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EDITOR’S NOTE

Making Decisions About Screening Mammography in Older Women

The US Preventive Services Task Force notes that there are insufficient data to recommend breast cancer screening among women older than 70 years. Yet, as Walter points out, older women have a high incidence of breast cancer, screening does not suddenly stop being effective in older women, and many live long enough to benefit from screening. On the other hand, the benefit of screening is lower in older women with a limited life expectancy because of the competing risk of death. Screening thus requires that clinicians individualize the decision regarding breast cancer screening in older women. However, this article by Fox et al suggests that clinicians do not alter their recommendations for breast cancer screening based on age or health status and overwhelmingly recommend screening.

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RESEARCH LETTERS

ONLINE FIRST

Optimal Medical Therapy Use Among Patients Receiving Implantable Cardioverter/Defibrillators: Insights From the National Cardiovascular Data Registry

Current guidelines predicate primary prevention cardioverter/defibrillator (ICD) implantation on patients receiving “optimal medical therapy” (OMT), defined as use of both β-blocker and angiotensin-converting enzyme inhibitor or angiotensin receptor blocker (ACEI/ARB) in the absence of contraindications. These recommendations promote clinical optimization of patients with low left ventricular ejection fraction (LVEF) as well as cost-effective allocation of high-cost device therapy. While prior studies hint at significant care gaps among select ICD recipients, the ICD Registry offered the opportunity to examine national patterns of OMT use among first-time ICD recipients in contemporary, real-world practice.

Methods. Details regarding the ICD Registry, including data definitions and quality, have been published previously. Among 1201 centers reporting data on consecutive ICD procedures from January 1, 2007, to June 30, 2009, we examined 175 757 patients undergoing first-time ICD implantation and excluded those younger than 18 years, who had an LVEF higher than 35%, or who had in-hospital death or unknown OMT status. Patients enrolled in a study necessitating blind or with documented contraindications to β-blocker or ACEI/ARB use were counted toward medication use. Patients’ clinical and procedural characteristics and implanting physician and hospital characteristics were compared among patients stratified by OMT use. Multivariable hierarchical logistic regression modeling using backward variable selection (P < .01) examined factors associated with OMT, β-blocker, and ACEI/ARB use. Missing values were imputed (continuous variables to the median; categorical to the mode).

Results. Among 175 757 initial ICD recipients with an LVEF of 35% or lower, 45 240 (25.7%) were eligible for but did not receive OMT. Similar rates were observed when ICD placement was the primary purpose of hospitalization (24.6%) and among primary prevention ICD recipients (25.6%). The rate of OMT prescription by site ranged from 0% to 100%, with a median of 73.5% (interquartile range, 64%-82%). Patients receiving OMT were more likely to be younger, have commercial insurance, and have a diagnosis of hypertension and were less likely to have a history of ischemic heart disease, recent heart failure hospitalization, atrioventricular node conduction abnormalities,
or renal dysfunction (eTable 1; http://www.archinternmed.com). Among patients who underwent coronary artery bypass graft during the hospitalization (n=2632), 65.7% were discharged on OMT, whereas 75.3% of patients (n=5258) who underwent percutaneous coronary intervention during the hospitalization were discharged receiving OMT. Higher OMT rates were observed for implanting physicians with formal electrophysiology training (eTable 2). Use of OMT was highest at government hospitals (78.5%) and lowest at private and/or community hospitals (73.7%; OR/H0.7/0.9; eTable 2). Teaching hospitals had a higher rate of OMT use (76.0% vs 72.3%; OR/H1.0/0.8; P<.001). Teaching hospitals had a higher rate of OMT use (76.0% vs 72.3%; OR/H1.0/0.8; P<.001).

In multivariate analysis (Figure), factors associated with higher OMT use included treatment at a teaching hospital (odds ratio [OR], 1.16; 95% CI, 1.06-1.27), percutaneous coronary intervention during the admission (OR, 1.11; 95% CI, 1.04-1.19), history of hypertension (OR, 1.32; 95% CI, 1.28-1.36), and a cardiovascular indication for admission (OR, 1.11; 95% CI, 1.04-1.19). Factors associated with the lowest odds of OMT use were coronary artery bypass graft during the admission (OR, 0.66; 95% CI, 0.61-0.72) and an implanting care provider who was board certified in surgery (OR, 0.73; 95% CI, 0.66-0.80). Other factors associated with low OMT rates included medical comorbidities (renal dysfunction, chronic lung disease, and cerebrovascular disease), severity of cardiovascular disease (atrial or ventricular tachyarrhythmias, conduction abnormalities, New York Heart Association class IV heart failure), and patient sex and age.

An ACEI/ARB was not prescribed in 18.7% of patients with low LVEF in the absence of documented contraindications, and 10.7% were not prescribed a β-blocker. The lowest odds for ACEI/ARB use were observed for coronary artery bypass graft during the index admission (OR, 0.59; 95% CI, 0.54-0.65) and surgical training of the performing operator (OR, 0.76; 95% CI, 0.68-0.84; eTable 3). The lowest ORs for β-blocker use were for chronic lung disease (OR, 0.72; 95% CI, 0.70-0.75) and surgical training of the performing operator (OR, 0.74; 95% CI, 0.65-0.84). Despite ICD implantation, patients with abnormal atroventricular node conduction were also less likely to receive β-blockers.

Comment. Although medical therapy optimization reduces mortality, the risks of heart failure decompensation and ventricular arrhythmias requiring shocks, I CD recipients with an LVEF of 35% or lower are not prescribed β-blockers and ACEI/ARBs.
The in-hospital “snapshot” captured by the ICD Registry highlights a critical window of opportunity for therapy optimization for patients with low LVEF. Among patient and health care provider variables, surgical revascularization and ICD implantation by a board-certified surgeon were 2 of the strongest factors independently associated with lower OMT use. Although hemodynamic factors may play a role, persistently lower utilization rates of other evidence-based therapies (eg, statins and antiplatelet agents) among surgical patients suggest that the care provider’s training background may influence prescribing patterns. In addition, nonelectrophysiologists are more likely to implant non–evidence-based ICDs and to miss candidates for resynchronization therapy. These data suggest that patients implanted by nonelectrophysiology care providers may benefit from further scrutiny to maximize guidelines adherence.

In the Registry to Improve the Use of Evidence-Based Heart Failure Therapies in the Outpatient Setting (IMPROVE-HF), failure to document was a significant contributor to failure to treat. While our study cannot distinguish between true but undocumented contraindications in patients and health care provider reluctance to challenge patients deemed at risk of developing an adverse reaction, it underscores the need for increased vigilance for treatment opportunities. For example, the association of atrioventricular conduction abnormalities with failure to receive a β-blocker suggests that the elimination of this contraindication by ICD implantation was ignored. Electronic decision support and standardized discharge order sets may improve guideline adherence but cannot completely close care gaps. Direct involvement of a medical cardiologist in the peri-implantation setting may help identify appropriate, medically optimized ICD candidates as well as maximize OMT adherence after implantation.

From a broader perspective, the observed low rate of OMT use supports the need for increased focus on this aspect of care for patients receiving ICD therapy. Institutional rates of medical therapy for patients undergoing ICD implantation are currently available to hospitals from the National Cardiovascular Data Registry, but this study suggests that those data are not yet driving practice improvement. These findings suggest that further investigation is needed to identify quality improvement and reporting strategies that effectively reduce care gaps such as those identified in this study.

In conclusion, despite well-proven benefits and guideline recommendations, gaps in medical therapy optimization of ICD recipients persist. These results underscore the need for dedicated strategies, optimized quality of care, and improved cost-effectiveness of care for patients with heart failure.

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INVITED COMMENTARY

ONLINE FIRST

Implantable Cardioverter/Defibrillators in the Primary Prevention of Sudden Death: We Know What to Do but Are We Doing It?

The mandate to weigh risks and benefits for use of cardiac rhythm devices (specifically implantable cardioverter/defibrillators [ICDs]) for the primary prevention of sudden cardiac death is substantial, given the cost of the devices and their potential impact on patient outcomes including health-related quality of life. Recent studies have demonstrated that comorbidities such as renal failure, \( \beta \)-blocker \( \text{underuse} \), and inappropriate timing of implants \( \text{are all in play} \). In their analysis, Miller and colleagues\(^2\) use data from the National Cardiovascular Data Registry (NCDR) to assess whether patients undergoing device implantation with reduced ejection fraction are receiving optimal medical therapy (OMT) for congestive heart failure. \( \text{This is a descriptive analysis for the period January 2007 to June 2009 that relies on NCDR reports by the participating institution of medication use at discharge. Given the limitations of the NCDR (for example, the lack of linkage to patient and pharmacy records), the investigators do not have information about antecedent and subsequent medication adherence or medication dosing. Furthermore, the authors acknowledge that, as for many NCDR data elements, on-site auditing was not performed on the medication variable. Therefore we are provided, at best, with a snapshot of medication use. Importantly, given the number of cases in the NCDR, it is a snapshot with a wide lens. Somewhat surprisingly, the use of \( \beta \)-blockers was reported at a higher level than the renin-angiotensin blockers. A total of 10.7% of patients are not on \( \beta \)-blocker therapy, which approximates the figure reported for contraindications to \( \beta \)-blockade in a hospitalized cohort with heart failure.}^6 \text{This finding differs from what we previously described using a managed care database, with a cohort of 2766 patients (from 2003 through 2006) defined by strict inclusion criteria. The median number of days patients were credited with being on \( \beta \)-blocker therapy in the 90 days preceding the procedure was 46; 33.4% of beneficiaries did not have any pharmacy fills for a \( \beta \)-blocker that covered a single day in that 3-month window.}

Despite differences in the magnitude of \( \beta \)-blocker underuse, which are unlikely to be explained by temporal trends, the fact is that in the current study,\(^3\) an additional 18.7% of patients were not using an angiotensin-converting enzyme inhibitor or angiotensin receptor blocker. These observations lead to a fundamental question: why is the use of any of these drugs suboptimal when drug therapy is effective and available in generic formulation? Clearly, there is ample justification for use of both rennin-angiotensin antagonists and \( \beta \)-blockers in patients with left ventricular dysfunction and heart failure. Not only have landmark clinical trials demonstrated efficacy and survival benefit,\(^7\) but multiple professional guidelines specify that OMT is required for patients undergoing consideration of device therapy.\(^8\) \( \beta \)-Blockers in particular are known to lead to improvement in left ventricular function in a significant proportion of patients and hence might allow the clinician to defer or postpone an implantation in a patient who initially qualified for a cardiac rhythm device based on the left ventricular ejection fraction. Furthermore, \( \beta \)-blockers may decrease the frequency of arrhythmic events, a strong consideration both prior to and after ICD implantation.

In the current report by Miller et al,\(^2\) variables associated with lower use of OMT such as physician specialty are described; these findings are interesting but to some degree a distraction. There are only so many comparisons one can or should make in a descriptive analysis, and it is not clear if the authors tested for interactions among the covariates. However, it is noteworthy that OMT was less common when the implant occurred during an admission that also included a coronary artery bypass surgery. This observation is potentially important because it is more than reasonable to inquire why a device implant occurs during a hospitalization for a revascularization procedure, which can lead to improvements in both ventricular function and the arrhythmia substrate, unless these device procedures were revisions rather than de novo implants. The latter are not recommended by current guidelines.

Looking ahead, additional research might improve our understanding of other variables that predict use of OMT; for example, we can explore geographic variation, temporal trends, and predictors of sustained medication compliance. However, we have already learned a lot and have actionable data. While some critics may argue that the study by Miller and colleagues\(^2\) is only a tale about data.