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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНИТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНИТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman** (**Кириллица**), для текста на грузинском языке следует использовать **AcadNusx.** Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - http://www.spinesurgery.ru/files/publish.pdf и http://www.nlm.nih.gov/bsd/uniform_requirements.html
В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректура авторам не высылается, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or compu-ter-printed on a single side of standard typing paper, with the left margin of **3** centimeters width, and **1.5** spacing between the lines, typeface - **Times New Roman** (**Cyrillic**), print size - **12** (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf
In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

Articles that Fail to Meet the Aforementioned Requirements are not Assigned to be Reviewed.

ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე,დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx.** შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შეღებვის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფჩხილებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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ASSOCIATION OF PLASMA NEUTROPHIL GELATINASE-ASSOCIATED LIPOCALIN WITH METABOLIC SYNDROME

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Abstract.

Background: This prospective hospital-based study conducted in Tikrit City aimed to investigate the role of Neutrophil gelatinase-associated lipocalin and level of hemoglobin A1c and lipid profile concentrations in Metabolic syndrome (MetS) with hypertension and Diabetes mellitus (DM).

Objective: Estimate of serum NGAL levels in MetS patients and the Control Group.

Methods: The study included 60 Patients with metabolic syndrome along with 30 healthy individuals as controls who were 18-50 years old; the samples were collected at a specific time (10 P.M. to 1 A.M.) from October 2023 to the end of November 2023 from Tikrit Teaching Hospital in Tikrit City and analyzed for various parameters. Patients with Metabolic Syndrome had their waist measured men as >102 cm (>40 in) and Women >88 cm (>35 in) and BMI >30 kg/m2 and/or waist ship ratio >0.9 in men and >0.85 in women.

Results: The mean serum level NGAL in patients with metabolic syndrome compared with the control group (523.12±271.8 versus 353.66± 151.0 pg/ml). The result was a significant difference (P<0.001). The study found that metabolic syndrome patients who had HbA1c% results were significantly different (P<0.001) compared with the control group. Also, the serum level lipid profile concentrations in patients with metabolic syndrome compared with the control group which was significantly different (P<0.001).

Conclusion: The results of this research clearly indicate that a high level of NGAL associated with metabolic syndrome is a significant risk factor for the incidence and mortality of cardiovascular disease. Reducing the prevalence of cardiovascular disease in the general population should involve identifying, treating, and preventing the underlying risk factors of metabolic syndrome. Male obesity, diabetes, dyslipidemia, and hypertension are well-known main cardiovascular risk factors.

Key words. Neutrophil, gelatinase, lipocalin, metabolic syndrome.

Introduction.

Other names for metabolic syndrome include Syndrome X, Insulin resistance syndrome, and Dysmetabolic syndrome [1]. The main focus of metabolic syndrome has been whether high abdominal obesity should be a required component. Three of the five criteria in the updated definition need to be satisfied in order for a diagnosis to be made [2]. The conditions needed include low HDL cholesterol, blood pressure, triglycerides, high waist circumference, and fasting glucose. Guidelines tailored to certain sexes and ethnicities have been established in response to concerns raised by differences in baseline waist circumference between the sexes and ethnic groups [3].

Tissues such as the pancreas, kidney, and prostate gland emit neutrophil gelatinase-associated lipocalin (NGAL), which is also released by immune cells, adipocytes, and hepatocytes [4]. When inflammatory and metabolic disorders arise, NGAL is found in higher concentrations in adipocytes. It also plays a role in carcinogenesis and elevates inflammatory states and levels in arterial hypertension, obesity, diabetes, and metabolic complications like insulin resistance. Systolic blood pressure (SBP) was favorably linked with plasma NGAL concentrations [5]. The study aims to evaluate the role of serum Neutrophil gelatinase-associated lipocalin (NGAL) in metabolic syndrome male patients. Correlation among NGAL levels, Serum Cholesterol, TG, HDL, LDL, and S. HbA1c in MetS patients.

Materials and Methods.

Study design: Sixty male patients with metabolic syndrome, ages 18 to 50, were enrolled in the case-controlled research. Samples were taken at the Tikrit Teaching Hospital in Tikrit City between October 2023 and November 2023 at a set period (10 P.M. to 1 A.M.). The investigator created a questionnaire form that was used for the interviews with these individuals. It had questions on their age, weight, length, and illness history.

Study population: Male metabolic syndrome patients 18-50 years old were included in the study.

Exclusion criteria: All patients with chronic liver and renal disorders, or Patients with Myocardial Infarction. Women were excluded from this study. Patients who take aspirin, ibuprofen, or melatonin

Study groups were categorized as the following:

MetS group (n=60): Included sixty male patients who meet the criteria for MetS.

Control group (n=30): Included thirty samples from a healthy, typical control group.

Sampling: Before that, every research participant should have fasted for at least eight hours. Patients' blood samples were taken between 10:00 p.m. and 1:00 a.m. All subjects had their antecubital veins punctured with a disposable syringe to remove around five milliliters of blood. The drawn blood was split into two parts. Three milliliters of the first part were placed in a separation gel tube, which helps separate the serum by centrifugation at 3000 rpm for ten to fifteen minutes. To test NGAL by ELISA and the lipid profile by UV Spectrophotometer, the clear serum was pipetted into dry, transparent Eppendorf tubes and kept at -20 °C. The second portion, 2 mL of blood, was placed in a blood collection tube with ethylene diamine tetra acetic acid (EDTA) as an anticoagulant so that the Cobas C 111 analyzer could detect glycated haemoglobin (HbA1c) right away.

Physical Examination: Every male involved in the research had his height, weight, and waist circumference (WC) measured. The formula for calculating BMI was weight in kilograms divided by height in square meters. It was measuring obesity using the worldwide obesity task force and the WHO's BMI categorization.

Ethical consideration: According to the research consent form, both sick and healthy individuals gave their approval to participate in this study, where a personal interview was conducted for each person through which a questionnaire was filled out that included the sequence, name, age, height, weight, residence, sex, duration of injury and type of treatment.

Statistical analysis: Statistical software (SPSS) version 23 was used to examine the data from the current study. The mean and standard deviation were tested, and the Duncan test was used to ascertain the difference between the groups at the probability level of 0.05.

Results.

The total number of subjects that participate is 90 (60 patients and 30 control). This study showed that the peak age of men with metabolic syndrome was highest at 23(>40) years and its percentage was 38%, while 18 (18-29) and 19 (30-40) age groups percentage which were found to be 30 % and 32% respectively (Table 1).

Table 1. *Relation the number of metabolic syndrome men with Age.*

Age group(years)	n	%
18-29	18	30
30-40	19	32
>40	23	38
Total	60	100

As shown in Table (2), the mean of the serum level NGAL in patients with metabolic syndrome compared with the control group (523.12±271.8 versus 353.66±151pg/ml). The result was a significant difference (P<0.001).

Table 2. *NGAL levels in the metS groups compared to control group.*

Studied groups	**n**	**P. NGAL (pg/ml) (mean±SD)**
MetS	60	523.12± 271.8
Control	30	353.66± 151.0
P value		P<0.001

Table 3 explains the result of NGAL inpatient metabolic syndrome with Hypertensive and patient metabolic syndrome with diabetes mellitus group Mean±SD which was (544.14±157.9 versus 537.13±165.07) respectively, compared with the control group Mean±SD which was (427.04±121.4). The result was a non-significant difference (p=0.346).

Table 3. *NGAL levels in the studied groups compared to control group.*

Studied groups	**n**	**P. NGAL (pg/ml) (mean±SD)**
Hypertensive	26	544.14±157.9
Diabetes mellitus	34	537.13± 165.07
Control	30	427.04±121.4
P value		0.346

Discussion.

The purpose of this study was to determine the prevalence of MetS in a sample of Iraqi city residents. The prevalence of MetS risk factors, particularly obesity, diabetes mellitus, and cardiovascular consequences from untreated MetS, is rising in our nation.

Urbanization, economic expansion, westernization of our cuisine, physical inactivity, irregular meal schedules, and elevated stress levels are likely the causes of this shift in occurrence [6]. The results of this study indicated that the peak age at which the percentage of men with metabolic syndrome was highest—23(>40) years—was 38%. This percentage is comparable to the prevalence of MetS in Iran, which is 32.1%, but it is higher than that of Saudi Arabia, which is 39.3%. This variation in prevalence might be brought about by variations in the prevalence of physical inactivity, sedentary lifestyles, and obesity, as was previously indicated [6,7].

This study found a correlation between the prevalence of MetS and advancing age. A key independent risk factor for Mets is age, according to a research by Ervin et al. with a similar conclusion. Regarding the etiology and pathophysiology of MetS, there is disagreement; it is necessary to identify a single, consistent mechanism [8]. But a number of factors—including environmental, hormonal, and genetic—as well as body composition, diet, and stress hormones, are important in this competition. This investigation indicated that a family history of diabetes mellitus, hyperlipidemia, obesity, and hypertension, among other cardiovascular risk factors, was linked to MetS. The findings were consistent with those of Katzmaryk et al. [9]. Similar to Thomas et al. [10], marital status was shown to be substantially correlated with MetS. This finding may be explained by the previously mentioned finding that the prevalence of MetS increases with age.

The current study concurs with the metabolic syndrome (men 50 years of age) study by Kobo, Ofer, et al. [11]. Regardless of the fact that metabolic syndrome was previously reported in other demographics as well, the prevalence of the condition was greater in those over 60 (men: 19.3%).

In comparison to control groups, patients in their research of male, obese, hypertensive adolescents with metabolic syndrome exhibited increased blood NGAL levels. Elevated serum NGAL showed a negative connection with HDL and a positive correlation with the waist-hip ratio, HbA1c, and the prevalence of hypertension. This study revealed that, in addition to hyperuricemia, metabolic syndrome components also affect renal tubular indicators [12]. Our results align with those of Tomczak et al., who have documented comparable relationships between NGAL and metabolic syndrome components in hypertension patients. Additional researchers have noted that individuals with hypertension also had higher blood NGAL levels [13].

According to Singer et al. (2014), who conducted the current investigation, there was a substantial rise in the levels of NGAL in both the control and ELISA groups.

In addition to raising inflammatory conditions, NGAL is implicated in the development of cancer and is elevated in metabolic problems such insulin resistance, obesity, diabetes, and arterial hypertension. The current understanding of NGAL and its participation in many illnesses, particularly its significance in renal and cardiovascular disorders, is presented in this work [15].

In many clinical conditions, NGAL quantities increase. Many different tissue types express NGAL, and when an injury occurs, its concentration rises. Hepatocytes, epithelial cells, or neutrophils can all express NGAL when exposed to inflammatory cytokines [16]. NGAL is also derived from adipose tissue, and it is more prevalent in obesity, type 2 diabetes, and non-alcoholic fatty liver disease [17]. According to some research, NGAL concentrations in serum may be estimated, which may help forecast the metabolic issues brought on by obesity. NGAL stands alone as a risk factor for lipid metabolic problems, systolic blood pressure, and insulin resistance. It's unclear how NGAL functions in the pathophysiology of obesity at this time [18].

Patients with hypertension had greater amounts of NGAL in their plasma than those with normotension. One of the primary causes of secondary hypertension is primary hyperaldosteronism. It is established that elevated aldosterone concentrations cause hypertension, and NGAL plays a role in its development. There is still much to learn about the precise process. It's thought that it could have something to do with immune cell activation [19].

Following the activation of macrophages and dendritic cells during an aldosterone excess, there was an increase in NGAL production, which resulted in blood vessel fibrosis and the onset of hypertension [20]. Furthermore, as NGAL is a significant indicator of renal dysfunction, it might be useful to identify kidney damage in hypertensive patients before kidney failure develops [21]. Because serum NGAL concentrations and ambulatory blood pressure readings correlate, it is feasible to identify a subset of individuals who have elevated plasma NGAL and are thus at a greater risk of cardiovascular disease and death [22]. Many investigations have demonstrated a strong correlation between NGAL and TNF-alpha and 12-lipoxygenase activity in adipose tissue. The way in which these molecules act is essential to the emergence of insulin resistance. It has been demonstrated that NGAL promotes its expression and that NGAL deficiency delays the development of diseases related to glucose metabolism. It was also shown that hyperglycemia induced the production of NGAL [21,22]. Diet also affects immunometabolic status of the human body which shouldn't be ruled out [23,24]. Treatment to reduced complication should be directed against diabetes and hypertension [25,26].

Conclusion.

Male obese, hypertensive adult with metabolic syndrome, demonstrated that patients had higher serum NGAL compared with control groups. These findings contribute to our understanding of the pathophysiology of metabolic syndrome, emphasizing the involvement of HbA1c has proven to be a biomarker for both cardiovascular and metabolic risk. Demonstrated that patients with metabolic syndrome level of Lipid profiles were associated with MetS- in Iraqi community-men adults, showed significantly strong associations with men.

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