

Use Of Mexiletine for Recurrent Ventricular Tachycardia in Patients with Severe Left Ventricular Systolic Dysfunction: A Retrospective Observational Study

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Abstract

Background: Recurrent ventricular tachycardia (VT) is a major therapeutic challenge in patients with severe left ventricular systolic dysfunction (LVSD), particularly when arrhythmias persist despite contemporary heart failure therapy, implantable cardioverter-defibrillator (ICD) therapy, and/or catheter ablation. Mexiletine is an oral class IB sodium-channel blocker that remains an adjunctive option in selected patients with refractory ventricular arrhythmias. This study evaluated its effectiveness and safety in patients with recurrent VT and severe LVSD.

Methods: This retrospective observational study was conducted in the Department of Cardiology at Sri Ramachandra Medical College & Research Institute, Chennai. Records of 200 adults with VT and left ventricular ejection fraction (LVEF) $\leq 35\%$ who received mexiletine as part of routine clinical care were reviewed. Demographic, clinical, echocardiographic, arrhythmic, treatment, and adverse-event data were extracted. VT episodes and ICD shocks before and after mexiletine initiation were compared using paired analyses, with statistical significance defined as $p < 0.05$.

Results: The mean age was 60.69 ± 12.63 years and 57% of participants were male. Ischemic cardiomyopathy was the most frequent underlying etiology (40%), followed by dilated cardiomyopathy (36%) and post-myocardial infarction left ventricular dysfunction (24%). Mean LVEF was $26.29 \pm 5.20\%$. The mean baseline VT burden was 15.14 ± 6.87 episodes compared with 4.65 ± 3.27 episodes after treatment ($p < 0.0001$). Mean ICD shocks decreased from 4.36 ± 2.53 to 2.38 ± 2.01 ($p < 0.0001$). The mean percentage reduction in VT episodes was $68.75 \pm 15.39\%$. The mean mexiletine dose was 433.96 ± 170.16 mg/day and mean follow-up was 8.16 ± 3.20 months. No adverse effects were documented in 66% of patients; tremor was the most frequent reported adverse effect (22%), followed by nausea (7%), gastrointestinal upset (3.5%), and dizziness (1.5%).

Conclusion: In this single-center retrospective cohort of patients with severe LVSD and recurrent VT, mexiletine use was associated with substantial reductions in VT episodes and ICD shocks and was generally well tolerated. Because the study lacked a control group and nearly half of the cohort received concomitant amiodarone, the findings support mexiletine as an adjunctive option rather than establishing an independent causal treatment effect.

Keywords: Mexiletine; ventricular tachycardia; left ventricular dysfunction; implantable cardioverter-defibrillator; antiarrhythmic therapy; structural heart disease

Introduction

Ventricular tachycardia (VT) is a potentially life-threatening arrhythmia and an important cause of morbidity in patients with structural heart disease and severe left ventricular systolic dysfunction (LVSD). A markedly reduced left ventricular ejection fraction (LVEF) identifies a population at high risk of sustained ventricular arrhythmia, sudden cardiac death, recurrent hospitalization, and progressive heart failure. The arrhythmogenic substrate is particularly important in ischemic cardiomyopathy, where infarct scar and surviving myocardial channels can support slow conduction and re-entry, while nonischemic cardiomyopathy may involve more diffuse myocardial fibrosis and heterogeneous conduction [1,2].

Contemporary management of recurrent VT is multimodal. Optimization of the underlying cardiac disease and guideline-directed heart failure therapy is fundamental, while ICDs reduce the risk of sudden cardiac death by terminating malignant ventricular arrhythmias. Catheter ablation has become an established treatment for recurrent scar-related VT, particularly in patients with ischemic cardiomyopathy. Nevertheless, recurrent VT can persist despite these approaches, and repeated ICD therapies are associated with substantial physical and psychological burden [3-5].

Antiarrhythmic drugs therefore continue to have an important adjunctive role in carefully selected patients. Mexiletine is an orally active class IB antiarrhythmic agent related to lidocaine. It blocks voltage-gated sodium channels, with greater effects in depolarized and rapidly activated tissue, and has relatively limited effects on ventricular repolarization. These properties have made it a potential option for patients with refractory ventricular arrhythmias, including those with structural heart disease and recurrent ICD therapies [6-8].

The contemporary evidence base for mexiletine remains heterogeneous. A systematic review of 221 studies involving 8,970 patients found evidence of reduction in ventricular arrhythmia burden in a substantial proportion of reports, but emphasized heterogeneity in study design and outcome definitions [7]. An European Heart Rhythm Association systematic review focused specifically on adults with structural heart disease and ICDs and concluded that mexiletine may reduce ICD therapies, particularly when catheter ablation is unsuccessful or unsuitable, while also noting that the underlying evidence is limited and largely observational [8]. A more recent review similarly concluded that mexiletine retains a niche role in therapy-refractory ventricular arrhythmias, while highlighting neurological and gastrointestinal adverse effects and clinically relevant drug interactions [6].

The present study was undertaken to evaluate the real-world use of mexiletine in patients with recurrent VT and severe LVSD. The primary objective was to assess the change in VT episode frequency following treatment. Secondary objectives were to assess changes in ICD shocks or anti-tachycardia therapies, adverse effects, clinical outcome, and the need for escalation of therapy.

Materials And Methods

Study design and setting

This was a retrospective, observational, record-based study conducted in the Department of Cardiology, Sri Ramachandra Medical College & Research Institute, Chennai. The thesis describes a one-year study period encompassing data collection and analysis. Medical records of eligible patients who had received mexiletine as part of standard clinical care were reviewed without additional intervention or direct patient contact.

Participants

Adults aged 18 years or older with sustained or recurrent non-sustained VT and severe LVSD, defined in the study protocol as LVEF $\leq 35\%$, were eligible. Additional inclusion criteria were receipt of mexiletine during the study period and willingness to provide written informed consent as specified in the thesis protocol. Exclusion criteria were acute myocardial infarction within the preceding 48 hours, severe hepatic dysfunction, known hypersensitivity to mexiletine, pregnancy or lactation, advanced atrioventricular block without pacing support, and anticipated survival of less than 30 days because of non-cardiac illness.

Sample size

A total of 200 patients were included. The thesis states that sample size was considered in relation to the expected reduction in VT burden using a paired comparison approach based on previous observational studies; however, the document does not provide sufficient numerical information on the assumed effect size, alpha level, or statistical power to independently reproduce the calculation. Accordingly, no additional sample-size assumptions have been introduced in this manuscript.

Data collection

A structured investigator-developed data extraction proforma was used. Variables included age, sex, cardiomyopathy etiology, comorbidities, New York Heart Association (NYHA) functional class, LVEF, VT characteristics, baseline VT frequency, ICD therapies, mexiletine dose and duration, concomitant antiarrhythmic therapy, adverse effects, need for treatment escalation, and clinical outcome. Records were identified from hospital records, intensive care unit admission logs, electrophysiology databases, and electronic health records. Data were extracted from case files, discharge summaries, ICD interrogation reports, and medication charts. The thesis states that collected information was cross-verified by at least two investigators and that personal identifiers were not included in the study data set.

Exposure and follow-up

Mexiletine was administered as part of routine clinical care, with dosing individualized according to clinical response and tolerability. The observed mean daily dose was 433.96 ± 170.16 mg/day. Concomitant therapy was permitted; 47% of patients received amiodarone and beta-blockers were commonly used. The mean follow-up duration was 8.16 ± 3.20 months.

Outcome measures

The primary outcome was the change in VT episode frequency after initiation of mexiletine compared with the pre-treatment period documented in the medical record. Secondary outcomes included change in ICD shocks or anti-tachycardia pacing events, adverse effects, need for additional antiarrhythmic drugs or catheter ablation, and in-hospital mortality. The available results in the thesis provide quantitative data for VT episodes, ICD shocks, adverse effects, percentage VT reduction, and an overall clinical outcome classification.

Statistical analysis

Data were entered into Microsoft Excel and analyzed using SPSS version 25. Continuous variables were summarized using means and standard deviations, with 95% confidence intervals where reported in the thesis. Categorical variables were summarized using frequencies and percentages. Pre-treatment and post-treatment measurements were analyzed in a paired manner where applicable. A p-value < 0.05 was considered statistically significant. The present manuscript reports the statistical results exactly as presented in the thesis and does not introduce unreported multivariable analyses or effect estimates.

Ethical considerations

The thesis states that the study was conducted after approval from the Institutional Ethics Committee and that patient confidentiality was maintained, with data used solely for academic and research purposes. The ethics approval number and approval date were not specified in the thesis text reviewed and should be inserted before journal submission.

Results

Baseline characteristics

The study included 200 patients. The mean age was 60.69 ± 12.63 years (95% confidence interval [CI], 58.93-62.46 years), and 114 (57%) were male. The underlying cardiac substrate was ischemic cardiomyopathy in 80 patients (40%), dilated cardiomyopathy in 72 (36%), and post-myocardial infarction LV dysfunction in 48 (24%). Mean LVEF was $26.29 \pm 5.20\%$ (95% CI, 25.56-27.02%), confirming severe LV systolic dysfunction. NYHA class II, III, and IV accounted for 77 (38.5%), 46 (23.0%), and 77 (38.5%) patients, respectively.

Characteristic	Observation
Sample size	200
Age, years	60.69 ± 12.63
Male sex	114 (57%)
Female sex	86 (43%)
Ischemic cardiomyopathy	80 (40%)
Dilated cardiomyopathy	72 (36%)
Post-MI LV dysfunction	48 (24%)
LVEF, %	26.29 ± 5.20
NYHA II	77 (38.5%)
NYHA III	46 (23.0%)
NYHA IV	77 (38.5%)

Arrhythmic burden and treatment characteristics

The mean baseline VT burden was 15.14 ± 6.87 episodes during the documented baseline period, with a 95% CI of 14.18-16.10. The mean baseline number of ICD shocks was 4.36 ± 2.53 (95% CI, 4.01-4.71). The mean daily mexiletine

dose was 433.96±170.16 mg/day (95% CI, 410.23-457.69), and the mean follow-up duration was 8.16±3.20 months (95% CI, 7.71-8.61).

Treatment characteristic	Observation
Baseline VT episodes	15.14±6.87
Baseline ICD shocks	4.36±2.53
Mexiletine dose, mg/day	433.96±170.16
Follow-up, months	8.16±3.20
Concomitant amiodarone	94 (47.0%)
No concomitant amiodarone	106 (53.0%)
Bisoprolol	90 (45.0%)
Carvedilol	73 (36.5%)
Metoprolol	37 (18.5%)

Change in ventricular tachycardia burden

The mean number of VT episodes decreased from 15.14±6.87 at baseline to 4.65±3.27 after mexiletine initiation. The paired comparison was highly statistically significant ($p<0.0001$). The mean percentage reduction in VT episodes was 68.75±15.39%, with a 95% CI of 66.60-70.89%.

Outcome	Baseline	Post-treatment	p-value
VT episodes	15.14±6.87	4.65±3.27	<0.0001
ICD shocks	4.36±2.53	2.38±2.01	<0.0001

Change in ICD shocks

The mean number of ICD shocks declined from 4.36±2.53 before mexiletine treatment to 2.38±2.01 during follow-up after treatment initiation. This reduction was statistically significant ($p<0.0001$).

Safety and clinical outcome

No adverse event was documented in 132 patients (66.0%). Tremor was reported in 44 patients (22.0%), nausea in 14 (7.0%), gastrointestinal upset in seven (3.5%), and dizziness in three (1.5%). The thesis describes these events as predominantly mild and does not report life-threatening adverse events or treatment-related deaths. The overall outcome classification recorded 139 patients (69.5%) as improved, 47 (23.5%) as stable, and 14 (7.0%) as having a partial response.

Adverse event	n (%)
None	132 (66.0%)
Tremor	44 (22.0%)
Nausea	14 (7.0%)
Gastrointestinal upset	7 (3.5%)
Dizziness	3 (1.5%)
Overall outcome	n (%)
Improved	139 (69.5%)
Stable	47 (23.5%)
Partial response	14 (7.0%)

Discussion

This retrospective single-center study evaluated 200 patients with recurrent VT and severe LVSD who received mexiletine as part of routine clinical care. The principal findings were a substantial reduction in documented VT episodes, a significant reduction in ICD shocks, and generally acceptable tolerability over a mean follow-up of approximately eight months. Importantly, these observations should be interpreted as an association with

mexiletine exposure rather than proof of an independent causal effect because the study had no untreated control group and background therapy was heterogeneous.

Clinical profile of the cohort

The cohort represented a high-risk population with advanced structural heart disease. The mean age was approximately 61 years and 57% were male. Ischemic cardiomyopathy was the most frequent substrate, followed by dilated cardiomyopathy and post-myocardial infarction LV dysfunction. This distribution is clinically plausible because scar-related VT is a major manifestation of advanced structural heart disease, while fibrosis and remodeling in nonischemic cardiomyopathy can also provide a substrate for ventricular arrhythmogenesis [1,2].

The severity of ventricular dysfunction was pronounced, with a mean LVEF of 26.29%. The combination of severe LVSD and predominantly NYHA class III-IV disease identifies patients with a substantial baseline risk of ventricular arrhythmia and recurrent ICD therapy. Reduced LVEF remains an important marker of sudden cardiac death risk, but contemporary management emphasizes that LVEF alone does not fully characterize arrhythmic substrate; myocardial scar, fibrosis, autonomic activation, and clinical arrhythmia history are also important [3,9].

Reduction in ventricular tachycardia episodes

The most important observation was the reduction in mean VT episodes from 15.14 to 4.65, corresponding to a mean reported reduction of 68.75%. This magnitude of reduction is clinically meaningful because recurrent VT may result in repeated emergency interventions, hospitalization, ICD therapies, and progressive functional deterioration. However, the estimate should be interpreted in the context of the study design and the absence of a contemporaneous comparator.

The findings are directionally consistent with previous real-world evidence. Gao et al. studied 29 ICD recipients treated with mexiletine and reported significant reductions in ventricular tachyarrhythmia episodes and ICD shocks during early follow-up; longer-term benefit was most evident in patients who continued amiodarone [10]. A cohort of patients with chronic coronary syndrome also found reductions in VT/VF episodes and ICD interventions after mexiletine initiation, although clinically important adverse effects led to treatment discontinuation in a minority [11]. The EHRA systematic review similarly concluded that mexiletine may reduce recurrent ventricular arrhythmias and ICD therapies, particularly in patients for whom catheter ablation is unsuccessful or unsuitable, while emphasizing the low-to-moderate quality of the available evidence [8].

A broader systematic review by van der Ree et al. included 221 studies and 8,970 patients and found that more than half of the studies evaluating VT reported a greater than 50% reduction in ventricular arrhythmia burden. At the same time, the authors highlighted substantial heterogeneity in patient populations, treatment regimens, outcomes, and study quality [7]. The 68.75% reduction observed in the present cohort therefore falls within the range reported in the wider observational literature, but should not be interpreted as a treatment effect that can be generalized to all patients with VT.

Reduction in ICD shocks

ICD shocks decreased from 4.36 to 2.38 per patient over the corresponding observation periods, with $p < 0.0001$. This finding is important because ICDs terminate life-threatening arrhythmias but do not prevent the occurrence of VT. Recurrent appropriate shocks can be physically distressing and are associated with adverse psychological effects and poorer outcomes in patients with heart failure [4,5]. Reducing arrhythmia burden and therefore reducing device therapies is consequently an important therapeutic objective even when the underlying substrate cannot be eliminated.

The present observation is consistent with the EHRA systematic review, which found a recurring signal toward reduction of ICD therapies with mexiletine, particularly in patients with structural heart disease and recurrent arrhythmias [8]. The systematic review of ICD populations by Ali et al. also reported reductions in ventricular tachyarrhythmia recurrences and appropriate ICD therapies after oral mexiletine, while finding an overall side-effect rate of approximately 30% and treatment reduction or discontinuation in about one-fifth of patients [12]. The lower adverse-event burden recorded in the present thesis may reflect differences in ascertainment, follow-up, dose distribution, and the retrospective clinical documentation process.

Potential pharmacological explanation

Mexiletine is a class IB sodium-channel blocker with preferential binding to activated and inactivated sodium channels. Its use-dependent activity becomes more pronounced during rapid depolarization, providing a mechanistic rationale for suppression of rapidly firing ventricular tissue. It has relatively limited effects on ventricular repolarization compared with agents that substantially prolong the QT interval [6,13]. These characteristics are potentially advantageous in patients with severe LVSD, in whom additional negative inotropy or substantial QT prolongation may be undesirable.

The role of mexiletine is nevertheless best understood as adjunctive rather than definitive therapy. Contemporary guidelines place optimization of the underlying disease, ICD therapy when indicated, and catheter ablation at the center of management for appropriate patients with recurrent VT. Mexiletine can occupy a niche in patients with recurrent arrhythmias despite conventional treatment or when invasive options are unsuccessful, contraindicated, or not feasible [14].

Concomitant antiarrhythmic therapy

An important feature of this cohort was the frequent use of background antiarrhythmic therapy. Amiodarone was used in 47% of patients, and beta-blockers were widely prescribed. This is clinically relevant because the observed reduction in VT burden cannot be attributed exclusively to mexiletine. Gao et al. found that the longer-term benefit of mexiletine was particularly apparent among patients continuing amiodarone, supporting the concept that combination therapy may be important in selected refractory cases [10].

Mexiletine and amiodarone have complementary electrophysiological actions, but their combination also requires careful monitoring for drug interactions and adverse effects. Recent reviews emphasize that mexiletine is most appropriately used in carefully selected patients rather than as a universal replacement for amiodarone, catheter ablation, or ICD therapy [6,8]. The present study therefore supports the practical role of mexiletine within a multimodal treatment strategy rather than supporting mexiletine monotherapy.

Safety and tolerability

Two-thirds of the cohort had no documented adverse effects. Tremor was the most frequent adverse event, followed by nausea, gastrointestinal upset, and dizziness. This pattern is consistent with the known adverse-effect profile of mexiletine, in which neurological and gastrointestinal symptoms are common and often dose related [6,7]. The absence of reported life-threatening toxicity in the thesis is reassuring, but the retrospective nature of adverse-event ascertainment may underestimate mild or transient symptoms that were not recorded in the medical record. The mean daily dose was 433.96 mg/day, with considerable interindividual variation. This variability is consistent with individualized dose titration according to efficacy, tolerability, comorbidities, and concomitant medications. Because mexiletine undergoes substantial hepatic metabolism, clinical monitoring is particularly important in patients with hepatic dysfunction and when interacting medications are present [6].

Clinical outcome

The thesis classified 69.5% of patients as improved, 23.5% as stable, and 7.0% as having a partial response. These findings provide supportive clinical context for the reduction in arrhythmia burden, but the manuscript should not equate this classification with a validated clinical outcome measure because the thesis does not define the criteria used to assign patients to the three categories. Similarly, the available results do not provide sufficient information to determine whether reduced VT burden translated into lower hospitalization, cardiovascular mortality, or improved quality of life.

Strengths and limitations

The principal strengths of this study are its relatively large real-world cohort for a mexiletine study, inclusion of patients with severe LVSD, clinically relevant arrhythmic outcomes, and documentation of adverse effects over a mean follow-up exceeding eight months. The study also reflects contemporary practice in which mexiletine is commonly used alongside ICD therapy and other antiarrhythmic or heart failure treatments.

Several limitations are important. First, the retrospective single-center design limits external validity and introduces potential selection and information bias. Second, there was no untreated or alternative-treatment control group, so regression to the mean, temporal changes in arrhythmia burden, optimization of heart failure therapy, changes in amiodarone or beta-blocker treatment, and other clinical factors could have contributed to the observed reductions.

Third, nearly half of the cohort received concomitant amiodarone, making it impossible to isolate the independent effect of mexiletine. Fourth, the thesis does not provide detailed information on the exact duration of the pre-treatment observation window versus the post-treatment observation window, which is important when comparing event counts.

Fifth, the study did not report validated quality-of-life measures, hospitalization outcomes, cardiovascular mortality, or long-term survival. Sixth, adverse events were obtained from clinical records rather than a standardized prospective toxicity assessment. Finally, although the thesis includes in-hospital mortality and escalation of therapy among the planned secondary outcomes, corresponding numerical results are not presented in the reported results tables; these outcomes should therefore not be claimed in the final submission unless the underlying master chart is analyzed and the missing results are confirmed.

Implications for practice and future research

The findings suggest that mexiletine may be a useful adjunct in patients with recurrent VT and severe LVSD when clinically significant arrhythmias persist despite contemporary therapy. The strongest rationale is reduction of arrhythmia burden and ICD therapies rather than replacement of ICD protection or catheter ablation. Patient selection, dose titration, monitoring for neurological and gastrointestinal toxicity, and review of drug interactions remain important.

Future research should use prospective multicenter designs with clearly defined pre-treatment and treatment observation windows, standardized VT and ICD endpoints, documentation of catheter-ablation history and heart failure therapy, and adjustment for concomitant antiarrhythmic drugs. Randomized or well-controlled comparative studies are particularly needed to determine the independent efficacy of mexiletine and to establish whether reductions in VT burden translate into improved hospitalization, quality of life, and survival.

Conclusion

In this retrospective cohort of 200 patients with severe LV systolic dysfunction and recurrent ventricular tachycardia, mexiletine use was associated with a substantial reduction in ventricular tachycardia episodes and implantable cardioverter-defibrillator shocks and was generally well tolerated. These findings support the role of mexiletine as a carefully selected adjunctive therapy within comprehensive management of refractory ventricular arrhythmias. The absence of a control group and the frequent use of concomitant antiarrhythmic therapy limit causal inference, and prospective comparative studies are needed.

Declarations

Ethics approval

The thesis states that Institutional Ethics Committee approval was obtained and that confidentiality was maintained. The ethics committee name, approval number, and approval date should be inserted here before submission.

Human subjects and consent

The thesis protocol states willingness to provide written informed consent. The final manuscript should clarify whether written informed consent for retrospective record use was obtained from all participants or whether the Institutional Ethics Committee granted a waiver, and the corresponding approval documentation should be cited accurately.

Conflict of interest: Nil

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Author contributions

References

1. de Bakker JM, van Capelle FJ, Janse MJ, Wilde AA, Coronel R, Becker AE, et al. Reentry as a cause of ventricular tachycardia in patients with chronic ischemic heart disease: electrophysiologic and anatomic correlation. *Circulation*. 1988;77:589-606. 10.1161/01.CIR.77.3.589
2. Gulati A, Jabbour A, Ismail TF, et al. Association of fibrosis with mortality and sudden cardiac death in patients with nonischemic dilated cardiomyopathy. *JAMA*. 2013;309:896-908. 10.1001/jama.2013.1363

3. Zeppenfeld K, Tfelt-Hansen J, de Riva M, et al. 2022 ESC Guidelines for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death. *Eur Heart J*. 2022;43:3997-4126. 10.1093/eurheartj/ehac262
4. Poole JE, Johnson GW, Hellkamp AS, et al. Prognostic importance of defibrillator shocks in patients with heart failure. *N Engl J Med*. 2008;359:1009-1017. 10.1056/NEJMoa0710981
5. Manzoni GM, Castelnovo G, Compare A, et al. Psychological effects of implantable cardioverter defibrillator shocks: a review of study methods. *Front Psychol*. 2015;6:39. 10.3389/fpsyg.2015.00039
6. Alhourani N, Wolfes J, Könnemann H, et al. Relevance of mexiletine in the era of evolving antiarrhythmic therapy of ventricular arrhythmias. *Clin Res Cardiol*. 2024;113:791-800. 10.1007/s00392-024-02383-9
7. van der Ree MH, van Dussen L, Rosenberg N, et al. Effectiveness and safety of mexiletine in patients at risk for (recurrent) ventricular arrhythmias: a systematic review. *Europace*. 2022;24:1809-1823. 10.1093/europace/euac087
8. Farkowski MM, Karlinski M, Pytkowski M, et al. Mexiletine for recurrent ventricular tachycardia in adult patients with structural heart disease and implantable cardioverter defibrillator: an EHRA systematic review. *Europace*. 2022;24:1504-1511. 10.1093/europace/euac101
9. Tomaselli GF, Zipes DP. What causes sudden death in heart failure? *Circ Res*. 2004;95:754-763. 10.1161/01.RES.0000144493.65297.4A
10. Gao D, Van Herendael H, Alshengeiti L, et al. Mexiletine as an adjunctive therapy to amiodarone reduces the frequency of ventricular tachyarrhythmia events in patients with an implantable defibrillator. *J Cardiovasc Pharmacol*. 2013;62:199-204. 10.1097/FJC.0b013e31829651fe
11. Mugnai G, Paolini C, Cavedon S, et al. Mexiletine for ventricular arrhythmias in patients with chronic coronary syndrome: a cohort study. *Acta Cardiol*. 2022;77:264-270. 10.1080/00015385.2021.1916034
12. Ali H, Cristiano E, Lupo P, et al. Oral mexiletine for ventricular tachyarrhythmias treatment in implantable-cardioverter-defibrillator patients: a systematic review of the literature. *Minerva Cardiol Angiol*. 2023;71:622-630. 10.23736/S2724-5683.22.06176-2
13. Olleik F, Kamareddine MH, Spears J, et al. Mexiletine: antiarrhythmic mechanisms, emerging clinical applications and mortality. *Pacing Clin Electrophysiol*. 2023;46:1348-1356. 10.1111/pace.14726
14. Zeppenfeld K, Tfelt-Hansen J, de Riva M, et al. 2022 ESC Guidelines for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death. *Eur Heart J*. 2022;43:3997-4126. 10.1093/eurheartj/ehac262
15. Jentzer JC, Noseworthy PA, Kashou AH, et al. Multidisciplinary critical care management of electrical storm: JACC state-of-the-art review. *J Am Coll Cardiol*. 2023;81:2189-2206. 10.1016/j.jacc.2023.03.424
16. The Cardiac Arrhythmia Suppression Trial (CAST) Investigators. Preliminary report: effect of encainide and flecainide on mortality in a randomized trial of arrhythmia suppression after myocardial infarction. *N Engl J Med*. 1989;321:406-412. 10.1056/NEJM198908173210701
17. Moss AJ, Hall WJ, Cannom DS, et al. Improved survival with an implanted defibrillator in patients with coronary disease at high risk for ventricular arrhythmia. *N Engl J Med*. 1996;335:1933-1940. 10.1056/NEJM199612263352601
18. Moss AJ, Zareba W, Hall WJ, et al. Prophylactic implantation of a defibrillator in patients with myocardial infarction and reduced ejection fraction. *N Engl J Med*. 2002;346:877-883. 10.1056/NEJM200203213461201
19. Bardy GH, Lee KL, Mark DB, et al. Amiodarone or an implantable cardioverter-defibrillator for congestive heart failure. *N Engl J Med*. 2005;352:225-237. 10.1056/NEJMoa043399
20. Campbell NP, Kelly JG, Shanks RG, et al. Mexiletine (Kö 1173) in the management of ventricular dysrhythmias. *Lancet*. 1973;2:404-407. 10.1016/S0140-6736(73)90306-3