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## A Novel Ultrasound-based Measure of the Liver among Diabetes Mellitus Type II Patients

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# A Novel Ultrasound-based Measure of the Liver among Diabetes Mellitus Type II Patients\*

Carlos I. Ayala Santos; Juan Carlos Jorge, PhD; and Bárbara L. Riestra-Candelaria, PhDc

## Abstract

Diabetes mellitus type II (DM II) or adult onset diabetes is due to the inefficient use of insulin, which affects various organs and tissues. Patients with DM II are at risk of suffering non-alcoholic fatty liver disease (NAFLD) that can later develop into more life threatening forms such as hepatomegaly, cirrhosis or liver cancer. Following the logic of the non-inferiority trial test, we aim to establish a more accurate anatomical measure of the right liver lobe (RLL) to facilitate close monitoring of liver size with ultrasound (US). We hypothesize that US is not unacceptably worse than computed tomography (CT) or magnetic resonance imaging (MRI) to accurately and reliably measure the size of the RLL when the measure is taken in the midaxillary line and craniocaudal plane (MAL-CC). Therefore, the objective of this study is to conduct a non-inferiority trial to test our novel MAL-CC measure.

To meet this aim, US measure of the RLL was taken from DM II (n=7) and non-DM II (n=5) patients, whom were recruited from 2 endocrinology clinics at SoM-UPR. Preliminary data shows that MAL-CC measure of the RLL from non-DM II patients is  $13.99 + 2.53$  cm whereas the same measurement among DM II patients is  $15.25 + 3.25$  cm (Mann-Whitney U test,  $p= 0.42$ ). It is concluded that there is a non-significant trend for large RLL sizes among DM II patients. Future work aims to increase sample size and to validate our novel measurement with MRI.

**KEYWORDS:** diabetes mellitus type II (DM II); nonalcoholic fatty liver disease (NAFLD); , ultrasound; liver; right liver lobe (RLL)

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### **ABSTRACT**

Diabetes mellitus type II (DM II) or adult onset diabetes is due to the inefficient use of insulin, which affects various organs and tissues. Patients with DM II are at risk of suffering non-alcoholic fatty liver disease (NAFLD) that can later develop into more life threatening forms such as hepatomegaly, cirrhosis or liver cancer. Following the logic of the non-inferiority trial test, we aim to establish a more accurate anatomical measure of the right liver lobe (RLL) to facilitate close monitoring of liver size with ultrasound (US). We hypothesize that US is not unacceptably worse than computed tomography (CT) or magnetic resonance imaging (MRI) to accurately and reliably measure the size of the RLL when the measure is taken in the midaxillary line and craniocaudal plane (MAL-CC). Therefore, the objective of this study is to conduct a non-inferiority trial to test our novel MAL-CC measure.

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