

PROTOKOLI ZA SLIKANJE JETER Z RAČUNALNIŠKO TOMOGRAFIJO

LIVER COMPUTED TOMOGRAPHY IMAGING PROTOCOLS

Benjamin Duh, Jure Mišič, Irena Lopatič

Univerzitetni klinični center Ljubljana, Klinični inštitut za radiologijo, Zaloška cesta 7, 1000 Ljubljana, Slovenija / University medical centre Ljubljana, Institute of Radiology, Zaloška cesta 7, 1000 Ljubljana, Slovenia

Korespondenca / Corresponding author: benni.duh@gmail.com

Prejeto/Received: 5. 11. 2019

Sprejeto/Accepted: 8. 3. 2022

IZVLEČEK

Uvod: Računalniška tomografija (CT) ima ključno vlogo pri določanju diagnoze, stopnje bolezni, načrtovanju in vrednotenju zdravljenja kot tudi pri spremljanju bolnikov z znanimi boleznimi jeter ali s sumom na bolezen jeter. Za kakovostno slikanje patologij v jetrih in s tem njihovo karakterizacijo se uporabljajo različne faze slikanja. Jetra lahko slikamo z ali brez uporabe kontrastnega sredstva (KS), v različnih časovnih obdobjih po aplikaciji KS. Različne faze slikanja nam služijo za identifikacijo patologij v jetrih.

Namen: Namen prispevka je predstavitev pomembnosti izbire pravega protokola za CT slikanje jeter.

Metode: Uporabili smo kvalitativno raziskovalno metodologijo s pregledom literature in pregledom obstoječih protokolov na Kliničnem inštitutu za radiologijo (KIR) UKC Ljubljana. V teoretičnem delu je bila uporabljena deskriptivna metoda dela, opravili smo pregled strokovne literature in znanstvenih člankov s pomočjo podatkovnih baz COBISS, MEDLINE, CHINAL.

Rezultati in razprava: Po pregledu obstoječe literature smo z zdravniki radiologi optimizirali protokol za CT slikanje jeter na KIR UKC Ljubljana. Pri omenjenem protokolu smo prilagodili hitrost aplikacije KS in količino KS ter s tem izboljšali kontrastnost jetrnih patologij. Uporaba pravih protokolov za CT slikanje jeter, optimizacija količine in hitrosti aplikacije KS in izbira ustrezne faze slikanja so ključni za kakovostno CT slikanje jeter, ki ne omogoča le odkrivanja lezij, temveč tudi njihovo karakterizacijo. Metoda je zlasti pomembna za zanesljivo ugotavljanje, ali so majhne lezije benigne ali maligne.

Zaključek: Pri pregledu obstoječih protokolov za slikanje abdomna na Kliničnem inštitutu za radiologijo UKC Ljubljana smo ugotovili, da je pravilna izvedba ključna za pravi prikaz jetrnih patologij. Protokoli za slikanje jeter bi morali biti standardizirani med posameznimi ustanovami. Na ta način bi dosegli primerljivost preiskav med ustanovami, saj bi bile patologije jeter vedno prikazane na enak način. S tem bi se izognili centralizaciji CT slikanj jeter ter ponovni dozni in kontrastni obremenitvi pacienta. Radiološki inženirji morajo poznati pomen izbire primerne protokola za slikanje jeter pri posamezni diagnozi in sodelovati z radiologi pri izbiri primerne protokola za slikanje.

Ključne besede: računalniška tomografija, jetra, kontrastno sredstvo

ABSTRACT

Introduction: Computed tomography (CT) plays an important role in diagnosis, disease staging, treatment planning and evaluation, and monitoring of patients with known or suspected liver disease. Different phases of imaging are used to provide the high-quality visualization of pathology in the liver and thus to characterize it. The liver can be imaged with or without the use of a contrast agent (CA) at different time periods after CA application. Different phases of imaging help us to identify pathologies in the liver.

Purpose: The purpose of this paper is to present the importance of choosing the right protocol for the CT imaging of the liver.

Methods: We used a qualitative research methodology with a review of literature and a review of existing protocols at the Clinical Institute of Radiology (KIR) at the UKC Ljubljana. In the theoretical part, the descriptive working method was used. We reviewed professional literature and scientific articles using the COBISS, MEDLINE, CHINAL databases.

Results and discussion: After reviewing existing literature, we optimized the protocol for the CT imaging of the liver at KIR UKC Ljubljana with the help of radiologists. In the aforementioned protocol, we adjusted the rate of CA application and the amount of CA, and thus improved the contrast of liver pathologies. Using the right protocols for the CT imaging of the liver, optimizing the amount and rate of CA application, and selecting the appropriate phase of imaging are key to the high-quality CT imaging of the liver, which allows not only the detection of lesions but also their characterization. The method is particularly important for reliably determining whether small lesions are benign or malignant.

Conclusion: After reviewing the existing protocols for CT abdominal imaging at the Clinical Institute of Radiology, University Medical Centre Ljubljana, we found that proper implementation is critical for the correct presentation of liver pathologies. Liver imaging protocols should be standardized between institutions. In this way, comparability between institutions would be achieved, as liver pathologies would always be presented in the same way. This would avoid the centralization of CT scans of the liver and the re-dosing and contrast exposure of the patient. Radiographers should be aware of the importance of selecting an appropriate liver imaging protocol for each diagnosis and work with radiologists to select an appropriate imaging protocol.

Keywords: computed tomography, liver, contrast medium

LITERATURA / REFERENCES

- Bae, K. (2010). Intravenous contrast medium administration and scan timing in CT: Considerations and approaches. *Radiology*, 256: 32–61.
- Feng, ST., Zhu, H., Peng, Z., Huang, L., Dong, Z., Xu, L., Huang, K., Yang, X., Lin, Z., Li, ZP. (2017). An individually optimized protocol of contrast medium injection in enhanced CT scan for liver imaging, *Contrast media mol imaging* 2017 Jul 10; 7350429.
- <http://www.radiologyassistant.nl/en/p446f010d8f420/liver-masses-i-characterisation.html> (dostopno 15. 5. 2019).
- Jo, B.G., Song, Y.G., Shim, S.G., Kim, Y.W. (2016). Comparison of enhancement and image quality: different iodine concentrations for liver on 128-slice multidetector computed tomography in the same chronic liver disease patients, *Korean J Intern Med*, 31:461-9.
- Kartalis, N., Brehmer, K., Loizou, L. (2017). Multi-detector CT: Liver protocol and recent developments, *Eur J Radio*. 97, 101–9.
- Masuda, T., Nakaura, T., Funama, Y., Sato, T., Higaki, T., Matsumoto, Y., Yamashita, Y., Imada, N., Kiguchi, M., Baba, Y., Yamashita, Y., Awai, K. (2019) Contrast enhancement on 100- and 120 kVp hepatic CT scans at thin adults in a retrospective cohort study: Bayesian inference of the optimal enhancement probability. *Medicine* 98 (47), e17902.