

LIPID DEPOSITS IN HUMAN KIDNEYS IN PATIENTS WITH UNHEALTHY OBESITY OR DIABETES



DIABESITY
WORKING GROUP



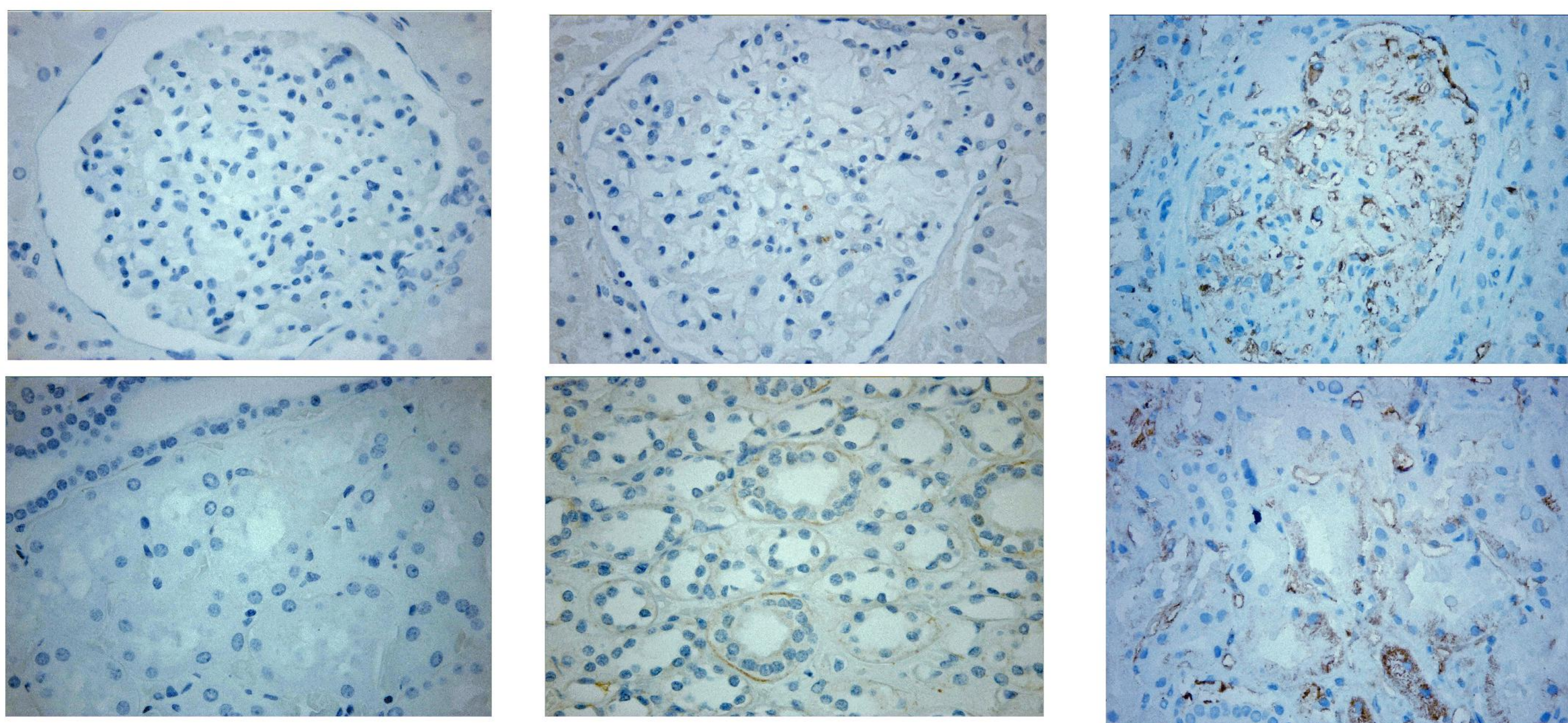
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Background: The pandemic of obesity and type 2 diabetes mellitus (T2DM) may have consequences in renal disease. Metabolically unhealthy obesity is related with risk factors for renal disease i.e. hyperglycaemia, hypertension, dyslipidemia, insulin resistance, sub-clinical inflammation, that are also present in T2DM. Early markers of renal disease: glomerular hyperfiltration and albuminuria are frequent in both diseases. Thus, T2DM and obesity may have a common pathway in inducing renal damage. Dislipidemia may be involved in obesity/diabetes induced renal disease. Renal-lipotoxicity has been proposed as a trigger of glomerular damage, interstitial inflammation and fibrosis. However, in humans, little evidence of its relevance is available. The aim of this study is to evaluate lipid deposits in human kidneys in patients with T2DM, unhealthy obesity or in those without these characteristics.

Methods: We analyzed 16 patients who underwent a nephrectomy due to cancer. Patients with other causes of renal disease were excluded. Subjects were classified in (a) T2DM (ADA criteria), (b) unhealthy obesity: obese subjects (BMI >30 kg/m²) with metabolic syndrome (MS: ATP III criteria) and (c) patients without MS. The non-neoplastic kidney tissue was analyzed with the adipophilin staining. Adipophilin immunohistochemistry visualizes small lipid droplets that are not visible by conventional light microscopy. We analyzed the presence of positive adipophilin stain in tubular epithelial cells and in glomeruli. The intensity of the stain was empirically divided in 0=absence, 1< 25%, 2= 25-75% and 3 < 75%. The pathologist (RR) was blinded for clinical characteristics.

Results: Four cases were unhealthy obese, 6 had T2DM and 6 did not have MS. The 6 biopsies of T2DM subjects were positive for adipophilin in tubular cells (<25%) in the basal side and in the whole cytoplasm. Also, 5/6 cases were positive in glomeruli (<25 or 25-75%). The 4 biopsies of unhealthy obesity were positive for adipophilin in tubular cells (<25%), mainly in the basal side. Only 1 was positive in the glomeruli (<25%). The 6 biopsies of patients without MS were negative for adipophilin in the glomeruli and only 1 was positive in tubular cells (<25%). Two patients without MS were obese.

Figure 1 shows three cases. **Left:** obesity without MS, no stain is observed in the glomeruli (up) or tubuli (down). **Middle:** unhealthy obesity, mild lipid droplets in epithelial cells in the glomeruli (up) and in the epithelial cells (down); **Right:** T2DM, more intense lipid droplets in glomeruli (up) and epithelial cells (up).



Conclusions: In this preliminary study, we observed that lipid droplets are intense in the renal tissue of diabetic patients, mild in obese with MS and rare in patients without MS. Further research is needed to evaluate the clinical relevance of this technique. This study is an initiative of the DIABESITY working group of the ERA-EDTA.

