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Extended Abstract
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Pathology Summit 2018: Level of human Kidney Injury Molecule-1 (KIM-1) as an early marker for diabetic nephropathy in Egyptian type-2 diabetic patients - Hoda Ali Mohamed El-Attar - Alexandria University, Egypt.

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Background: Human kidney damage molecule 1 (KIM-1) is produced in affected segments of the proximal renal tubule whenever a pathophysiological condition results in dedifferentiation of the epithelium. The kidney damage molecule-1 is a type 1 transmembrane glycoprotein (339 AA). The ectodomain KIM-1 is cleaved and eliminated in a manner dependent on metalloproteinases. The soluble KIM-1 protein that appears in human urine is around 90 KDa. All forms of chronic kidney disease, including diabetes, are associated with tubulointerstitium damage.

Objective: The present study was carried out to try to assess the urinary KIM-1 / creatinine ratio as a sensitive diagnostic tool for kidney damage in the urine of patients with Egyptian type 2 diabetic patients.

Methods: Eighty (80) subjects were subjected to an included clinical examination and subdivided into 20 apparently healthy control volunteers (group-1) and 60 diabetic patients who were divided into 3 subgroups (group-2, group- 3 and group-4) of 20 patients individually: according to ACR: (ACR <30 mg / g, 30-299 mg / g and ≥300 mg / g respectively). All were subjected to laboratory tests which included: a mid-morning urine sample for: (1) full urine analysis, (2) quantitative measurement of urine albumin, (3) urinary creatinine, (4) calculating the urinary albumin / creatinine ratio, (5) measuring KIM-1 (ELISA), and (6) calculating the KIM-1 to creatinine ratio.

Recommendations: The use of the KIM-1 / Cr ratio as a diagnostic tool for kidney disease by measuring it in the urine of type 2 diabetic patients at risk of chronic kidney disease.

Diabetic nephropathy (diabetic kidney disease) is a kidney disease resulting from diabetes. High blood sugar levels due to diabetes can damage the part of the kidneys that filters your blood. The damaged filter becomes "waterproof" and lets proteins enter your urine. Diabetic nephropathy is a serious kidney complication of type 1 diabetes and type 2 diabetes. It is also called diabetic kidney disease. About 25% of individuals with diabetes ultimately develop kidney disease.

Diabetic nephropathy affects the ability of your kidneys to do their normal job of removing waste and extra fluids from your body. The best way to prevent or delay diabetic nephropathy is to maintain a healthy lifestyle and treat your diabetes and high blood pressure. For many years, this condition slowly damages the delicate filtration system of your kidneys. Early treatment can prevent or slow the progression of the disease and reduce the risk of complications. Your kidney disease can progress to kidney failure, also called end-stage kidney disease. Kidney failure is a deadly disease. At this point, your treatment options are dialysis or a kidney transplant.

Symptoms:

In the primary stages of diabetic nephropathy, you may not notify any signs or symptoms. At later stages, signs and symptoms include:

- Worsening blood pressure control
- Protein in the urine
- Swelling of the feet, ankles, hands or eyes
- Increased need to urinate
- Reduced need for insulin or diabetes medication
- Confusion or difficulty concentrating
- Shortness of breath
- Loss of appetite

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• Nausea and vomiting

• Persistent itching

• Tired

Causes:

Diabetic nephropathy occurs when diabetes damages the blood vessels and other cells in your kidneys.

• How the kidneys work

• Illustration showing a normal kidney compared to a sick kidney

• Normal kidney vs sick kidney Open the pop-up dialog box inside a kidney

• Kidney cross section Open the contextual dialog box

• Your kidneys contain millions of tiny clusters of blood vessels (glomeruli) that filter waste products from your blood. Serious damage to these blood vessels can lead to diabetic nephropathy, decreased kidney function, and kidney failure.

• Diabetic nephropathy causes

• Diabetic nephropathy is a common complication of type 1 and type 2 diabetes.

Over time, poorly controlled diabetes can damage the clusters of blood vessels in your kidneys that filter waste products from your blood. This can cause kidney damage and cause high blood pressure. High blood pressure can cause additional kidney damage by increasing the pressure in the delicate filtering system of the kidneys.

How can I prevent it?

Diabetic kidney disease can be prevented by keeping blood sugar within your target range. Research has shown that tight blood sugar control reduces the risk of microalbuminuria by a third. In people who already have microalbuminuria, the risk of developing microalbuminuria has been halved. Other studies have advocated that tight control can reverse microalbuminuria.

Risk factors:

Your risk of diabetic nephropathy is higher if you have type 1 or type 2 diabetes. Several other factors can increase your risk of diabetic nephropathy, including:

• High blood sugar (hyperglycemia) which is not well controlled

• Uncontrolled high blood pressure (hypertension)

• Being a smoker

• High blood cholesterol

• Family history of diabetes and kidney disease

Complications of diabetic nephropathy can develop gradually over months or years. They can include:

• Fluid retention, which can cause swelling of the arms and legs, high blood pressure, or fluid in the lungs (pulmonary edema)

• Increased potassium levels in your blood (hyperkalemia)

• Heart and vascular disease (cardiovascular disease) which can lead to a stroke

• Impairment to the blood vessels of the retina (diabetic retinopathy)

• Anemia

• Foot sores, erectile dysfunction, diarrhea and other problems with damaged nerves and blood vessels

• Pregnancy complications that pose risks to the mother and the developing fetus

• Irreversible damage to your kidneys (end-stage renal disease), possibly requiring dialysis or a kidney transplant to prevent survival

To reduce your risk of developing diabetic kidney disease:

Treat your diabetes. With effective diabetes treatment, you can prevent or delay diabetic kidney failure.

Manage high blood pressure or other medical conditions. If you have high blood pressure or other conditions that increase your risk of kidney disease, see

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your doctor to control them. Ask your doctor for tests to check for signs of kidney damage.

Follow the instructions on over the counter medications. When using over-the-counter pain relievers such as aspirin and ibuprofen (Advil, Motrin IB, others), follow the directions on the package. For people with diabetic kidney disease, taking these types of pain relievers can cause kidney damage.

Maintain a healthy weight. If you have a healthy weight, work to maintain it by being physically active most days of the week. If you need to lose weight, talk to your doctor about weight loss strategies, such as increasing daily physical activity and reducing calories.

Do not smoke. Smoking can damage your kidneys and worsen existing kidney damage. If you smoke, talk to your doctor about strategies to quit smoking. Support groups, counseling and medication can all help you quit.

Results: Urinary levels of KIM-1 increased with the progression of nephropathy. Urinary KIM-1 levels were an independent risk factor for eGFR and albuminuria in diabetic patients. The KIM-1 / Cr urinary ratio was more sensitive than KIM-1. There was no correlation between the KIM-1 / Cr urinary ratio and the DFG in all the groups studied.

Conclusion: The KIM-1 / Cr urinary ratio is a sensitive and non-invasive diagnostic tool for kidney disease in Egyptian type 2 diabetic patients who seem to predict renal damage at the start of the period independently of albuminuria. Due to the lack of correlation, the KIM-1 / Cr and Alb / Cr ratios should be calculated for patients with type 2 diabetes.

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