

## Increase in heart failure mortality in Poland: can we explain the reasons?

**To the Editor** In recent decades, we have witnessed an increase in the incidence of heart failure (HF) worldwide, which has been accompanied by a slight decrease in mortality confirmed by several studies.<sup>1,2</sup> Rywik et al.<sup>3</sup> demonstrated a gradual decline in HF mortality in Poland between the years 1980 and 2005 and a significant increase in HF mortality in subsequent 5 years in both sexes, especially in older patients. A similar pattern, although less pronounced, has been observed in other Western European countries.<sup>4,5</sup>

It should be emphasized that Rywik et al.<sup>3</sup> observed an increase in HF deaths in proportion to all cardiovascular deaths, which could be explained by an increase in the crude number of patients with HF in a large population of patients with cardiovascular disease (CVD). The spectrum of CVD is wide and includes diseases with cardiovascular risk factors without overt heart disease as well as those with end-stage HF, which is the final inevitable stage of CVD continuum.<sup>6</sup>

An increase in the population of HF patients is the consequence of a rising incidence of HF in the general population<sup>2</sup> and improving survival owing to a significant progress in the management of HF.<sup>7</sup> According to the data from the DATA-HELP registry, including outpatients with systolic HF in Poland, the rates of administered drugs known to reduce mortality in this population were higher (angiotensin-converting enzyme inhibitor [ACEI] and/or angiotensin II receptor blocker [ARB]: 94%;  $\beta$ -blocker: 96%; and mineralocorticoid receptor antagonist [MRA]: 61%) as compared with the analogous data from the ESC-HF Pilot registry both for the whole cohort of HF patients (ACEI and/or ARB: 89%;  $\beta$ -blocker: 87%; MRA: 44%) and the subgroup with left ventricular ejection fraction of 45% or lower (ACEI and/or ARB: 92%;  $\beta$ -blocker: 93%; MRA: 67%) and also those in the American IMPROVE-HF registry of subjects with HF from outpatient cardiology practices (ACEI: 78%;  $\beta$ -blocker: 86%; MRA: 35%).<sup>8</sup> Although clinical trials have shown the implantation of implantable cardioverter-defibrillator (ICD) to reduce the risk of sudden cardiac death and, as a consequence, to increase the risk of death due to HF progression, it is still unknown to what extent this factor could contribute to an observed

increase in HF mortality in Poland. Unfortunately, the percentage of ICD implantations in patients with HF in Poland is still relatively low and was even lower during the study period. In the ESC-HF Pilot registry, ICD and CRT defibrillators (CRT-D) were implanted in 9% and 4% of the patients with HF, respectively.<sup>6</sup> In the Polish DATA-HELP registry, only 8% and 3% of the patients with systolic HF received ICD and CRT-D, respectively.<sup>8</sup>

It is possible that a radical reform of the health care system in Poland in 1999 along with the establishment of the National Health Fund in 2003 have affected the reported changes in HF mortality. Particularly the introduction of the so called homogeneous groups of patients in 2008 for contracting medical services within the hospital might have affected the reporting of data on patients with HF and related deaths, as the diagnosis of HF and the corresponding ICD-10 coding significantly influenced the costs of treatment reimbursed by the National Health Fund. The proportion of people who died at home vs. those who died in the hospital has changed in Poland in recent decades (according to the Central Statistical Office in Poland, 49% died at home in 1980, and only 37% in 2011), which may have resulted in an increase in heart failure mortality in Poland.

Finally, the available data are far from being optimal and easy to interpret. To understand the changes in the trends in mortality of HF, well-designed prospective population-based studies are required. It would help accurately determine the contributions of different factors to the evolving epidemiology of incidence, prevalence, and survival of patients with HF in contemporary populations.

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**Authors' reply** We have read the comment<sup>1</sup> on our paper<sup>2</sup> with great interest. We are grateful for insightful comments and additional interpretation of our data. We fully agree with the authors that there is probably no simple explanation of the observed tendencies. In fact, no other researchers reporting trends in mortality from heart failure (HF) have attempted to interpret these data although, as admitted in the letter,<sup>1</sup> a careful observer can find similarities with our findings.<sup>3-5</sup>

The trends described in our study<sup>2</sup> are not easy to explain in the context of the improvement in HF care. It was not our intention to question the improvement in HF prognosis, being fully aware of the great progress in HF care in recent decades. It can be easily noticed that the quality of pharmacology has substantially improved since the 1990s, as noted in the letter.<sup>1</sup> Similar data on the quality of care in the Polish population were reported previously, showing a similarly high level of pharmacotherapy.<sup>6</sup> In fact, as pointed by the European registry, also the diagnostic approach in HF has improved, showing higher rates of compliance with the recommended strategy. We have the opportunity to compare these results with the previous findings from the IMPROVEMENT study.<sup>7</sup> Thus, we can assume that not only the treatment but also the general understanding of HF has greatly improved. Moreover, an accurate diagnosis of HF with preserved ejection fraction has recently received much more attention. Therefore, our findings might be explained by the higher awareness of HF among

physicians along with population aging because elderly people are at higher risk of HF with preserved left ventricular ejection fraction. This is further confirmed by our data showing upward trends, particularly for the eldest group.

Another issue, already discussed in the original paper,<sup>1</sup> is the lack of uniform criteria for cause-of-death coding in the context of much better awareness of HF morbidity. This problem has already been addressed by Wojtyniak et al.,<sup>8</sup> who showed the discrepancies between the Polish provinces.

We agree with the comment that the National Health Fund regulation is likely to influence the ICD coding. However, we do not fully agree that this accounts for the observed tendencies. Unfortunately, we cannot present any data to confirm this hypothesis, but a comparison of the places of death between the years 1980 and 2011 does not seem relevant, as the changes have started after 2005. We believe that despite the stabilization of the incidence rates, the recent data show that the prevalence rates are much higher than before.<sup>9,10</sup> It is in agreement with the generally observed advances in HF treatment. Owing to better HF care in the recent years, we are confronted with older and sicker HF population, which would have died in the past having it not been for the improved specialist care.

On the other hand, it must be also considered that a precise definition of HF have been formulated after 2000, additionally complicating the interpretation of the results during such a long follow-up. It is unfeasible to expect a homogenous interpretation of the observed tendencies. Only a comprehensive approach may address the epidemiological issues regarding the incidence and prevalence of HF as well as associated prognostic factors and mortality.

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