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The Ultrasonography Image of Abdominal Fat

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Description

The metabolic syndrome is a complex clustering of cardiometabolic abnormalities associated with aging, physical inactivity, poor diet, insulin resistance and diabetes and abdominal adiposity [1-9].

The incidence of obesity has increased dramatically during recent decades. Obesity increases the risk for metabolic and cardiovascular diseases and premature death. The adipose tissue of the obese expresses increased amounts of proinflammatory proteins such as TNF-α, IL-6, TGF-β, IL-10, C-reactive protein, soluble ICAM, and monocyte chemotactic protein-1 (MCP-1), and procoagulant proteins such as plasminogen activator inhibitor type-1 (PAI-1), tissue factor, and factor VII [10-18].

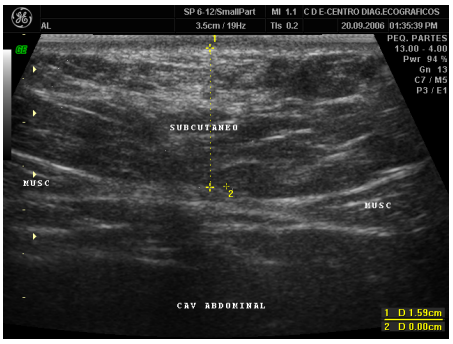

Figure 1: The thickness of the subcutaneous fat.

The researchers found that abdominal subcutaneous fat (Figure 1) was at least as strong a correlate of insulin sensitivity as visceral fat and retained independent significance after adjusting for visceral fat (Figure 2). The visceral adipose tissue accumulations are well known correlates of metabolic complications predictive of increased risk of type II diabetes, hypertension, coronary heart disease and heart failure [19-21].

The ultrasonographic of perirenal fat thickness measurement may better reflect the risks commonly associated with increased visceral fat accumulation and particularly those related to renal function impairment, microalbuminuria, hypertension and uricaemia (Figure 3). The perirenal adipose tissue has been shown to compress renal vessels and renal parenchyma, causing elevated renal interstitial hydrostatic fluid, and reductions in both renal blood and tubular flow rate [22-26].

The subcutaneous fat thickness was measured with a 7.5 MHz linear transducer transversely positioned 1 cm above the umbilical scar. For the visceral fat, a 3.5 MHz transducer was also positioned 1 cm above the umbilical scar, considering the distance between the internal surface of the abdominal rectus muscle and the posterior aortic wall in the abdominal midline. The perirenal fat was measured in the middle third of the right kidney, with the transducer positioned at the axillary midline [27-38].

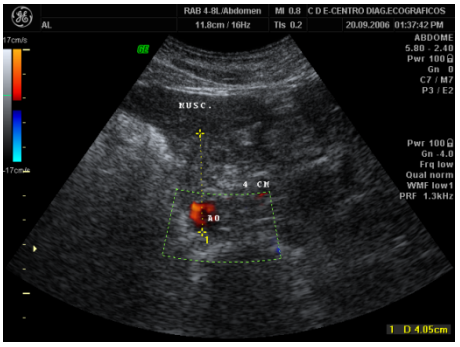

Figure 2: The thickness of visceral fat.

Figure 3: The thickness of the perirenal fat.

The Magnetic resonance imaging (MRI) and Computed Tomography (CT) can accurately quantify the volumes of visceral adipose tissue (VAT) and subcutaneous adipose tissue (SAT) and shows good accuracy with ultrasonography. But its cost and need for specialized personnel limits their use.

The Ultrasonography (US) has been shown to be an alternative, noninvasive, reliable method to estimate these fat compartments. Abdominal fat thickness is an independent predictor of metabolic syndrome, diabetes, hypertension, kidney dysfunction and uricaemia. Abdominal fat it is associated with metabolic risk factors for cardiovascular disease.

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