THE ROLE OF DIFFUSION-WEIGHTED IMAGING IN THE DIFFERENTIAL DIAGNOSIS OF LIVER LESIONS

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Abstract
Introduction: Diffusion-weighted imaging [DWI] plays a significant role in distinguishing liver lesions. This study focuses on the significance of apparent diffusion coefficient [ADC] values in distinguishing between benign and malignant liver lesions.
Methods: A retrospective evaluation was conducted on patients who underwent liver MRI examinations at our clinic, and 378 liver lesions were found. The study comprised 141 women, 80 men, and 221 patients with liver lesions. The measured ADC values between benign and malignant lesions were compared. In addition, the lesion ADC value/CSF ADC value ratio was measured, and the relative ADC value was named.
Results: 118 hemangiomas, 59 simple cysts, 67 hydatid cysts, 3 focal nodular hyperplasias, 9 abscesses, 28 hepatocellular carcinomas, 88 metastases, and 6 lymphomas were evaluated. Simple cysts and hemangiomas had the most elevated ADC values compared to all other liver lesions. The ADC values for liver lesions classified as benign had a mean of 2.10 x 10⁻³ mm²/s, while malignant ones had a lower mean of 0.75 x 10⁻³ mm²/s. The ADC values of malignant liver lesions were lower compared to the benign lesions.
Conclusion: Using DWI combined with ADC values could be valuable in discerning between benign and malignant liver lesions. Besides, relative ADC values may also contribute to more objective results.

Keywords: Liver lesion, ADC, Diffusion-weighted imaging, MRI
INTRODUCTION
Correct diagnosis of liver lesions is crucial for effective therapy. However, identifying these lesions during routine radiology procedures can be challenging. Numerous studies have reported that Diffusion-Weighted Imaging [DWI] significantly distinguishes liver lesions [1-6]. DWI is an increasingly valuable tool in MRI technology. Its usage is growing alongside the advancements in this field, allowing for even more accurate and effective diagnoses [7]. It is necessary to perform this examination for imaging diffuse liver diseases, characterizing focal liver lesions, and evaluating the response to treatment [4]. It is a quick and non-invasive imaging technique that doesn't need injecting contrast material [8].

Diffusion refers to the motion of water molecules in biological tissues induced by thermal energy. The phenomenon of Brownian motion, which involves the random movement of water molecules, is closely affiliated with a technique that reflects the viscosity properties of various tissues. This technique can be utilized to gain insights into the characteristics of different tissues based on their viscosity.

DWI provides quantitative data with the apparent diffusion coefficient [ADC], independent from the imaged tissue’s T1 and T2 relaxation times [9-11]. Decreased ADC values are seen in tissues with high cellularity where the motion of water molecules is restricted. Increased ADC values are noticed in tissues with low cellularity where water molecules can move freely. Malignant lesions exhibit atypia in tissues and growth in extracellular space, leading to lower ADC values due to increased cellularity [12-14].

As the liver has a double blood pool, it is the second most frequent location for metastasis, following lymph nodes. At the term of diagnosis, 20-25% of patients with solid malignant tumors have liver metastasis. The incidence of primary hepatic tumors has risen remarkably over the past two decades despite metastatic liver lesions remaining the most prevalent form of malignant masses. Hepatocellular carcinoma [HCC] is the most prevalent hepatic tumor worldwide, followed by cholangiocarcinoma, which is also a primary hepatic tumor [15]. HCC is the cause of the second most common cancer-related dyings. It is ranked as the third most common form of cancer [13, 15]. The incidence of solid benign liver lesions is 20% [16]. The liver’s most common non-cancerous tumor is hemangioma. It is seen in 7% of the adult population. Its prevalence in the autopsy series is 7-20% [17]. The second most frequent tumor is Focal nodular hyperplasia [FNH], typically seen in adolescent females [18, 19]. Hepatocellular adenoma is an infrequent neoplasm originating from the liver, typically found in women who use oral contraceptives [2, 20].

In previous studies, cysts and hemangiomas had elevated ADC values, while HCC and liver metastasis had low values. Therefore, ADC values have proven valuable in discriminating between benign and malignant liver lesions and in characterizing these lesions [3, 21, 22].

Our study aimed to explore the diagnostic prospect of DWI in distinguishing between benign and malignant liver lesions. Specifically, we measured the ADC values to determine the ability of DWI to differentiate between the two types of lesions accurately. By doing so, we hope to contribute to developing more effective diagnostic and treatment strategies for liver lesions.

MATERIAL AND METHODS
A retrospective evaluation was performed on patients who underwent liver MRI examinations at our clinic between April 2012 and December 2013.

Inclusion and Exclusion Criteria
In this retrospective study, 221 patients who underwent abdominal MRI for a variety of medical conditions were examined and found to have liver lesions. Lesions that exceeded 6 millimeters in size were identified and subsequently incorporated into the study. Excluded cases were those where DWI and ADC sequences were not obtained, as measurements could not be taken in those instances. The data did not account for solitary lesions. Moreover, the statistical analysis excluded lesions that were no more than one in number.

Lesion Identification
The investigation of potential histopathological findings associated with the observed lesions has been conducted. Without histopathology findings, a diagnosis was reached based on a thorough analysis of the patient’s clinical record, typical MRI results, and the lesion’s stability for over six months. The diagnosis of HCC was established by considering the underlying cirrhosis, elevated alpha-fetoprotein level, and an enlargement of the lesion during the follow-up period. Metastases were diagnosed based on typical MRI findings and a proliferation in the number and size of lesions during follow-up. The presence of a known malignancy has also been taken into consideration.
MRA Protocol
A 1.5 Tesla Magnetom Symphony A Tim System device manufactured by Siemens in Erlangen, Germany, was utilized to conduct the examinations. During the imaging scan, a heavy T2 TSE coronal was utilized over the upper abdomen with the following parameters: TR/TE of 2000 ms/83 ms, slice thickness of 6 mm, and FOV of 444 mm. DWI was carried out using single-shot, spin echo, and echo planar imaging techniques. The imaging was done in three serial imaging sequences, with the imaging factors being TR/TE/NEX/echo planar [6000/88/1/44]. Different sequences were conducted, including diffusion sequences with b-values of 0, 500, and 1000, TR/TE of 6000 ms/88 ms, slice thickness of 5.5 mm, and FOV of 380 mm. Additionally, dynamic VIBE 3D sequences were taken with TR/TE of 5.5 ms/2.38 ms, slice thickness of 3 mm, and FOV of 400 mm.

Image Analysis
After acquiring images, they were transferred to the clinical workstation, the Leonardo console developed by Siemens. Subsequently, the ADC measurements were accurately and precisely obtained from the images using advanced software tools and techniques available on the workstation. A circular ROI [Region of Interest] was placed in a spot away from these structures for the data measurement of the ADC value of lesions in the liver to avoid artifacts that may arise from the abdominal wall, fat, and vascular structures. The designated ROI measurement was established to encompass an approximate area of 1 cm². The measurements of each lesion were standardized by taking the average of three different points.

As per the protocol, the ADC measurement was conducted on the cerebrospinal fluid within the spinal canal precisely at the level of the lesion. The size of the ROI was decreased to 0.5 cm² and adjusted accordingly. We have calculated the relative ADC values by comparing the ADC values of the lesion with those of the adjacent normal tissue.

Statistical analysis
The statistical analysis was done using SPSS version 20.0 for Windows, developed by SPSS Inc. in Chicago, IL. USA. The Kolmogorov-Smirnov test was utilized to evaluate the normality of the data distribution. A nonparametric test was performed because the data distribution was not normal. Data are presented as mean and standard deviation. The Chi-square test was utilized to compare categorical variables across different groups. We used the Kruskal-Wallis test to compare continuous variables across multiple groups.

We compared continuous variables between the two groups using the Mann-Whitney U test. In cases where we noticed a substantial difference in comparisons between multiple groups, we applied a Bonferroni correction while comparing the groups individually. The use of ROC analysis was implemented to examine the efficacy of ADC in the differentiation of lesions from benign to malignant. The hypotheses were bidirectional, and a p-value of less than 0.05 was considered statistically significant.

RESULTS
Comparison of benign and malignant lesions
The study population included 221 patients [141 female, 80 male, mean age 49.52 years, ranging from 3 to 81]. 378 lesions, 122 malignant and 256 benign, were examined. There were 118 cases of hemangioma, 59 cases of a simple cyst, 67 cases of hydatid cyst, 3 cases of FNH, and 9 cases of abscess, all considered benign lesions. The analysis of malignant lesions revealed 88 cases of metastasis, 28 cases of HCC, and 6 cases of lymphoma.

The benign group had an average age of 46.90±17.73 years, with the youngest being three years old and the oldest being 81. In contrast, the malignant group had an average age of 59.33±13.05 years, with the youngest being 28 and the oldest 77 years old. The mean ADC value of the group displaying benign features was computed to be 2101.36±571.59 mm²/s, with the lowest value of 743 and the highest value of 3337. In contrast, the mean ADC value of the group displaying malignant features was found to be 757.82±158.45 mm²/s, with the lowest value being 250 and the highest being 1085 [Figure 3]. The benign group had lesions with a mean anteroposterior diameter of 32.70±21.83 mm, ranging from 6 mm to 140 mm. The transverse diameters of the lesions in this group had a mean of 27.79±18.20 mm, with a range of 6 mm to 103 mm. For the malignant group, the size of the tumors was 39.42±31.25 mm [7-169 mm] and 30.90±23.63 mm [6-120 mm], respectively. The mean relative ADC value for the benign group was 0.64±0.16, whereas for the malignant group, it was 0.23±0.05.

The comparison between the benign and malignant lesions was statistically meaningful regarding lesion ADC value, relative ADC value, and mean age [p < 0.05]. The statistical comparison between the benign and malignant lesions based on CSF ADC values, anteroposterior diameters, and transverse diameters yielded no significant results [p > 0.05].
Comparison of the subgroups

In individuals diagnosed with metastases, the primary tumor was found to be located in various organs such as colon, lung, stomach, ovary, cervix, and endometrium. In some cases, the location of the primary tumor could not be determined.

The individuals with hemangioma had an average age of 50.22±12.15 years, ranging from 19 to 81. The individuals with simple cysts had an average age of 53.10±15.98 years, ranging from 3 to 79. The individuals with hydatid cysts had an average age of 39.49±22.17 years, ranging from 7 to 81 years. The individuals with FNH had an average age of 40, with a standard deviation of 9.84 years. The group’s age range was between 32 and 51 years old, with the oldest participant being 81 years old. The individuals with abscesses had an average age of 21.11±16.46 years, ranging from 10 to 52 years old. The individuals with HCC had an average age of 64.35±11.87 years, ranging from 33 to 77 years. The individual with metastases had an average age of 59.51 years, with a standard deviation of 11.75 years. The range of ages varied from 28 years to 74 years. The individuals with lymphoma had an average age of 33.33±1.63, ranging from 30 to 34 years old. The age of the groups with hemangioma and simple cysts did not differ significantly [p > 0.05]. The statistical calculation indicated a notable age difference between the groups of hemangioma and each of the following: hydatid cyst, FNH, abscess, HCC, metastasis, and lymphoma [p < 0.05]. The analysis showed that the age difference between the groups with hydatid cysts and lymphoma was insignificant [p > 0.05]. Significant age differences were noticed between hydatid cyst, simple cyst, metastasis, and HCC groups [p < 0.05]. There was no meaningful age distinction between the FNH and lymphoma groups [p > 0.05]. The statistical calculation showed a significant age difference between the FNH group and the metastasis group and between the FNH group and the lymphoma group [p < 0.05]. The findings indicate a statistically meaningful age difference between the HCC and metastasis groups and between the HCC and lymphoma groups [p < 0.05].

The CSF ADC values ranged from 2378 mm²/s to 4095 mm²/s, and the difference between the groups was not statistically noteworthy [p > 0.05].

The mean lesion ADC value for hemangioma was calculated to be 1761.34±275.27 mm²/s, ranging from 1370 mm²/s to 2638 mm²/s. The range of lesion ADC values for simple cysts was between 1804 mm²/s and 3337 mm²/s, with a mean value of 2619.18±396.48 mm²/s. The mean ADC value of the hydatid cyst lesion was 2512.88±403.74 mm²/s, ranging from 1539 mm²/s to 3239 mm²/s. The ADC value for FNH lesions had a mean of 1180.66±118.58 mm²/s, with a minimum of 1087 mm²/s and a maximum of 1314 mm²/s. The mean ADC value of the abscess lesion was 1161.11±281.90 mm²/s with a minimum of 743 mm²/s and a maximum of 1465 mm²/s. The mean ADC measurement for HCC lesions was 745.60±132.66 mm²/s. The minimum ADC value recorded was 398 mm²/s, while the maximum was 1008 mm²/s. Metastasis had a mean lesion ADC value of 759.30±164.92 mm²/s. The minimum ADC value recorded was 250 mm²/s, while the maximum was 1085 mm²/s. In lymphoma, the mean ADC value was 793.16±192.09 mm²/s. The minimum value was 536 mm²/s, and the maximum was 1057 mm²/s.

The mean ADC difference observed between the hemangioma and each of the following: simple cyst, hydatid cyst, FNH, abscess, HCC, metastasis, and lymphoma, was statistically meaningful [p < 0.05]. There was no considerable distinction between a simple cyst and a hydatid cyst, as indicated by statistical calculation [p > 0.05]. The lesion ADC value distinctions between metastasis and lymphoma were insignificant [p > 0.05]. The study found no critical distinction between FNH and abscess [p > 0.05]. Still, there was a statistically significant discrepancy between FNH and each of the following: metastasis, HCC, and lymphoma [p < 0.05]. The statistical analysis revealed a marked difference between abscess and each of the following: HCC, metastasis, and lymphoma [p < 0.05]. The statistical calculation revealed no marked distinction [p > 0.05] between HCC and each of the following: metastasis, lymphoma and metastasis. Similarly, the statistical calculation also revealed no considerable discrepancy [p > 0.05] between metastasis and lymphoma [Figure 4].

The analysis' cut-off value for determining between benign and malignant lesions was 1.086 x 10^-3 mm²/s.

DISCUSSION

Our study has yielded significant findings regarding liver lesions’ ADC values. Specifically, the ADC value of malignant liver lesions was remarkably lower than benign liver lesions.

According to Kandpal et al. [2], benign lesions had higher mean ADC values than malignant lesions. This result is consistent with the findings of our study, which also observed a similar pattern. Cystic lesions have higher ADC values due to their higher fluid content and free water molecules. Solid lesions have lower ADC.
values because of their high cellularity and diffusion restrictions. These differences in ADC values help diagnose and characterize different types of lesions. Our study has shown that cysts and hemangiomas exhibit the highest ADC value, while malignant lesions typically exhibit a lower ADC value. Earlier studies have shown that the effectiveness of ADC values can be seen in distinguishing malignant lesions from benign ones in different organs, which is in line with this observation [1-4]. We measured the mean ADC value of cyst and hemangioma to be $2.90 \times 10^{-3}$ mm²/s and $2.22 \times 10^{-3}$ mm²/s, respectively. Their ADC values increased as cysts and hemangiomas have more elevated fluid content and free water molecules than solid lesions. However, solid lesions had diffusion restrictions and reduced ADC values owing to their high cellular density. Hence, some researchers excluded cysts and hemangiomas from their study [23-26].

Moreover, current study has identified metastases exhibiting the lowest mean ADC value among malignant lesions. This finding is consistent with Taouli et al.'s findings [27]. In our study, we conducted measurements of the ADC values of metastases. Our findings revealed that the mean ADC values of the metastases were as low as $759.30 \pm 164.92$ mm²/s, indicating that they were among the lowest values observed in our analysis.

A study by Miller et al. [4] included 382 individuals from a diverse patient group. The average ADC values were measured in the study for four distinct types of liver masses, including HCC, metastases, FNH, and adenomas. The results showed that the average ADC values for HCC, metastases, FNH, and adenomas were $1.54 \pm 0.44 \times 10^{-3}$ mm²/s, $1.50 \pm 0.65 \times 10^{-3}$ mm²/s, $1.79 \pm 0.39 \times 10^{-3}$ mm²/s, and $1.49 \pm 0.38 \times 10^{-3}$ mm²/s, respectively. The study did not find considerable differences in ADC values that could be used to differentiate between FNH and adenomas from HCC and metastases like the study of Parsai et al. [28]. As per their observation, ADC values may not accurately distinguish malignant lesions from benign ones in all cases. According to the findings of previous studies [1, 3, 7], it has been observed that the ADC values of benign lesions are generally higher than those of malignant lesions. Previous studies [1, 3, 7] have shown that benign masses exhibit more increased ADC values compared to malignant masses. This observation was explained by the fact that the studies mainly included cysts and hemangiomas and only a limited number of FNH and adenomas. This could be attributed to a more elevated number of cysts and hemangiomas in benign lesions, which tend to affect the distribution of water molecules within tissues. In our study, we observed a significant number of cysts and hemangiomas, while the number of FNH cases was relatively low [only three cases]. Our research findings suggest that DWI is ineffective in distinguishing between simple cysts and hydatid cysts or in distinguishing abscesses and FNH. Our analysis concluded that DWI is not helpful for distinguishing between malignant lesions, such as HCC, metastasis, and lymphoma. Our study has demonstrated that using ADC values can be beneficial in distinguishing between FNH and malignant lesions such as HCC, metastasis, and lymphoma. The statistical analysis showed a considerable distinction in ADC values between all malignant lesions and FNH. Also, we did not observe any adenomas. We found that the mean ADC values were $2.10 \times 10^{-3}$ mm²/s in the benign group and $0.75 \times 10^{-3}$ mm²/s in the malignant group. The notable disparity between the two groups was likely due to a high number of cysts and hemangiomas in the study.

Holzapfel et al. [3] conducted a study focusing mainly on cysts and haemangiomas. The study found that the mean ADC values of lesions were as follows: $1.69 \pm 0.34 \times 10^{-3}$ mm²/s for hemangiomas, $2.61 \pm 0.57 \times 10^{-3}$ mm²/s for cysts, $1.43 \pm 0.22 \times 10^{-3}$ mm²/s for FNH, $1.12 \pm 0.28 \times 10^{-3}$ mm²/s for HCC, and $1.08 \pm 0.32 \times 10^{-3}$ mm²/s for metastases. With a threshold value of $1.41 \times 10^{-3}$ mm²/s, the accuracy of the test was found to be 90.8% for sensitivity and 89.9% for specificity. Our research found that a value of $1.086 \times 10^{-3}$ mm²/s ADC can effectively differentiate between benign and malignant lesions in the ROC curve analysis. Sensitivity and specificity were 97.4% and 99.2%, respectively, at this value.

In their study, where b values [b = 600, b = 300, b = 500] were used, Bruegel et al. [20] evaluated 102 patients with various lesions, including 11 cases of hepatocellular carcinoma, 82 metastases, 4 FNH, 56 hemangiomas, and 51 cysts. The mean ADC values for different types of liver lesions are as follows: $1.05 \times 10^{-3}$ mm²/s for HCC, $1.22 \times 10^{-3}$ mm²/s for metastases, $1.40 \times 10^{-3}$ mm²/s for FNH, and $1.92 \times 10^{-3}$ mm²/s for hemangiomas. In our study, where b values [b = 1000, b = 500, b = 0] were used, ADC values for FNH were inferior. According to the study, FNH has been found to have a more elevated mean ADC value than metastase and HCC (Table 1).

In our study, We made a proportion between the lesion’s ADC values and those of the CSF to establish relative ADC values. Our purpose was to create a set of criteria for evaluation that are more objective in order to
ensure a reliable assessment. The mean CSF ADC values for benign and malignant groups were not particularly distinct \( p > 0.05 \). The ADC values differed significantly between the benign \([0.64\pm0.16]\) and malignant \([0.23\pm0.05]\) groups \( p < 0.05 \).

**Study Limitations**

Some limitations of our study should be stated. Histopathological confirmation was not obtained for all malignant lesions. The sample size of specific lesions, including FNH \([\text{only 3 cases}]\), was relatively small. Additionally, the study did not include cases of hepatic adenoma or cholangiocarcinoma. These limitations are essential to consider when interpreting the study's results. The exclusion of hematoma and epithelial hemangioendothelioma from the study was necessary as we only had one case of each.

**CONCLUSION**

This study's results clearly illustrate the significance of mean ADC values in denoting between benign and malignant liver lesions. However, our study has a limited number of lesions. Therefore, our results must be demonstrated in additional studies with a more balanced number of lesion subtypes. Despite advancements in medical imaging technologies, differentiating between some lesions, such as FNH and adenoma, from malignant lesions remains a challenge.

**ETHICS APPROVAL**

Approval from the Ethics Committee was granted at the Faculty of Medicine, Harran University, with decision number 03 during session 04 on March 17, 2014. Regarding the rights of humans and animals, we complied with the Helsinki Declaration of 1975, which was revised in 2008. All authors followed our policy on Informed Consent, as presented on WMA.com.

**AUTHORS’ CONTRIBUTIONS**

All authors contributed to the writing and completion of the article. Idea/Concept: OK; Design: OK; Writing the Article: OK and FNB; Control/Supervision FKB and EK; Revision: MT. All authors take full responsibility for the integrity of all aspects of the work.

The current study was a doctoral thesis [29] and was presented as an oral presentation at the 44th Turkish National Radiology Congress in 2023 [30].

**CONFLICT OF INTEREST**

All authors declare no conflict of interest

**FUNDING**

None

**References**


Figure 1. A hydatid cyst is observed on the fat-suppressed axial T2 image of a 32-year-old female patient. The mean ADC value in DWI [b=1000] using Single Shot, Spin Echo, and Echo Planar [SS-SE-EP] was measured at 2850 mm2/s.

Figure 2. Multiple metastatic masses were observed on the coronal T2 image of a 71-year-old male patient. The mean ADC value in DWI [b=1000] using Single Shot, Spin Echo, and Echo Planar [SS-SE-EP] was measured at 472 mm2/s.

Figure 3. Box plot chart comparing groups.
Figure 4. Box plot chart comparing subgroups
[FNH: Focal nodular hyperplasia. HCC: Hepatocellular carcinoma]
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БАУЫР ЗАҚЫМДАНУЫҢЫҢ ДИФФЕРЕНЦИАЛДЫҚ ДИАГНОСТИКАСЫНДА ДИФФУЗИЯЛЫҚ ҚАЛҚЫМА БЕЙНЕЛЕУДІҢ Рөлі

Түйіндеме

Құрісмет. Диффузиялық қалқыма бейнелеу (ДҚБ) бауырың зақымдануың диагностикалауда мәні болып атқарады. Бул зерттеуде бауырың зақымсатуы және зақымдандуын ажыratу үшін корсетін диффузия коэффициентінің (АСД) мәндеріне негізделген ағымдарды қамтылады.

Әдістеме: біздің клиникалық бауырың МРТ өткен науқастарга ретроспективті бағалау жүргізіліп, бауырың 378 зақымдануы анықталды. Зерттеуе 141 айел, 80 ер адам және бауыр зақымданған 221 науқан қатысты. Солдан кейін алынған қатерсіз және қатерлі зақымдануының АСД мәндерімен салыстырылды. Сонымын қатар, зақымдауына қатерсіз мәніндегі құрылыстыққа сүйкітіп тұсын қатерлі АСД мәніне қатынасы өшінеді және АСД сальстырмалы мәні шығарылды.

Нәтижелер: 118 гемангиома, 59 карапайым киста, 67 эхиноокк ок, 3 ошқарың түйіндік гиперплазия, 9 абсцесс, 28 гепатоцеллюлярнық карцинома, 88 метастаз және 6 лимфа зерттелді. Карапайым кисталар мен гемангиомалар бауырың бәскә зақымдандарымен салыстырында АСД мәндерінің ең жоғары денгейіне өтбейді. Қатерсіз ден жіктелген бауыр зақымдануына арналған АСД мәндерінің орташа мәні 2,10 х 10^{-3} мм²/с болды, ал қатерлі ісіктердің орташа мәні 0,75 х 10^{-3} мм²/с тәм болды. Бауырың қатерлі зақымдануының АСД мәндері қатерлі зақымдандары мен сальстырында тәм бөзді.

Қорытынды: АСД мәндерінен бірге ДҚБ қоңдыру бауырың қатерсіз және қатерлі зақымдануын ажыратуда пайдады болуы мүмкін. Сонымын қатар, АЦП-нің сальстырмалы мәндері объективті натижелерге қыптал етуі мүмкін.

Түйінді сөздер: бауырың зақымдануы, АСД, диффузиялық қалқыма бейнелеу, МРТ.

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РОЛЬ ДИФФУЗИО-ВЗВЕШЕННОЙ ВИЗУАЛИЗАЦИИ В ДИФФЕРЕНЦИАЛЬНОЙ ДИАГНОСТИКЕ ПОРАЖЕНИЙ ПЕЧЕНИ

Резюме

Введение. Диффузино-взвешенная визуализация (ДВИ) играет важную роль в диагностике поражений печени. В этом исследовании основное внимание уделяется значениям видимого коэффициента диффузии (АСД), чтобы отличать доброкачественные и злокачественные поражения печени.

Методы: проведена ретроспективная оценка пациентов, прошедших МРТ печени в нашей клинике, было выявлено 378 поражений печени. В исследовании приняли участие 141 женщина, 80 мужчин и 221 пациент с поражением печени. Затем сравнивались полученные значения АСД доброкачественных и злокачественных поражений. Кроме того, измеряли отношение значения АСД поражения к значению АСД спинномозговой жидкости и выводили относительное значение АСД.

Результаты: исследовано 118 гемангиом, 59 простых кист, 67 эхинооккковых кист, 3 очаговых узловых гиперплазиях, 9 абсцессов, 28 гепатоцеллюлярных карцином, 88 метастазов и 6 лимфом. Простые кисты и гемангиомы имели наиболее повышенные значения АСД по сравнению с другими поражениями печени. Значения АСД для поражений печени, классифицированных как доброкачественные, имели среднее значение 2,10 х 10^{-3} мм²/с, в то время как злокачественные имели более низкое среднее значение 0,75 х 10^{-3} мм²/с. Значения АСД злокачественных поражений печени были ниже по сравнению с доброкачественными поражениями.

Вывод: Использование ДВИ в сочетании со значениями АСД может быть полезным для различения доброкачественных и злокачественных поражений печени. Кроме того, относительные значения АЦП также могут способствовать получению более объективных результатов.

Ключевые слова: поражение печени, АСД, диффузино-взвешенная визуализация, МРТ.