



**Kerman University
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Title

**Cost-effectiveness analysis of Implantable Cardioverter
Defibrillator in compared with drug therapy in patient's exposure
arrhythmia**

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Abstract

Introduction: Heart disease is a chronic, non-communicable disease. In the present time, chronic and non-communicable diseases are the leading causes of death and disability. Cardiac arrhythmias are associated with an increased incidence of sudden cardiac death. To treat cardiac arrhythmias, various methods are used, the most important of which is the use of an implantable cardiac defibrillator and drug therapy. Because these methods have varying outcomes and costs, health system policymakers are looking for the most cost-effective ones due to the health system's limited resources. As a result of the scarcity of research in this area, the goal of this study was cost-effectiveness analysis of Implantable Cardioverter Defibrillator in compared with drug therapy in patient's exposure arrhythmia.

Methods: The current study is an economic evaluation study conducted using the cost-effectiveness method and the Markov model. This study was conducted in Kerman province. All patients with cardiac arrhythmia admitted to Shafa Hospital in Kerman from 2017 to 2019 were included in the study population. All 101 patients treated with ICD and 101 patients treated with drug therapy that were chosen at random were included in the study sample. The data collection tool was a checklist created by the researcher that collected cost and outcome information. The study perspective was the healthcare system, and direct medical costs were calculated. The outcome of the study was quality-adjusted life years. The Markov model considered four health states for ICD strategy (well, hospitalization, adverse events, and death) and three health states for drug therapy (well, hospitalization, and death). The study's time horizon was the lifetime, and the cycle length of the Markov model was one year. TreeAge software version 2020 was used to analyze the data, and the incremental cost-effectiveness ratio was compared with a willingness to pay equal to three times the per capita GDP in 2019 (699,300,000 Rials). The effect of the model's uncertainty parameters on the incremental cost-effectiveness ratio was investigated using deterministic and probabilistic sensitivity analysis.

Results: Demographic findings revealed that the majority of subjects in the ICD method were male (79%) with a mean age of (57.13 ± 5.8), and in the drug method, male (78%) with a mean age of (57.15 ± 1.5). Furthermore, findings revealed that the lifetime costs of ICD strategies and drug therapy for the treatment of cardiac arrhythmias were 1,727,682,960 Rials and 360,843,113 Rials, respectively, and their effectiveness were 12.64 QALY and 11.29 QALY, respectively. The average cost-effectiveness ratios for ICD and drug therapy strategies for were 136,759,811 Rials per QALY and 31,974,427 Rials per QALY, respectively. The incremental cost-effectiveness ratio of the ICD strategy was 1,014,272,213 Rials per QALY when compared to the drug therapy strategy. This finding suggests that the ICD strategy is not cost-effective when compared to drug therapy and has been dominated. The results of a deterministic sensitivity analysis using a Tornado diagram revealed that eight variables had the greatest influence on ICER, the most important of which were the cost of state of well in the ICD strategy and the cost of state of well in the drug therapy strategy. However, the probabilistic sensitivity analysis showed that at the threshold of willingness to pay three times GDP per capita, the probability of cost-effectiveness of the ICD method is 43%.

Conclusion: The current study's findings show that the ICD strategy for treating patients with cardiac arrhythmias is not cost-effective, whereas the drug treatment method is. More research is needed in this area based on information on the outcomes of the strategy based on Iranian data.