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ECR 2023 / C-24504

Neuroimaging, a key role in diagnosis of diffuse axonal injury. CT and MRI patterns every radiologist should know

Congress: ECR 2023 Poster Number: C-24504 Type: Educational Exhibit Keywords: Neuroradiology brain, CT, MR, Education, Trauma Authors: I. Jovanoska, D. Veljanovski, A. Gjoreski, I. Lombardo DOI: 10.26044/ecr2023/C-24504 DOI-Link:

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Learning objectives

- to understand the common mechanisms and pathology of diffuse axonal injury (DAI) - to recognize the radiological appearances on Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) - to understand the role and clinical importance of neuroimaging in patients with DAI

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Background

Diffuse axonal injury as the name implies is a traumatic stretch/disruption of axons that occurs with sudden acceleration/deceleration or rotation of the brain. Patients with DAI are most commonly injured in high-velocity vehicle crashes and DAI represents 50% of all primary intraaxial traumatic brain lesions in moderate/severe traumatic brain injury (TBI). It has 80-100% autopsy prevalence in fatal injuries and even occurs in utero if pregnant woman subjected to sufficient force. Typically, patients present with loss of consciousness at the time of accident and often...

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Findings and procedure details

Non enhanced CT is the first-choice neuroimaging tool in all emergency head trauma patients, but MRI is the modality of choice for assessing suspected diffuse axonal injury. It is a potentially difficult diagnosis to make on imaging alone. Some patients with relatively normal CT scans may have significant unexplained neurological deficit, in those cases DAI should be suggestive and confirmed with MRI. On CT the finding can be subtle or absent, but that does not categorically exclude the presence of axonal injury. Contrary to the... Read more

Conclusion

DAI as a diagnosis should be suggestive in TBI patients with clinical symptoms disproportionate to imaging findings. More than 30% of patients with negative CT have positive MR, so in general it is clinically developed based on clinical manifestations and MRI findings. Neuroimaging plays a significant role, by detecting the location and number of lesions, not only in diagnosis but also in determining the outcome of patients after DAI.

Personal information and conflict of interest

I. Jovanoska: Nothing to disclose D. Veljanovski: Nothing to disclose A. Gjoreski: Nothing to disclose I. Lombardo: Nothing to disclose **Read more**

References

Fig.1: © DIAGNOSTIC IMAGING:BRAIN, THIRD EDITION, Anne G.Osborn, Karen L.Salzman and Miral D. Jhaveri ISBN: 978-0-323-37754-6 Fig.2: Case courtesy of Matt Skalski, Radiopaedia.org. From the case rID: 38437 Fig.2, Fig.3, Fig.4, Fig.5, Fig.6: Case courtesy of "Neuroradiology Unit at Radiology Department, Careggi University Hospital Florence 2022" Anne G.Osborn, Karen L.Salzman and Miral D. Jhaveri, DIAGNOSTIC IMAGING:BRAIN, THIRD EDITION, ISBN: 978-0-323-37754-6 Gaillard F, Sharma R, Micał W, et al. Diffuse axonal injury. Reference article, Radiopaedia.org (Accessed on 21 Feb 2023) https://doi.org/10.53347/rID-13562 Andrew D. Schweitzer,Sumit...

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Fig 1: Sagittal graphic illustrates multiple diffuse axonal injury hemorrhagic foci...



Fig 5: 25 year old man, with head trauma. Axial SWI shows multiple punctuate and...



Fig 6: 25 year old man, with head trauma, same as in Fig.5. Axial FLAIR and DWI with...



Fig 2: 23 years old girl with head injury in a car accident CT



Fig 3: Same 23 years old girl.as in Fig.2. MRI performed 7 days



Fig 4: Axial T2*GRE: Bilaterally in white matter multiple

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EPOS™ - C-24504 later: Axial FLAIR:



Fig 7: Illustration depicting the differential motion that causes axonal injury in...

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