

## The role of brain MRI in mesial temporal lobe epilepsy

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**Background:** Mesial temporal lobe epilepsy is the most common form of epilepsy. Since its pathophysiological substrate is usually related to hippocampal sclerosis, the seizures are typically resistant to antiepileptic drugs and surgical treatment is considered in most patients. Defining the affected region on medical imaging is of paramount importance in this situation. The study aimed to evaluate the role of brain magnetic resonance imaging (MRI) in patients with suspected mesial temporal lobe epilepsy and its ability to reveal the responsible epileptogenic focus.

**Material and methods:** The study included 96 patients aged 3 to 48 years old with clinical suspicion of temporal lobe epilepsy who underwent a brain MRI scan at the Medpark International Hospital in the period 25.01.2017 – 25.01.2018. The scans were performed on a *Siemens Essenza* 1.5 Tesla MRI scanner using a specially designed epilepsy imaging protocol (sag T1W, T2W, T2-tirm, DWI). Additional sequences (such as cor T2 FLAIR, T1 IR + contrast) were also included if required.

**Results:** From a total of 96 patients, brain MRI revealed the potential epileptogenic region in 27 (28%) cases. The MRI findings in these patients included increased signal intensity in the region of hippocampus (23 patients), hippocampal atrophy or volume loss (19 patients), enlarged temporal horn (11 patients), smaller temporal lobe (10 patients) and collateral white matter atrophy (6 patients).

**Conclusions:** In our study, mesial temporal sclerosis was the most common identifiable cause of seizures. Even though brain MRI features may vary, the increased hippocampal signal intensity was the most consistent finding.

**Key words:** MRI, mesial temporal epilepsy, mesial temporal sclerosis.

## The roles of CT and MRI techniques in ischemic stroke

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**Background:** Ischemic stroke is the second most common cause of death and the leading cause of disability. Imaging modalities such as computed tomography (CT) and magnetic resonance imaging (MRI) are essential in diagnosing the stroke and guiding the treatment strategy. Choosing a specific technique might be challenging in different clinical situations.

**Material and methods:** The study involved searching PubMed database with the following keywords: ischemic stroke, computed tomography, magnetic resonance imaging. The search revealed over 1100 articles, from which 52 were relevant for the studied topic.

**Results:** A head CT scan can quickly exclude the presence of hemorrhage and reveal related signs of ischemia such as the loss of contrast between the gray and white matter, hyperdense vessel sign, etc. CT imaging can also exclude other pathologies that may resemble stroke clinically. MRI is generally more sensitive than CT in the detection of ischemia, although an MRI exam is more complicated and time-consuming, which can limit its applications in an emergency. The major advantages of MRI are also related to absence of radiation and relatively safer contrast agents. Imaging vertebral and carotid arteries and their branches is an essential part of a stroke protocol and both CT and MR angiography techniques can be used for this purpose, each having its own advantages and disadvantages. A variety of newly emerged techniques such as perfusion computed tomography of the brain can also significantly improve the detection of fresh ischemia.

**Conclusions:** It is most likely that CT and MRI will coexist for decades, and the imaging modality for patients with acute neurological deficits will be decided according to local conditions and patient's characteristics. Patients are likely to benefit from developmental research of both imaging techniques.

**Key words:** ischemic stroke, computed tomography, magnetic resonance imaging.

## The importance of computed tomography in the management of renal trauma

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**Background:** Contrast-enhanced computed tomography (CE-CT) has become the imaging modality of choice for evaluating abdominal trauma and has replaced the intravenous urography as the primary modality for assessing suspected renal injuries. The aim of this study was to assess the value of CE-CT in the management of renal trauma.

**Material and methods:** The study included 11 patients aged 4 to 17 years who underwent CE-CT for assessment of renal trauma at the Institute for Mother and Child Health Care between May 2016 and February 2018.

**Results:** CE-CT has allowed grouping renal injuries into five grades of severity according to the American Association of Surgeons in Trauma organ injury severity scale (grade 1 – parenchymal contusions and isolated subcapsular hematomas; grade 2 – superficial cortical lacerations < 1 cm in depth and nonexpanding perirenal hematomas; grade 3 – lacerations > 1 cm in depth without extension into the collecting system or evidence of urinary extravasation; grade 4 – deep lacerations that involve the collecting system, traumatic arterial thrombosis or urinary extravasation; grade 5 – shattering of the kidney into multiple fragments and devascularizing injuries of the renal pedicle. In this study, 45% of patients had grade 3 renal injuries, 36% – grade 4 renal injuries and 18% – grade 5 renal injuries. The obtained details about the injured anatomical structures proved indispensable for guiding the treatment strategy and surgical interventions.

**Conclusions:** Computed tomography provides valuable information in the evaluation of renal trauma, guiding the treatment strategy and surgical interventions in selected patients.

**Key words:** renal trauma, contrast-enhanced computed tomography, grades of renal injuries.

## Evolving role of nuclear medicine modalities in the evaluation of renal diseases

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**Background:** Nuclear medicine in renal diseases is becoming one of the most important modalities of investigation.

**Material and methods:** The study involved a search of the Pubmed Central database with the keywords *renal scintigraphy, renal diseases, nuclear medicine, kidney function*. The retrieved articles were studied and nuclear medicine techniques used for evaluation of kidney diseases were summarized.

**Results:** The search revealed 9899 articles, which were subsequently filtered according to their relevance. The results show several groups of radiopharmaceuticals used for evaluation of renal function and renal abnormalities. *Tubular secretion agents* such as Tc-99m MAG-3 are most commonly used for evaluating renal function, obtaining renograms and a variety of parameters reflecting differential renal function such as time to peak activity, relative renal uptake ratios at 2 to 3 minutes, half time excretion, differential cortical excretion at 15 minutes, 20-min to peak count ratio, etc. *Glomerular filtration agents* such as Tc-99m DTPA and 125-I-labeled sodium iothalamate (Glofil) are commonly used for evaluation of glomerular filtration rate. *Renal cortical agents* such as Tc-99m DMSA and Tc-99m glucoheptonate are used for visualization of renal parenchyma due to their ability to bind for a sufficiently long period to the renal tubules, allowing their visualization. *Positron emission tomography agents* such as 2-deoxy-2-[fluorine-18]fluoro- D-glucose (18F-FDG) are commonly used for evaluation of patients with primary renal malignancies or metastatic renal lesions. A variety of other radiopharmaceuticals are also under development or used for research purposes.

**Conclusions:** Nuclear medicine is increasingly being used in patients with various renal abnormalities and its area of applications is expanding.

**Key words:** renal scintigraphy, tubular secretion agents, glomerular filtration agents, renal cortical agents.

## Le rôle de la résonance magnétique nucléaire dans le diagnostic et la localisation du cancer rectal

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**Introduction:** Le cancer rectal, bien qu'il partage de nombreuses caractéristiques du carcinome colorectal, a quelques aspects individuels. Ceux-ci sont principalement liés à sa position anatomique, ce qui a des implications dans l'imagerie préopératoire et l'évaluation de la technique chirurgicale. Bien que la tomographie par ordinateur (TDM) puisse faire le diagnostic, la résonance magnétique nucléaire (RMN) est devenue le point d'arrêt préopératoire. L'étude visait à évaluer la contribution de la résonance magnétique nucléaire (RMN) dans la détection du cancer rectal par localisation, propagation locorégionale et diagnostic différentiel avec le cancer sigmoïde et anal.

**Matériel et méthodes:** Un groupe de 24 patients, ayant un cancer colorectal suspecté, a été examiné par RMN du petit bassin entre août 2014 et décembre 2017.

**Résultats:** Suite à l'étude, les 24 patients atteints d'un cancer colorectal présumé ont été diagnostiqués avec un cancer rectal de localisation variée. Parmi ceux-ci: cancer rectal supérieur – 6 patients (25%); cancer rectal moyen – 3 patients (12,5%); cancer rectal inférieur – 8 patients (33,3%); mixtes – 7 patients (29,2%), dont: supérieur et moyen – 2 patients (8,3%), moyen et inférieur – 5 patients (20,9%).