

## CHANGES IN VEGETATIVE HEART TONUS AFTER ENDOTRACHEAL INTUBATION DURING INDUCTION OF GENERAL ANESTHESIA WITH PROPOFOL AND FENTANYL

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**Introduction.** Induction of general anesthesia, especially the stage of endotracheal intubation is frequently associated with changes in heart rhythm and cardiac arrhythmias triggered by changes in vegetative tonus of the heart.

**Keywords.** Endotracheal intubation, vegetative heart tonus

**Purpose.** Detection of changes in vegetative tonus of the heart by spectral analysis of heart rate variability after endotracheal intubation during induction of general anesthesia with propofol, fentanyl and myorelaxation with atracurium.

**Material and methods** The study was approved by the Ethic Committee SUMF “N.Testemițanu”. Changes in vegetative tonus of the heart were appreciated by changes in heart rate variability with ECG Holter. There were calculated LFun (marker of sympathetic heart tonus and baroreceptor activity), HFun (marker of parasympathetic heart tonus) and the LFun/HFun ratio (sympathetic-parasympathetic cardiac balance). Statistical analysis was performed with the program Prism, version 8,0. Results are presented as mean with 95% confidence interval.

**Results** The study group comprises 47 patients with age 37,5±11,9 years. BMI 24,6±3,4 kg/m2. Preinduction period is marked as T1 (baseline). Induction of general anesthesia was performed with propofol 2,5 mg/kg combined with fentanyl 0,2-0,3 mkg/kg (T2). Endotracheal intubation was performed after administration of atracurium 0,5 mg/kg (T3).

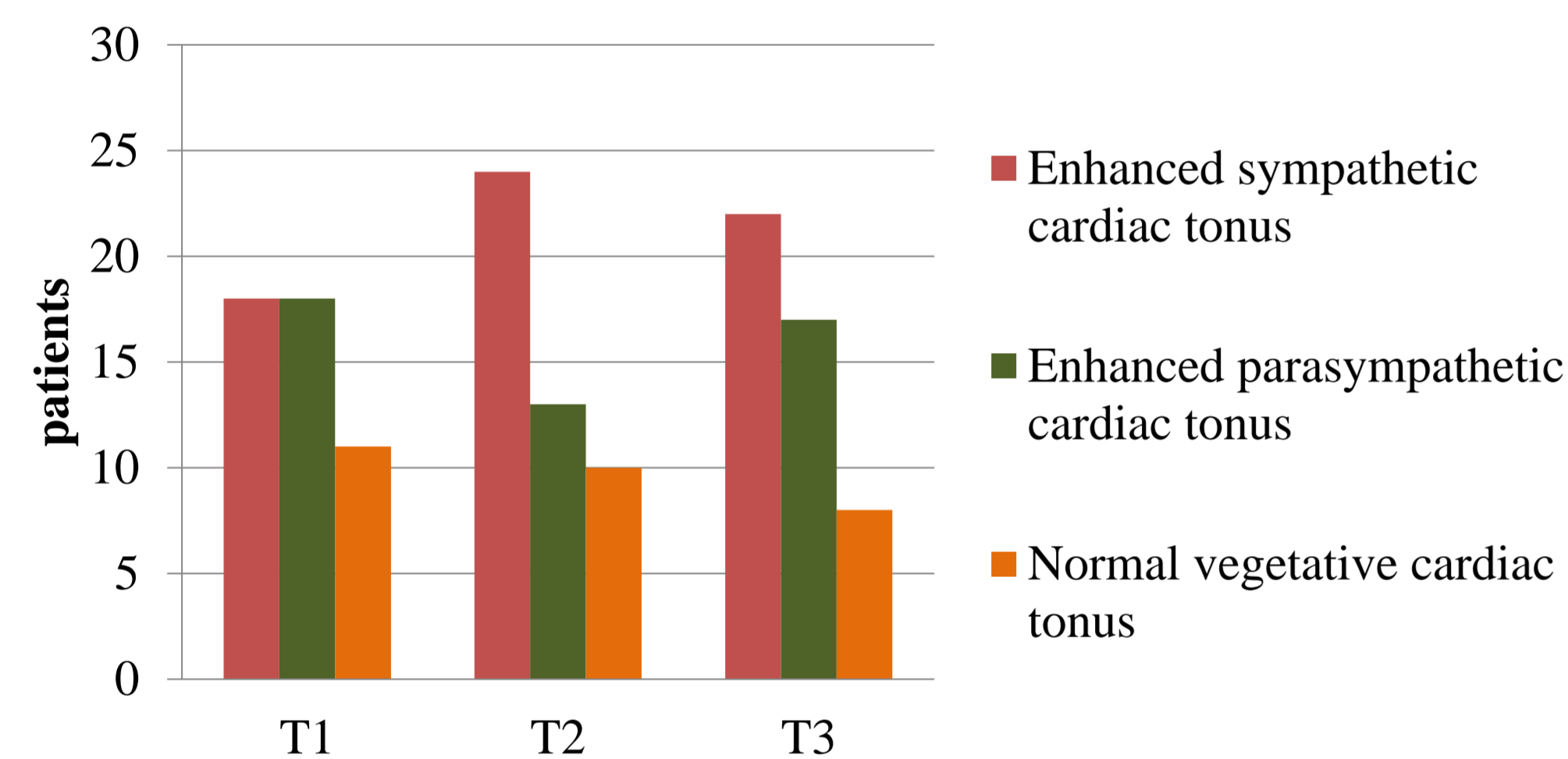


Fig. 1. Structure of the study group in function of vegetative heart tonus in baseline (T1), after induction of general anesthesia (T2) and after endotracheal intubation (T3).

In baseline 38,3% of patients were with enhanced sympathetic cardiac tonus and 38,3% were with enhanced parasympathetic cardiac tonus. After administration of propofol and fentanyl number of patients with enhanced sympathetic cardiac tonus enhanced to 51,1%, meantime the proportion of patients with cardiac vagotonia diminished to 27,7%. After endotracheal intubation proportion of patients with cardiac simpaticotonia reached 46,8% and proportion of patients with cardiac vagotonia was 36,2%.

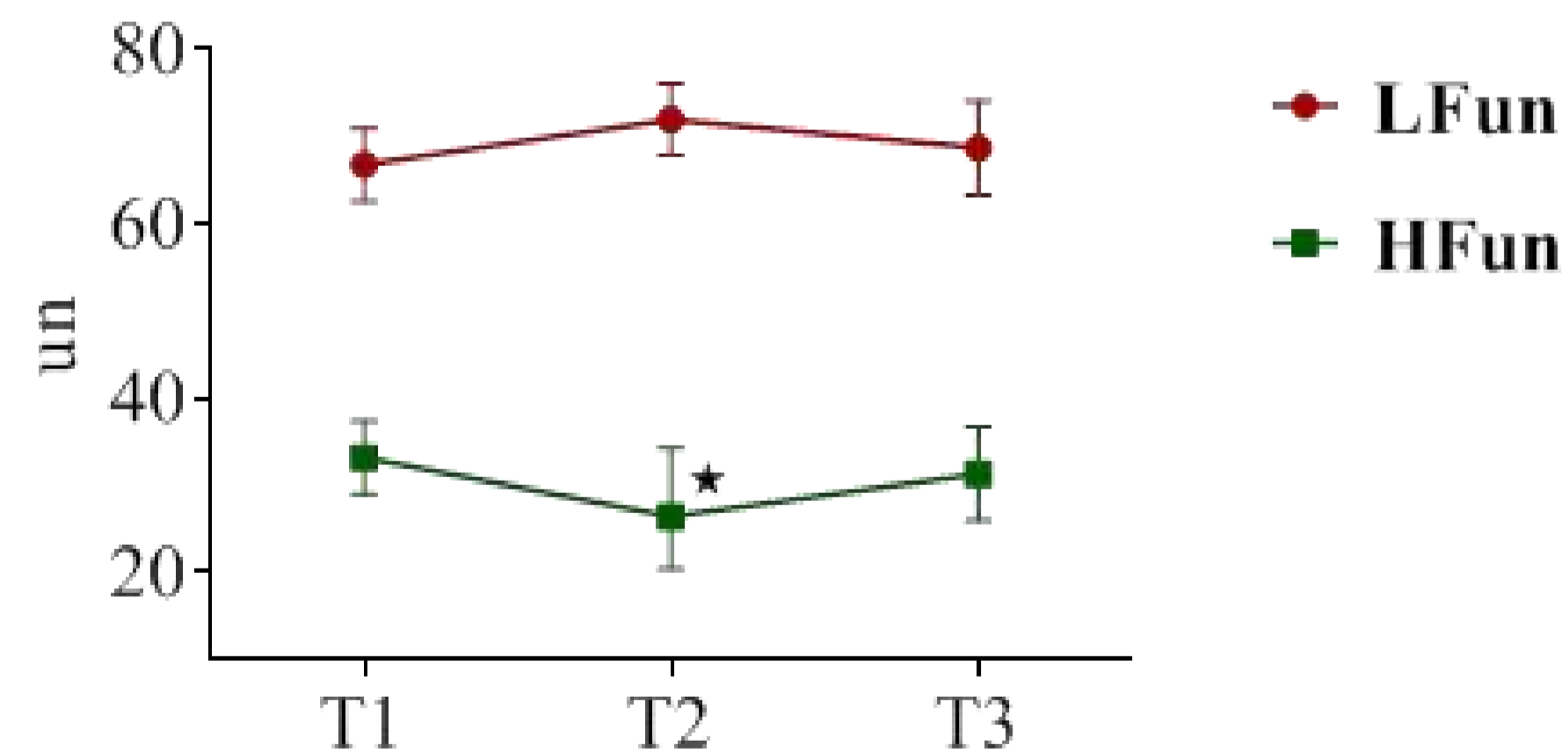


Fig. 2. Changes in power spectrum of LFun and HFun during induction of general anesthesia (T2) and endotracheal intubation (T3) (\*p<0,05). Values are presented as mean±95%CI.

After administration of propofol and fentanyl HFun reduced by 19,8% (32,9 (95%CI 28,9-36,8) vs 26,4 (95%CI 20,4-34,3)(p=0,009). This proved vagolytic effect of anesthetic agents. Power spectrum of LFun didn't change significantly, being remarked only a slight enhancement by 6,8% (67,1 (95%CI 63,1-71,1) vs 72,0 (95%CI 67,9-76,1)(p=0,05). LFun/HFun ratio enhanced by 30,8% (2,7 (95%CI 2,1-3,4) vs 3,9 (95%CI 2,9-4,8)(p=0,002), such proving the presence of cardiac simpaticotonia.

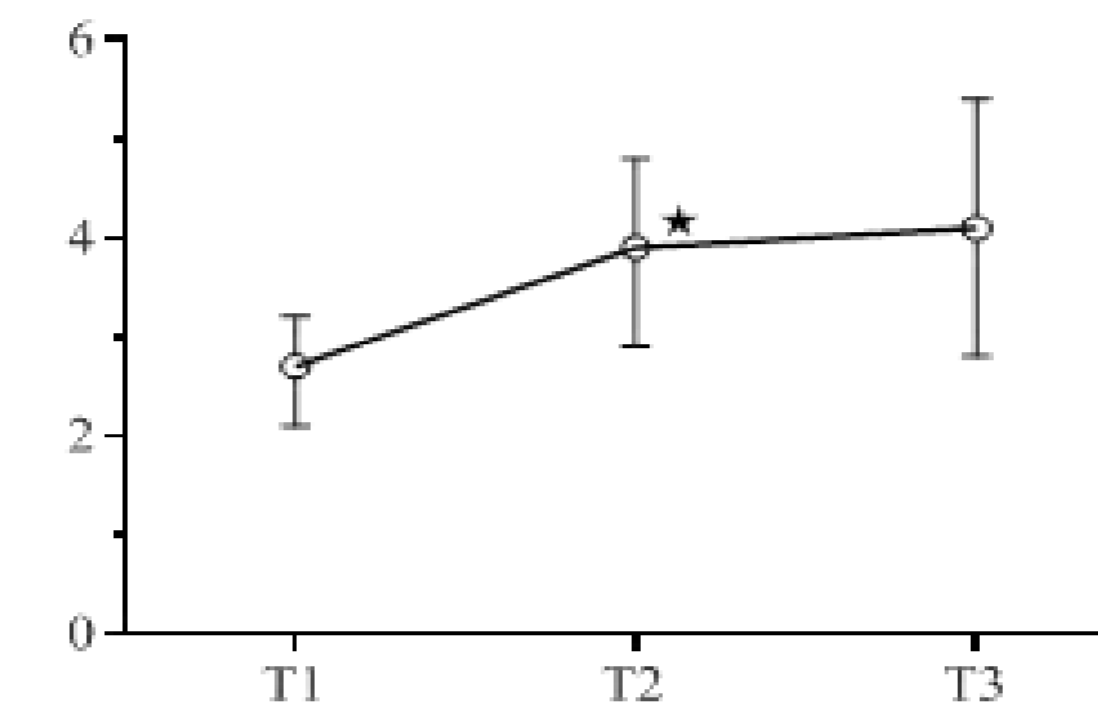


Fig. 3. Changes of LFun/HFun ratio during induction of general anesthesia (T2) and endotracheal intubation (T3) (\*p<0,05). Values are presented as mean ±95%CI

After endotracheal intubation there were attested insignificant changes in the power spectrum of LFun, HFun and the LFun/HFun ratio. In this stage LFun/HFun ratio was 4,1 (95%Î 2,8-5,4) proving the presence of sympathetic cardiac tonus.

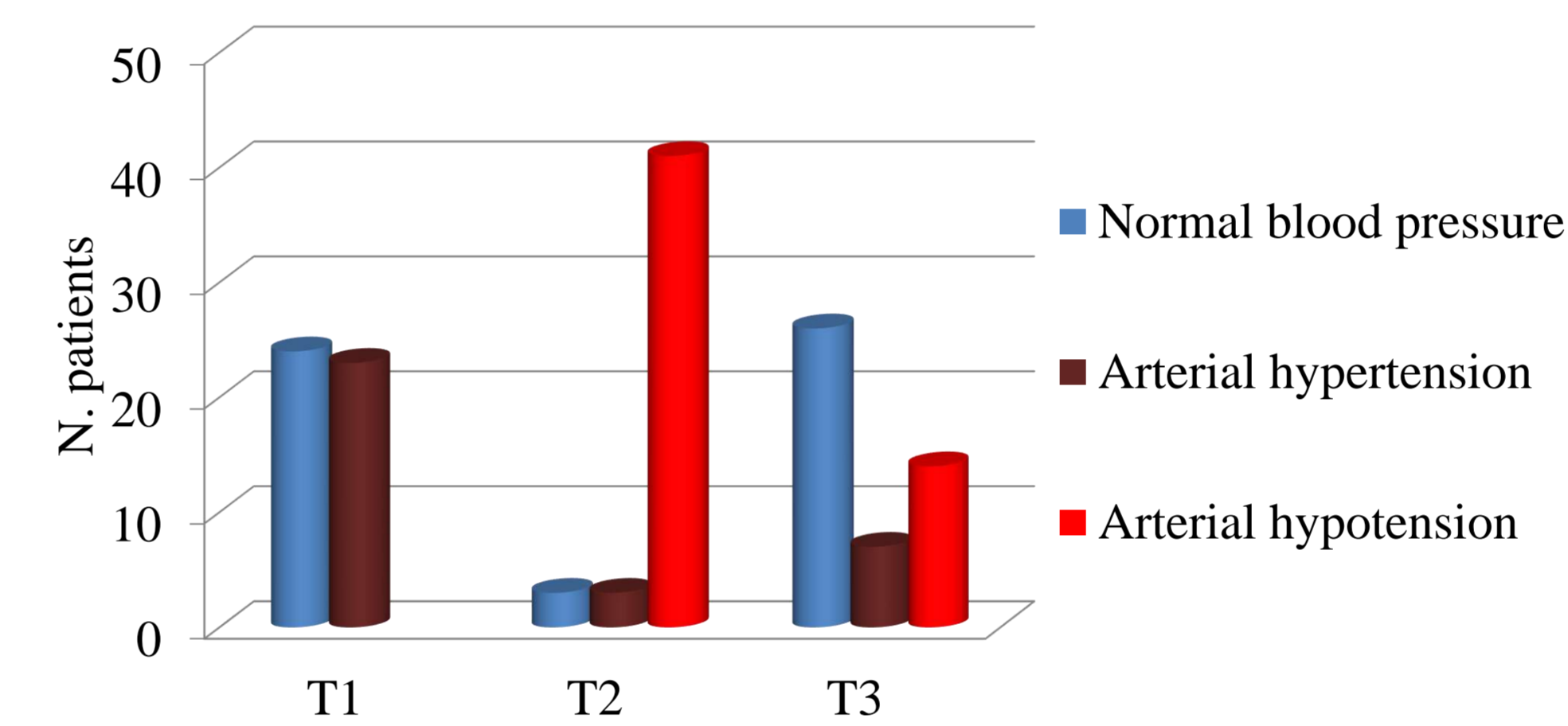


Fig.4. Structure of the study group in function of blood pressure in baseline (T1), after induction of general anesthesia (T2) and after endotracheal intubation (T3).

After administration of propofol and fentanyl for induction the most patients in the study group developed arterial hypotension (87,2%) and sinus bradycardia (51,1%). Arterial hypertension was registered in just 3 patients (6,4%) and sinus tachycardia was attested in 3 patients (6,4%). One important remark was the fact that in this stage in no one patient ECG Holter registered ectopic cardiac arrhythmias.

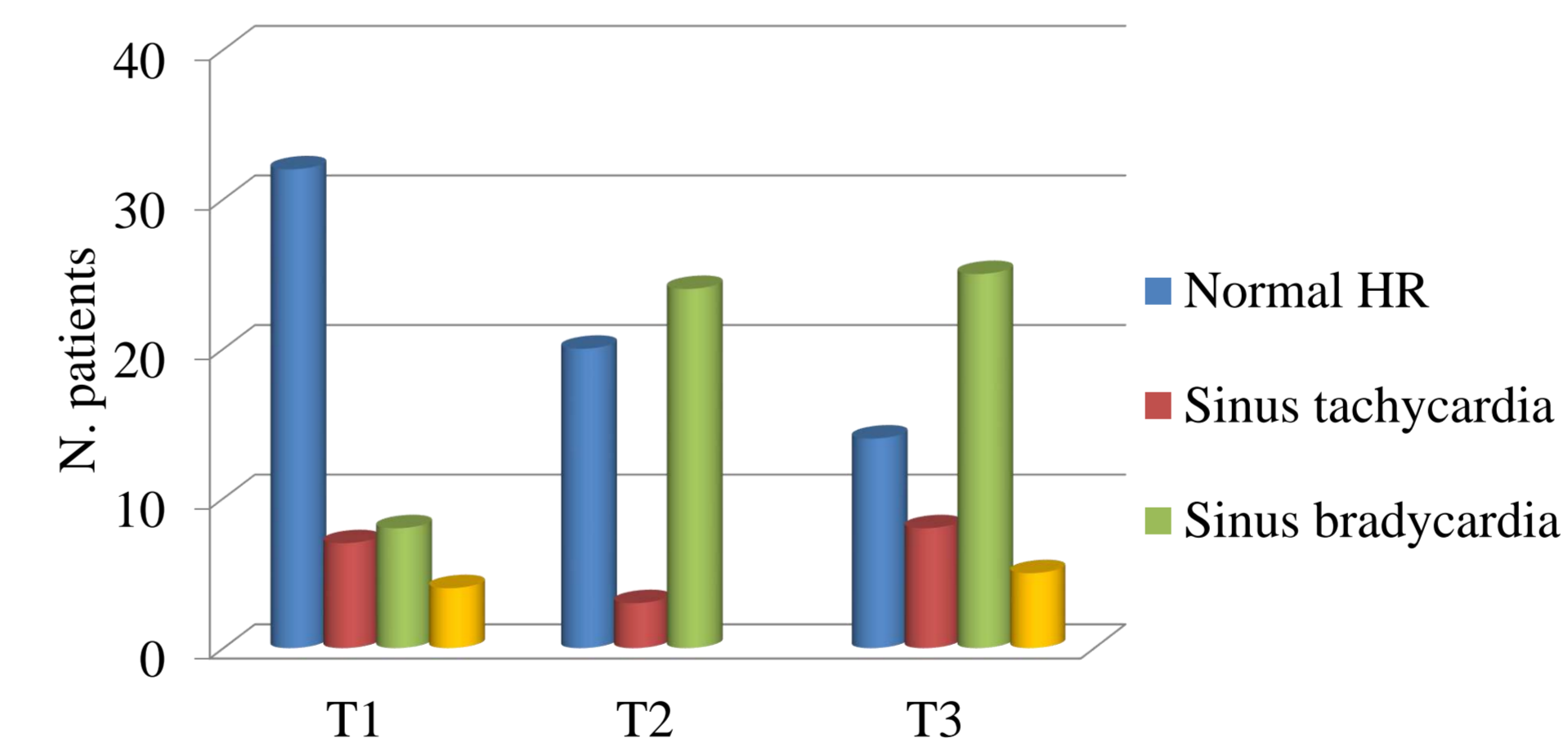


Fig.5. Structure of the study group in function of HR and presence od ectopic cardiac arrhythmias in baseline (T1), after induction of general anesthesia (T2) and after endotracheal intubation (T3).

After endotracheal intubation the most of patients in the group presented normal blood pressure (55,3%) and sinus bradycardia (53,2%). In 14 patients (29,8%) was found arterial hypotension and in 7 patients (14,9%) – arterial hypertension. Sinus tachycardia was registered by ECG Holter in 8 patients (17,0%) and ectopic heart arrhythmias was found in 5 patients (10,6%).

**Conclusions.** Induction of general anesthesia with propofol and fentanyl followed by administration of miorelaxant and endotracheal intubation is associated with enhancement of sympathetic cardiac vegetative tonus. This can be interpreted as a compensatory reaction to drop in systolic blood pressure.