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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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THE PREVALENCE OF SARCOPENIA AND ITS EFFECTS ON OUTCOMES IN POLYTRAUMA

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Abstract.

Background: Sarcopenia has a negative impact on the number of populations. The frequency of sarcopenia in polytrauma patients, however, is little understood. Knowing how many people face a bad outcome will raise awareness and help stop additional muscle mass loss. **Aim:** This pilot study's objectives included determining prevalence of the low mass of muscle in the aged patients of poly-trauma and examining the links between complications, low muscle mass, death, and the inflammatory response. **Method:** All polytrauma patients who were seen between 2017 and 2021 at the level-I trauma centre were included in the data from the regional perspective registry of trauma. The computed tomography (CT) of the abdomen's availability and the height in the subjects was screened to determine the skeletal mass index (SMI), which is utilised to calculate the sarcopenia. Additionally, factors of clinical outcome were evaluated. A multivariate regression analysis was conducted if parameters related to a poor result were found through a univariate analysis. **Results:** Sarcopenia was prevalent in 33.5 percent of the population overall, but in older age groups (60-79 years), it was significantly more prevalent, reaching to 82 percent in the individuals over the 80 years old. The ISS (Injury severity score) where the $p = 0.026$, age where the $p < 0.0001$, the CCI (Charlson comorbidity index) where the $p = 0.001$, injury severity score, and the 30-day or the in-hospital mortality were all associated with sarcopenia. The Injury Severity Score (ISS) is a medical scoring system to assess trauma severity based on the extent of injuries in various body regions. Sarcopenia was discovered to be a predictor of the 30-day mortality by log rank analysis ($p = 0.032$).

Conclusion: In conclusion, we found that polytrauma patients had a significant prevalence of sarcopenia, which increased with age. Additionally, sarcopenia was found to be the predictor of the 30-day death, highlighting clinical importance of finding the low muscle mass on the CT-scan, which was already regularly performed on the majority of patients of trauma.

Key words. Polytrauma, sarcopenia, skeletal mass index, prevalence, mortality, muscle mass.

Introduction.

Senior individuals frequently suffer from sarcopenia, a disease that is characterised by a progressive decrease of the skeletal muscle mass (SMM), athletic performance, and the muscle strength [1]. It results in a lower quality of life and higher mortality and is linked to a variety of unfavourable outcomes [2]. Sarcopenia's clinical importance has been extensively discussed in relation to a number of illnesses [3]. Additionally, assessments of skeletal muscle mass have been shown to be useful in predicting problems in a number of surgical specialties, including general, colorectal, vascular, and the liver transplant surgery [4].

Prevalence of sarcopenia in the trauma patients is anticipated to rise along with global increases in life expectancy and the frequency of geriatric polytrauma [5]. Sarcopenia prevalence in polytrauma patients is basically unknown as of this writing [6]. There is little research on the negative effects of the sarcopenia in the patients of polytrauma, and the studies' quality that are available is poor [7]. The variability of polytrauma patients, which includes all the groups of age, various trauma causes, and the range of pre-existing illnesses, is one limiting issue. Additionally, the comparability of studies on trauma patients is hampered by the use of several sarcopenia definitions [8,9]. However, the total-body CT-scan (computed tomography) was always executed as soon as a trauma patient arrives, and the measurement based on CT-scan of the skeletal muscle mass was standard for quantifying of the SMM. Thus, abdomen CT-scan provides a chance to directly detect patients having reduced muscle mass.

This pilot study's objectives included determining prevalence of the low mass of muscle in aged patients of polytrauma and examining the links between the complications and low muscle mass, inflammatory response, and death. We postulate that polytrauma patients with advanced age frequently have the low skeletal muscle mass upon the abdominal CT, which is a sign of sarcopenia, and this could worsen the clinical result by the raising of risk of sequelae. Additionally, we propose that the reduced muscle mass increases the early inflammatory response during hospitalisation and is the predictor of the in-hospital mortality or thirty-day.

Patients and Determination of Muscle Mass.

The study's eligibility was determined based on the data from the patients of polytrauma (ISS 16) admitted to the single trauma (level-I) centre between the January 2017 and the December 2021. The existence of the abdominal CT-scan & the height of patient was retrospectively verified in patient records. Patient data was only comprised for the analysis when both the admission abdomen CT scan and the patient's height were available. As previously mentioned, SMM's measurement was carried out by means of images of abdominal CT by the

2 independent observers via OsiriX Lite (Version 11.0.2) software on the transverse slides of the abdominal CT-scan. By selecting tissue of the interest threshold for skeletal muscle at between 30 and +110 HU (Hounsfield Units), all measurements were carried out semi-automatically. Areas of interest that were generated automatically were manually corrected. The total area of the muscles was determined automatically and shown in square centimetres. The following equation was then used to determine the SMI, derivative of SMM:

$SMI = SMM/height^2$ ----------[1]

Sarcopenia was classified in accordance with the cut-off values for the SMI as given by a study in order to assess the sarcopenia's prevalence in study population [10]. For boys and females, these values were established at 52.4 cm2/m2 and 38.5 cm^2/m^2, respectively. All patients' L3 muscle areas were assessed by two separate researchers, and the results were utilised to determine the interobserver agreement. Six months following the original study, 50 L3 measures were repeated to test intra-observer agreement.

Clinical Outcome.

Two observers extracted complications from patient data. This comprised scoring length of the ICU (intensive care unit) admission and hospitalisation as well as complications such pneumonia, UTI, the delirium, & death (both 30-day and in-hospital). Chest radiographs and the antibiotic therapy were used to make the diagnosis of pneumonia [11]. Positive urine culture results and the start of antibiotic therapy were used to characterise urinary tract infection [11]. The geriatrician categorised patients having impaired mental status as having delirium if they were receiving the medical care [12]. CRP (C-reactive protein) and the Leukocytes levels were also assessed at admission, 24 and 48 hours later. In order to determine the prevalence of sarcopenia, data from individuals who had suffered severe head trauma and had passed away within 24 hours were included. However, the examination of problems did not include their data.

Statistical Analysis.

Frequencies are displayed as percentages and absolute figures. Standard error of the mean is used to show continuous data as mean. The Kolmogorov-Smirnov test is utilized to examine normal distribution. With regard to dichotomous variables, the Pearson-2-test was utilized to evaluate differences across the groups. Logistic regression analysis is used to generate the confidence intervals. Univariate analysis was first used to determine variables that were specifically linked to a poor outcome. Variables were selected for inclusion in the multivariate logistic regression based on their significant association ($p < 0.05$) with adverse outcomes as determined in the univariate analysis. Only those factors showing initial significance were included to enhance the predictive accuracy of the regression model. The analysis multi-variate logistic regression was then accomplished using dependent variables that are found in the univariate study. Utilizing a log-rank-test, the impact of the sarcopenia on the Thirty-day mortality is ascertained.

The Pearson correlation index was used to examine interobserver agreement of L3 muscle index assessment of the sarcopenia. Significant 2-tailed p-values were those <0.05. The statistical analysis was done by SPSS version 26.

Results.

Patients.

Eligibility of data from 846 polytrauma patients was evaluated. There was no abdominal CT-scan available for 428 patients. Additional exclusion was made because patient height information (n = 179) was unavailable, and one person died from a brain injury within 24 hours (n = 1). In order to analyse prevalence and complications, data from the 238 patients of polytrauma are used instead of the one patient who passed away from a serious brain injury within the 24 hrs. In Table 1, demographics of patient are provided. There were 239 patients, of which 149 (or 66.5%) were men and 80 (or 33.5%) were women. With the non-significant gender distribution of the 48 (±20) & the 53 (±24) years for the males & the females, respectively where the p = 0.078, average age is 49 years (ranging from 6 to 89, ±21.45). The ISS was 26.7 (±9.9), the BMI is 25.0 kgm^{-2} (±4.3), and the CCI (Charlson Comorbidity Index) was 1.7 (±2.1) for the entire population. Average length of the stay for the patients is 19 days (±17). Males had a mean L3 SMI of 57.4 cm2/m2 (±10.24) and females had a mean L3 SMI of 42.7 $cm^2\ m^{-2}$ (±7.82), respectively.

Prevalence.

80 out of 239 patients (33.5%) met the criteria for sarcopenia according to Prado et al.'s definition, with 65% men and 35% women out of 80 as shown in Table 2. In the group of sarcopenic, the mean SMI is 42.8 (±6.9), but in the non-sarcopenic group, it was 57.5 (±10.5). SMI was higher in men (57.4 cm2/m2 (±10.2) vs. 42.7 cm2/m2 (±7.8), respectively) than in women. Prevalence rose to 85% in the elder group (those who were over 80), with a balanced mix of the females and the males (85.7 percent and 83.3 percent, respectively). Sarcopenia-defined the patients were aged than the patients of with no sarcopenic (57 yrs (±22.9) vs. 46 yrs (±19.5), respectively, where the $p < 0.0001$. Patients with sarcopenia (ISS = 25.9) and patients without sarcopenia (ISS = 27.2) had similar ISS values. Figure 1 depicts the relationship between age, ISS, and SMI.

In Hospital Mortality.

The 7.6% patients passed away in a month or while being admitted to the hospital. Sarcopenia was discovered to be the independent predictor of the Thirty-day mortality by log rank analysis where the p = 0.032, as shown in Figure 1. The Sarcopenia was found to be predictor for the in-hospital mortality or thirty-day in univariate analysis where the p = 0.045. Additional significant predictors of the mortality in one month included age where the p = 0.005, the ISS where the p = 0.026, the CCI where the p = 0.001, the surgical procedures where the p = 0.038, and duration of hospital stay where the p = 0.004. As the independent predictors of the mortality in 1-month or during hospital admission, the age (1.08, 95 percent, CI 1.01 to 1.165 where the p = 0.018), ISS (1.19, 95 percent CI 1.04 to 1.20 where the p = 0.003), and length of stay in hospital (0.83; 95 percent CI 0.74 to 0.92 where the $p < 0.0001$) persisted in binary logistic regression analysis. Results of the logistic regression were presented in the Table 3.

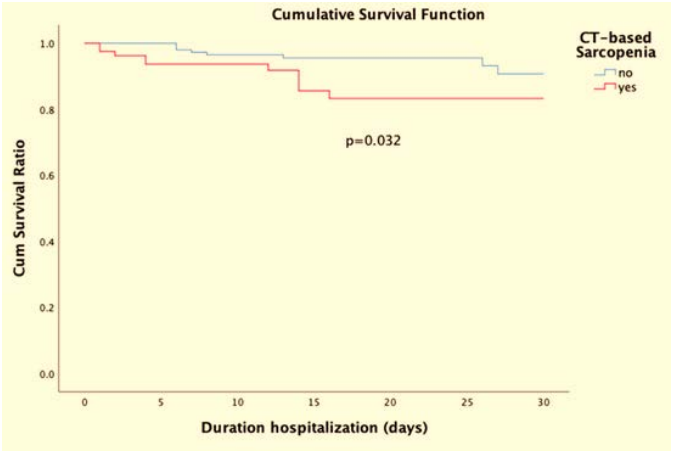

Figure 1. *Curves of survival for non-sarcopenic and sarcopenic patients.*

Table 1. *Characteristics of Patient.*

	Patients (%)	Mean ± SD	Non-Sarcopenic	Sarcopenic	Significance
Gender					
Female	33.5		50	30	
Male	66.5		108	51	
Age					
female		53 ± 24	46 ± 21.0	66 ± 22.7	$p < 0.0001$
Male		48 ± 20	46 ± 18.7	52 ± 21.9	$p = 0.046$
>80	8.3				
Female		83 ± 2	2	12	
Male		84 ± 3	1	5	
BMI					
>30	9.7		21 (8.8%)	2 (0.8%)	$p = 0.005$
25–29.9	36.9		68 (28.6%)	20 (8.4%)	$p = 0.006$
18.5–24.9	50.5		66 (27.7%)	54 (22.7%)	$p < 0.0001$
<18.5	2.9		3 (5.1%)	4 (1.7%)	$p = 0.174$
ICU stay Length (days)		6 ± 8	6.2 ± 8.6	5.4 ± 7.5	$p = 0.48$
Hospital stay Length (days)		19 ± 17	20.1 ± 17.3	17.6 ± 15.9	$p = 0.29$
Severity score of Length		26.7 ± 9.9	27.1 ± 10.2	25.9 ± 9.3	$p = 0.34$
Charlson comorbidity index					
>2	39.9		50	44	
0–1	60.9		108	37	
SMI					
Female <38.5	11.8				
Male <52.4	21.8				
Complications					
Urinary tract infection	5.5		9 (5.6%)	2 (2.5%)	$p = 0.032$
Mortality within 1 month	7.5		8 (5.1%)	10 (12.3%)	
Mortality after 1 year	2.1		2 (1.3%)	3 (3.7%)	
Mortality within 1 year	3.4		4 (2.5%)	4 (4.9%)	
Patients No. requiring the ICU admission	76.1		54 (67.5%)	127 (80.4%)	
Patients No. requiring emergency surgery (<24 h)	45.4		75 (47.5%)	33 (41.3%)	
Delirium	21		29 (18.4%)	22 (27.2%)	
Pneumonia	18.1		26 (16.4%)	17 (20.9%)	

Table 2. *Prevalence of sarcopenia in the population having polytrauma.*

Group	Age 60–79 (%)		Age ≥ 80 (%)		General Population	
	n	%	n	%	n	%
Males	16/66	24.2	5/20	25	52/239	21.8
Females	09/66	13.6	12/20	60	28/239	11.8

Table 3. *Mortality's logistic regression analysis in 1-month.*

		Multivariate Analysis		Univariate Analysis	
	Mortality	**Odds Ratio**	***p***	**Odds Ratio**	***p***
Gender					
Female	09/79			2.14 (0.82–5.6)	0.115
Male	09/150			1	
BMI				0.93 (0.82-1.04)	0.21
Age				1.05 (1.02–1.08)	0.005
Sarcopenia					
Yes	10/81			2.62 (0.99–6.93)	0.45
No	8/157			1	
Score of Injury Severity		1.19 (1.00 to 1.41)	0.05	1.05 (1.00 to 1.09)	0.026
Charlson Comorbidity Index				1.46 (1.20–1.77)	0.001
Hospitalization's duration Surgery					
Yes				0.36 (0.14 to 0.98)	0.380
No				1	
Parameters' inflammatory					
Plasma Leukocyte at hospitalization				1.01 (0.98–1.03)	0.59
Hospitalization duration Plasma CRP				0.97 (0.87 to 1.07)	0.55
Plasma Leukocytes after 24 h				1.08 (0.95–1.24)	0.25
After 24 hours Plasma CRP				0.99 (0.99 to 1.01)	0.85
After 48 hours Plasma leukocytes		1.77 (1.06–2.96)	0.029	1.13 (0.94–1.36)	0.2
After 48 hours Plasma CRP				0.99 (0.99 to 1.00)	0.190
Pneumonia					
Yes	04/43			1.33 (0.41–4.25)	0.63
No	14/195			1	
Urinary tract infection					
Yes	0/11				0.33
No	18/227				
Delirium					
Yes	07/51			2.55 (0.93–6.94)	0.06
No	11/187			1	
length of Hospital stays		0.67 (0.50–0.89)	0.006	0.89 (0.82–9.63)	0.004
length of ICU stays				0.99 (0.93 to 1.06)	0.840

Inflammatory Response and Complications.

Incidence of the complications in patients was 45.3 percent who were not sarcopenic and 41 (52.6%) in those who were ($p = 0.28$). There were no discernible changes in the pneumonia prevalence where the $p = 0.25$, delirium where the $p = 0.085$, UTI where the $p = 0.34$, the ICU where the $p = 0.48$ or duration of hospital stay where the $p = 0.29$ between the sarcopenic and the non-sarcopenic cohorts. When compared to non-sarcopenic patients, the inflammatory response in patients with sarcopenia resulted in substantial rise in the leukocyte counts after the 48 hours (11.95 (± 3.64) verses 10.08 (± 3.04, respectively, where the $p = 0.002$). Leukocyte levels at other points of time (the admission and the 24 hours following the admission) did not differ where the $p = 0.18$ & $p = 0.45$, respectively).

Interobserver Agreement of the CT-Based Measurement of Muscle by the Osirix.

All metrics' agreement of interobserver analyses revealed a considerable and robust correlation ($R2 = 0.99$, where the $p < 0.0001$. Along with the Cronbach alpha of the 0.99, the ICC (inter-class correlation coefficient) of the assessment of sarcopenia utilising the Osirix CT image processing was 0.99 where the $p < 0.0001$. 10.1% made up coefficient of variation (CV) inter-observer. A substantial correlation was there (0.863) where the $p < 0.0001$ in repeated measurements was found by analysing the agreement of interobservers of the 50 L3-measurements.

Discussion.

In several areas of medicine, clinical importance of the sarcopenia as defined in current study as lowered SMM was becoming clear. Both cancer patients and non-cancer patients are at risk for infection during hospitalisation due to the loss of muscle mass [13]. Sarcopenia in cancer patients has also been linked to the treatment toxicity, longer hospital stays, poor functional status, more intensive care rehabilitation, and the higher mortality [14]. The Sarcopenia affects up to 29 percent of community-dwelling populations, with colorectal cancer patients experiencing a range of 12 to 60 percent sarcopenia [15]. Despite the direct therapeutic importance, it is unknown whether

people with polytrauma are more likely to have sarcopenia. According to this study, the prevalence of polytrauma was 34 percent overall and increased to the more than the 80 percent in the patients who were over the 80 years old. Moreover, independent of gender, our results show connection between the sarcopenia and the thirty-day or the in-hospital mortality, highlighting clinical importance of the sarcopenia in the patients of polytrauma.

Our findings were consistent with the research on the incidence of the sarcopenia in diverse groups [16]. In the general populations, researchers report the prevalence of 5 to 13% in individuals who are from 60 to 70 years of age, rising to 11 to 50% in the 80 years of age or older. These figures are comparative to prevalence of the sarcopenia in the populations with cancer, renal failure, and the COPD (chronic obstructive pulmonary disease) [17]. When compared with the studies utilizing same age groups, current study demonstrates higher prevalence of the sarcopenia in the patients of polytrauma. This higher incidence begs the question of whether sarcopenia and accidents are causally related, even though the cause of this greater/elevated prevalence is outside the focus of the current analysis. A fall is identified as a mechanism of the trauma in a portion of the current population, and sarcopenia is linked to an increased chance of falling. Falls were identified as a significant cause of multiple trauma, particularly among sarcopenic patients ($p < 0.05$). This suggests a potential link between sarcopenia and increased fall risk in this population, warranting further investigation. The actual definition of sarcopenia must also be taken into consideration when interpreting the high frequency in our demographic. The Prado criteria for skeletal muscle mass were applied in the current investigation. Additionally, to measuring the muscle mass, other definitions of the sarcopenia also include functional testing, such as definition of EWGSOP-II usage of the strength of hand-grip and walking speed [1,10]. Moreover, polytrauma group makes it challenging to gather these measurements. This constraint is mostly brought on by the many extremity's injuries seen in patients of polytrauma, but the admission to ICU and the breathing also prevents the collection of the data. Data collection during admission was challenging because bedrest causes rapid loss of the muscle function and mass [18]. On the other hand, a CT scan of total-body that includes the abdomen is nearly always carried out as soon as a polytrauma patient arrives. Skeletal muscle mass may therefore be measured easily, and our research shows that this factor is closely associated to survival.

In the univariate analysis of our data, the relationship between sarcopenia and mortality that has been reported in numerous studies also exists. Additionally, a precise 30-day mortality prediction was discovered. While this study focused on 30-day mortality outcomes, data regarding mortality at 6 or 12 months were not collected. Existing literature, however, indicates that sarcopenia may have longer-term prognostic implications, suggesting the need for future studies to examine these extended outcomes. These studies' identification of sarcopenia is consistent with the literature that is currently accessible, which documents higher mortality within a year of sarcopenia diagnosis [19]. Sarcopenia is a significant predictor of the 6-month after-discharge death in patients of elderly trauma, according to the recent study [20]. We are not able to keep the sarcopenia as a separate factor of risk for in-hospital or thirty-day mortality in our study's multivariate analysis, though. This is most likely the result of study's small sample size and higher link between death and other elements like age and the seriousness of the trauma. Despite this result, Leeper et a study describes a link between mortality and a number of variables, such as the length of hospital and ICU stays as well as damage grading methods like the ISS and the AIS. Our data were consistent with the conclusions.

Receiving the abdominal CT-scan is the procedure that trauma patients are having more and more frequently [21]. Our data demonstrated the similar pattern, with a yearly decline in the proportion of patients excluded due to incomplete CT scans. Surprisingly, in clinical practise, the estimation of muscle mass rarely uses information from frequently acquired trauma CT scans. Since the treatment for the low muscle mass could start right away & additional loss of the mass of muscle can be avoided, we think that included the measurement of the skeletal mass analysis in patients of trauma had direct positive impact. Moreover, aforementioned values of cutoff for L3-index, which is utilised to assess the sarcopenia, should be taken into account when using only CT generated data. The study employed Prado et al.'s cutoff values for skeletal muscle index (SMI) on CT scans; however, further research may be required to validate these thresholds across diverse populations for accurate prognostic application. Determining optimal SMI cutoff values could enhance the utility of sarcopenia assessment in predicting patient outcomes. When applying these values to other populations, care should be used because they are based on obese cancer patients. In a perfect world, sarcopenia cutoff values would be determined for each distinct patient demographic and BMI range. To conduct analyses of the values of cutoff by BMI and gender, a significantly larger sample size would be needed (BMI). It is crucial to understand that there is growing data demonstrating clinical significance of the BMI in discipline of the traumatology. In patients of polytrauma with the BMI > 30, A study found the high risk of the infections, the length of stay in ICU, the acute renal failure, the stay length in hospital, and the mechanical ventilation duration [22]. Our results also indicate that there are variations in the sarcopenia prevalence across the different Body Mass Index ranges, having a rising proportion of patients of the sarcopenic trauma in the increased BMI ranges. It was crucial for recognizing that the BMI doesn't differentiate between the fat and muscle components. Opportunity to analyse the anthropometric parameters based on CT of fat in adding to the mass of muscle is provided by an increase in frequently obtained CT-scanning. A study demonstrated that the pathologic body composition in the patients of trauma can be revealed using the assessment CT-based of the abdominal fat [23]. Future research on trauma patients' problems and mortality may benefit from measuring the amount of abdominal fat.

In order to clarify clinical importance of the sarcopenia in patients of trauma, a retrospective analysis of the data that had been collected was carried out as part of the current investigation, which was a pilot study. Therefore, it is vital for keeping in mind

the drawbacks of current study when interpreting findings. The retrospective aspect of this study is one of its weaknesses. There may be an inclusion bias because our analysis only included data from patients who had an abdominal CT. Nevertheless, the impact of any potential selection bias was mitigated by the fact that all the cases are obtained from the regional perspective registry of trauma. The study population's diversity is another drawback. Any age group can experience traumatic situations, and they can range in severity. Only individuals with an ISS 16 were included in order to lessen the impact of heterogeneity, and specific to age analysis was attained on sarcopenia prevalence and their sequelae. Finally, only the data of CT were examined; we excluded the other frailty indicators including the nutritional and functional status from our analysis.

Future research should try to integrate functional testing in the definition of sarcopenia. Furthermore, based on reported outcomes in this particular population, cut-off values for the SMI on the measurements of CT may needed diverse cut-off points.

Conclusion.

Elderly polytrauma patients have a high rate of sarcopenia, which can approach 85% in those over the age of 80. Sarcopenia is the independent predictor of the thirty-day death, according to our research. We recommend measuring skeletal mass to identify decreasing muscle mass early because abdomen CT scans are now nearly always performed on trauma patients. More awareness will aid in preventing further loss of the mass of muscle during admission next after the trauma and the earlier identification of those at the risk for the sarcopenia would result in the earlier therapy and diagnosis.

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