



HOME



As you type keywords, suggestions will appear that you can select. From To Search

Advanced



Educational Items

Endoscopy, Technology and Imaging (ETI)

AGA

Society

Display by Content Types

Protected by US Patents

Abstract Discussion Forum (0)



Number: Tu1996
USE OF AN AUTOMATED, DEEP LEARNING SOFTWARE TO EVALUATE BODY COMPOSITION INCLUDING SKELETAL MUSCLE MASS AND VISCERAL ADIPOSITY IN PATIENTS WITH INFLAMMATORY BOWEL DISEASE

Society: AGA
Track: Technologies and Procedural Innovation

Background: Body composition is increasingly recognized as an independent predictor of poor outcomes in patients with inflammatory bowel disease (IBD). More specifically, metrics of body composition including skeletal muscle depletion and visceral adiposity have been shown to be more meaningful than measures such as body mass index. However, the traditional technique to assess body composition on CT requires manual segmentation of tissues which is not only time consuming but also dependent on the experience and skill of the person performing the segmentation. Therefore, to study body composition in large cohorts of IBD patients, an automated technology is crucial.

Methods: Patients with a diagnosis of IBD who had a CT abdomen/pelvis at any point in their clinical course were identified retrospectively. Basic demographics and clinical data were collected. To evaluate body composition on CT, an automated, deep learning open-source software (Comp2Comp, Stanford, CA) was used to segment skeletal muscle and adipose tissue using an axial image at the mid L3 level. Both the cross-sectional area and density (measured in Hounsfield Units) were measured including the skeletal muscle area (SMA) and density, visceral fat area (VFA) and density, intramuscular fat area (IMAT) and density as well as subcutaneous fat area (SFA) and density. For comparison, the same software was used to analyze CT scans in a healthy cohort of patients (defined as those without major medical conditions associated with muscle depletion). Bivariate comparisons were made using Chi-squared and student t tests.

Results: In total, 2,266 CT scans were analyzed for body composition at L3; 450 patients had a diagnosis of IBD and 1,816 were healthy controls. Among the IBD patients, 236 (52%) were male, with an average age of 40.7 years; 300 (67%) had a diagnosis of CD. (Table 1) CT body composition metrics for skeletal muscle, visceral adiposity and subcutaneous adiposity are summarized in Table 1 and 2. Similar to the general population, men with IBD had significantly higher amounts of VFA compared to women and women with IBD had significantly higher amounts of SAT compared to men (p=0.001). Men with CD had significantly lower SMA compared to male healthy controls (151 cm² vs. 166 cm², p=0.001). Furthermore, compared to the male healthy controls, the male CD patients had significantly higher IMAT (p=0.001). In both men and women, patients with CD had a significantly higher ratio of VFA:SFA compared to those with UC (0.73 vs. 0.53, p=0.02).

Conclusions: Patients with CD had lower SMA and higher VFA:SFA, both of which are previously established independent predictors of IBD complications. We found that use of an automated, deep learning software allows for rapid body composition assessment on previously acquired CT scans and can be used for future large-scale studies of IBD related outcomes.

Table 1: Baseline Characteristics and Body Composition Metrics

Table 1: Baseline Characteristics and Body Composition Metrics

Characteristics		IBD Patients (n=450)	Healthy Controls (n=1816)
Age at time of CT, years, mean (SD)		40.7 (16.4)	48.9 (16.5)
Sex, male n(%)		236 (52)	889 (49)
BMI, mean (SD)		24.5 (6.0)	26.1 (5.1)
IBD Diagnosis	Crohn's Disease, n(%)	300 (67)	n/a
	Ulcerative Colitis, n(%)	149 (33)	n/a
CT Body Composition Assessment at mid-L3 level	Skeletal Muscle Area (cm ²)	133.2	138.0
	Skeletal Muscle Density (HU)	42.6	46.6
	Visceral Fat Area (cm ²)	85.3	107.4
	Visceral Fat Density (HU)	-74.5	-81.5
	Subcutaneous Fat Area (cm ²)	172.7	175.5
	Subcutaneous Fat Density (HU)	-90.2	-97.8
	Intramuscular Fat Area (cm ²)	3.4	1.7
	Intramuscular Fat Density (HU)	-41.5	-18.8

BMI: Body mass index, SD: standard deviation, HU: Hounsfield Units, IBD: Inflammatory bowel disease

Table 2: Body Composition Metrics by Gender and Diagnosis at mid-L3 level

Table 2: Body Composition Metrics by Gender and Diagnosis at mid-L3 level										
Gender	Patient Group	Skeletal Muscle Area (cm ²)	Skeletal Muscle Density (HU)	Visceral Fat Area (cm ²)	Visceral Fat Density (HU)	SubQ Fat Area (cm ²)	SubQ Fat Density (HU)	IM Fat Area (cm ²)	IM Fat Density (HU)	VAT: SAT
Male	Crohn's Disease	151.4	44.2	98.7	-72.7	126.1	-83.2	3.1	-39.9	.78
	Ulcerative Colitis	161.7	46.7	95.8	-74.8	149.7	-89.1	2.7	-42.4	0.64
	Healthy Control	166.5	48.2	141.6	-83.5	156.6	-96.5	1.6	-18.5	0.9
Female	Crohn's Disease	110.6	39.9	75.4	-76.0	228.8	-96.5	3.8	-41.3	0.32
	Ulcerative Colitis	107.6	40.2	64.4	-74.9	191.8	-95.0	3.7	-44.7	0.33
	Healthy Control	110.7	45.2	74.6	-79.6	193.5	-99.0	1.7	-19.1	0.39
SubQ: Subcutaneous, IM: Intramuscular, VAT: Visceral Adiposity, SAT: Subcutaneous Adiposity, HU: <i>Hounsfield unit</i>										

USE OF AN AUTOMATED, DEEP LEARNING SOFTWARE TO EVALUATE BODY COMPOSITION INCLUDING SKELETAL MUSCLE MASS AND VISCERAL ADIPOSITY IN PATIENTS WITH INFLAMMATORY BOWEL DISEASE

Dr. Stephanie Gold
Author(s): [Stephanie L. Gold](#), [Louis Blankemeier](#), [Yash Lahoti](#), [Akshay Chaudhari](#), [Bruce E. Sands](#), [Robert Boutin](#)
DDW ePoster Library. Gold S. 05/21/2024; 417026; Tu1996

Abstract Discussion Forum (0)



Number: Tu1996
USE OF AN AUTOMATED, DEEP LEARNING SOFTWARE TO EVALUATE BODY COMPOSITION INCLUDING SKELETAL MUSCLE MASS AND VISCERAL ADIPOSITY IN

READ MORE

About Us

Digestive Disease Week® (DDW) is the world’s premier meeting for physicians, researchers and industry in the fields of gastroenterology, hepatology, endoscopy and gastrointestinal surgery.

Follow us

