ARTIGO ORIGINAL

Ultrasound evaluation of obesity: fat and muscle thickness, and visceral fat.

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INTRODUCTION

Obesity is a major public health challenges of the 21st century world and its prevalence is growing exponentially across all age groups and in all continents.

This chronic disease predisposes to cardiovascular disease, type II diabetes mellitus, dyslipidemia, increased blood pressure and left ventricular hypertrophy, among other comorbidities [1-6].

Among the current therapeutic possibilities, bariatric surgery results in greater weight loss for longer periods when compared to other treatments for obesity. Among the surgical techniques, the Y gastric bypass Roux has been one of the most used [4,7,8].

Apart from micronutrients, it is important to evaluate the body composition before and after surgery.

Assessment of body composition, including fat distribution, can be accomplished by different methods. The most commonly used are: skinfold thickness(ST) , dual-energy X-ray absorptiometry (DEXA), computed tomography (CT), magnetic resonance imaging (MRI) and ultrasonography.

DEXA and CT are sensitive and specific methods that assessment, but subject the patient to ionizing radiation. Although MRI, which has good sensitivity and specificity, not subject them to radiation, present, together with these two methods already mentioned, the technical limitations on the size and weight of the patient, thus hindering their use in obese patients, and its cost [2,9-13].

Another diagnostic method is ST, a simple, inexpensive and free of radiation. Studies show, however, a decrease in sensitivity when used in obese and tend to overestimate the thickness of subcutaneous tissue in these patients [14-16].

Ultrasound evaluation

Ultrasonography compared with other methods for measuring the subcutaneous fat in obese patients, has equal or better sensitivity, without the disadvantage of ionizing radiation, can also be used to assess visceral fat, which is an important cardiovascular risk factor [5]. Moreover, it has technical limitations to the size and weight of patients, and, except for ST, has the lowest financial cost [1-3,10,12,14,16,17]).

Besides the importance of evaluating the subcutaneous tissue, muscle mass in obese patients has been widely studied. The obese patient presents severe in critical situations, as in the presence of a trauma or surgery, greater loss of muscle mass compared with patients with BMI <30 kg/m2 [18,19]. Furthermore, there is a greater tendency to sarcopenia, related to increasing age and fatty infiltration of the intramuscular [20].

Ultrasonography is a practical method and how it can be used without restriction for obese patients, because they depend on the weight and size of the patient is a good method for monitoring of patients undergoing bariatric surgery. It can be used to assess the loss of fat and muscle mass postoperatively [21]. (Figure 1-3)

The evaluation of visceral fat, and peripheral muscle thickness is performed in B, except for the visceral fat, we use a linear transducer 5.0 to 10 mHz. For visceral fat, it uses a convex 2.0 to 5.0 mHz. Although, it is a simple test should be performed by an experienced operator, avoiding significant variations of the measures [1]. And, measurements should be measured at least three times and the average held between them, to improve the sensitivity of the method.

The proposed technique used to evaluate the thickness of adipose tissue and muscle is simple, allowing direct visualization of the structures. In the upper limbs, the measures of muscle and subcutaneous tissue were performed at 15 cm of the humeral head, distally, the ventral intermediate on the biceps brachii muscle. In the lower limbs, subcutaneous-muscular measurements were performed at 15 cm from the superior pole of the patella in the proximal direction on the quadriceps muscle in the

ventral, middle line of the thigh. The thickness of the subcutaneous tissue was characterized by the distance between the skin and fascia (cm) and the distance between the muscle fascia and the bones humerus and femur (cm) [21].

In the evaluation of the peripheral fat described above, ultrasound permits evaluation of the visceral fat [5, 22]. The measurement of visceral fat is performed with the patient fasting and supine in the region immediately above the umbilicus, swordtail-line cord. Measurements were taken directly from frozen images on the screen. It is considered the thickness of the visceral fat measured between the inner face of the rectus abdominis and the posterior wall of the aorta in the midline of the abdomen with the patient in expiration. As perirenal fat can be performed with a transducer positioned longitudinally in the mid axillary line with image identification of the right kidney. The measurement of perirenal fat was measured between the lateral edge of the kidney and the surface of the iliopsoas muscle, with the middle third of the kidney [5,22,23].

CONCLUSION

With the worldwide growth of obesity and bariatric surgery, tests for assessing peripheral and visceral fat, and muscle mass are increasingly being required.

In this context, ultrasonography is a direct method, low cost, practical and with no restrictions on obese patients, whose results are not affected by the weight and size of the patient. Moreover, it subjects the patient to ionizing radiation.

Therefore, ultrasound establishes himself as one of the best methods of diagnosis and management for the obese, allowing not only the evaluation of peripheral fat and muscle, as well as gauging cardiovascular risk by visceral fat.

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Figura 1 - Corte ultrassonográfico longitudinal do coxa direita
(A - espessura do tecido celular subcutâneo
B - espessura muscular)

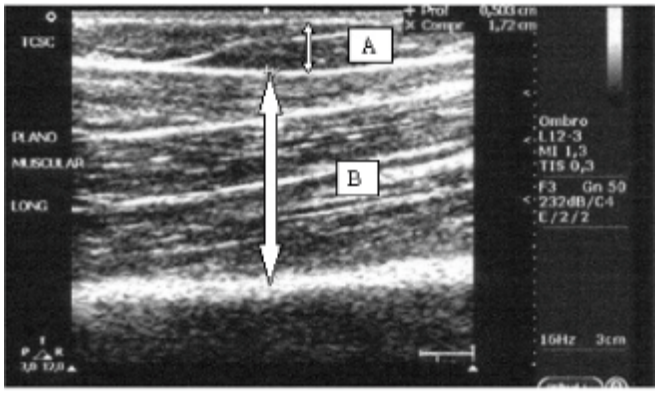

Figura 2 - Corte ultrassonográfico transversal da coxa diretia
(A - espessura do tecido celular subcutâneo
B - espessura muscular)

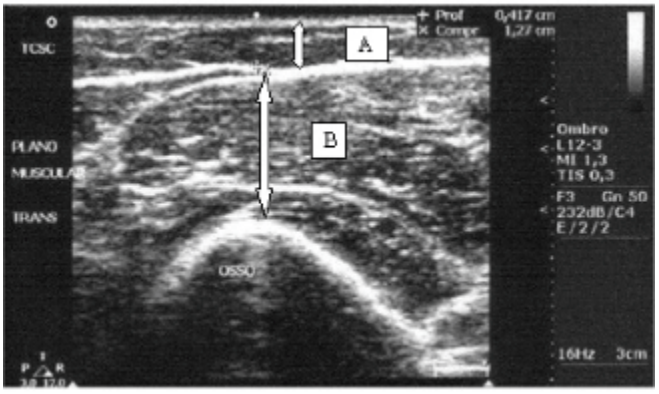

Figura 3 - Corte ultrassonográfico longitudinal do braço direito
(A - espessura do tecido celular subcutâneo
B - espessura muscular)