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Original Research Article

Evaluation of Renal Function Test in Body Building

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Abstract: Body builder tend to use high protein diet to produce optimum skeletal muscle hypertrophy. This study was conducted during the period from November 2024 to March 2025. During this period, 40 samples were collected from patients at Al-Qasim General Hospital and private clinics the city of Babylon, encompassing form male of varying ages between (20 - 40) year. The samples were divided to four groups (**G1** control, **G2** natural, **G3** take artificial protein (nutritional supplements) **G4** takes artificial hormones). Results showed that the values Analyses were conducted. The impact of high protein diet on renal functioning test and cholesterol, Triglycerides, PCV Serum creatinine and urea were significantly high in bodybuilders using high protein intake, and urea was reduced significantly as compared to the control group. We notice a gradual increase in the levels of cholesterol, triglycerides, LDL, VLDL and HDL from group A to D. This means clear differences in lipid indicators between the groups. This means changing the diet and body activity. This is related to the triglyceride table. As for PCV we only notice an increase in group D compared to the rest of the groups. This means a clear effect when taking the uses. In contrast, in the remaining groups, we do not notice the effect. When using synthetic protein and hormone injections, we notice a significant increase in liver enzymes, which reflects a negative effect on liver function. A significant increase in the level of creatine and urea in the serum of bodybuilders who consumed a high percentage of protein was observed, while the level of urea decreased significantly in comparison control.

Keywords: Skeletal Muscle Hypertrophy, Bodybuilding, Nutritional Supplements, Synthetic Hormones, Renal Function, Lipid Profile.

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1. INTRODUCTION

Proteins are a vital macronutrient that is required to grow and maintain the human body [1]. Since substituting a regular diet with a high-protein one has the effect of increasing the amount of nitrogen into the body and raising the level of muscle mass, it has been an effective type of dietary supplement among sportspeople and physically-fit people. An emerging literature has tested the role of protein in prevention protein catabolism during long exercise and stimulates muscle glycogen resynthesize after exercise. Besides, protein enhances hemoglobin, myoglobin, oxidative enzymes and mitochondria that act to alleviate sports anemia during aerobic training [2].

Epidemiological data through observation confirms that CKD progression is one of the leading reasons because of excessive intake of dietary protein. The catabolism of proteins is also a significant contributor to the daily acid load to the kidney, through synthesis of sulfate [3].

Research has indicated a higher rate of kidney stone disease amongst body builders who consume a lot of protein. The correlation of an excess consumption of protein with the formation of the kidney stone can be illustrated by the finding that high protein consumption corresponds with an increased excretion of acid by the kidney and acid loads, and this effect has been alkalinised by the observation that bone releases calcium to be excreted by the kidney. This hyper calciuria due to this protein might result in the development of calcium kidney stones [4].

Additionally, Purines, the building blocks of uric acid are also found in large amounts in animal protein and thus Excessive consumption of animal protein is also linked to hyper uricosuria, which is also found in some uric acid stone formers [5].

The kidneys are the primary pathway through which the nitrogenous end products are released. It leads to the condition of increased nitrogenous waste products in the blood and is manifested by the loss of renal functioning. The tendency of certain sportsmen to use protein supplements in order to make their muscles bigger is quite trendy nowadays. This is a very worrying trend as the excessive consumption of proteins will cause the increase of the production of urea that has to be filtered in the kidneys [6]. Highlighted that clinical studies conducted in laboratories give needed information towards determination of critical pathological alterations as well as towards scientific understanding in clinical research studies [7].

The Aim of Study

The aim of this study is to identify dietary and non-nutritional supplementation interventions that are evident in bodybuilders and their effects on the kidney.

2- MATERIALS AND METHODS

2.1 Laboratory Materials

Laboratory Instrument and Apparatuses used in the study are listed in Table (3:1) presents a list of laboratory apparatus and instruments used in the study, along with their country of origin. The equipment includes Creatine kit, Water path, Centrifuge, Tubes, Tourniquet and more, each sourced from different countries such as Germany, the United Kingdom, Japan, and Turkey. The table highlights the diversity of equipment sources, reflecting the reliance on various technologies in the research.

Table 1: Laboratory Instrument and Apparatuses used in the study

Instrument	Compony\Origin
Creatine kit	Biotec
2- Spectrophotometer	Clarivate \UK
Centrifuge	DLAB\ china
Water path	Gallenkump\England
Tubes	China
Cuvette	MAY\Turkey
Tourniquet	China
Syringe, cotton, gel tube,	Medijecte \ China
Micropipette, yellow and blue tips	Jippo\ Japan

2. 2 Reagent

Table 2: Different chemical materials which used in the study

Urease
Sodium nitroprusside
Phenol concentrate (phosphate buffer, sodium salicylate, EDTA).
Hypochlorite concentrate

2-3 Study Design

This experiment was designed in November 2024 for the period of March 2025 at Al-Qassim General hospital. A total of 40 samples were analyzed divided into four groups (10 control and 10 natural and 10 of them from the study sample among the male volunteers who have confessed to taking protein supplements. While 10 body builder takes artificial hormones) between every participant was requested to provide a consent form and data were gathered via the help of a proper questioner (weight, age). All samples was tested for, Cholesterol, VLDL, HDL, LDL, PCV, liver enzyme, Creatine and urea.

3-2 Methods

3.2.1 Samples Collection

3.2.1.1 Collection of Blood and Urine Samples

Blood samples take after an overnight fast and 24- hour urine from previous day were obtained in this study to measure creatine level and estimate renal function.

3.2.1.2 Biochemical Determination

Determination of Serum Creatinine

The creatinine in serum was identified using spectrophotometer Creatinine kit. Picrate reacts with inalkaline solution containing creatinine to give a coloured solution; the strength of the colour is proportional to the concentration of the creatinine in the serum and urine. Spectrophotometer was used to measure the absorbance at 580 nm.

Determination of Serum Urea

Urea in serum was measured with the aid of test kit and absorbance studied at 490-520 nm with the spectrophotometer.

4. RESULT AND DISCUSSION

4.1 Results

4.1.1 Serum Creatinine

High protein diet bodybuilders recorded a large rise in serum creatinine level. when compared to control group. group, whereas, serum creatinine level does not alter significantly in bodybuilders without protein diet when compared with control group.

4.1.2 Serum Urea Level

Serum urea level increased significantly in high protein diet versus control in the bodybuilders. In contrast, serum urea level did not indicate any significant variation in bodybuilder group compared with control group.

Group N (10)	Cholesterol mmol/L	Triglyceride mmol/L	HDL mmol/L	LDL mmol/L	VLDL
GROUP A	3.38 ± 0.070	1.13 ± 0.048	0.85± 0.130	1.81± 0.060	0.51± 0.025
GROUP B	3.44± 0.220	1.40 ±0.155	0.86 ±0.164	1.95 ± 0.115	0.63 ± 0.054
GROUP C	4.20 ± 0.902	2.30 ± 0.558	1.05 ± 0.048	2.11 ±0.360	1.04 ± 0.307
GROUP D	4.90 ± 0.789	2.60 ± 0.382	2.33 ± 0.028	2.5 ± 0.184	1.18 ± 0.250
LSD	1.5	0.85	0.28	0.53	0.51

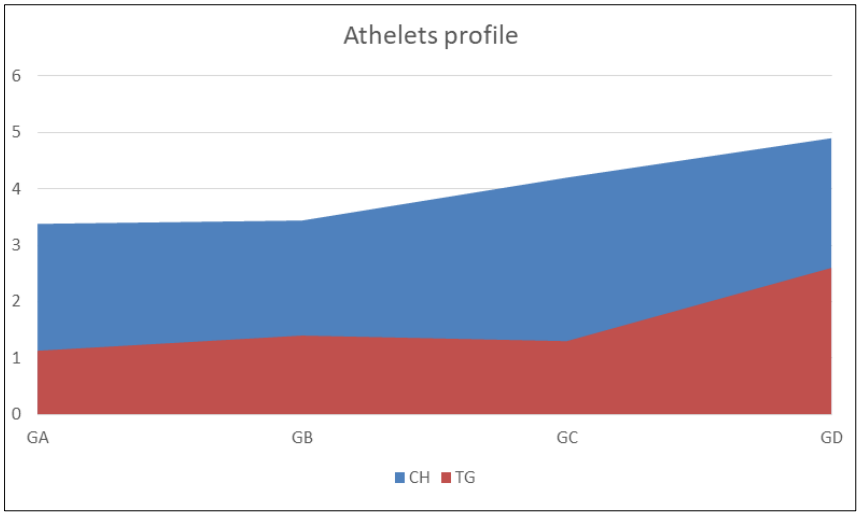

Fig. 4-1: Lipid profile change (HDL, LDL) (m Mol\L)

Group N (10)	PCV
Group A	44.60 ± 0.580
Group B	44.90 ± 0.600
Group C	45.80 ± 0.3806
Group D	48.25 ± 0.790
LSD	1.50

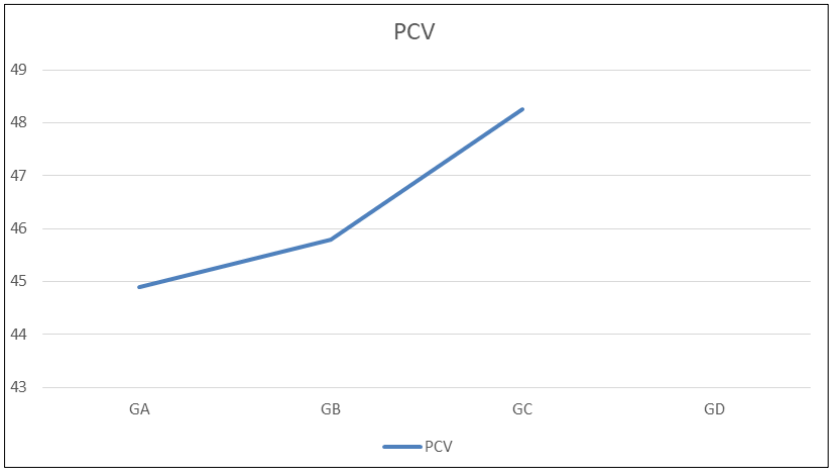

Fig. 4-2: PCV % Change between Group

Group N (10)	ALT Mean ± U/L	AST Mean ± U/L
Health person Group A (GA) drug free & don't play any sport.	19.15 ± 0.734	18.10 ± 0.685
Healthy athletes depend on natural source of protein Group B (GB)	26.30 ±1.150	24.4 ±0.491
Healthy athletes depend on natural and synthetic source of protein Group C (GC)	30.80 ± 0.926	48.94 ± 4.310
Healthy athletes depend on natural and synthetic source of protein with injection of growth androgenic hormone Group D (GD)	50.61 ± 3.909	95.60 ± 5.295
LSD	5.477	8.757

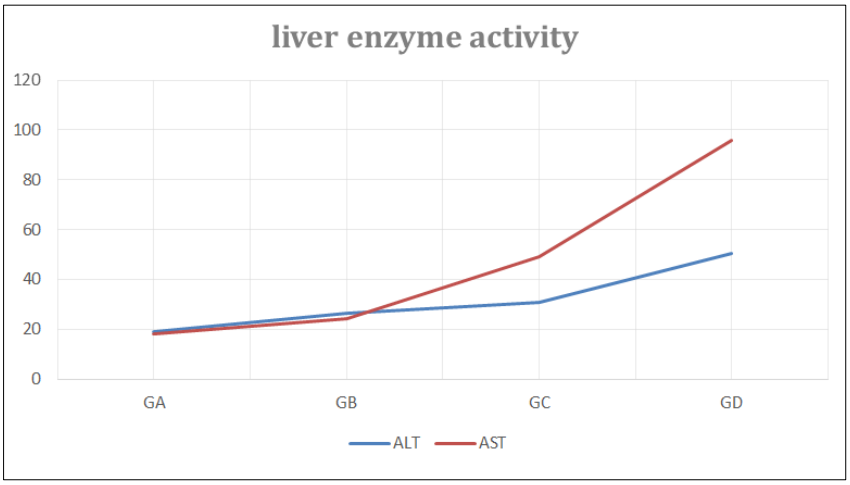

Fig. 4-3: Measurment of (AST) and (ALT) active (U\L)

Group N (10)	Creatinine Mean ± Mol\L	BUN Mean ± Mol\L
Health person Group A (GA) drug free & don't play any sport.	65.3 ± 2.356	2.50 ± 0.287
Healthy athletes depend on natural source of protein Group B (GB)	70.20 ±1.398	3.90 ±0.350
Healthy athletes depend on natural and synthetic source of protein Group C (GC)	78.56 ± 1.354	5.80 ± 0.301
Healthy athletes depend on natural and synthetic source of protein with injection of growth androgenic hormone Group D (GD)	98.30 ± 3.322	8.12 ± 0.192
LSD	5.83	0.680

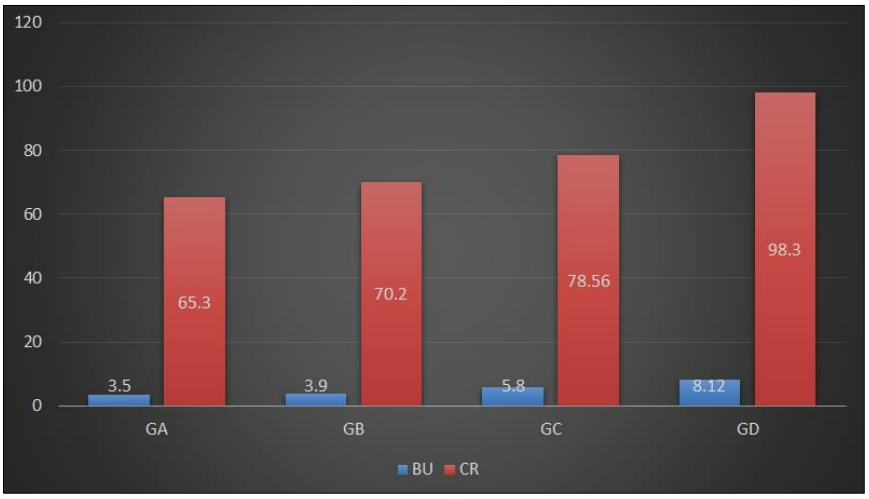

Fig. 4-4: Measurment of Serum Creatnine (m Mol\L) and blood urea nitrogen BUN (m Mol\L)

4.2 Discussion

Our findings reveal that high protein diet among bodybuilders brought a significant change of urea and creatinine in serum. It is no secret that urea which is the main final product of nitrogen and amino acid metabolism is synthesized in the liver in greater amounts than the amount excreted in the urine [21]. Nonetheless, the kinetics of urea generation, excretion and hydrolysis have been broadly examined in human beings, during physical exercise [23].

And protein intake. Conversely, showed that the intake of dietary protein plays significant roles in the metabolism of renal ammonia. Overall, high-protein diets especially those rich in amino acids that contain a lot of sulfur enhance the production of endogenous acids, which leads to a similar rise in the excretion of ammonia [24].

Research indicates that mammals that are fed acute and chronic high protein diets have GFR and renal blood flow improvements [25]. The unified mechanism of elevated creatinine level was later explained by variations in GFR and proved that renal blood flow was the foundation behind GFR mediated variation in serum creatinine to incremental protein intake [25].

The findings of the current research revealed that bodybuilders on high protein diet were found to have low urine pH than control group. The outcome of an augmented urinary excretion of anionic products of protein catabolism results in augmented renal acid discharge on a protein rich diet in a mild metabolic acidosis. Which further elevates excretion of acid in the kidneys [26].

CONCLUSION

1. It was based on the current study that we concluded that dietary protein consumption altered same renal functioning in bodybuilders.
2. This study demonstrates that anabolic steroid use can significantly affect kidney, liver, and heart functions.
3. The adverse effects observed in the steroid users group highlight the importance of regular monitoring and the potential risks of continued steroid use.
4. Individuals using steroids should be aware of these risks and take preventive measures to safeguard their health.

RECOMMENDATIONS

1. Regular Monitoring: Steroid users should undergo routine kidney, liver, and heart function tests to detect any early signs of damage.
2. Minimizing Steroid Use: It is recommended to reduce or eliminate the use of anabolic steroids to prevent long-term health complications.
3. Public Awareness: There should be increased education on the health risks associated with steroid use, particularly regarding kidney, liver, and cardiovascular health.

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