-

o you by

Browse Posters » Search result » Poster ECR 2022 / C-21620

POSTER SECTIONS

ECR 2022 / C-21620

Brain imaging patterns by magnetic resonance imaging in pediatric population using automatic segmentation by VolBrain

Congress:

ECR 2022

Poster Number:

C-21620

Type:

Scientific Exhibit

Keywords:

Radiographers, MR, Segmentation, Tissue characterisation

Authors:

M. Silvério, M. Pragosa, M. M. C. P. Ribeiro

DOI:

10.26044/ecr2022/C-21620

DOI-Link:

https://dx.doi.org/10.26044/ecr2022/C-21620

Purpose

The interpretation of the pediatric brain is challenging due to the fact that its development is a dynamic process that continuously and rapidly changes in the macro- and microstructural level[1-4], especially in the first 2 years of life[5]. Another issue that makes interpretation difficult is the small size of brain structures and the limited experience of radiologists with the pattern and variability of maturation's activity[4]. Consequently, there is some difficulty in distinguishing what is normal from what is pathological. The Magnetic Resonance allows characterization of...

Read more

Methods and materials

An observational study was conducted, and a retrospective quantitative methodology was followed. All brain MRI scans performed at a University and Paediatric Hospital between 1th January and 31 December 2021, were analyzed. Examinations of children aged between 0 and 5 years at the time of the examination were included. Exclusion criteria were images with low quality, resulting from movement artefacts, or when they presented any pathology. The sample selection was carried out according to a systematic random sampling[27], where the examinations whose last file number...

Read more

Results

The 103 scans were analysed in order to obtain quantitative data of the structures under study. The correlation analysis allowed concluding that there is a relationship between the total volume of the structures (brain: ᴘ=0.824, p<0.01; cerebellum: ᴘ= 0.748, p<0.01; lateral ventricles: ᴘ= 0.305, p<0.01; caudate nucleus: ᴘ= 0.709, p<0.01; putamen: ᴘ= 0.799, p<0.01; thalamus: ᴘ= 0.663, p<0.01; globus pallidus: ᴘ= 0.604, p<0.01; hippocampus: ᴘ= 0.763, p<0.01; amygdala: ᴘ= 0.677, p<0.01; nucleus accumbens: ᴘ=0.530, p<0.01) and age, and between GM volume in the brain and...

Read more

Conclusion

Some studies report that the cerebellum develops significantly in the first year of life, with a 15% increase by the age of 2 years[16,17,22]. This increase is supported by the statistical differences found in the age groups [0-1[and [1-2[, which are not found in the other age groups. These data also confirm what is described in the literature, namely the rapid growth of brain structures after birth and in the first 3 months[23]. Gilmore et. al. [23] and Knickmeyer et. al. [16] describe that...

Read more

Personal information and conflict of interest

M. Silvério: Nothing to disclose M. Pragosa: Nothing to disclose M. C. P. Ribeiro: Nothing to disclose

Read more

References

Flood TF, Bhatt PR, Jensen A, Maloney JA, Stence N V, Mirsky DM. Age-dependent signal intensity changes in the structurally normal pediatric brain on unenhanced T1-weighted MR imaging. Am J Neuroradiol [Internet] 2019 [cited 2021 Feb 15];40(11):1824–8. Available from: http://dx.doi.org/10.3174/ajnr.A6254 Barkovich MJ, Li Y, Desikan RS, Barkovich AJ, Xu D. Challenges in pediatric neuroimaging. Neuroimage2019;185:793–801. Miller JH, Bardo DME, Cornejo P. Neonatal Neuroimaging. Semin Pediatr Neurol [Internet] 2020 [cited 2021 Feb 15];33. Available from: https://doi.org/10.1016/j.spen.2020.100796 Levman J, MacDonald P, Lim AR, Forgeron C, Takahashi E....

Read more

Age range	Sequence	slice	Thickness (mm)	TR (ms)	TE (ms)	Field Of View (mm)
[0-1[	T1	Axial	0,7–2	[illegible]	2	160–220
	T1 FLAIR	Axial e Sagital	3,5–4	[illegible]	6–10	160–220
[1-2[	T1	Axial	3	6	2	150–220
	T1 FLAIR	Axial e Sagital	4	2500–11000	[illegible]	150–220
[2-3[	T1	Axial	0,8–3	6	2	220–240
	T1 FLAIR	Sagital	4	[illegible]	7–8	220–240
[3-4[	T1	Axial	0,8–3	6,0–6,7	2,5–2,8	–
	T1 FLAIR	Sagital	4	[illegible]	6–8	200–240
[4-5[	T1	Axial	0,8–3	6,0–6,6	2,5–2,8	–
	T1 FLAIR	Sagital	4	2704	8	240
[5-6[	T1	Axial	0,8–3	[illegible]	2,5–2,8	–
	T1 FLAIR	Sagital	4	[illegible]	[illegible]	200–260

Fig 1: MR Protocols applied.

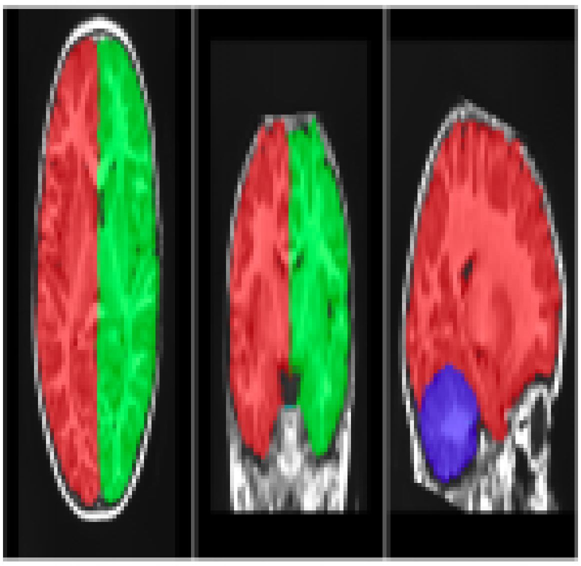

Fig 2: Segmentation of cerebrum (right hemisphere in red and left hemisphere in green)...

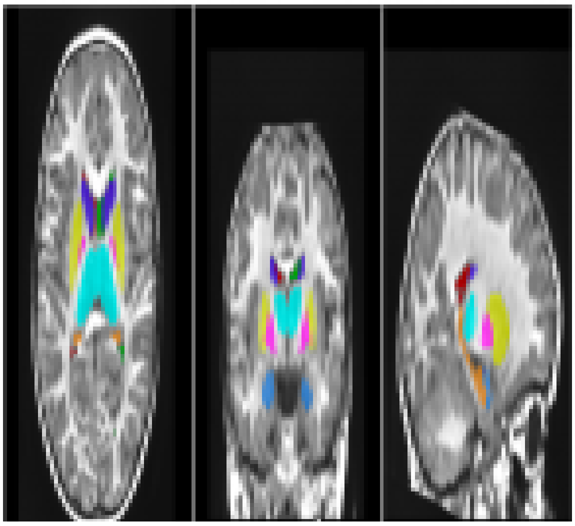

Fig 3: *Segmentation of structures in the 3 orthogonal planes.*