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Estimation of Urea in Iraqi Patients

Safa M. Khudair[1*], Shahad Imad Hameed[2]

Department of dental prosthetic technology, medical techniques college, al-farahidi university, Iraq[1]
Medical laboratey technique, Al-Hadi University College, Baghdad, Iraq[2]

Corresponding Author: 1*

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ABSTRACT

According to estimated albuminuria and glomerular filtration rate the kidney failure severity can be different. Mortality outcomes initially begin from a loss of access to renal replacement therapy specially in the developing states. The kidney failure classified as acute or chronic disease. In the body, urea is the main output of protein metabolism. The concentration of the urea plays significant role in the blood as an indicator of kidney functions. dehydration, gastrointestinal hemorrhage, renal disorders, high-protein diets, or elevating protein catabolism are the most causes of increasing urea in blood. The objective of this study was to investigate the assembly of the urea with kidney failure in Iraqi people. Biochemical study was performed on 20 kidney failure patients from Baghdad Surgical Hospital and 20 apparently healthy control. The concentration of urea in the serum was determined. Comparisons of studied parameters were done by statistical analysis system (SAS). The percentage of urea level was significantly ($P \leq 0.01$) greater in people with kidney failure disease compared with apparently healthy control (70.96 ± 9.17 versus 31.86 ± 3.44 respectively; Ttest=20.214, P-value =0.0006). No-Significant difference were noted between the level of urea and the age of both two group of patients and control (> 50= 45.36 ±8.57 versus ≥ 50= 58.57 ±9.15 respectively; Ttest=24.323, P-value =0.273). while, there were significant difference in male than female as related to serum level of urea (63.38±9.34 versus 39.45±7.15 respectively; Ttest=24.323, P-value =0.0435). We concluded that the increasing of serum urea is associated with kidney failure in Iraqi people.

1. INTRODUCTION

The kidney failure classified as acute or chronic disease. According to estimated albuminuria and glomerular filtration rate the kidney failure severity can be different. Mortality outcomes initially begin from a loss of access to renal replacement therapy specially in the developing states [11]. The metabolism and functions of urea is important because it plays significant roles in organizing kidney function and urea is the important circulating origin of nitrogen-containing materials. In the liver the foods contain of amino acids in which the α-amino set is separated and turned to urea [1], [2]. then it excretes a urea to the blood. The ratio excretion of urea about (30–50)% [3]. In the inner medullary processes, urea has a role for producing concentrated urine

[4]. Renal nitrogen intake similar to nitrogen excretion So for the good health nitrogen metabolism is necessary. Urea and ammonia are the major composition of renal nitrogen excretion and other nitrogen compounds for example (nitrates and nitric oxide metabolites, urinary protein, uric acid, etc.) comprise less of 1% of total renal nitrogen excretion. The secretion of ammonia and urea are organized by a set of conditions and play significant roles in normal health, through roles in acid-base homeostasis and in the urine concentrating mechanism. The amount of protein eaten is more associated with the production of urea; therefore, [1], [2]. Urea is filtered across the glomerulus and enters the proximal tubule. The concentration of urea in the ultrafiltrate is same to plasma, so the quantity of urea moving the proximal tubule is controlled by the GFR. In general 30%–50% of the filtered load of urea is secreted. The urea quantity elevated in the first 75% of the proximal convoluted tubule, where it reaches a value nearly50% greater than plasma [5]. This elevating produces from secondary to salt transport, the existing of water and is maintained throughout the remainder of the proximal tubule. Urea transport via the proximal tubule is not organized by vasopressin also named antidiuretic hormone, but it is increased with an increase in sodium transport. The elevated intraluminal urea quantity in thin descending limbs produces from a variation in the urea: water ratio because of water loss. Although there are considerable variation in the absolute urea permeability values measured in various animals, it is generally compatible that urea is excreted into the lumen of thin limbs under antidiuretic conditions. also, the quantity of urea is elevated by water reabsorption driven by the hypertonic medullary interstitium, which produces from the move of urea out of the inner medullary collecting duct (IMCD) [8].

Aim of the study:
detection the effect of difference factors in the study parameters.

2. Subjects, Materials and Methods

A total of 40 human were used for the study. Blood volunteers samples were collected from apparently healthy subjects as controls (n=20), and patients with kidney failure from Baghdad Surgical Hospital in Baghdad-Iraq (n=20) during the period from August to October 2021.Both of two group of the controls and patients at different ages 20 to 90 years. Fiveml of venous blood were collected from aticubital fassa vein are transferred to gel tubes for preparing serum. Serum was separated after of blood collection by centrifugation at 5000 RPM for 10 min and then stored in a refrigerator. Biochemical analyses on the serum samples were done after sample collection. Biochemical analyses were carried out for the Blood urea. In this study We used kit reagents (Randox laboratory Ltd, UK) were used for biochemical analyses according to manufacture protocol and then, the optical density were read using a UV-Vis spectrophotometer (DREL 3000 HACH) at 520(nm). The Statistical Analysis System- SAS (2012) program was used to detect the effect of difference factors in study parameters. T-test was used to significant compare between means in this study.

3. Result and Discussion

The levels of urea in both sexes of apparently healthy control and kidney failure patients shown in table (1), the effect of age in urea was shown in table (2) and the effect of sex in urea was shown in table (3).

Table 1: Comparison between control and patients groups in Urea

Group	Mean ± SE of Urea
Control	31.86 ± 3.44
Patients	70.96 ± 9.17
T-test	20.214 **
P-value	0.0006

** (P≤0.01).

Table 2: Effect of Age groups in Urea

Age groups	Mean ± SE of Urea
> 50	45.36 ±8.57
≥ 50	58.57 ±9.15
T-test	24.323 NS
P-value	0.273
NS: Non-Significant.	

Table 3: Effect of Sex in Urea

Sex	**Mean ± SE of Urea**
Male	63.38±9.34
Female	39.45±7.15
T-test	24.323 *
P-value	0.0435
* (P≤0.05).	

This study produce estimation of long-term risk of kidney failure for the people that suffering from elevating of urea. We examined the level of serum urea for both sexes among Iraqi people with kidney failure and apparently healthy controls at different ages. [9] observed that the high elevate (P<0.05) in concentration of blood urea in Iraqi patient than Iraqi control. The result of the present study agreeing with [9] as related with serum level of urea which higher in patient group than control group with a Highly Significant (P≤0.01) as demonstrate in table 1. No-Significant difference were noted between the level of urea and the age of both two group of patients and control as shown in table 2 and the present study's results were disagreement with [10] who found that the age set (20-44) years listed the highest rate of injury. while, there were significant difference in male than female as related to serum level of urea, the result of this study shown that kidney failure was higher in male than female. As shown in table 3. These results are in agreement with Morgan et al., (2016) who found a significant difference in male 0.24% than female 0.15%.

4. Conclusion

We concluded that the increasing of serum urea is associated with kidney failure in Iraqi people. This study demonstrated that the urea levels were increased in patients with kidney failure than apparently healthy controls (especially in male than female) because of accumulating of urea in their blood. So they suffer from increasing of creatinine, proteins and other substances in the blood as a result of uremia.

5. Reference

[1] Franch, H. A., & Mitch, W. E. (2009). Navigating between the Scylla and Charybdis of prescribing dietary protein for chronic kidney diseases. Annual review of nutrition, 29, 341-364.

[2] Maroni, B. J., Steinman, T. I., & Mitch, W. E. (1985). A method for estimating nitrogen intake of patients with chronic renal failure. Kidney international, 27(1), 58-65.

[3] Klein, J. D., Blount, M. A., & Sands, J. M. (2011). Urea transport in the kidney. Comprehensive Physiology, 1(2), 699-729.

[4] Gamble, J. L., McKhann, C. F., Butler, A. M., & Tuthill, E. (1934). An economy of water in renal function referable to urea. American Journal of Physiology-Legacy Content, 109(1), 139-154.

[5] Hamm, L. L., & Simon, E. E. (1987). Roles and mechanisms of urinary buffer excretion. American Journal of Physiology-Renal Physiology, 253(4), F595-F605.

[6] Cottini, E. P., Gallina, D. L., & Dominguez, J. M. (1973). Urea excretion in adult humans with varying degrees of kidney malfunction fed milk, egg or an amino acid mixture: Assessment of nitrogen balance. The Journal of nutrition, 103(1), 11-19.

[7] SAS. 2012. Statistical Analysis System, User's Guide. Statistical. Version 9.1th ed. SAS. Inst. Inc. Cary. N.C. USA.

[8] Weiner, I. D., Mitch, W. E., & Sands, J. M. (2015). Urea and ammonia metabolism and the control of renal nitrogen excretion. Clinical Journal of the American Society of Nephrology, 10(8), 1444-1458.

[9] Ali, A. A. K. J. K., & Abdulmohsin, M. A. (2020). The Effect of Some Biochemical and Physiological Parameters in Iraqi Patients with Renal Failure. Parameters, 5(1.29), 23-57.

[10] Alabdali, R. M., Hussein, H. M. A., & Muslim, R. (2021). Spatial Analysis of Kidney Failure Disease in The Province of Najaf for The Period (2014-2018). Review of International Geographical Education Online, 11(4), 1270-1281.

[11] Grams, M. E., Sang, Y., Levey, A. S., Matsushita, K., Ballew, S., Chang, A. R., ... & Garg, A. X. (2016). Kidney-failure risk projection for the living kidney-donor candidate. New England Journal of Medicine, 374(5), 411-421.