

Body composition at the bedside.

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OBJECTIVE:

To evaluate the use of an inexpensive hand-held bioelectric impedance analysis machine which measures lean body mass, by technical comparisons against standard instruments and techniques (an in-house bioelectric impedance machine and dual energy X-ray absorptiometry), and by performing body composition analyses in groups of potentially malnourished patients.

DESIGN:

Prospective simultaneous comparison of measurements made by the hand-held and in-house bioelectric analysis machines and dual energy x-ray absorptiometry.

SETTING:

Medical Physics Department and Gastrointestinal Unit in a university teaching hospital.

SUBJECTS/METHODS:

One hundred and sixty subjects were recruited into the study. Data from 58 adolescent and 14 adult volunteers and from 42 adult patients were used for technical comparisons ($n = 114$). Body composition information was evaluated ($n = 102$) for 60 adult volunteers and 42 patients (17 with eating disorders, 7 with chronic alcoholic pancreatitis and 18 with inflammatory bowel disease).

OUTCOME MEASURES:

Estimation of bias, limits of agreement and correlations on data from the three machines. Relationships between percentage body mass as lean, absolute weights and body mass index, in the adult subjects.

RESULTS:

Both resistance and calculated impedance measured by the hand-held machine significantly correlated with the impedance measured by the in-house machine ($r = 0.996$; $P < 0.0001$). An estimation of the level of agreement in percentage lean measurement between dual energy x-ray absorptiometry and hand-held bioelectrical impedance analysis machine by the Bland and Altman method showed a bias of -0.07% and satisfactory limits of agreement from -7.97% to 7.76% . Body mass index was similar in the groups of healthy men and women, but proportion of weight as lean was significantly higher in men than women. In underweight patients with eating disorders, the ratio of lean to fat varied widely; in inflammatory bowel disease patients, proportions of lean and fat were similar to controls; however patients with alcoholic pancreatitis had

values for body mass index similar to controls, but had significantly lower proportion of their body weight as lean ($P < 0.05$).

CONCLUSION:

In non-obese and thin adults, an accurate two-compartment (lean, fat) measurement of body composition can be made in 10 min by using an inexpensive, hand-held, bioelectric impedance analysis machine.