Original Article

The Diagnostic Efficacy of Urinary Vascular Endothelial Growth Factor in Early Stage 2 Diabetic Nephropathy

Pang LL

Department of Medicine, The Third Affiliated Hospital of Qiqihar Medical University, Qiqihar, Heilongjiang, China

Abstract

Objectives: The objective was to analyze the application of vascular endothelial growth factor (VEGF) in the diagnosis of early type 2 diabetic nephropathy (DN). **Methods:** Thirty-eight patients with type 2 DN diagnosed and treated from March 2016 to August 2017 were selected as the study group and another 38 healthy controls were selected as the control group. The two groups were examined by enzyme-linked immunosorbent assay. Two groups of VEGF, serum creatinine, and glycosylated hemoglobin were observed and recorded. **Results:** Compared with the control group, the VEGF was higher in the observation group, and there was statistically significant difference between the two groups ($P < 0.05$). Compared with the control group, the specificity of serum creatinine and glycosylated hemoglobin was more significant in the observation group, and there was statistically significant difference between the two groups ($P < 0.05$). **Conclusions:** The application of urinary VEGF in the early diagnosis of type 2 DN has some clinical diagnostic value.

Keywords: Glycosylated hemoglobin, immunosorbent, serum creatinine, vascular endothelial growth factor

Introduction

Urinary exospores are secreted by renal tubular epithelial cells and released into urine, which may carry biomarkers of renal structural and functional damage.[1] It was found that markers such as producing and wt1 were found in urinary exospores and that in proximal convoluted tubules such as metaling. Cubin, aquaporin-1 (water channel aquaporin-1) AQP-1 IV carbonic anhydrase, and y-anhydrase and y-glutamyl transferase anhydrase (vascular endothelial growth factor [VEGF]) were used as markers for the injury of the ascending branch of the loop, such as THP cd9 and type 2 na-k-2c1 transporters. Markers of distal tubule injury include an-cl transporter (VEGF); water channel aquaporin-2 (AQP-2), mucin-1 HR[2] type c glycoprotein; markers of bladder transitional cell injury. Therefore, analysis of urinary exospores can provide a new understanding of the physiological and pathological functions of the epithelial cells of each urinary system. Urine is a noninvasive source of biomarkers. The first exospores database, excreta, was founded in 2009, collecting a lot of information about urinary exospore research. As exospores are still a new research field, the database is still in the process of being improved and updated year by year. The study of urinary stage has been applied to urinary tract diseases such as chronic kidney disease, bladder cancer, and prostate cancer. It has also been reported that stage II can be used as a biomarker for the diagnosis of acute myocardial infarction and non-small cell lung cancer.[3]

Overview

We have established two kinds of urine exospore extraction techniques in China: ultracentrifugation and nano film concentration. The operating steps of ultracentrifugation are as follows: first, the relative centrifugal force (VEGF) 20 at room temperature 00 g centrifuge for 30 min, remove cell debris, bacteria and other impurities. After 3.5 membrane dialysis, three times to replace ultra-pure water, cold room overnight. The vacuum then condenses the sample volume to 10% of the original sample volume. Then, rcf18000 g centrifuges at room temperature for 30 min to remove contaminated protein from

Access this article online

Quick Response Code:

Website: www.matrixscipharma.org

DOI: 10.4103/MTSP.MTSP_9_19

Address for correspondence: Dr. Pang LL, The Third Affiliated Hospital of Qiqihar Medical University, Qiqihar, Heilongjiang, China.
E-mail: gganxiao@gmail.com

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Pang LL. The diagnostic efficacy of urinary vascular endothelial growth factor in early stage 2 diabetic nephropathy. Matrix Sci Pharma 2019;3:19-22.

Received: 19-Jun-2019 **Accepted:** 18-Sep-2019 **Available Online:** 02-Jan-2020

urine. The final 4 °crcf200000 g ultracentrifugation for 2 h, collect urine sediment and ultrapure water heavy suspension. First, rcf2000 g centrifuges for ½ h at room temperature to remove cell debris, bacteria, and other impurities (VEGF). Afterward, the Nano film concentration device was made, and after good checking performance, Nano film dialysis concentrated the sample to the original volume of 10. When the sample was concentrated to about 10% of the original volume, 200-ml ultra-pure water was added to wash the nano membrane repeatedly, and the soluble protein and yellow particles in urine were filtered. The concentrate is collected when the sample is further dialyzed to 5 ml Finally, 4trcf 40,000 g was centrifuged for 1 h. Urine sediment was collected and suspended with ultra-pure water.

Methods

The incidence of type 2 diabetic nephropathy (DN) has increased annually at home and abroad. It has become a global public health problem. The pathogenesis is still not completely clear, and the effect of clinical treatment needs to be further improved (VEGF).[4] The ideal method is to identify kidney damage as early as possible. In order to detect early renal damage (174 mg/L, or 30? 300 mg albumin/g keratinize) and a large number of white eggs, white urine (urinary albumin excretion [UAE] >174 mg/L or >300 mg/g) is recommended for the detection of UAE every year. The study suggests that UAE is lower than the threshold and may have progressed to DN, increasing the mortality rate. The system of early and prediabetic renal impairment was established [Figure 1].[5]

For the accuracy, reliability, and repeatability of the fruit, each protein point has its own internal standard in the DIGE technology, and the software is automatically calibrated according to the amount of each protein point, ensuring that the detected protein abundances are real. The difference in protein expression between 10% and 10% is >95%. The system includes the CyDye DIGE fluorescent marker, the DALT electrophoresis system, and the Typhoon™ multifunction excitation (VEGF). The optical confocal scanner and the Decider differential analysis software. Cadies are specially designed to attain DIGE system, which are characterized by molecular weight and charge matching, with characteristics of strong signal, spectral separation, absorption and emission peaks. The samples marked with different CyDye (Cy2 and Cy3) can be separated on the same glue to ensure that all the samples are separated under the same first- and second-direction electrophoresis conditions, eliminating the deviation of the experiment and ensuring the exact matching of the inside glue. The second-direction separation was carried out by the first separation and to attain DALT vertical electrophoresis apparatus. Typhoon on a piece of two-dimensional glue was optimized. The fourth chapter protein components of the fourth chapter of attain were used to find the disease of diabetes (VEGF). The biological markers in the urinary exospore DIGE system can achieve high sensitivity in the CyDye DIGE fluorescent labeling protein imaging, and its control software has been optimized to collect the attained DIGE image.[6] The Decider software can fully automate the comparison of the differences between the multiple samples of the DIGE results and make the analysis of each protein point and each difference through the internal standard. The results are obtained by Decider software, which can greatly reduce the deviation between the operators and the manual operation. Time reduces to a few minutes [Figure 2].

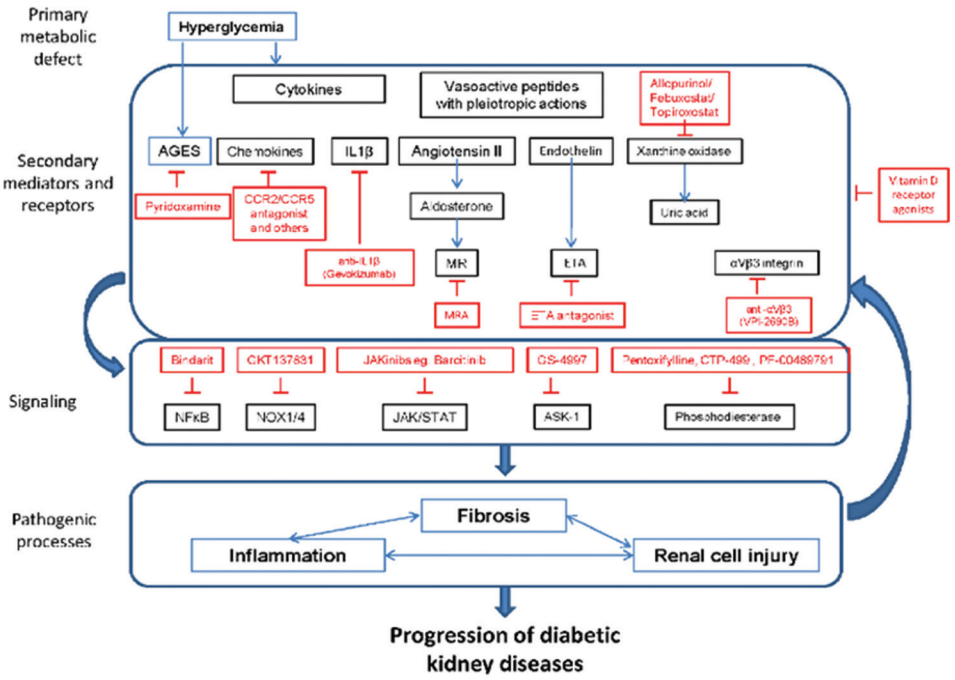

Figure 1: Progression of diabetic kidney diseases

Results

There are few reports on the identification of protein s100a8 and s100a9 in exospores by proteomics and mass spectrometry. There are only three articles in the Excreta database. Proteins s100a8 and s100a9 were found in the exospores of bladder cancer. The proteins s100a8 and s100a9 were detected in exospores secreted by salivary glands. Proteins s100a8 and s100a9 were detected in exospores and normal urine (VEGF). Our study found that compared with normal people, the proteins s100a8 and s100a9 in the urinary exospores of patients with DN and glycosuria showed a decreasing trend. Protein s100 family has a variety of biological functions. The S100 family is involved in mediating protein phosphorylation, enzyme activity, calcium homeostasis, cytoskeleton dynamics, transcription factors, and cell proliferation and differentiation. Protein dimer is an important form of protein dimer. S100a8 and s100a9 are easy to form dimer complex. Protein s100a8/a9 is a heterodimer of 24kd composed of light chain of s100a8 and heavy chain of s100a9. Its molecular functions are signal transduction molecular activity, calcium ion activity, and protein-binding activity. Its biological process involves inflammatory reaction, intercellular signal transduction, and leukocyte chemotaxis. At present, the role of protein s100a8 and s100a9 in renal damage is still controversial. Studies on the prognosis of renal grafts showed that the high expression of s100a8 and s100a9 during acute rejection was associated with good prognosis and had protective effect on renal function. Proteomics study on saliva of type 1 diabetes mellitus (VEGF) proteomics techniques was used to search for biomarkers in exospores. The overexpression of s100a8 and s100a9 in saliva is associated with diabetic macrovascular complications such as nephropathy. It can be seen that the roles of proteins s100a8 and s100a9 in the pathogenesis of DN are unclear and need further study. Hemodynamic factors and metabolic pathways stimulated by oxidative stress play an important role in the development of DN. In clinic, glycosylated hemoglobin has been widely used to evaluate the control of diabetic blood

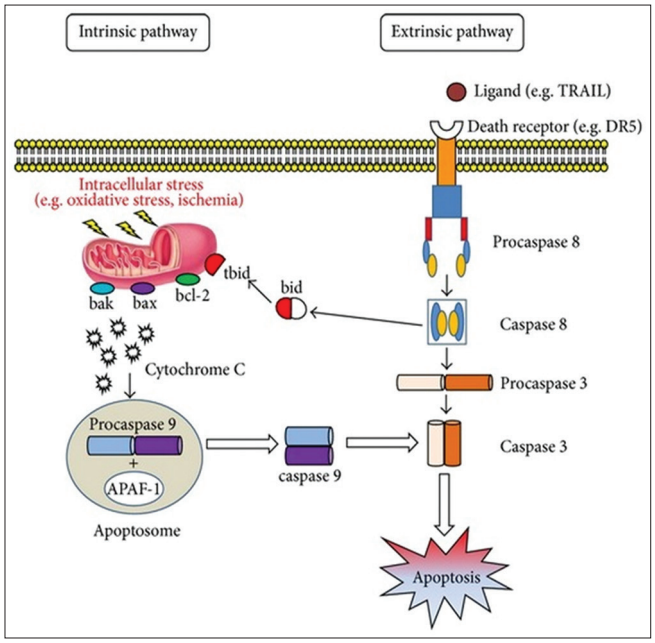

Figure 2: Progression of vascular endothelial growth factor

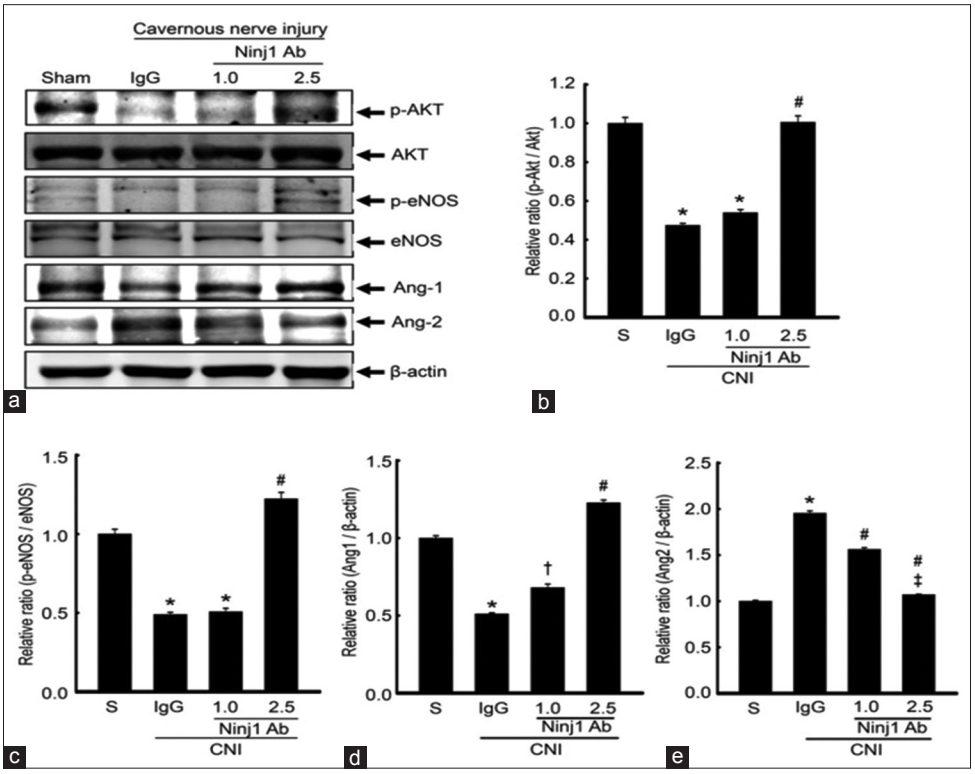

Figure 3: Covetous nerve injuries

sugar, and it has also been suggested that glycosylated albumin can also be used to evaluate the control of blood sugar. We speculate that the renal metabolic system may be impaired by hyperglycemia induced by stress and other factors, as shown by metabolic changes in renal tubular epithelial cells. As a result, the secretion of exospores in renal tubule epithelial cells is increased, which carries signal molecules of cell transport and regulates cellular function [Figure 3].

Discussion

Cubin, aquaporin-1 (water channel aquaporin-1) AQP-1 IV carbonic anhydrase, and y-anhydrase and y-glutamyl transferase anhydrase (vascular endothelial growth factor [VEGF]) were used as markers for the injury of the ascending branch of the loop, such as THP cd9 and type 2 na-k-2c1 transporters. Markers of distal tubule injury include an-cl transporter (VEGF); water channel aquaporin-2 (AQP2), mucin-1 HR type c glycoprotein; markers of bladder transitional cell injury.

Conclusions

In the early stage of DN, there is no irreversible injury, mainly characterized by dysfunction. Proximal tubules often bear the brunt. It has been suggested that there was damage to proximal tubule epithelial cells before micro albuminuria[1 () 7-1 () 9]. Oxidative injury and apoptosis of renal tubular cells can lead to abnormal tubular reuptake and secretion, promote atrophy of renal tubular epithelial cells and interstitial fibrosis, and are the main factors leading to the progression of DN to renal failure. Therefore, the injury of renal tubular epithelial cells may play an important role in the early pathological mechanism of diabetic renal damage. The study of urinary exospore protein is still a new field, and many proteins have not been found. The function of protein is not very clear, and urine exospore database still needs to be improved. There are many reports of exospore research on tumor origin and few reports on diabetes mellitus and DN urinary exospore research, which is the direction of future research. We studied the proteomics of urinary exospores in different stages of diabetes mellitus and identified 22 differential proteins. On bioinformatics analysis, we found proteins masp2calb1, S100a8, and s100a9, which play a biological role in the progression of diabetes mellitus, which still needs to be further studied.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Ichinose K, Maeshima Y, Yamamoto Y, Kitayama H, Takazawa Y, Hirokoshi K, *et al.* Antiangiogenic endostatin peptide ameliorates renal alterations in the early stage of a type 1 diabetic nephropathy model. Diabetes 2005;54:2891-903.
2. Vukovic I, Bozic J, Markotic A, Ljubicic S, Ticinovic Kurir T. The missing link-likely pathogenetic role of GM3 and other gangliosides in the development of diabetic nephropathy. Kidney Blood Press Res 2015;40:306-14.
3. Muller YL, Piaggi P, Hanson RL, Kobes S, Bhutta S, Abdussamad M, *et al.* A cis-eQTL in PFKFB2 is associated with diabetic nephropathy, adiposity and insulin secretion in American Indians. Hum Mol Genet 2015;24:2985-96.
4. Janickova Zdarska D, Zavadova E, Kvapil M. The effect of ramipril therapy on cytokines and parameters of incipient diabetic nephropathy in patients with type 1 diabetes mellitus. J Int Med Res 2007;35:374-83.
5. Agarwal SK, Venkatesh P, Tandon N. The kidney and the eye in people with diabetes mellitus. Natl Med J India 2008;21:82-9.
6. Cho DC, Puzanov I, Regan MM, Schwarzberg T, Seery V, Lee MY, *et al.* Retrospective analysis of the safety and efficacy of interleukin-2 after prior VEGF-targeted therapy in patients with advanced renal cell carcinoma. J Immunother 2009;32:181-5.