Improving Survival Rates of Patients With Idiopathic Dilated Cardiomyopathy in Tuscany Over 3 Decades
Impact of Evidence-Based Management

Gabriele Castelli, MD; Alessandra Fornaro, MD; Mauro Ciaccheri, MD; Alberto Dolara, MD; Vito Troiani, MD; Benedetta Tomberli, MD; Iacopo Olivotto, MD; Gian Franco Gensini, MD

Background—Contemporary therapeutic options have led to substantial improvement in survival of patients with heart failure. However, limited evidence is available specifically on idiopathic dilated cardiomyopathy. We thus examined changes in prognosis of a large idiopathic dilated cardiomyopathy cohort systematically followed during the past 30 years.

Methods and Results—From 1977 to 2011, 603 consecutive patients (age, 53±12 years; 73% men; left ventricular ejection fraction, 32±10%) fulfilling World Health Organization criteria for idiopathic dilated cardiomyopathy, including negative coronary angiography, were followed up for 8.8±6.3 years. Patients were subdivided in 4 enrollment periods on the basis of heart failure treatment eras: (1) 1977–1984 (n=66); (2) 1985–1990 (n=102); (3) 1991–2000 (n=197); (4) 2001–2011 (n=238). Rates of patients receiving angiotensin-converting enzyme inhibitors/angiotensin receptors blockers, β-blockers, and devices at final evaluation increased from 56%, 12%, 8% (period 1) to 97%, 86%, 17% (period 4), respectively (P<0.05). There was a trend toward enrollment of older patients with less severe left ventricular dilatation and dysfunction during the years. During follow-up, 271 patients (45%) reached a combined end point including death (heart failure related, n=142; sudden death, n=71; and noncardiac, n=22) or cardiac transplant (n=36). A more recent enrollment period represented the most powerful independent predictor of favorable outcome (period 2 versus 1 [hazard ratio [HR], 0.64; P=0.04], period 3 versus 1 [HR, 0.35; P<0.001], period 4 versus 1 [HR, 0.14; P<0.001]). Each period was associated with a 42% risk reduction versus the previous one (HR, 0.58; 95% confidence interval, 0.50–0.67; P<0.001), reflecting marked decreases in heart failure–related mortality and sudden death (period 4 versus 1: HR, 0.10; P<0.001 and HR, 0.13; P=0.0001, respectively).

Conclusions—Evidence-based treatment has led to dramatic improvement in the prognosis of idiopathic dilated cardiomyopathy during the past 3 decades. The benefits of controlled randomized trials can be replicated in the real world, emphasizing the importance of tailored follow-up and long-term continuity of care. (Circ Heart Fail. 2013;6:913-921.)

Key Words: cardiac resynchronization therapy ■ cardiomyopathy, dilated ■ drug therapy ■ heart failure ■ outcomes assessment

Clinical Perspective on 921

Diopathic dilated cardiomyopathy (IDCM) is a severe myocardial disease characterized by dilatation and impaired function of the left or both ventricles, affecting >36.5 individuals per 100,000.2 IDCM accounts for ≈50,000 hospitalizations and 10,000 deaths each year and is responsible for ≈25% of all cases of heart failure (HF) in the United States.3 During the past 3 decades, the outcome of IDCM is presumed to have radically changed after major advances in pharmacological and device-based therapeutic strategies for HF; however, studies addressing the outcome of HF have been characterized by relatively small representation of individuals with IDCM, so that limited data exist with specific regard to this condition.4–11

In addition, real-world implementation of standard HF guidelines is challenging, with rates of compliance that can be considerably lower than those reported in clinical trials documenting survival benefits.12–17 As a result, the issue of long-term outcome of IDCM in the community remains largely unresolved. In the present study, we therefore chose to examine the clinical features and prognosis of a sizeable cohort of unselected, consecutively enrolled and angiographically negative patients with IDCM from a well-defined regional population in Tuscany, evaluated during the past 30 years in a systematic fashion and by the same team, in relation to the evolving treatment strategies including evidence-based pharmacological and device-based interventions.
Methods
Setting and Study Population
The Referral Center for Cardiomyopathies has been established in the mid-1970s in Careggi University Hospital, a large community-based multispecialty hospital in Florence, Italy. Careggi is a tertiary center with >1500 beds, serving the Florence metropolitan area (population ≈1 million) and the surrounding geographic region of Tuscany (total population ≈700000 within 23000 km²).16 In this setting, between January 1977 and September 2011, we consecutively enrolled 1085 patients with a diagnosis of dilated cardiomyopathy. In 271 patients, the condition was judged to be secondary to ischemic heart disease, systemic hypertension, chemotherapy, alcoholic abuse, diabetes mellitus, cor pulmonalis, valve disease, or other cardiac or systemic diseases. In addition, 211 patients in whom a coronary angiogram was not available were excluded. The remaining 603 were classified as IDCM, according to the World Health Organization criteria and in the presence of a negative coronary angiogram: these comprise the present study cohort.

Evaluation and Follow-Up
All study patients were evaluated and followed up at our institution by clinical and family history, physical examination, 12-lead ECG, standard chest radiograph, routine laboratory tests, 24-hour Holter ECG monitoring (since early 1980s), M-mode and 2D echocardiography (since 1970s), and Doppler echocardiography (since mid-1980s). Exercise stress test and cardiac catheterization were performed as dictated by clinical requirements. Endomyocardial biopsy has been performed routinely until the early 1990s and thereafter only on selected patients with suspect active myocarditis. Although the family history of each patient was investigated, systematic family screenings have not been performed. In 51 patients (8%) a genetic transmission was evident or suspected by virtue of clinical and echocardiographic documentation of the disease in a relative or by a family history of HF-related death or premature sudden death (SD).

Patients were regularly followed up by outpatient visits every 6 months (or more frequently when clinically indicated) and, when necessary, by interviews with referring physicians or by telephone contacts. For the purposes of this study, follow-up ended on September 30th, 2011. In patients who died or were transplanted, end of follow-up was considered as time of death or heart transplantation. In the minority of patients lost to follow-up (ie, not traceable by September 30th, 2011), the last clinical evaluation of telephone contact was considered. In the past 5 years of the study (2006–2011), the proportion of patients who were actively followed up, had died/transplanted, or were lost in period was 44%, 45%, and 11%, respectively. For the entire study period, patients were seen by the same cardiologists who assumed primary responsibility for management. The use of pharmacological agents, implantable cardioverter defibrillator (ICD), and biventricular pacing for cardiac resynchronization therapy (CRT) was carefully considered as these became available and implemented when felt appropriate, according to existing guidelines. Pharmacological treatment was carefully titrated to achieve maximum tolerated doses of angiotensin-converting enzyme inhibitors/angiotensin receptors blockers (ACEI/ARBs) and β-blockers. Candidates for heart transplantation (HTx) were assessed jointly with the Regional Heart Transplant Referral Center in Siena, where the operations were performed. The study was approved by the institutional review committee and patients gave an informed consent.

Enrollment Periods
To assess long-term changes in outcome in relation to treatment options, we subdivided our patients with IDCM into 4 periods, coinciding with different therapeutic eras of HF treatment: period 1: 66 patients (11%) enrolled from 1977 to 1984, defined as the pre-ACEI inhibition era, when standard therapy consisted of diuretic agents, digoxin, and early vasodilators; period 2: 102 patients (17%) enrolled from 1985 to 1990, marking the beginning of the ACEI era; period 3: 197 patients (33%) enrolled from 1991 to 2000, characterized by increasing use of ACEI and ARBs and the introduction of β-blockers; and period 4: 238 patients (39%) enrolled from 2001 to 2011, the device-era, characterized by the introduction of ICD and CRT on top of extensive neurohormonal blockade.20

Statistical Analysis
Student t test and 1-way ANOVA were used to compare continuous variables, whereas categorical variables were compared by χ² test or Fisher method, as appropriate. Univariate survival estimates were obtained using Kaplan–Meier method. Forward conditional Cox proportional hazards regression analysis was used to evaluate the relationship between periods of enrollment, clinical and instrumental baseline data of patients, and long-term outcome for the following end points: (1) death from any cause including appropriate ICD interventions and HTx; (2) SD; (3) death because of refractory HF. The following variables were included in the models: age, New York Heart Association (NYHA) class, sex, left ventricular ejection fraction (LVEF), baseline LV end-diastolic diameter index, left atrial diameter index, and the presence of moderate to severe mitral regurgitation at enrollment. A P value <0.05 was considered statistically significant. Statistical analysis was performed with the SPSS package, version 20 (SPSS Inc, Chicago, IL).

Results
Baseline Clinical Features
Mean age of the 603 patients at first evaluation was 53±12 (range, 16–75) years; 442 (73%) were men. In 51 patients (8%) there was a family history of IDCM. Average NYHA functional class was 2.3±0.8; 82 patients (14%) were in class I, 265 (44%) in class II, 198 (33%), and 58 (10%) in class III or IV. Mean end-diastolic diameter index was 36±6 mm/m², LVEF was 31±10%, and left atrial diameter index was 24±4 mm/m²; moderate to severe mitral regurgitation was diagnosed in 106 patients (18%). One hundred seventeen patients (19%) had ECG evidence of left bundle-branch block, whereas a history of paroxysmal or permanent atrial fibrillation was recorded in 123 (21%). Of the 531 patients with 24-hour ambulatory Holter monitoring, 183 (30%) showed non–sustained ventricular tachycardias ≥3 beats and sustained ventricular tachycardias (Table 1).

Comparison of Enrollment Periods
At initial evaluation, the 4 groups of patients identified based on the period of enrollment were comparable with regard to sex and NYHA class (Table 1). However, there was a slight trend toward enrollment of older patients with less severe LV dilatation and dysfunction during the years: in period 4 versus period 1, age was 55±12 versus 50±11 years, respectively (P<0.0001); end-diastolic diameter index was 34±5 versus 39±6 mm/m² (P<0.0001), and LVEF was 33±9 versus 29±11% (P=0.016). The overall prevalence of atrial fibrillation was similar in the 4 periods; however, permanent atrial fibrillation at initial diagnosis became less prevalent over time (overall P<0.001; Table 1).

Evolution in Management
Expectedly, medical treatment at enrollment differed significantly between the 4 patient periods (Table 2; Figure 1). ACEI and ARBs were extensively used at our institution since early 1990s, reaching a 96% rate at enrollment after 2001 versus 4% before 1985 (P<0.0001). The use of β-blockers increased significantly after 2001: 79% of patients were already treated with these agents at enrollment in period 4 compared with 0%
in period 1, 1% in period 2, and 21% in period 3 (P < 0.0001). These differences were still evident at the end of follow-up, although the rate of treated patients considerably increased in all patient subgroups, reflecting changes in management over time (Table 2). Of note, 97% and 86% of patients in period 4 were on ACEI/ARBs and β-blockers, respectively, at final evaluation. The use of mineralocorticoid receptor antagonists also increased progressively in periods 1 to 4, whereas that of digoxin decreased (at final evaluation, only 37% of patients in period 4 were on digoxin versus 92% in period 1; P < 0.0001). The ICD and CRT were introduced in 1998 and 2000, respectively, and their use increased steadily over time (Table 2).

Table 1. Baseline Clinical and Instrumental Characteristics of Patients at Enrollment

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=66</td>
<td>n=102</td>
<td>n=197</td>
<td>n=238</td>
<td></td>
</tr>
<tr>
<td>Men, %</td>
<td>442</td>
<td>50 (76%)</td>
<td>75 (73%)</td>
<td>149 (76%)</td>
<td>168 (71%)</td>
</tr>
<tr>
<td>BSA, kg/m²</td>
<td>1.9±0.2</td>
<td>1.8±0.2</td>
<td>1.8±0.2</td>
<td>1.8±0.2</td>
<td>1.9±0.2</td>
</tr>
<tr>
<td>Age, y</td>
<td>53±12</td>
<td>50±11</td>
<td>48±13</td>
<td>54±12</td>
<td>55±12</td>
</tr>
<tr>
<td>Follow-up, mo</td>
<td>106±75</td>
<td>113±108</td>
<td>135±99</td>
<td>122±64</td>
<td>79±47</td>
</tr>
<tr>
<td>Familial IDCM, %</td>
<td>51 (8%)</td>
<td>1 (1%)</td>
<td>2 (2%)</td>
<td>22 (11%)</td>
<td>26 (8%)</td>
</tr>
<tr>
<td>LBBB, %</td>
<td>117 (19%)</td>
<td>19 (29%)</td>
<td>32 (31%)</td>
<td>35 (18%)</td>
<td>31 (13%)</td>
</tr>
<tr>
<td>Paroxysmal AF</td>
<td>29 (5%)</td>
<td>0 (0%)</td>
<td>2 (2%)</td>
<td>8 (4%)</td>
<td>19 (8%)</td>
</tr>
<tr>
<td>Chronic AF</td>
<td>94 (16%)</td>
<td>18 (27%)</td>
<td>21 (21%)</td>
<td>29 (15%)</td>
<td>26 (11%)</td>
</tr>
<tr>
<td>Complex VA</td>
<td>183 (30%)</td>
<td>27 (41%)</td>
<td>46 (45%)</td>
<td>65 (33%)</td>
<td>45 (19%)</td>
</tr>
<tr>
<td>NYHA class I</td>
<td>82 (14%)</td>
<td>6 (9%)</td>
<td>10 (10%)</td>
<td>31 (16%)</td>
<td>35 (15%)</td>
</tr>
<tr>
<td>NYHA class II</td>
<td>265 (44%)</td>
<td>33 (50%)</td>
<td>50 (49%)</td>
<td>89 (45%)</td>
<td>93 (39%)</td>
</tr>
<tr>
<td>NYHA class III</td>
<td>198 (33%)</td>
<td>21 (32%)</td>
<td>31 (30%)</td>
<td>63 (32%)</td>
<td>83 (35%)</td>
</tr>
<tr>
<td>NYHA class IV</td>
<td>58 (10%)</td>
<td>6 (9%)</td>
<td>11 (11%)</td>
<td>14 (7%)</td>
<td>27 (11%)</td>
</tr>
<tr>
<td>EDD, mm</td>
<td>67±8</td>
<td>69±8</td>
<td>69±9</td>
<td>67±9</td>
<td>65±8</td>
</tr>
<tr>
<td>iEDD, mm/m²</td>
<td>36±6</td>
<td>39±6</td>
<td>38±6</td>
<td>36±5</td>
<td>34±5</td>
</tr>
<tr>
<td>LVEF, %</td>
<td>31±10</td>
<td>29±11</td>
<td>30±10</td>
<td>31±9</td>
<td>32±9</td>
</tr>
<tr>
<td>LVFS, %</td>
<td>18±6</td>
<td>16±5</td>
<td>17±6</td>
<td>19±6</td>
<td>19±6</td>
</tr>
<tr>
<td>ARD, mm</td>
<td>33±4</td>
<td>33±4</td>
<td>32±4</td>
<td>32±4</td>
<td>33±4</td>
</tr>
<tr>
<td>iARD, mm/m²</td>
<td>17±3</td>
<td>17±5</td>
<td>18±3</td>
<td>17±2</td>
<td>17±3</td>
</tr>
<tr>
<td>LAD, mm</td>
<td>44±7</td>
<td>45±7</td>
<td>46±8</td>
<td>44±7</td>
<td>44±7</td>
</tr>
<tr>
<td>iLAD, mm/m²</td>
<td>24±4</td>
<td>25±4</td>
<td>25±5</td>
<td>24±4</td>
<td>23±4</td>
</tr>
<tr>
<td>Moderate to severe MR</td>
<td>106 (18%)</td>
<td>3 (4%)</td>
<td>12 (12%)</td>
<td>29 (15%)</td>
<td>62 (26%)</td>
</tr>
</tbody>
</table>

Table 2. Treatment at Enrollment and at the End of Follow-Up

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=66</td>
<td>n=102</td>
<td>n=197</td>
<td>n=238</td>
<td></td>
</tr>
<tr>
<td>ACEI/ARBs</td>
<td>467</td>
<td>522 (91%)</td>
<td>3 (4%)</td>
<td>37 (56%)</td>
<td>53 (52%)</td>
</tr>
<tr>
<td>β-Blockers</td>
<td>232</td>
<td>344 (57%)</td>
<td>0 (0%)</td>
<td>8 (12%)</td>
<td>1 (1%)</td>
</tr>
<tr>
<td>Digoxin</td>
<td>338</td>
<td>359 (59%)</td>
<td>60 (91%)</td>
<td>61 (92%)</td>
<td>80 (78%)</td>
</tr>
<tr>
<td>Diuretics</td>
<td>483</td>
<td>502 (83%)</td>
<td>61 (92%)</td>
<td>63 (95%)</td>
<td>87 (85%)</td>
</tr>
<tr>
<td>MRA</td>
<td>155</td>
<td>243 (40%)</td>
<td>7 (11%)</td>
<td>24 (36%)</td>
<td>12 (12%)</td>
</tr>
<tr>
<td>Vasodilators</td>
<td>58</td>
<td>96 (16%)</td>
<td>8 (12%)</td>
<td>20 (30%)</td>
<td>5 (5%)</td>
</tr>
<tr>
<td>Warfarin</td>
<td>131</td>
<td>203 (34%)</td>
<td>6 (9%)</td>
<td>27 (41%)</td>
<td>20 (20%)</td>
</tr>
<tr>
<td>Amiodarone</td>
<td>103</td>
<td>155 (26%)</td>
<td>10 (15%)</td>
<td>26 (39%)</td>
<td>20 (20%)</td>
</tr>
<tr>
<td>ICD</td>
<td>79</td>
<td>79 (13%)</td>
<td>5 (8%)</td>
<td>9 (9%)</td>
<td>24 (12%)</td>
</tr>
<tr>
<td>CRT</td>
<td>69</td>
<td>69 (11%)</td>
<td>3 (4%)</td>
<td>7 (7%)</td>
<td>18 (9%)</td>
</tr>
</tbody>
</table>

ACEI indicates angiotensin-converting enzyme inhibitors, ARBs, angiotensin receptor blockers; CRT, cardiac resynchronization therapy; ICD, implantable cardioverter defibrillator; MRA, mineralocorticoid receptor antagonists; and NS, not significant.
Notably, 52% of patients that received an ICD and 59% of those with CRT were enrolled in period 4; the remaining were implanted in patients enrolled in previous periods, who were still actively followed up when the devices became available.

Changes in Functional Status and Reverse Remodeling

On average, patients enrolled in periods 3 and 4 improved their functional status during follow-up, whereas those enrolled earlier showed symptomatic progression (Figure 2). Improvement in systolic LV function compared with baseline was observed in all groups, although most evident in periods 3 and 4. Likewise, a reduction in end-diastolic diameter index occurred to a greater extent in those patients enrolled most recently (Figure 2). This was paralleled by a less common occurrence of worsening mitral regurgitation after 1990 (33% in period 1; 37% in period 2; 28% in period 3; and 11% in period 4; overall $P<0.0001$).

Long-Term Outcome and Predictors of Risk

During an average follow-up of 8.8±6.3 years, 271 patients (45%) reached the combined end point including all-cause mortality and HTx. Of these, 142 patients (23%) died because of refractory HF, 71 (12%) because of SD, 22 (4%) died of noncardiac causes, and 36 patients (6%) underwent HTx. Overall survival was 79% and 63% at 5 and 10 years, respectively. There was marked and progressive improvement in outcome from periods 1 to 4 for all end points (Figure 3).
When adjusted for age, sex, NYHA class, LVEF, and left atrial diameter index, event-free rates for the combined end point (all-cause mortality and HTx) at 5 years were 62%, for patients enrolled in period 1; 74% for period 2; 84% for period 3; and 93% for period 4 (Figure 3A). At multivariate analysis, an earlier enrollment period proved the most powerful predictor of the combined end point, independent of age, NYHA functional class, LVEF, left atrial diameter index, and sex (Table 3). Of note, each enrollment period was associated with a 42% reduction in risk compared with the previous one (hazard ratio, 0.58; 95% confidence interval, 0.50–0.67; \( P < 0.001 \)).

Likewise, an earlier period of enrollment proved a potent independent predictor of refractory HF death and SD. Risk
of refractory HF mortality decreased (53%, 74%, and 90% in periods 2, 3, and 4, respectively) compared with period 1. Conversely, likelihood of SD declined sharply in patients enrolled after 2000, with a 87% risk reduction in period 4 compared with period 1. Notably there was also a trend of risk reduction from 1991 to 2000 (48%; \( P=0.09 \); Figure 3B and 3C).

**Discussion**

The present study demonstrates that the long-term prognosis of patients with IDCM has radically improved during the past 30 years, in terms of overall mortality, refractory HF death, and SD, reflecting continuing progress in pharmacological and device-based management.\(^9\) Among our patients, each of 4 consecutive HF management eras implied a 42% reduction in mortality compared with the previous one, paralleled by greater degrees of reverse LV remodeling.\(^9\) As a consequence, patients enrolled during the past decade, maximally treated with ACEI/ARBs and \( \beta \)-blockers and with unrestricted access to ICD/CRT, showed a 86% relative risk reduction in cardiovascular mortality compared with those enrolled before 1985, who were essentially managed with diuretics and digoxin.\(^9\)

**Causes of Death: Changing Patterns Over Time**

With regard to specific causes of death, the greatest reduction in refractory HF mortality was observed in the transition from periods 1 to 2 after the introduction of ACE inhibition; thereafter, HF death rates declined at a relatively constant rate. Conversely, marked and progressive impact on SD was evident in the transition to periods 3 and 4. Such advantageous trend of SD mortality reflects both the introduction of the ICD/CRT and the complete penetration of \( \beta \)-blocker treatment for HF in real-world practice. Indeed, because of the relatively small number of patients receiving ICD and ICD/CRT in our cohort, the fall in SD rates suggests a crucial prophylactic role of \( \beta \)-blockers. Consistent with this concept, Zecchin et al.\(^22\) have recently demonstrated the efficacy of optimized pharmacological treatment in reducing SD risk of IDCM. In their cohort, accurate titration of ACEI/ARBs and \( \beta \)-blockers led to a substantial improvement in the clinical and instrumental profile of patients with IDCM initially meeting the Sudden Cardiac Death in Heart Failure Trial (SCD-HeFT)\(^3\) criteria for prophylactic ICD implantation, two thirds of whom did not retain such indication at 6 months. Of note, the long-term outcome in this subgroup was comparable with that of patients with IDCM without SCD-HeFT criteria at enrollment.\(^22\) Of note, similar results in patients with new-onset HF and severely depressed LVEF have been recently reported by Teeter et al.\(^24\)

**Impact of Clinical Setting on Pharmacological Therapy Implementation**

HF treatment is constantly evolving and has led to remarkable achievements during the past decades. The use of neurohormonal inhibitors has become established during the past 2 decades, following major randomized clinical trials\(^25\) and their subsequent impact on international HF guidelines.\(^19,33,34\) Compared with the early observations from the 1980s, when HF treatment was virtually confined to diuretics and digoxin, the 1990s have seen an explosion in the use of neurohormonal blockers: an extensive analysis by Stevenson et al showed that 86% of patients with HF were treated with ACEI after 1990 compared with 46% before 1990.\(^35\) Nonetheless, the use of evidence-based pharmacological therapies in the real world has consistently failed to reach the rates reported in landmark randomized clinical trials. The EuroHeart Failure Survey,\(^36\) investigating the clinical profile and treatment of >11,000 patients hospitalized for or with HF in 115 hospitals from 24 European countries between 2000 and 2001, showed that diuretics were still the most widely used agents in HF, prescribed in 87% of patients at the time, followed by ACEI.
Changes in Demographics Among Enrollment Periods

It is important to acknowledge that, in our IDCm cohort, patients enrolled later had a less severe profile in terms of symptoms, LV size and function. This trend presumably reflects increasing awareness of the disease and availability of more sensitive diagnostic tools and may have contributed to the reduction in mortality observed during the years, resulting in an overestimation of benefits related to treatment. However, this trend is counterbalanced by the more advanced age at enrollment of the most recent groups. Although it is virtually impossible to quantify the net result of these trends on outcome, their opposite prognostic weight is likely to limit their combined effect substantially. In our multivariate models, the enrollment period proved to be a very potent predictor of outcome independent of the most relevant baseline clinical and demographic features including well-recognized prognostic factors (ie, age, sex, NYHA functional class, LV and left atrial diameters, LVEF, and degree of functional mitral regurgitation). Therefore, it is plausible to attribute most of the survival benefit observed to improvements in management rather than to the evolving patient demographics.

Conclusions

The evolution of evidence-based treatment has led to progressive improvement in the prognosis of IDCm, with dramatic reduction in heart failure–related mortality and SD during the past 3 decades. In the appropriate setting, the benefits of controlled randomized trials can be replicated in the real world, emphasizing the importance of tailored and systematic follow-up providing long-term continuity of care.

Sources of Funding

This work was supported by the Italian Ministry for University and Research (Programmi di Ricerca di rilevante Interesse Nazionale) and the European Union (Specific Targeted Research Projects, STREP Project 241577 "BIG HEART," 7th European Framework Program).

Disclosures

None.

References


Fonarow GC, Albert NM, Curtis AB, Stough WG, Gheorghiade M, Heywood JT, McBride ML, Inge P, Mehra MR, O’Connor CM, Reynolds
The present study is based on a clinical experience whereby 603 patients with angiographically proven idiopathic dilated cardiomyopathy have been followed by the same team during the past 30 years in a Regional Hospital in Florence, providing substantial continuity of care during an extended time period. Outcome in our cohort was associated with the treatment era in which each patient was enrolled (1977–1984; 1985–1990; 1991–2000; and 2001–2011), reflecting progress in management and changing demographics of patients with idiopathic dilated cardiomyopathy. Of note, each period was associated with a 40% reduction in mortality compared with the previous one, with patients enrolled during the most recent decade showing a 75% relative risk reduction in cardiovascular mortality compared with those enrolled before 1985. With regard to specific causes of death, the greatest reduction in mortality related to refractory heart failure was observed in the transition from periods 1 to 2 after the introduction of angiotensin-converting enzyme inhibition. Conversely, progressive impact on sudden death was evident in the past 2 periods, reflecting the introduction of device-based therapies and full penetration of β-blocker treatment. These results quantify the impact of evolving treatment options for idiopathic dilated cardiomyopathy in the real world, emphasizing the importance of tailored follow-up and long-term continuity of care.
Improving Survival Rates of Patients With Idiopathic Dilated Cardiomyopathy in Tuscany Over 3 Decades: Impact of Evidence-Based Management
Gabriele Castelli, Alessandra Fornaro, Mauro Ciaccheri, Alberto Dolara, Vito Troiani, Benedetta Tomberli, Iacopo Olivotto and Gian Franco Gensini

_Circ Heart Fail._ 2013;6:913-921; originally published online July 25, 2013; doi: 10.1161/CIRCHEARTFAILURE.112.000120
_Circulation: Heart Failure_ is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2013 American Heart Association, Inc. All rights reserved.
Print ISSN: 1941-3289. Online ISSN: 1941-3297

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://circheartfailure.ahajournals.org/content/6/5/913

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in _Circulation: Heart Failure_ can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to _Circulation: Heart Failure_ is online at:
http://circheartfailure.ahajournals.org//subscriptions/