

T1 IN T2 MAPIRANJE PRI MAGNETNORESONANČNEM SLIKANJU SRCA

T1 AND T2 MAPPING IN MAGNETIC RESONANCE IMAGING OF THE HEART

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IZVLEČEK

Uvod: Magnetnoresonančno slikanje srca predstavlja največjo prednost za tridimenzionalen prikaz struktur z odlično prostorsko in visokokontrastno ločljivostjo. Tako se omogoča merjenje srčne funkcije in ocena morfoloških struktur. Napredek tehnologije ponuja možnost slikanja s T1 in T2 mapiranjem.

Namen: Ugotoviti native vrednosti T1 in T2 mapiranja pri zdravih preiskovancih ter ugotoviti vpliv preiskovalnega polja na vrednosti T1 in T2 relaksacijskega časa pri izvajanju T1 in T2 mapiranja.

Metode: V raziskavo je bilo vključenih 30 zdravih prostovoljcev. Raziskava je potekala na MR aparatu znamke Siemens Magnetom Aera 1.5 T. Vsakemu prostovoljcu smo opravili native T1 in T2 mapiranje srčne mišice. Izvedli smo korekcijo velikosti FOV, tako da smo velikost povečevali za 10 mm, in sicer od 360 mm do 390 mm. V drugem delu raziskave pa smo v računalniški program vrisovali interesna področja v interventrikularni septum ter primerjali meritve.

Rezultati: Primerjava velikosti slikovnega polja je pokazala, da obstajajo minimalne statistične razlike v vrednosti T1 relaksacijskih časov. Vse izmerjene vrednosti so v okvirih referenčnih vrednosti. Primerjava med velikostjo slikovnega polja pri T2 mapiranju je pokazala, da ne obstajajo statistično značilne razlike v T2 relaksacijskih časih. Vse izmerjene in izračunane vrednosti so v okvirnih referenčnih vrednostih T2 relaksacijskih časov. Med raziskavo smo ugotovili, da obstajajo razlike med spoloma tako pri T1 kot tudi T2 mapiranju.

Razprava in zaključek: Ugotovili smo, da so povprečne native vrednosti T1 in T2 mapiranja primerljive z rezultati drugih raziskav in z referenčnimi vrednostmi zdravega miokarda. V drugem delu raziskave smo ugotavljali, ali velikost slikovnega polja vpliva na izmerjene vrednosti T1 in T2 mapiranja pri MR slikanju srca. Ugotovili smo, da obstajajo posamezne minimalne razlike med vrednostmi T1 in T2 relaksacijskih časov, vendar še vedno v okviru normalnih vrednosti.

Ključne besede: MR slikanje srca, T1 mapiranje, T2 mapiranje

ABSTRACT

Introduction: Magnetic resonance imaging of the heart is used worldwide today in the field related to cardiovascular disease. The biggest advantage of magnetic resonance imaging of the heart is the three-dimensional display of structures with excellent spatial and high contrast resolution. It enables the measurement of cardiac function and the assessment of morphological structures. Advances in technology have made imaging possible with T1 and T2 mapping.

Purpose: To determine the native values of T1 and T2 mapping in healthy subjects and to determine the influence of the test field on the values of T1 and T2 relaxation time when performing T1 and T2 mapping.

Methods: 30 healthy volunteers were included in the study. The study was performed on a Siemens Magnetom Aera 1.5 T MR. None of the volunteers had a known history of cardiovascular disease or risk factors. For each volunteer, we performed native T1 and T2 mapping of the heart muscle at different image field sizes. We performed a size correction of the FOV by increasing the size by 10 mm, from 360 mm to 390 mm. In the second part of the research, we plotted areas of interest in the interventricular septum in a computer program and recorded measurements.

Results: A comparison between image field sizes in T1 mapping showed that there were minimal statistical differences in the values of T1 relaxation times. All measured and calculated values were within the reference values of T1 relaxation times. A comparison between the image field sizes in T2 mapping showed that there were no statistically significant differences in the values of T2 relaxation times. All measured and calculated values were in the approximate reference values T2 of relaxation times. The research has found gender differences in both T1 and T2 mapping.

Discussion and conclusion: We found that the average native values of T1 and T2 mapping are comparable with the results of other studies and that they can be compared with the native reference values of a healthy myocardium. In the second part of the study, we investigated whether the size of the image field affects the measured values of T1 and T2

mapping in MR imaging of the heart. We found that there are individual minimal differences between the calculated values of T1 and T2 relaxation times, but the measured values are still within normal values.

Keywords: MR imaging of heart, T1 mapping, T2 mapping

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