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NUTRITION INDEX DETERMINED BY A PORTABLE MULTIFREQUENCY BIOELECTRICAL IMPEDANCE ANALYSIS MACHINE

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Background:
Assessment of malnutrition by bioelectrical impedance analysis (BIA) has the simplicity of portability and easy bedside use. Multifrequency BIA can measure extracellular water (ECW), total body water (TBW), lean body mass (LBM) and fat mass. Our aim was to assess body composition in patients with GI diseases and malnutrition by dualfrequency BIA and validate this in healthy volunteers

Methods:
The best correlation between ECW/TBW ratio measured by radioisotope dilution (H3 and Br77 labelled water) was obtained for impedance measurements at 200 Hz and 5 Hz. A small improvement was achieved by correcting for sex (s=1 for male, s=0 for female). A nutrition index was derived: NI = 1/{(1 9884 R200Hz/R5Hz) - 0.0526 s - 0.6085}

Subjects:
The subjects studied included 26 healthy volunteers (13 males mean age = 37 y), 23 patients with chronic liver disease (15 males, mean age = 60 y), 19 patients with GI malignancies (9 males; mean age = 74 y), 21 patients with IBD (14 males; mean age = 39y).
Results: The NI is > 1 in all volunteers. The mean NI in male volunteers is 1 20 (SD = 0.03) and in female volunteers 1 07 (SD= 0.04), BMI in patients with chronic liver disease was greater than in healthy volunteers ($p<0.002$) 57% of patients have a NI <1 despite a normal BMI. BMI in patients with GI malignancies was lower than in healthy volunteers and the NI ranged between 0.9-1.1, lower than in most healthy volunteers, but similar to patients with chronic liver disease with a much higher BMI. In IBD patients the NI showed a wide scatter.

Discussion:
The NI measured by dual frequency BIA detects malnutrition in patients with normal or high BMI and is not dependant on height or weight. BMI does not reflect nutritional status in many patients, as the decrease in body cell mass is obscured by an expansion of extracellular water.