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COMPARATIVE OUTCOME ANALYSIS OF TORSEMIDE AND FUROSEMIDE IN THE MANAGEMENT OF PATIENTS WITH CARDIOVASCULAR DISEASE

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ABSTRACT
Heart disease includes various conditions affecting the heart and blood vessels, such as coronary heart disease caused by arterial blockages. Heart failure symptoms primarily include dyspnea and fatigue, leading to exercise intolerance, along with orthopnea and tachypnea. Diuretics, once the only treatment, advanced in the 1950s with acetazolamide, spironolactone, and thiazides, offering better tolerance and fewer side effects like hypotension and electrolyte imbalances. Loop diuretics provide rapid, potent effects and are often used in combination for managing fluid overload, a key cause of heart failure hospitalizations. However, diuretic resistance, driven by factors like high sodium intake, electrolyte imbalances, and renal system activation, is a major challenge, increasing the risk of rehospitalization and death in chronic heart failure. Side effects such as electrolyte disturbances, renal failure, and hypersensitivity highlight the importance of careful therapeutic management.

KEYWORDS: Torsemide, Furosemide, Spironolactone, Therapeutic outcome, Clinical benefits, adverse effects, cost effectiveness.

MATERIALS AND METHODS

Study site
The study was conducted in the Cardiology Department of a tertiary care teaching hospital at Ernakulam, Kochi, India.

Study Duration and Design
This ambispective study spanned six months (October 1, 2023, to March 31, 2024). It involved retrospective data from April to September 2023 and prospective data from October 2023 to March 2024. Patient records and in-patient data from the hospital patient data system were analyzed, adhering to inclusion and exclusion criteria.

Inclusion and Exclusion Criteria
Inclusion: Men and women aged ≥18 years with cardiovascular conditions treated with furosemide or torsemide.
Exclusion: Pregnant women.

Sample size
Conducted research in 212 patients and a minimum of 98 patients was recommended by a statistician.

Data collection
Data were obtained from medical records and the hospital patient data system, recorded on structured data collection forms, and verified against the inclusion/exclusion criteria.

Demographics, medical history, and therapeutic parameters (e.g., serum creatinine, sodium, potassium, uric acid, and triglycerides) were assessed, alongside improvements in edema, dyspnea, activity levels, and blood pressure. Drug therapy and related costs were recorded. Adverse effects were evaluated using the Naranjo scale.

Statistical analysis
Data were analyzed using Microsoft Excel and SPSS. Descriptive and inferential statistics, including mean, standard deviation, paired t-tests, and ANOVA, were performed at a 10% significance level. Results were presented as tables, graphs, and pie charts.

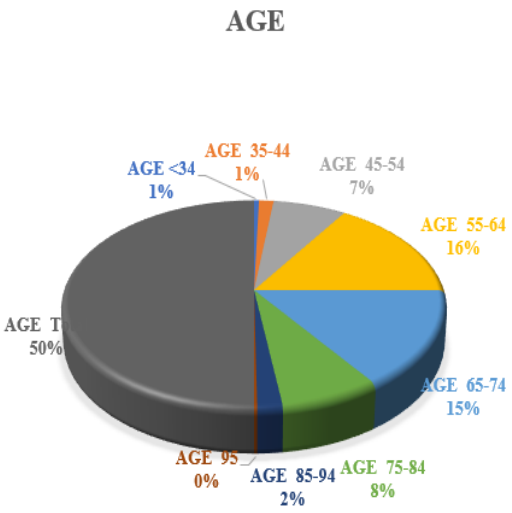
This study evaluated clinical effectiveness, adverse effects, and cost of therapy to identify optimal therapeutic outcomes in cardiovascular patients.

RESULT AND DISCUSSION

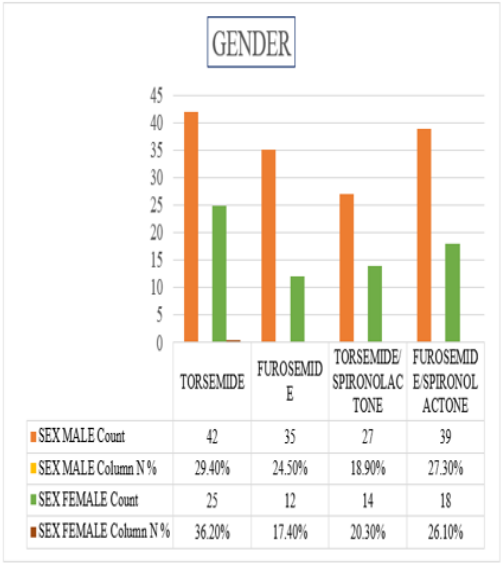
4.2.1 SHOWS AGE WISE DISTRIUTION

Category		Frequency	Percent
Age	<=34	2	.9
	35-44	6	2.8
	45-54	30	14.2
	55-64	68	32.1
	65-74	65	30.7
	75-84	32	15.1
	85-94	8	3.8
	95	1	.5
	Total	212	100.0

4.2 AGE DISTRIBUTION



4.3GENDER-WISE DISTRIBUTION OF PATIENTS



4.4 EVALUATING THE WEIGHT CHANGES IN STUDY POPULATION

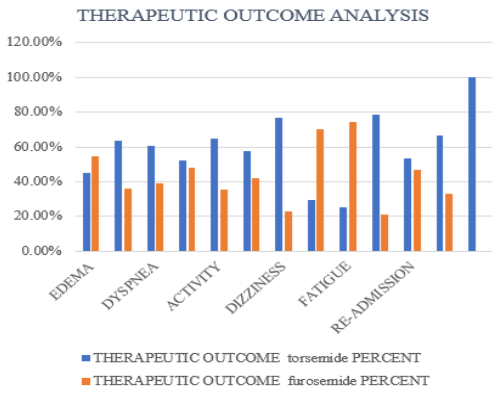
		N	Mean	Std. Deviation
WEIGHT1	TORSEMIDE	67	67.9955	12.90289
	FUROSEMIDE	47	60.2872	13.00533
	TORSEMIDE/SPIRONOLACTONE	41	62.4878	16.05790
	FUROSEMIDE/SPIRONOLACTONE	57	64.7018	11.53251
	Total	212	64.3358	13.48088
WEIGHT2	TORSEMIDE	67	64.4701	12.70197
	FUROSEMIDE	46	58.3739	11.04909
	TORSEMIDE/SPIRONOLACTONE	41	60.1659	13.97309
	FUROSEMIDE/SPIRONOLACTONE	57	61.6404	11.49913
	Total	211	61.5403	12.43483

DESCRIPTIVE ANALYSIS OF WEIGHT CHANGES

4.5 Monotherapy
Evaluating the clinical Efficacy and Adverse outcomes of patients undergoind diuretic therapy

4.5 MONOTHERAPY
EVALUATING THE CLINICAL EFFICACY AND ADVERSE OUTCOMES OF PATIENTS UNDERGOING DIURETIC THERAPY

THERAPEUTIC OUTCOME		MEDICATION			
		TORSEMIDE		FUROSEMIDE	
		COUNT	PERCENT	COUNT	PERCENT
EDEMA	PRESENT	14	45.2%	17	54.8%
	ABSENT	53	63.9%	30	36.1%
DYSPNEA	PRESENT	54	60.7%	35	39.3%
	ABSENT	13	52.0%	12	48.0%
ACTIVITY	PRSENT	11	64.7%	6	35.3%
	ABSENT	56	57.7%	41	42.3%
DIZZINESS	PRSENT	54	77.1%	16	22.9%
	ABSENT	13	29.5%	31	70.5%
FATIGUE	PRESENT	11	25.6%	32	74.4%
	ABSENT	56	78.9%	15	21.1%
RE-ADMISSION	NO READMISSION	40	53.3%	35	46.7%
	UPTO 5 DAYS	24	66.7%	12	33.3%
	MORE THAN 5	3	100.0%	0	0%



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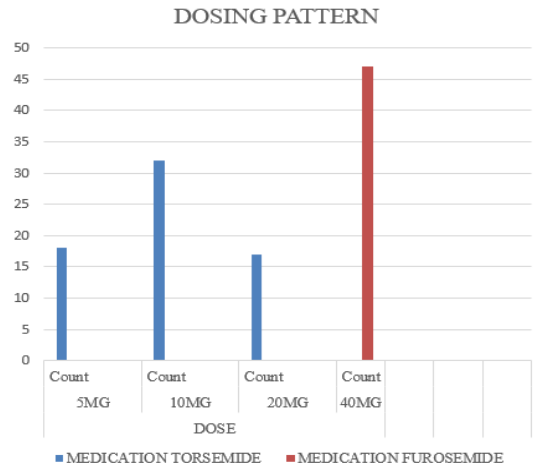
4.5.2 ADVERSE OUTCOME

PARAMETER	TORSEMIDE		P-VALUE
	MEAN	STANDARD DEVIATION	
CR1	1.48	1.04	0.007
CR2	1.68	1.24	
UR1	5.55	1.67	0.00
UR2	6.87	2.06	
TG1	130.23	59.59	0.006
TG2	145.58	63.81	
SBP1	136.26	26.04	0.05
SBP2	127.05	18.71	

PARAMETER	FUROSEMIDE		P-VALUE
	MEAN	STANDARD DEVIATION	
NA1	135.34	6.43	0.034
NA2	133.29	4.13	
UR1	5.80	1.52	0.00
UR2	6.65	1.68	
TG1	161.65	96.71	0.00
TG2	197.72	92.84	
DBP1	84.00	9.22	0.0
DBP2	76.34	13.15	

4.6 DOSAGE PATTERN OF LOOP DIURETICS PRESCRIBED



4.7 COST EFFECTIVE ANALYSIS OF LOOP DIURETIC THERAPY

Group Statistics

	MEDICATION	N	Mean	Std. Deviation	Std. Error Mean
COST	TORSEMIDE	67	6.9701	2.58768	.31613
	FUROSEMIDE	47	1.0000	.00000	.00000
MONTH3	TORSEMIDE	67	836.4179	310.52107	37.93619
	FUROSEMIDE	47	120.0000	.00000	.00000
MONTH4	TORSEMIDE	67	1672.8358	621.04215	75.87237
	FUROSEMIDE	47	240.0000	.00000	.00000

DISCUSSION

This ambispective observational study compared the clinical outcomes, adverse effects, optimal dosage, and cost-effectiveness of torsemide versus furosemide in cardiovascular patients. Despite evidence favoring torsemide, the study found no significant reduction in readmissions over 1–6 months.

Alaa Rahhal et al. reported that switching from furosemide to an equivalent dose of torsemide after acute decompensated heart failure (ADHF) did not reduce hospitalizations compared to optimized furosemide dosing, suggesting both approaches yield similar outcomes.

Miles et al. concluded in their meta-analysis that torsemide reduces intermediate-term heart failure readmissions and improves NYHA class compared to furosemide, though it does not reduce mortality risk.

Similarly, Balsam et al., in the TORNADO trial, observed greater improvement in edema and weight loss in patients receiving torsemide, indicating superior diuretic effects that may enhance mobility.

These findings suggest that while torsemide offers certain therapeutic advantages, particularly in symptom management, both diuretics may be effective depending on patient-specific needs and dosing strategies.

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CONCLUSION

Our study highlights the therapeutic advantages of torsemide over furosemide in cardiovascular patients. Through comprehensive analysis of the collected data, we found that torsemide offers superior clinical outcomes, including fewer hospitalizations and greater cost-effectiveness for patients.

Torsemide was associated with lower incidences of edema, fatigue, and hospital readmissions. Symptomatic improvement in patients' clinical conditions was assessed using comparative statistical methods such as ANOVA, Chi-square, and T-tests. Among the various clinical parameters evaluated, only those demonstrating significant differences in adverse effects were presented in the relevant tables.

Based on the study's findings, we conclude that torsemide is more effective than furosemide in managing cardiovascular conditions. Its enhanced clinical benefits, coupled with minimal adverse effects, make it a preferable choice, offering a more favorable therapeutic profile.

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