



Thyroid Dysfunction in the Elderly with Heart Failure

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Dear Editor-in-Chief

Today there is a vast number of controversies regarding the relevance and influence of thyroid function on heart failure (HF) and in particular regarding the relevance of hypothyroidism for heart failure for the elderly (1). The prevalence of heart failure and hypothyroidism are growing in the elderly population, geriatrics and geriatricians would have something new to add to the debate (2). Aging as a risk factor for heart failure and hypothyroidism are not sufficient to explain the occurrence of the pathophysiology of these disorders (3). The aim of this study was to investigate the New York Heart Association (NYHA) classification, thyroid status (measuring free triiodothyronine (fT3), free thyroxine (fT4), Thyroid-stimulating hormone (TSH)) and possible changes regarding medication treatment (furosemide, angiotensin-converting-enzyme (ACE) inhibitors, beta blockers (BB), spironolactone and digoxin) in hospitalized elderly (≥ 65 yr) patients with HF.

This matched case-control study was conducted from 2010 to 2015 at Clinical Hospital Center "Zvezdara", in Belgrade, Serbia and was ethically approved and informed consent was taken from participants.

Demographic and anthropometric variables such as age, including NYHA class, were taken. Blood samples were assayed for serum fT3, fT4 and

thyroid stimulating hormone (TSH). In addition, we evaluated the heart failure medication therapy and the parameters of medication therapy were addressed to six groups of drugs: diuretics (spironolactone, furosemide), ACE inhibitors, beta-blockers, cardiotoxic glycosides (digoxin) and coumarin preparations (4). The significance of difference was evaluated using chi-square test, (one-way) ANOVA or Kruskal-Wallis test depending on the type of parameter analyzed. In case of registered statistical significance, the correlation was done additionally.

Among 326 hospitalized elderly patients with HF (average aged 77.2 ± 5.9 yr), we investigated three groups of patients: with hypothyroidism (48.5%), euthyroid state (35.9%) or hyperthyroidism (5.6%). Decompensated form of HF (NYHA III or IV) was significantly more frequently registered in euthyroid group of hospitalized elderly patients than in hypothyroid or hyperthyroid patients (82.9% vs. 60.7% vs. 52.9%, $P < 0.001$). According to TSH values, decompensated HF was the most common among the hospitalized elderly patients with hypothyroidism, comparing to patients with euthyroid state or with hyperthyroidism (71.3% vs. 67.6% vs. 57.1%, $p = 0.322$) (5, 6). We found significant differences among investigated groups depending on their thyroid status on furosemide ($P = 0.002$) and BB ($P = 0.025$)

treatment (Fig. 1). Elderly HF patients with hypothyroidism, comparing to those with euthyroid status had significantly; lower intravenously dosage of furosemide ($P=0.014$), a fewer number of days for intravenously applied furosemide ($P=0.011$), higher total doses of ACE inhibitors ($P=0.031$) and BB ($P=0.001$) (Fig. 2).

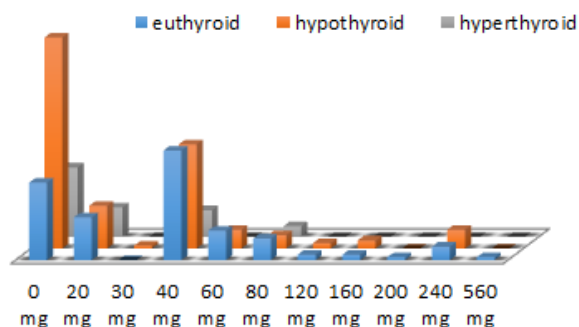


Fig. 1: Frequencies of doses of intravenously applied furosemid in hospitalized elderly patients depending on thyroid state

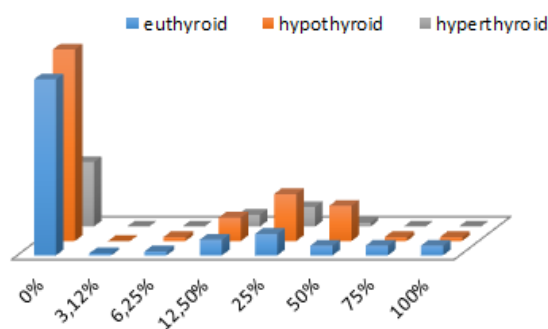


Fig. 2: Total dose of beta-blockers in hospitalized elderly patients depending on thyroid status

The level of TSH is a parameter closely linked to cardiovascular diseases and, more sensitive indicator of cardiovascular risk than the fT4. Besides,

a significant difference among HF medicament treatment in hospitalized elderly subjects according to their thyroid status. We can emphasize the need for a specific geriatric assessment together with a systematic screening for thyroid dysfunction in all patients with 65 yr.

Acknowledgments

The authors declare that there is no conflict of interests.

References

1. Vlachopoulos C, Terentes-Printzios D (2015). Thyroid, aldosterone and cardiovascular disease. *Heart Metab*, 66:3-6.
2. Jensen J, Hedin L, Widell C, Agnholm P, Andersson B, Fu M (2008). Characteristics of heart failure – a hospital cohort registry-based study. *Int J Cardiol*, 125(2):191-6.
3. Rodondi N, Bauer DC, Cappola AR, Cornuz J, Robbins J, Fried LP, Ladenson PW, Vittinghoff E, Gottdiener JS, Newman AB (2008). Subclinical thyroid dysfunction, cardiac function, and the risk of heart failure. The Cardiovascular Health Study. *J Am Coll Cardiol*, 52 (14):1152-9.
4. Dobre D, Haaijer-Ruskamp FM, Voors AA, van Veldhuisen DJ (2007). Beta-adrenoceptor antagonists in elderly patients with heart failure. A critical review of their efficacy and tolerability. *Drugs Aging*, 24(12):1031-44.
5. Gerdes AM (2015). Restoration of thyroid hormone balance: a game changer in the treatment of heart failure? *Am J Physiol Heart Circ Physiol*, 308(1):H1-10.
6. Van Tienhoven-Wind LJ, Dullaart RP (2015). Low-normal thyroid function and the pathogenesis of common cardiometabolic disorders. *Eur J Clin Invest*, 45(5):494–503.