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EDITORIAL

Heart failure and chronic obstructive pulmonary disease: Two for tea or tea for two?

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Abstract

A combination of chronic obstructive pulmonary disease (COPD) and heart failure (HF) is common yet it is inadequately and rarely recognized. Because of the similar clinical manifestations, comorbidity is frequently not considered and appropriate diagnostic tests are not performed. It is very important that a combination of COPD and HF is recognized as these patients have a worse prognosis than patients with an individual disease. When present, COPD should not prevent the use of life-saving therapy in patients with HF, particularly β-blockers. Despite clear evidence of the safety and tolerability of cardioselective β-blockers in COPD patients, these drugs remain grossly underprescribed and underdosed. Routine spirometry and echocardiography in HF and COPD patients, respectively, is therefore warranted to improve current clinical practice.

Key words: Heart failure; Chronic obstructive pulmonary disease; Spirometry; β blocker; Inflammation

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EPIDEMIOLOGY

Epidemiological studies and registries have demonstrated that heart failure (HF) and chronic obstructive pulmonary disease (COPD) are highly prevalent across the globe and contribute markedly to the global burden of disease. It is also known that in clinical practice they frequently coexist but the comorbidity is not readily recognized nor adequately treated[1-3]. Some of the estimates of the prevalence may not be accurate as they are based on hospital claims data, discharge diagnosis or medical prescription data. However, the coexistence of these two diseases should not be a surprise, as both diseases share smoking as the most common risk factor[4]. Smoking is almost a prerequisite for the development of COPD, and is the second most important and independent risk factor for chronic HF (CHF). Cigarette smoking was associated with a 45% higher risk of CHF in men and an 88% higher risk of CHF in women after adjustment for other known risk factors for CHF, including coronary heart disease[5].

SYMPTOMATOLOGY

Both COPD and HF have been intensively studied, but mostly on an individual basis. Consequently, clinicians should have sufficient knowledge to diagnose the condition and to deliver treatment as appropriate. Cardiologists and pneumologists, however, seem to focus primarily on a single organ and much too often fail to recognize the presence of COPD in patients with HF (cardiologists) and *vice versa* (pneumologists). Such ignorance extends even to large multinational or multicentric interventional trials where pulmonary function testing is exceptional in cardiology trials. Similarly, pneumologists seem to be satisfied with clinical parameters such as heart rate and blood pressure and did not consider simple diagnostic procedures, including echocardiography, in most of the conducted trials[6-9].

Based on the current literature, it is appropriate to ask whether attending physicians or patients with HF and/or COPD come from two completely different worlds. It was frequently argued, that because of the similarities in clinical presentation it is difficult to differentiate between HF and COPD or diagnose co-existence. But are symptoms of HF and COPD indeed so similar? Is it really so difficult to perform a simple spirometry in patients with HF? Is it really so difficult to find physical signs of HF in patients with COPD? This can be disputed, but in a stable clinical condition, such a differentiation may not be too difficult. In dubious cases, differentiating HF from COPD is aided by measurement of natriuretic peptides (NP) as the presence of pulmonary hypertension and right ventricular dysfunction only rarely significantly increase NP levels and only a few patients with moderate COPD have a brain NP (BNP) > 100 pg/mL or N-terminal-proBNP levels > 350 pg/mL[10].

Yet, in clinical practice, too many patients with HF had undiagnosed COPD and *vice versa*. Why such a paradox exists has not been investigated in detail. It seems unlikely that we are unaware of chronic lung and heart disease co-morbidity. An overwhelming body of evidence is available and it is known that prognosis of patients with chronic cardiopulmonary conditions is poor[11-14]. This holds true even if the physicians are not quite sure what the abbreviation COPD stands for[15].

PATHOGENESIS

If so frequently associated, do HF and COPD share the same pathogenetic features? Chronic inflammation is certainly present in both conditions. It was hypothesized, that as a consequence of mutual mechanisms of systemic cellular and humoral inflammation, HF and COPD occur more commonly in the presence of each other[16-18]. Such a "common inflammatory pathway" is by no means a splendid target for research or treatment. Although many studies demonstrated enhanced inflammatory activity, we still cannot provide convincing evidence for "bench to bedside" translation[9,19], even with a very sophisticated and targeted approach[20]. Other common mechanisms are the renin-angiotensin-aldosterone system and the sympathetic nervous system. In HF, there is no doubt about the efficacy of neurohormonal blockers[21], whilst adequately designed trials in COPD are lacking[22]. An interesting historical aspect is also a "prejudice" to β-blocker use in HF patients with coexistent COPD. It must be stressed, that nowadays differentiating asthma from COPD should not be a problem and that eligible COPD patients should not be withheld from life-saving therapy with β-blockers. On the other hand, however, is the warning that the safety of β-2 agonists in COPD is controversial[23]. As stressed before, a simple office spirometer may perform the diagnosis in a majority of patients and only a few need to be referred to a pneumologist. The results from epidemiological studies, however, are promising[24,25] and are likely to lead to adequately powered randomized trials. Much more important are clinical data from many studies of HF/COPD co-morbid patients.

DIAGNOSIS

A significant proportion of HF patients have not been undiagnosed or falsely diagnosed as having COPD, because pulmonary function tests were never performed or, if performed, they were falsely interpreted[13]. As an obstructive or even restrictive pattern of pulmonary function impairment provides significant prognostic information for all-cause mortality in patients admitted with HF it should be concluded that pulmonary function testing should be considered as a part of routine work-up, along with electrocardiography (ECG), laboratory markers, chest X-ray investigation or echocardiography. A spirometer, as with a simple blood pressure monitor or ECG, should be present in every internal medicine ward and in every GP office, where most HF patients are managed. Nonetheless, it has to be underlined that relevant measurements have to be performed in clinically stable and acutely decompensated patients. The latter may be the reason for insufficient implementation in clinical practice.

CONCLUSION

Currently, we can conclude that a combination of COPD and HF is highly prevalent, but apparently frequently unrecognized. This is partly due to similar clinical manifestations but mainly due to lack appropriate diagnostic tests to diagnose HF and/or COPD. Comorbidity of COPD and HF is clinically of utmost importance as these patients have much worse prognosis in comparison with patients with one of the diseases. Furthermore, even patients with known comorbidity are very frequently not treated properly[1,3,13]. Despite convincing evidence of cardioselective β-blocker safety and tolerability in COPD patients, β-blockers are grossly underprescribed to HF patients with concomitant COPD[12,13,15]. To overcome current dilemmas, future research is warranted.

CURRENT STUDIES

The CIBIS-ELD[26] multicenter, randomized, double-blind, double-dummy trial investigated the tolerability

of 2 pharmacologically distinct β-blockers, β-1 selective bisoprolol and nonselective carvedilol, in elderly patients with HF. Patients were included if they were β-blocker-naïve or under-dosed (≤ 1/4 of target daily dose). After randomization in a 1:1 manner β-blockers were uptitrated over 14-d interval according to patient condition. The primary end-point was tolerability after 4 wk of the achieved dose maintenance phase. Importantly, this is the first randomized, large scale β-blocker trial to have pulmonary function data. Spirometry was performed at baseline and after β-blocker titration. We expect to provide conclusive data on the prevalence of COPD and whether pharmacologically different β-blockers have any pulmonary effects in HF patients with or without COPD. Results of CIBIS-ELD, along with previously mentioned epidemiological studies are likely to set the stage for trials with angiotensin converting enzyme inhibitors and β-blockers in patients with COPD.

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