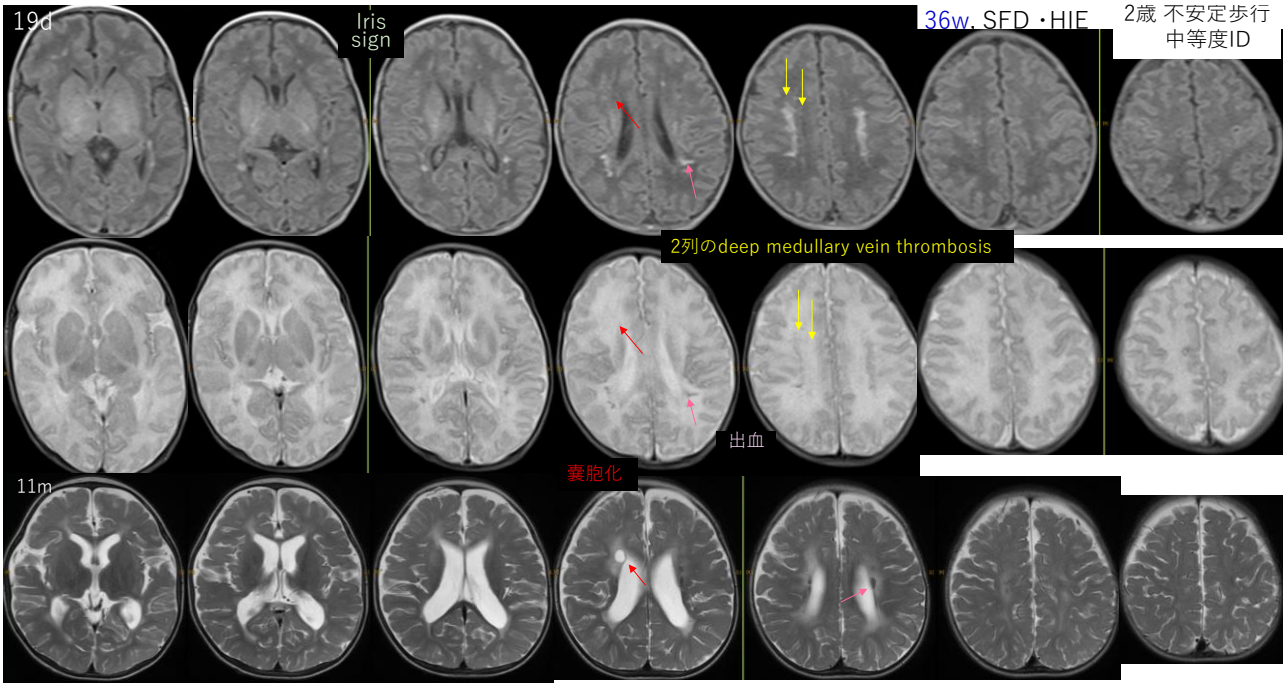
8


正常-36W
9d
胎児母体間輸血症候群
前方・後方の二分あり
静脈梗塞の特徴
16d

9

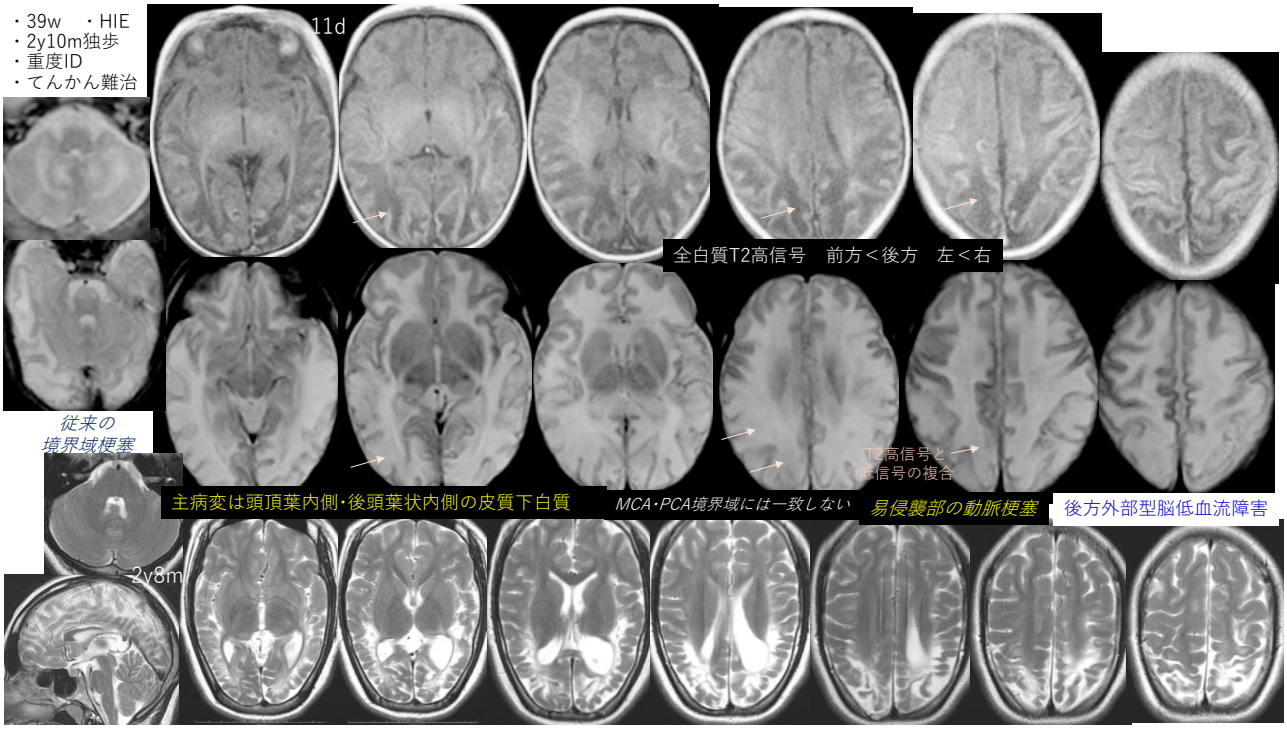

superficial medullary vein thrombosis＞deep medullary vein thrombosisの併存
頭頂葉内側と上部・後頭葉上内側は、正常でT2高信号であり、静脈還流負荷が大
静脈系侵襲は組織損傷が軽い
→予後がいい
正常-36W

10

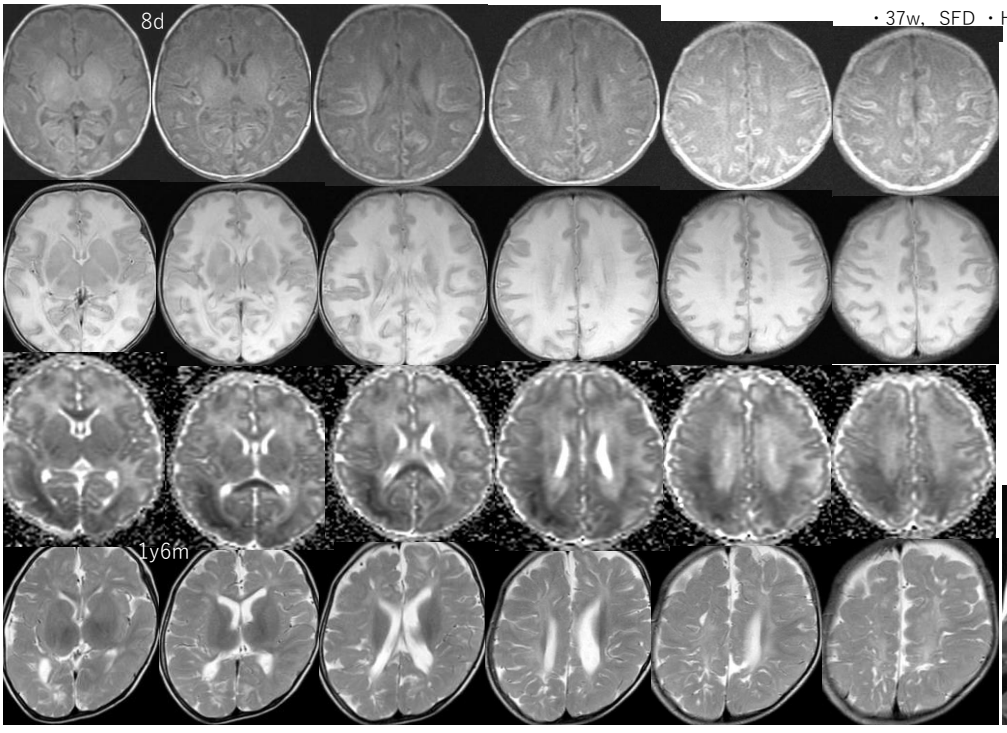


deep medullary vein thrombosis　　内部型脳低血流障害・早産白質障害ではない

11



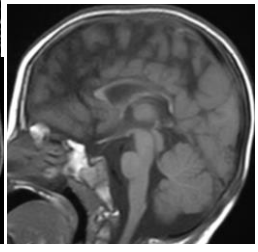
12



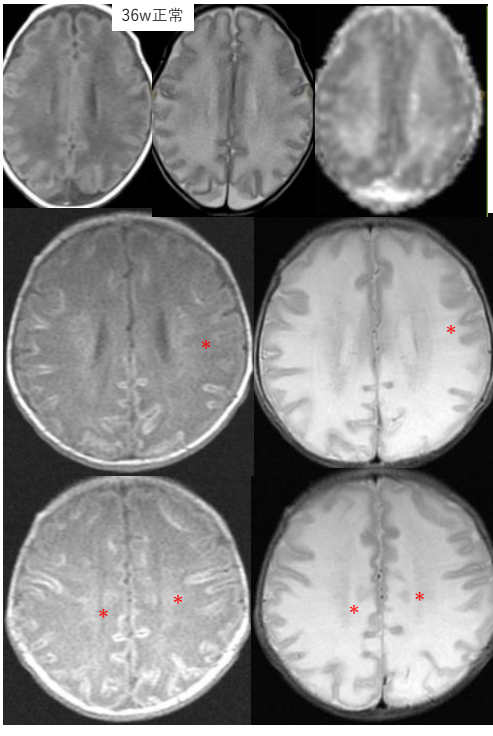
・37w, SFD ・HIE ・座位3y0mまで ・重度ID

- 白質はびまん性にT2高信号
  - ・後方＞前方は少しあり
  - ・元のADC高信号(T2高信号･T1低信号)の白質にADC低信号(T1高信号･T2低信号)病変が重なる
- 側脳室周囲3c領域にはT2低信号･T1高信号が重なる
  →T2高信号病変
- ADC最低信号部は右側頭葉･後頭葉･頭頂葉の皮質下白質にあり。右前頭葉皮質下白質はADC弱低信号である
  - ・対側同部はADC弱低信号である
  →皮質下白質優位の萎縮
  これが従来の周生期境界域梗塞の病巣である　×PCA･MCA境界域
- cortical highlightingは全脳にあり　後方＞前方

全脳型脳低血流障害

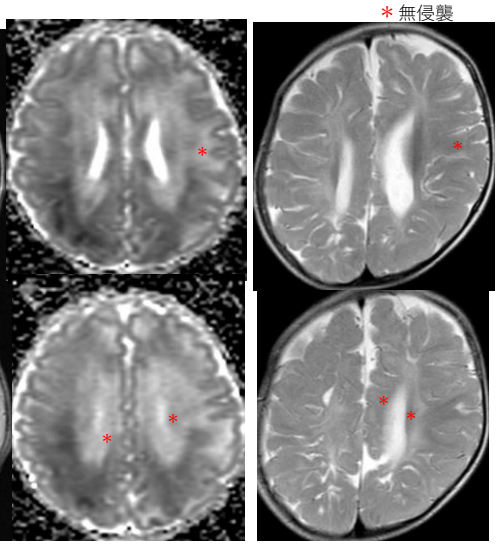


13



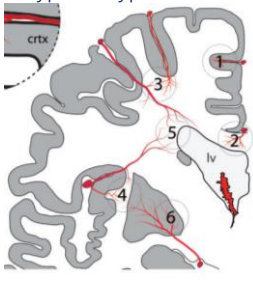
ADC低信号部は
T2高信号･T1低信号の腫大した白質内のT1高信号･T2低信号部にあたる
ADC低信号部は
1. 右頭頂葉の皮質下部と放線冠外側部(3c領域の外側)
2. 両頭頂葉脳回基部から放線冠外側部(3c領域の外側)
3. 右前頭葉上部と左前頭葉の上前部の脳回基部から放線冠外側部(3c領域の外側)

＊無侵襲



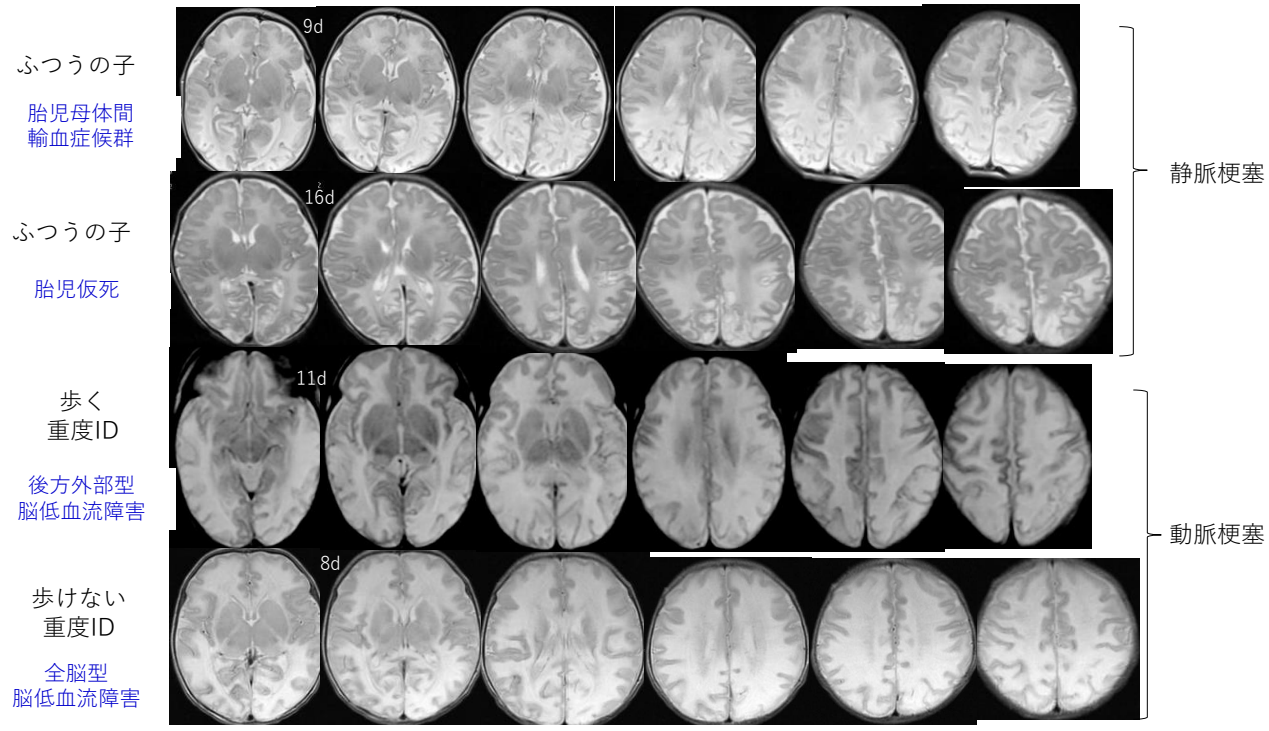
- 3c領域はADC低信号と高信号の混在
- その他白質の大半はADC高信号

type 3とtype 5が主

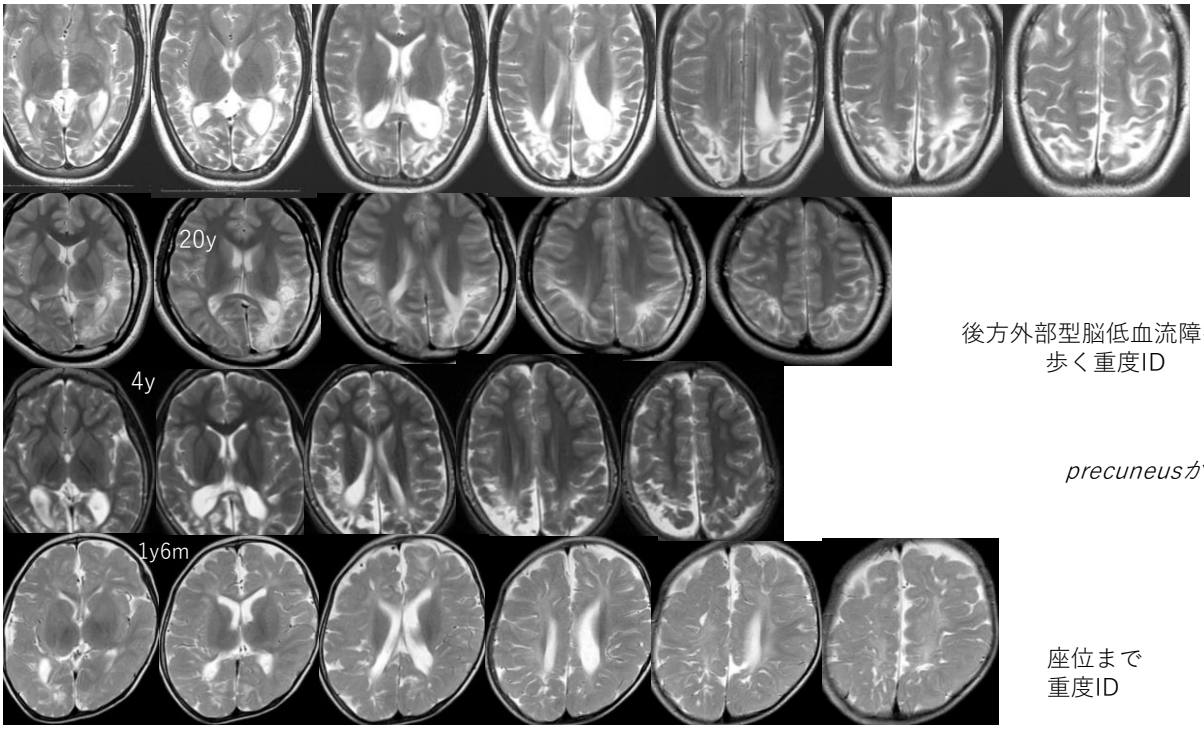


➢ 3c領域は脳低血流障害による易侵襲性があるが、MR画像上の拡散低下は免れる

14



15



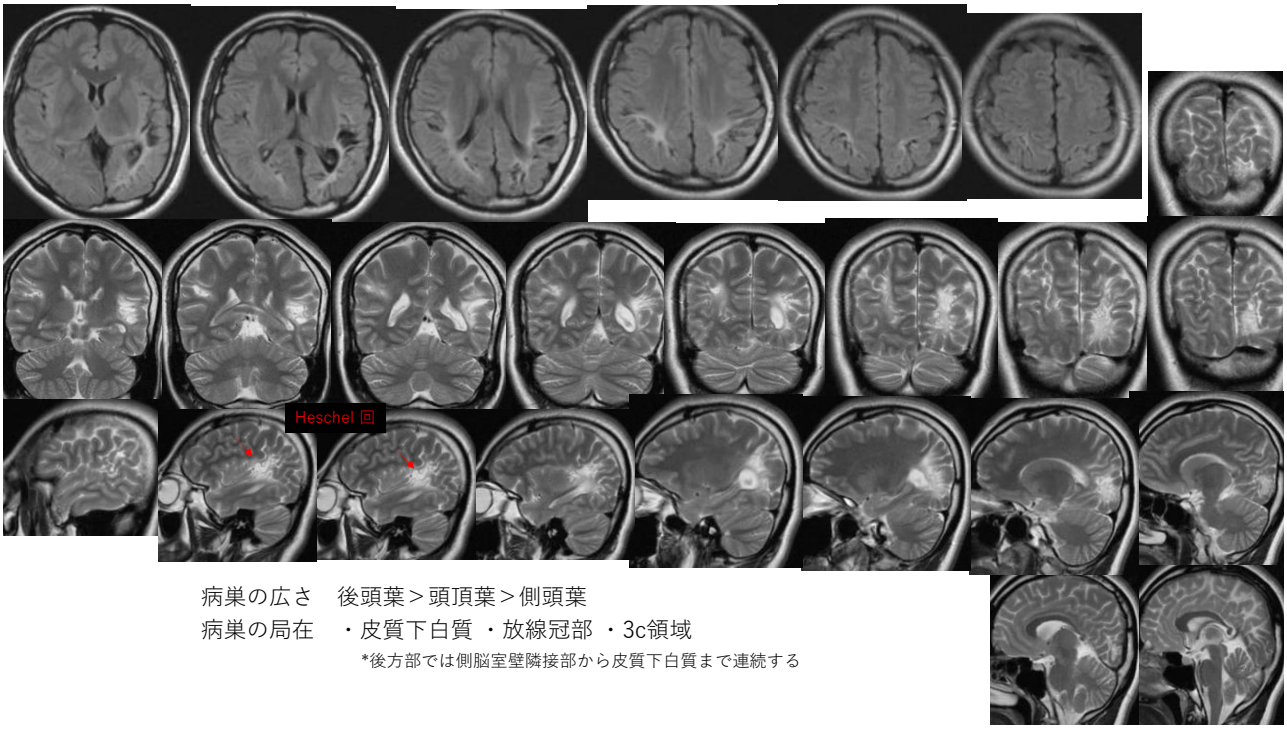
後方外部型脳低血流障害は
歩く重度ID

*precuneus*か

座位まで
重度ID

16

17

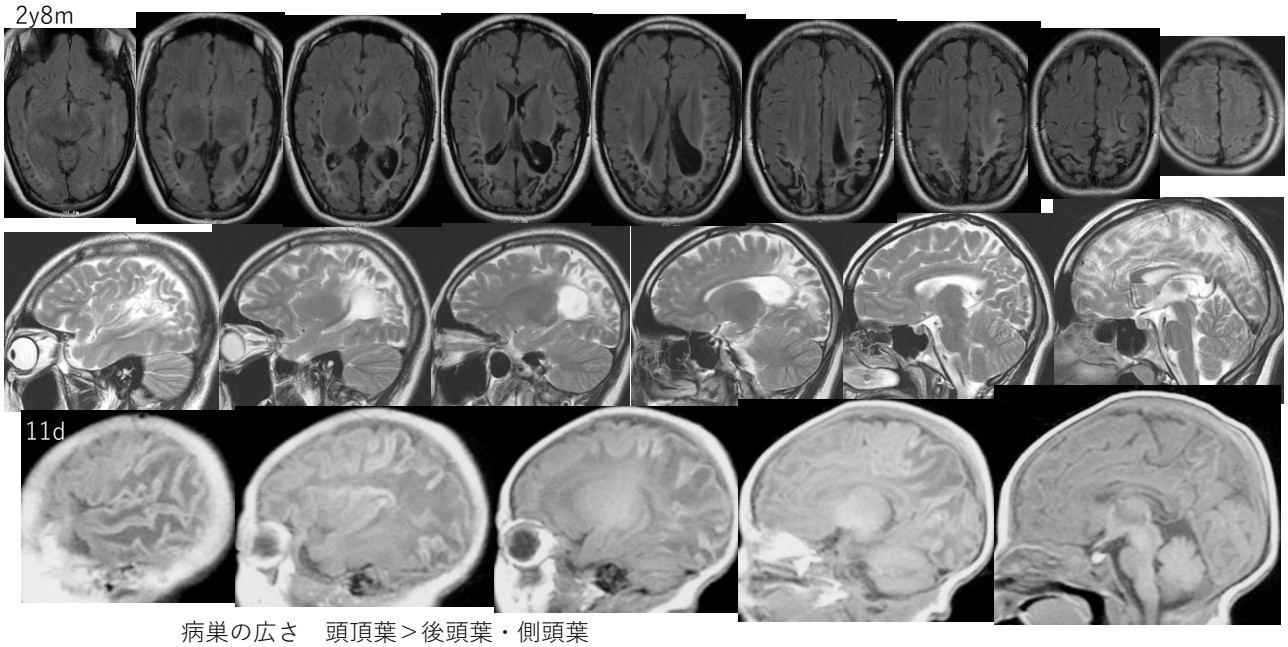


病巣の広さ　後頭葉＞頭頂葉＞側頭葉

病巣の局在　・皮質下白質 ・放線冠部 ・3c領域

*後方部では側脳室壁隣接部から皮質下白質まで連続する

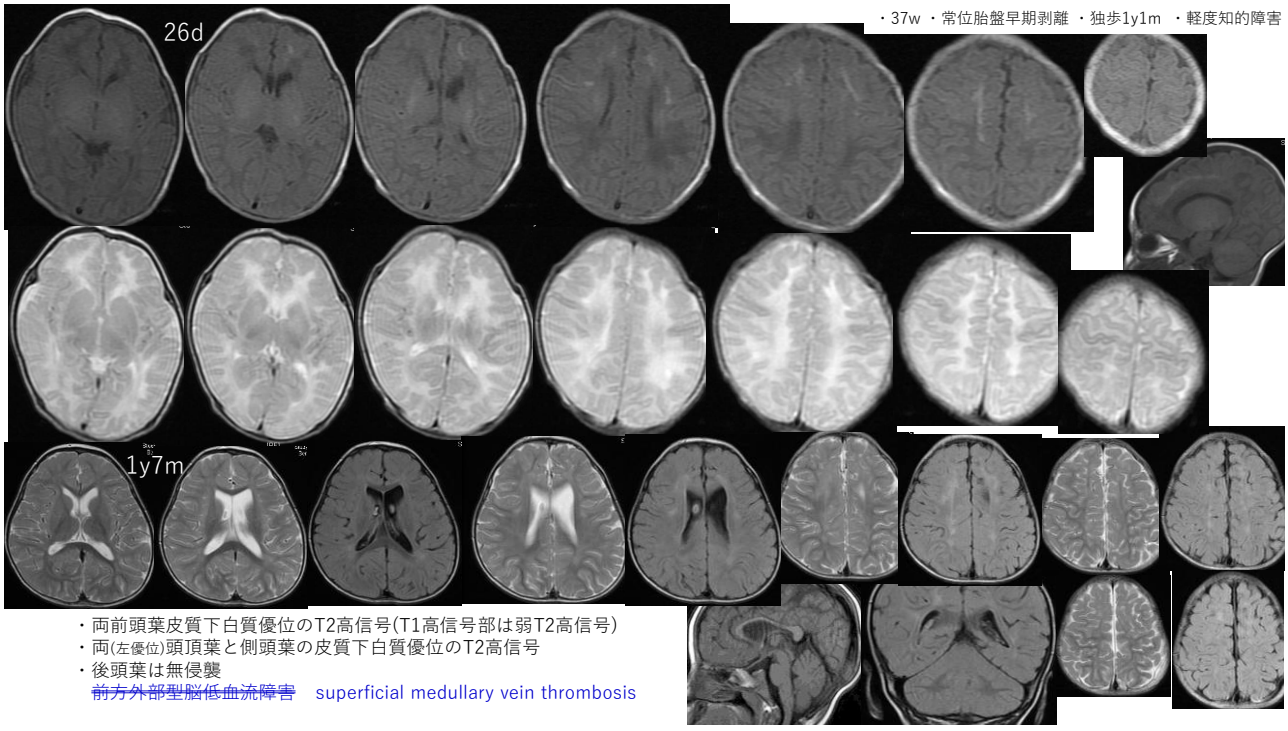
18



病巣の広さ　頭頂葉＞後頭葉・側頭葉

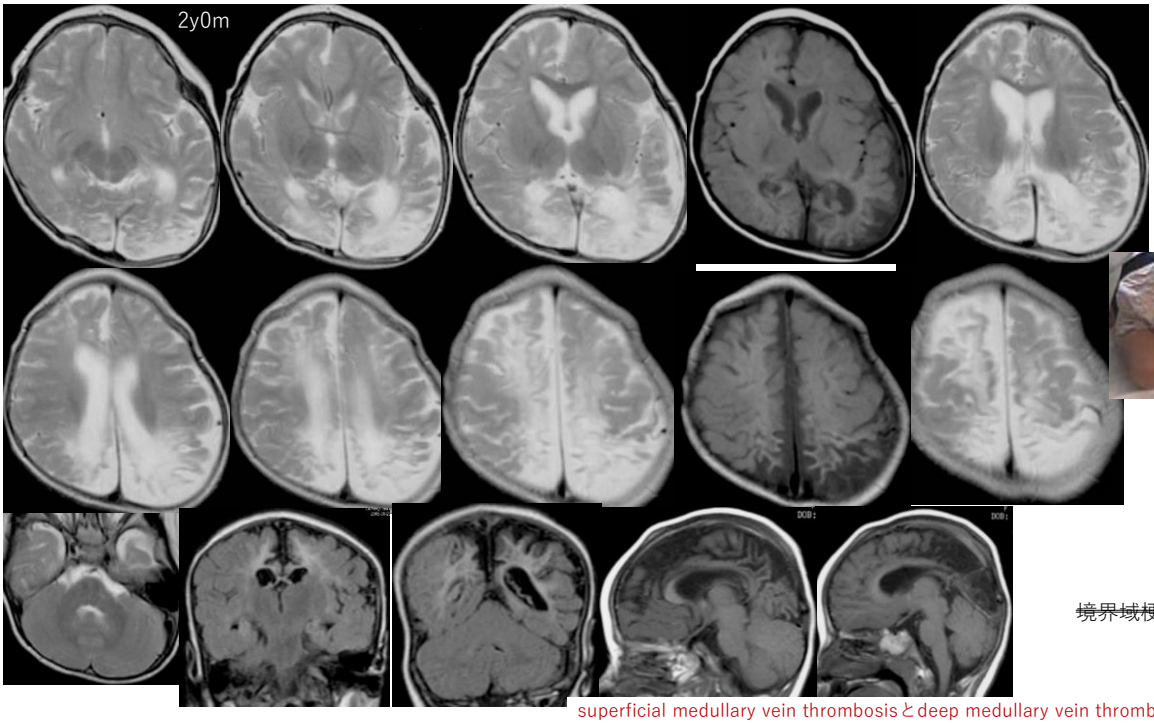
病巣の局在　・皮質下白質 ・放線冠部 ・3c領域　*後方部では側脳室壁隣接部から皮質下白質まで連続する

19



・両前頭葉皮質下白質優位のT2高信号(T1高信号部は弱T2高信号)
・両(左優位)頭頂葉と側頭葉の皮質下白質優位のT2高信号
・後頭葉は無侵襲
~~前方外部型脳低血流障害~~　superficial medullary vein thrombosis

20

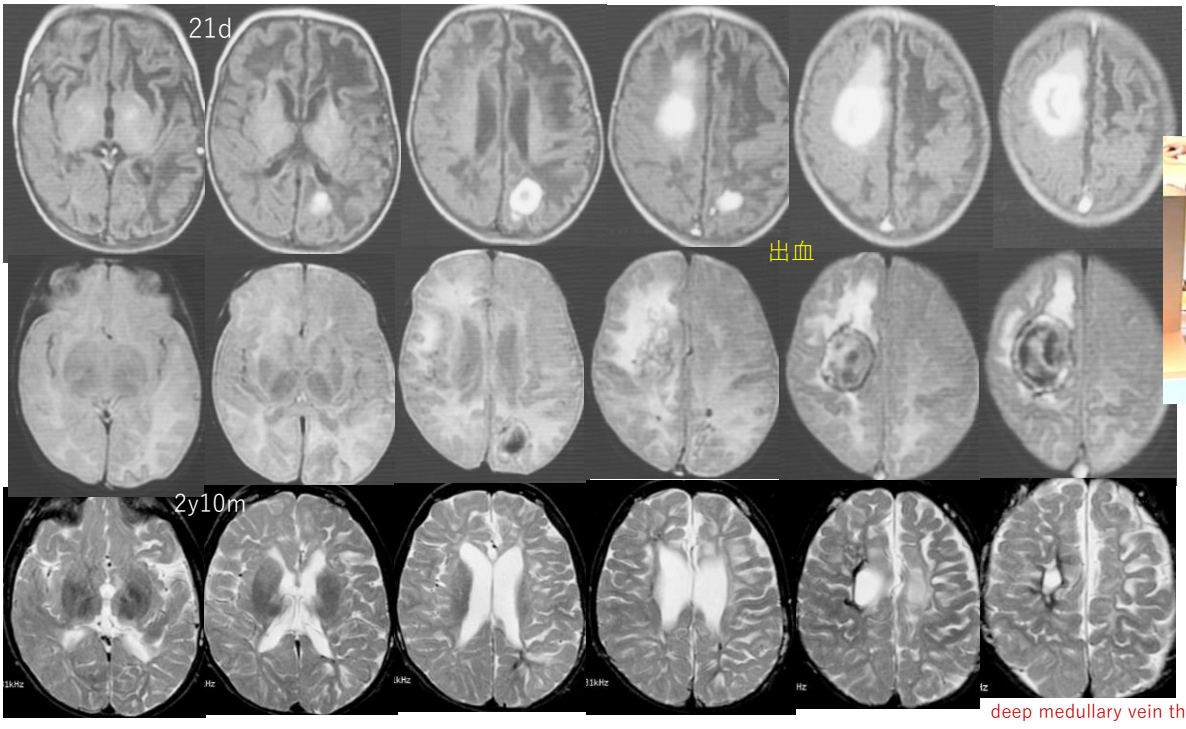


39w　HIE
横地分類A3

~~境界域梗塞~~

superficial medullary vein thrombosisとdeep medullary vein thrombosisの併存

21



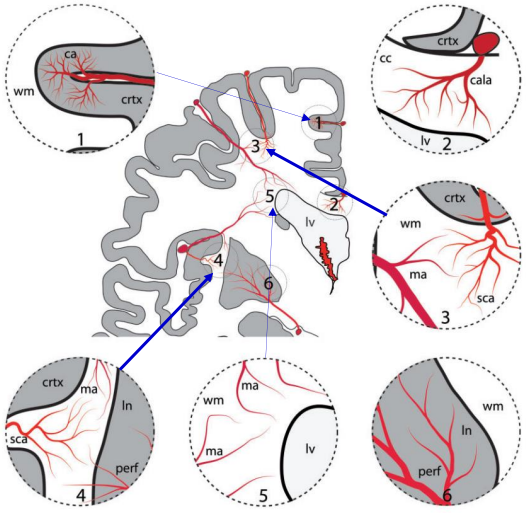
40w
つたい歩き
3y9m
最重度ID

deep medullary vein thrombosis

22

周生期脳低血流障害の考え方

1. 脳低血流の主易罹患部位は皮質下白質(Type 3)・島部白質(Type 4)・皮質谷部(type 1)・放線冠部(type 5)である。これとは別に、側脳室周囲3c領域は病因非特異的に侵されやすい



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Type 5~6：内部型脳低血流障害
Type 1~6：全脳型脳低血流障害

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周生期脳低血流障害の考え方

2. 周生期脳には軽度の脳血流低下*でも損傷を受ける脆弱部が存在する
   *成熟脳では境界域梗塞にも至らない
3. この脆弱部はMRIのT2高信号となる白質である
   ・3c領域(crossroads・corpus callosum・corona radiata)
   ・頭頂葉内側 ・後頭葉上後側 ・前頭葉上側
   ✓ 一部は3大脳動脈境界域内にある *→境界域梗塞と誤認*
4. 脳低血流による損傷部の静脈灌流は阻害され、静脈梗塞はふつうに併存しうる
   ・動脈圧低下による静脈圧の低下 ・静脈還流路の損傷 ・ 組織破壊物質の流入
   ✓ 側脳室周囲白質(type 5)の動脈血流低下はこれを助長する

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