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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.

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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 ВИНТИ 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.

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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. Корректур авторам не высылаются, 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 computer-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 საქურაღებოლ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დაიცვათ 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 შედეგის 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 ფხიხლებში 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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SEVERITY OF MITRAL REGURGITATION AND ITS ASSOCIATION WITH LEFT VENTRICULAR DYSFUNCTION AND BRAIN-NATRIURETIC PEPTIDE LEVELS IN PATIENTS WITH ACUTE DECOMPENSATED HEART FAILURE

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Abstract.

Background: Acute decompensated heart failure (ADHF) is greatly influenced by levels of brain-natriuretic peptides (BNP) and thereby may have strong correlation with severity of mitral regurgitation (MR) and left ventricular ejection fraction (LVEF). The available data on its association is limited which sought us to investigate correlations between type of ADHF, BNP levels and severity of MR.

Methods: A single-center, cross-sectional, observational study was conducted at Sri Ramachandra Institute of Higher Education and Research, Chennai, India. Adults aged >18 years, either gender, diagnosed as ADHF requiring hospital admission within 24 hours were incorporated into the research.

Results: Between June 2019 to June 2020, we included 79 patients of ADHF. The mean age was 64.9±11 years and 60.8% were males. The mean LVEF was 40.2±10.2%. The severity of MR was severe, moderate, and mild in 3.8%, 21.5% and 74.7% of patients, respectively. The proportion of patients with moderate to severe MR was significantly higher in ADHF patients with reduced EF compared to mid-range or preserved EF. The median levels of BNP significantly increased from 520.0 pg/ml in mild MR to 1020.0 pg/ml in moderate and 1410.0 pg/ml in severe MR.

Conclusion: In patients with ADHF, MR is a common finding. The severity of MR is associated with greater reduction in ejection fraction. Determination of MR severity is essential in all ADHF cases. Further, stratification of patients using BNP levels may help in identifying those at higher risk of adverse outcomes in ADHF.

Key words. Acute decompensated heart failure, brain-natriuretic peptide, mitral regurgitation, left ventricular dysfunction.

Introduction.

Heart failure (HF) is a global pandemic estimated to affect nearly 26 million individuals worldwide [1]. The overall lifetime risk of getting HF is estimated to be 33% for men and 28% for women [2]. Acute decompensated heart failure (ADHF) develops often in patients with pre-existing HF. Factors such as multiple comorbidities, age, stress, medications, etc. can be contributory in precipitation to ADHF [3]. Such factors are often complex and interlinked. However, there may not be a clearly defined precipitant in nearly 40–50% of ADHF patients [4]. Multiple factors affect the outcome of patients with ADHF. Among such factors, Mitral regurgitation (MR) worsens ADHF outcomes [5-7]. Nearly, 50% of ADHF patients may have moderate to severe left ventricular dysfunction (LV) as indicated by reduced ejection fraction (EF) <40% and other half

will thus have preserved LV function [8]. More severe MR has been linked to worse outcomes in ADHF patients with either diminished or intact EF [6,9].

Brain natriuretic peptide (BNP) is a known biomarker for HF. Presence of MR in ADHF patients is known to be associated with significantly raised BNP levels [10]. Even in patients with asymptomatic severe MR but without HF, baseline BNP of >105 pg/mL was reported to be associated with worse outcomes at one year [11]. In MR patient, some investigators advised BNP in conjunction with traditional imaging modalities for risk-stratification [12]. ADHF is common in Indian setting. A study from North India reported ADHF with reduced LVEF (ADHFrEF) in 77% of total 428 ADHF patients [13]. ADHF in Indian is identified to be more common in younger ages with long-term mortality rates and also higher in-hospital [14]. Given the significant presence of HF with ADHF in India, it is essential to determine the MR prevalence in such patients and its relationship to BNP levels. Therefore, we explored this association in patients with ADHF.

Materials and Methods.

This cross-sectional, single-center, observational study was carried out at the Sri Ramachandra Institute of Higher Education and Research in India. This study was conducted as per principals of ICH-GCP, declaration of Helsinki 1964, as revised in 2013 and as per applicable regulatory guidelines in India. The study was authorized by the institutional ethical committee. Written informed consent was acquired from every individual involved.

For inclusion, patients with an ADHF diagnosis who were hospitalized to the cardiac intensive care unit underwent screening. Adults aged 18 years and above, either gender, diagnosed as ADHF, participants who agreed to take part in the research were included. Patients who were not in decompensated state, non-cooperative patients, pregnant and lactating females, previously diagnosed significant valvular disease, patients with pulmonary embolism, patients diagnosed malignancy, or any other disorders known to raise BNP levels were excluded. All the eligible patients were included within 24 hours of admission to the hospital.

ADHF was diagnosed clinically. The 2016 European Society of Cardiology guidelines refer to acute heart failure as worsening of symptoms or rapid onset and/or signs of HF which is life-threatening situation necessitating urgent hospital admission [15]. After admission, a comprehensive transthoracic ECHO examination including color Doppler and spectral imaging was performed using (GE Vivid E95). A single, trained cardiologist examined all the echocardiographic examinations. LV ejection

Table 1. Classification of severity of mitral regurgitation on ECHO [17].

MR Severity	Central jet area	Vena contracta width (cm)	For jets or eccentric jets with 0.3 to 0.6 cm intermediate vena contracta widths		
			Regurgitant volume (ml)	Regurgitant fraction (%)	Effective regurgitant orifice area (cm ²)
Mild	<20% of LA area	≤0.3	<30	<30	<0.2
Moderate	>20%-<40% of LA area	Intermediate	30 - 59	30 – 49	0.2 - 0.39
Severe	>40% of LA area	≥0.7	≥60	≥50	≥0.4

fraction was determined by the equation as follows: LVEF = [SV/EDV] x 100 where, EDV: end-diastolic volume and SV is stroke volume. Patients were categorized as ADHF with preserved EF (ADHFpEF), mid-range ADHF (ADHFmrEF) and ADHF with reduced EF (ADHFrfEF) using EF threshold of ≥50%, 41 to 49% and ≤40% respectively [15].

As per the American Society of Echocardiography's recommendations, different qualitative and quantitative variables were determined to ascertain the MR severity [17]. Based on such variables, MR was classified in mild, moderate, and severe categories as shown in Table 1. For BNP levels, we collected venous blood sample within 24 hours of admission. Fluorescence immunoassay was used to detect BNP.

Statistical analysis:

For this investigation, a standard sample size analysis was not performed. Patients who met the exclusion and inclusion criteria one after the other were enrolled for an entire year, from June 2019 to June 2020. The data from patient's records was transferred in the case record form and was then entered in the Microsoft excel sheets. The data was represented using the interquartile range and median for non-normally distributed variables and the mean and standard deviation for normally distributed continuous variables. Accordingly, Kruskal Wallis test or Student t-test were employed to evaluate the statistical differences in such variables. The frequency and percentages of categorical variables were displayed, and the Chi-square test or Fischer exact test were employed to evaluate the statistical differences. For all statistical comparisons, P value <0.05 was considered as significant.

Results.

Baseline characteristics:

Between June 2019 and June 2020, we enrolled 79 patients with ADHF. Table 2 depicts the baseline characteristic of the patients. The mean age was 64.9±11.8 years and most patients were above the age of 60 years. Proportion of males was higher than females (60.8% vs 39.2% respectively). In all patients, ischemic heart disease was HF etiology. Atrial fibrillation was detected in 7.9% of patients at the time of admission. Mean LVEF was 40.2±10.2%.

Severity of MR, and type of HF:

The severity of MR was severe, moderate, and mild in 3.8%, 21.5% and 74.7% of patients respectively (Figure 1). Among ADHF patients, ADHFrfEF, ADHFmrEF and ADHFpEF were identified in 63.3%, 19.0% and 17.7% of patients respectively (Figure 2).

Table 2. Baseline characteristics.

Parameter	Observations
Age (years)	
Mean±SD	64.9±11.8
Range	27 to 85
Age groups	
≤40	3 (3.8)
41 to 50	7 (8.9)
51 to 60	14 (17.7)
61 to 70	27 (34.2)
>70	28 (35.4)
Gender	
Male	48 (60.8)
Female	31 (39.2)
Serum creatinine (mg/dl)	
Mean±SD	1.4±0.9
Range	0.5 to 5.5
Ejection fraction (%)	
Mean±SD	40.2±10.2
Range	25 to 62

Data presented as mean ± standard deviation (SD) or frequency (%).

Table 3. Association of severity of MR with LV dysfunction and type of heart failure.

Type of HF	Severity of MR			P value
	ADHFrfEF (n=59)	ADHFmrEF (n=17)	ADHFpEF (n=13)	
Mild (n=59)	32 (64.0)	14 (93.3)	13 (92.9)	0.079
Moderate (n=17)	15 (30.0)	1 (6.7)	1 (7.1)	
Severe (n=3)	3 (6.0)	0	0	

Association of MR severity with type of HF:

Table 3 shows the association of severity of MR with type of HF. Among patients with ADHFrfEF, MR was severe, moderate, and mild in 6%, 30% and 64% cases, respectively. In those with ADHFmrEF and ADHFpEF, most of the patients had mild MR (93.3% and 92.9%).

Association of severity of MR and ADHF types with BNP levels:

The median levels of BNP significantly increased from 520.0 pg/ml (IQR₂₅₋₇₅: 137.0 – 953.0) in mild MR to 1020.0 pg/ml (IQR₂₅₋₇₅: 570.0 - 2375) in moderate MR and to 1410.0 pg/ml (IQR₂₅₋₇₅: 790.3 – 1430.0) severe MR. There was no significant difference in the median levels of BNP in patients with different severity ADHF (Table 4).

Table 4. Distribution of BNP levels based on MR and LV dysfunction severity.

Severity grades	BNP levels (pg/ml)	P value
Mitral regurgitation		
Mild	520.0 (137.0 – 953.0)	0.007
Moderate	1020.0 (570.0 – 2375.0)	
Severe	1410.0 (790.3 – 1430.0)	
ADHF		
ADHFrEF	679 (214.5 – 1372.5)	
ADHFmrEF	142.0 (25.1 – 1120.0)	
ADHFPeEF	589 (402.5 – 1129.8)	

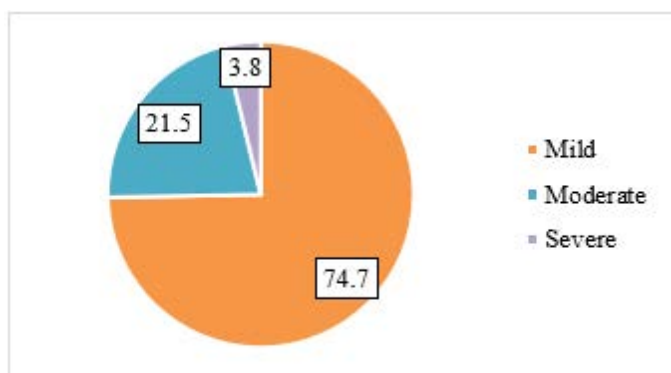


Figure 1. Severity of mitral regurgitation. Data presented as percentages.

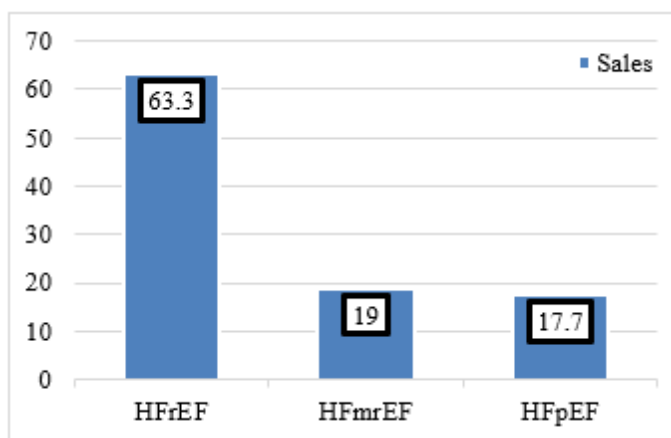


Figure 2. Prevalence of preserved, mid-range and reduced ejection fraction heart failure. Data presented as percentages.

Discussion.

In this cross-sectional observational study of 79 patients with ADHF, MR was of severe, moderate, and mild degree in 3.8%, 21.5% and 74.7% respectively. The severity of MR was non-significantly associated with severity of HF. Also, significantly higher BNP levels observed with increasing severity of MR.

ADHF is a life-threatening situation which necessitates extreme intensive care. In Indian setting, ADHF is common in younger ages. A higher in-hospital and long-term mortality demands early diagnosis and appropriate care [14]. Multiple triggers are known to exacerbate the compensated HF. In ADHF, prevalence of arrhythmia such as AF, valvular disease, and dilated cardiomyopathy is observed with increasing frequency [8]. We observed AF in 7.9% of patients whereas

ischemia or infarction as indicated by ST/T changes was seen in 59.5% of patients. A study from Nigeria observed AF (19%) as most common rhythm abnormality in patients of HF. They also observed acute MI as important cause of HF which correlated with high in-hospital mortality (66.7%) [18].

Deterioration of MR in ADHF patients is of significant prognostic importance. Multiple studies established MR as a significant indicator of worse mortality outcomes in ADHF [5-7]. A study from Wada et al. observed severe, moderate, and mild MR in 5%, 31% and 52% of ADHF patients [7]. This observation is similar to our results indicating MR of some degree is common in ADHF. The severity of MR is also observed to be associated with significant reduction in EF. Therefore, determining the severity of MR is especially important in the setting of declining EF. We observed that ADHFrEF was substantially higher in prevalence in patients with severe and moderate MR. A study from Kajimoto et al. reported that compared to patients without MR, MR of any severity (mild to severe) significantly increased the risk of primary endpoint of HF readmission and all-cause mortality in ADHF patients with preserved EF. In ADHF patients with reduced EF, moderate to severe MR had significantly higher risk of primary endpoint [5]. This indicates in ADHF any degree of MR may affect the outcomes. Therefore, all ADHF patients should be evaluated for MR severity to plan treatment strategies. With treatment of ADHF, improvement in MR may be expected. However, MR may persist despite the treatment. A study from Kubo et al. involved 563 ADHF patients with at least mild MR. They observed that patients who had persistent severe MR during the hospital stay or had change from severe to less severe (mild/moderate) at discharge had significantly higher rates of HF rehospitalization, composite of cardiac death, mitral valve intervention within 1-year [6].

BNP is an established marker for the diagnosis and prognosis of HF. We observed significantly higher levels of BNP with increasing severity of MR. In a study from Mayer et al., compared to no MR, MR of any severity was significantly associated with BNP levels. Also, BNP levels were associated with degree of severity of MR with mean levels of 835±400 pg/ml in mild MR and 953±356 pg/ml in patients with moderate/severe MR [10]. BNP has been identified as prognostic marker in patients with MR. In a study from Pizarro et al. involving asymptomatic patients with chronic severe MR observed that BNP levels of ≥105 pg/ml discriminated patients at high risk of composite endpoint of symptoms of CHF, LV dysfunction, or death [19]. This evidence indicate patients with MR should undergo BNP assessment to determine the patients at higher risk of HF associated complications including death. The role of BNP in patients undergoing surgical management of MR has also been found to be promising but requires further confirmation in larger studies [12].

Limitations.

The study was limited by sample size and cross-sectional, observational design. A prospective design with determination of in-hospital and short-term outcomes would have provided more insights into the role of MR in modifying prognosis of ADHF. Also, a comparison to control population without MR would have proven the role of MR in prognosis of ADHF.

Conclusion.

In patients of acute decompensated HF, MR is diagnosed with increasing frequency. The severity of MR is associated with greater reduction in ejection fraction. Increase in BNP levels are significantly associated with increasing severity of MR in acute decompensated HF. Identifying presence of MR along with determination of MR severity is essential in all ADHF cases. Further, stratification of patients using BNP levels may help in identifying those at higher risk of adverse outcomes in ADHF.

Conflict of interest.

All authors declare no potential conflict of interest.

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