

**UNIVERSITY OF MEDICINE AND PHARMACY  
OF CRAIOVA  
DOCTORAL SCHOOL**

**SUMMARY**

**PhD THESIS**

**THERAPEUTIC, PHARMACOLOGIC  
AND NONPHARMACOLOGIC  
STRATEGIES IN ATRIAL  
FIBRILLATION**

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## **ABBREVIATIONS**

AF-atrial fibrillation

MI –myocardial infarction

AMI – acute myocardial infarction

HTA –arterial hypertension

A/Na/D/M/DM – adrenaline/noradrenaline/ dopamine/milrinone/dobutamine

PCI-percutaneous coronary intervention

ICC-congestive cardiac failure

CHF-cardiac heart failure

BCC-chronic coronary artery disease

Cg – coronarography

AFPO –postoperative atrial fibrillation

ACC/AHA/ ESC - American College of Cardiology/American Heart Association/  
European Society of Cardiology

ACEI – angiotensin converting enzyme inhibitors

NYHA – New York Heart Association

## **INTRODUCTION**

Despite major progress in preventing and treating cardiovascular diseases, they remain the main cause of death in the entire world. Cardiac arrhythmias can be found in a proportion of approximately 5.3% and contribute in a consistent way to morbidity and mortality. Atrial fibrillation remains a major clinical issue causing a large variety of serious and debilitating symptoms which frequently lead to hospital admission, being able to anticipate a heart failure, ischemia or thromboembolic disorders.

Besides medicine treatments at the present moment there were developed nonpharmacological methods causing the passage of the AF to sinus rhythm, with an improvement of life quality. In the PhD thesis we assessed the efficiency of two methods of therapeutic intervention in AF: AF conversion to sinus rhythm by electrical and chemical, medicine conversion of AF occurred during a surgical heart intervention. We also believed as opportune the research on the AF – acute myocardial infarction interrelation, issue still widely debated upon in specialty literature.

In the last 2 – 3 years there are more and more studies analysing the causality of postoperative AF with the heart, searching for factors of predictability. Nevertheless the complexity of each case with AFPO makes the issue impossible to be solved even today. When we started our research specialty literature did not approach this issue with such intensity but in the last 2 years the number of studies regarding the AF increased considerably. Starting from this acknowledgement from specialty literature in the entire world I believe that the research from the PhD thesis is of great contemporaneousness and important for cardiac surgical practice. In the analysis part of the research our outcomes are compared to the ones obtained in clinical studies presented in specialty magazines worldwide from 2013 and especially 2014.

Thanks to the staff from the cardiac surgery clinic within the Cardiovascular Disease Emergency Clinic Academician “Vasile Cîndea” of Bucharest which allowed me to document myself in a practical way over the cases with AF.

### **I. OVERVIEW OVER THE STAGE OF KNOWLEDGE IN THE FIELD OF PHYSIOPATHOLOGICAL MECHANISMS OF ARRHYTHMOGENESIS AND OF ANTIARRHYTHMIC THERAPY**

In the general part we approached in the chapter “Cardiac arrhythmias” current data concerning the classification of cardiac arrhythmias according to: the production mechanism, arrhythmia origin sites, localisation of arrhythmia on the heart level, according to frequency and rhythm. Then there are presented the ACC/AHA/ ESC – 2003, 2006 classifications of supraventricular and ventricular arrhythmias and the development of artificial neuronal networks for the automatic classification of arrhythmias and diagnostic.

Haemodynamic disorders are described in arrhythmias and prognostic

significance, risk factors of fatal cardiac arrhythmias. In the chapter referring to physiopathological mechanisms in arrhythmogenesis there are exposed the mechanisms within disorders in impulse generation (cardiac automatism) and in impulse conduction.

In the chapter concerning atrial fibrillation there are presented the epidemiology, physiopathology with proteomic and genetic studies in arrhythmogenesis, structural and electrical myocardial remodelling in AF, genetic factors and atrial fibrosis in AF, atrial fibrillation and gap junctions.

In the chapter "Nonpharmacologic methods used in AF therapy" there are included: cardiostimulation by pacemaker implantation, electrical cardioversion, transcatheter ablation using radiofrequency flow, surgery in AF treatment, nonpharmacologic methods for stroke prevention.

In the chapter "Antiarrhythmic" there are included various classifications, classification according to electrophysiological effects, updated, of Vaughan – Williams, the "Sicilian Gambit" classification, according to the action mechanisms, according to the influence upon AV conduction, according to therapeutic indication. In two distinct chapters there are presented actualities in AF therapy and gap junctions as new therapeutic targets.

## **II. PERSONAL RESEARCH**

### **II.1. RESEARCH ON THE INTERRELATION ATRIAL FIBRILLATION – ACUTE MYOCARDIAL INFARCTION AND THE EFFICIENCY OF PHARMACOLOGIC AND NONPHARMACOLOGIC TREATMENT IN ACUTE MYOCARDIAL INFARCTION**

#### **II.1.1.Motivation of study**

In the management of AF associated to acute myocardial infarction (AMI) there are certain dilemmas regarding the balance between stroke prevention and recurrent coronary events or stent thrombosis and bleeding.

#### **II.1.2.Study protocol**

The clinical study is a descriptive, observational, retrospective study. The study was performed on a group of 40 patients admitted by means of the National Myocardial Infarct Program (NMIP) within the Cardiovascular Disease Emergency Clinic Academician "Vasile Căndeș" of Bucharest over the period 2012-2013. The study had the approval of the Ethical Department of University of Medicine and Pharmacy of Craiova.

#### **Criteria for study inclusion:**

Patients with AMI and AF in their history, AF upon admission or AF during the hospital admission period.

#### **Criteria for study exclusion**

Patients with AMI which did not show AF over the admission period,  
Patients with AF without AMI.

Clinical, paraclinical, as well as therapeutic data were statistically and graphically processed.

### II.1.3.Outcomes

The study group included 40 patients with AMI and AF hospitalised among which 5 died (12.50%).

Of the 40 patients with IMA upon admission, 17 (42.5%) patients had AF in their medical history (3 – 7.5% dead). Upon admission 16 patients (40.00%) showed AF of which 11 had AF in their medical history (27,5%) and 5 showed AF *de novo* after the infarction (12.5%). During the admission all the 40 patients showed AF (paroxysmal, persistent, permanent AF). Among them 23 (57.5%) had AF *de novo* post MI of which 18 patients had AF *de novo* after MI and percutaneous coronary intervention (PCI) (45.00%) with 2 deaths.

Upon discharge from the hospital of the 35 discharged patients with ameliorations 2 patients had a AF spontaneously terminated (5.71%), 3 patients after electrical cardioversion of which for 2 the chemical conversion was also applied (8.05%), 14 patients after chemical cardioversion with amiodarone (40.00%) and 16 were discharged with permanent AF (45.71 %). Five patients died, 2 with unconverted AF. Of the 35 patients 6 continued after discharge the treatment with amiodarone (17.14 %), 5 the treatment with amiodarone and beta-blocker (14.28%) and 16 the treatment with beta-blocker – metoprolol (45.71%).

In table no.1 there are presented the clinical and paraclinical characteristics of the study group and the outcomes of the statistical processing.

**Table no.1. Clinical and paraclinical characteristics of the patients in the group with acute myocardial infarction**

Variables	Total (40) 100%	AMI+AF ameliorated (35) 83.50%	AMI+AF dead (5) 12.50%	Odds ratio / Dif.	P rate
Average age (years)	68.97±12.70	68.06±12.92	75.4±9.84	-7.34	0.234
Men	20 (50.00%)	19 (47.50%)	1(2.50%)	0.25	0.1515
Women	20 (50.00%)	16 (40.00%)	4(10.00%)		
Urban	25 (62.50%)	22 (55.00%)	3 (7.50%)	0.90	0.9018
Rural	15 (37.50%)	13 (32.50%)	2 (5.00%)		
Smoker /Former smoker	8/6 (20.0%/15,00 %)	8/5 (20.0%/12.75% )	0/1 (0.0%/2.5%)	-	0.0794
Nonsmoker	26 (65.00%)	21 (52.50%)	5 (12.50%)		
Nutrition state – normal weight	13 (32.50%)	10 (25.00%)	3 (7.50%)	0,62	0.4086
overweight	20 (50.00%)	18 (45.00%)	2 (5.00%)		
obese	7 (17.50%)	7 (17.50%)	-		
Average days of admission	9.67	9.56	10.4	0.84	0.3852
State upon admission Serious	15 (37.50%)	12 (30.00%)	3 (7.50%)	5.76	0.0691

Mediocre	3 (7.50%)	2 (5.00%)	1 (2.50%)		
Average	13 (32.50%)	12 (30.00%)	1 (2.50%)		
Good/relatively good	9 (22.50%)	9 (22.50%)	-		
Hypertension	35 (87.50%)	30(85.71%)	5 (14.29%)	1.16 /	0.3663 /
Controlled/not controlled	20/15 (57.14%/ 42.86%)	16/14 (53.33%/ 46.67%)	4/1 (80.0% /20.0%)	1.5	0.2646
Diabetes mellitus	10 (25.00%)	7 (17.50%)	3 (7.50%)	3.95	0.0819
Hypercholesterolemia/hypertriglyceridemia/mixed	22 (55.00%)/0/ 8 (20.00%)	17 (42.50%) /0/ 8 (20.00%)	5 (12.50%)/ 0/ 0	1.33	0.7825
Thyroid pathology (multinodular goitre /hypothyroidism)	5 (15%) 4(10.00%)/ 1 (2.50%)	3 (7.50%)/ 1 (2.50%)	1 (2.50%) /0	1.75	0.5877
Carotid atheromatosis	22 (55.00%)	21 (52.50%)	1 (2.50%)	0.20	0.0926
CCF Class NYHA				0.67	0.1176
0	12 (30.00%)	12 (30.00%)	-		
1	0 (0.00%)	0 (0.00%)	-		
2	17 (42.50%)	14 (35.00%)	3 (7.50%)		
3	9 (22.50%)	8 (20.00%)	1 (2.50%)		
4	2 (5.00%)	1 (2.50%)	1 (2.50%)		
CVA medical history	4 (10.00%)	4 (10.00%)	0 (0.00%)	-	0.4256
IMA medical history	5 (12.50%)	3 (7.50%)	2 (5.00%)	3.77	0.0942
BCI medical history	29 (97.50%)	25 (62.50%)	4 (10.00%)	1.33	0.7825
AF background	17 (40%)	14 (32.50%)	3 (7.50%)	2.02	0.3974
AF upon admission	16 (40%)	15 (37.50%)	1 (2.50%)	0.37	0.3291
AF during the admission	40 (100%)	35 (97.5%)	5 (12.50%)	-	0.7019
AMI previous	10 (22.50%)	9 (20.00%)	1 (2.50%)	0.72	0.3570
AMI inferior	11 (27.50%)	10 (22.50%)	1 (2.50%)	0.64	0.6624
AMI lateral	2 (5.00%)	2 (5.00%)	0 (0.00%)	-	0.5777
AMI anterolateral	5 (12.5%)	5(12.5%)	0 (0.00%)	-	0.3584
AMI anteroseptal	3 (7.50%)	2 (5.00%)	1 (2.50%)	3.08	0.2566
AMI inferolateral	3(7.50%)	2 (5.00%)	1 (2.50%)	3.08	0.2566
AMI inferoposterior	2 (5.00%)	2 (5.00%)	0 (0.00%)	-	0.5777
AMI subendocardic	2 (5.00%)	1 (2.50%)	1 (2.50%)	4.62	0.1064
AMI inferior and right ventricle	1 (2.50%)	1 (2.50%)	0 (0.00%)		0.7320
Inferolateral and posterior	1 (2.50%)	1 (2.50%)	0 (0.00%)	-	0.7320
Lactate dehydrogenase (LDH)	884.79	909.81	719.6	190.21	0.5260
Uric acid	6.377	6.356	6.475	0.119	0.9342
Aspartate aminotransferase 8-43 (48 la B) U/L (AST)	102.7	105.7	82	23.68	0.6155
Alanine aminotransferase (ALT)	39.02	38.57	42.2	-3.63	0.7688
CK women (normal 38-176 U/L)	789.8	907.7	348	559.67	0.4746
CK men (normal 52-336 U/L)	629.3	630.2	611	19.21	0.9999

CK-MB 0-3 mcg/L	116.5	122.89	59.5 (din 2)	63.31	0.7854
Troponin $\geq$ 0.01 ng/mL	0.5731	0.5731	-	-	-
Fibrinogen	517	514.4	531.8	-17.38	0.7857
Fibrinogen $\geq$ 400 mg	36	32	4	0,44	0.4256
Leucocite	11.900	11.901	11.850	0.054	0.9737
Leucocite $\geq$ 8000 average/no. of cases	37 (92.50%)	33 (82.50%)	4 (10.00%)	0.56	0.3471
Na+	136.9	137.1	136.14	0.93	0.5615
K+	4.131	4.11	4.25	-0.13	0.6754
SaO2 %	69.42	54.19	84.66	-30.47	0.0139
SaO2 less than 95% no. of cases	40	35	5	-	-
Urea average	45.2	43.83	54.84	-11.01	0.1829
Urea > 45 mg/dl no. of cases	18 (45.00%)	14 (35.00%)	4 (10.00%)	4.48	0.0926
Creatinine average	1.059	1.132	1.13	-0.084	0.5917
Creatinine >1,2 mg% no. of cases	10 (25.00%)	9 (22.50%)	1 (2.50%)	0.75	0.7825
Amylasemia	61.23	60.23	65.2	-6.97	0.6808
Glycaemia	197.6	183.4	297.2	-	0.0620
AF paroxysmal	24 (60.00%)	21 (52.50%)	3(7.50)	1	1
AF persistent	5 (12.5%)	4 (10%)	1 (2.50%)	1.5	0.5710
AF permanent	11 (27.50%)	10 (4.00%)	1 (2.50%)	0.54	0.4910
AF de novo post AMI	5 (12.5%)	5 (12.50%)	0	-	0.4390
AF <i>de novo</i> post AMI and PCI	17 (42.50%)	15 (37.50%)	2 (5.00%)	0.7058	0.6787
AF spontaneously rendered	2 (5.00%)	2 (5.00%)	0	-	0.5521
AF unconverted upon discharge	18 (45.00%)	16 (40.00%)	2 (5.00%)	0.63	0.5808
AF chemically converted upon discharge	14 (35.00%)	14 (35.00%)	0	-	0.0486
AF electrical shock	3 (7.50%)	2 (5.00%)	1 (2.50%)	2.66	0.3241
VS ejection fraction	37.89	38.91	31.40	7.50	0.6698
Coronarography Occlusion ram AC	32 (80%)	28 (70%)	4(10%)	0.37	0.3241
Coronarography Subocclusion ram AC	7 (17.50%)	7(17.50%)	0	-	0.2272
Cg stenosis ram AC over 50% din of the diameter of the lumen	24 (60.00%)	21 (52.50%)	3 (7.50%)	0.6875	0.6655
Cg multiple stenosis	23 (56.00%)	21 (51.00%)	2 (5.00%)	0.35	0.1907
Coronary stent	29 (72.50%)	25 (62.50%)	4 (10.00%)	1.33	0.7825
Percutaneous coronary intervention	39 (97.50%)	35 (87.50%)	4 (10.00%)	0.10	0.0074
Percutaneous coronary intervention with a balloon	10	10	0	-	0.1266
Coronary desobstruction +stent - 1	21 (52.50%)	17 (42.50%)	4 (10.00%)	3.62	0.1880

Coronary desobstruction+stent - 2	6 (15.00%)	6 (15.00%)	0	-	0.2719
Coronary desobstruction +stent – 3/4	2 (5.00%)	1 (2.50%)/ 1 (2.50%)	0 0	- -	0.6787 0.6787

In table no. 2 it is presented the moment of the AF occurrence in relation to the AMI. Thus there were delimited a subgroup with AF occurred in background, a subgroup in which the AF occurred at the beginning of the AMI or during it (AF *de novo* post AMI) of which it is dislocated a subgroup of AF which occurred post percutaneous coronary intervention during the AMI (AF *de novo* post PCI and AMI)

**Table no. 2. Moment of the AF occurrence in relation to the AMI**

Moment of the AF occurrence connected to the AMI					
AF in background		AF upon admission		AF during the admission	
Yes	No	Yes	No	Yes	No
17	23	16	24	40	0
		11 AF in background 5 AF <i>de novo</i> post AMI		17 AF background 5 AF post AMI 18 AF post AMI and PCI	

**Table No. 3. Medicine treatment in the first 4 days after admission and within the group of patients with AMI**

Medicines	Number of patients				
	Day 1	Day 2	Day 3	Day 4	Discharge
Beta-adrenoblocker/ alpha, beta blocker	23(4)/0	23(4)/1	28(3)	25(1)	29/2
Amiodarone	7(1)	10(3)	16(4)	14(3)	11
Diuretic: furosemide /spironolactone	14 (4)/20 (3)	17(4)/18(4)	18(4)/19(4)	19(3)/21(3 )	18/22
IECA/Sartani	22(2)/1	25(2)/1	23(1)/1	23(1)/1	26/1
Oral anticoagulant	1(0)	2(0)	4(0)	9(0)	20
Blocking calcium (diltiazem/C.B. vasodilatator	0/3	0/1	0/1	0/1	0
Heparin/heparin with a small molecular weight	25/7	19 (1) /13(2)	15(2) /15(1)	8(1)/22(2)	0
Aspirin 75 mg	30(5)	35(4)	35(4)	35(3)	31
Clopidogrel	28(5)	30(4)	33(4)	33(3)	15
Digoxin	1	2	3	1(1)	1
Statins	32(5)	35(4)	34(4)	35(3)	34
Antibiotics	13(4)	14(4)	19(4)	19(3)	6 (cipro)

<b>Insulin/oral anti-diabetes</b>	4 (2)/1	1(2)/1	1(2)/1	2(2)/1	0/4
<b>Adrenomimetics A/Na/D/M/DM</b>	1(1)/1(0)/3 (1)/0(0)(1/ 1	1(1)/0(0) /5(2)/1(1)/1 (0)	0(1)/0(1)/ 5(2)/1(1)/1 (0)	0(2)/0(0)4( 1)/1(1)/1 (0)	0

Initially, the number of patients is registered in the group of patients who survived and then between brackets it is shoed the number of patients that died; /delimitated another group of medicines from the same class.

Of the 40 patients with AMI it was practiced percutaneous coronary intervention (PCI) associated with pharmacologic reperfusion therapy (anticoagulants and platelet antiaggregant) for 39 patients (97.5%). With 28 patients (71.79%) sent was applied. Of them 20 had only one stent (71.42%), 6 two stents (21.42%) 1 three stents (5%) and 1 four stents (5%).

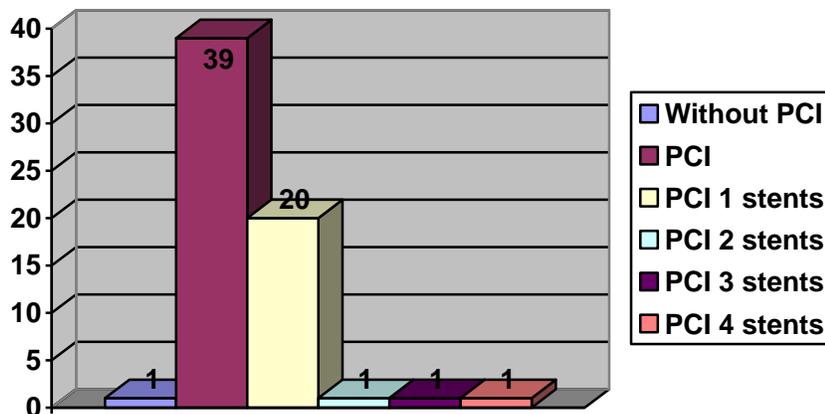


Diagram no.1. Number of patients with percutaneous coronary intervention and stent application

#### II.1.4.Conclusions

1. In the group of 40 patients with AMI upon admission, 17 (42.5%) patients had AF in their background (3 deaths – 7.5%). Upon admission 16 patients showed AF (40.00%) of which 11 had AF in their background (27.5%) and 5 showed AF *de novo* after AMI (12.5%). During the admission all the 40 patients showed AF (paroxysmal, persistent, permanent). Of them 23 (57.5%) had AF *de novo* post MI.

2. After the reperfusion percutaneous coronary intervention combined with pharmacologic therapy AF occurred *de novo* with 18 patients (45.00%) of the 23 patients with AF post MI (2 died and 1 remained unconverted upon discharge).

3. Of the 35 patients discharged and ameliorated 2 (5.71 %) patients had a AF spontaneously terminated, 3 patients (8.05%) passed to sinus rhythm after electrical cardioversion of which for 2 it was combined with chemical

conversion, 14 patients after chemical cardioversion with amiodarone (35.28%) and 16 were discharged with permanent AF (45.71 %).

4. Of the 35 patients upon discharge 6 remained under treatment with amiodarone (17.14 %), 5 under treatment with amiodarone and beta blocker (14.28%) and 16 under treatment with beta blocker – metoprolol (45.71)

5. AF *de novo* post PCI was spontaneously converted for 2 patients (11.11%), for 13 patients it was chemically converted (72.22%), for 1 patient the cardioversion was made electrically (5.55%) and 1 patient was not converted.

6. AF occurred *de novo* after AMI or after AMI and PCI has a chance of conversion to sinus rhythm 5.66 bigger ( $p=0.0003$ ) compared to patients with AF in their background.

7. Patients were under antihypertensive, antidiabetes, antidyslipidaemic treatment as ambulatory care for the comorbidities they encountered in their background.

8. Emergency Percutaneous coronary intervention (PCI) was applied with 39 patients with or without stent application.

9. In the first 4 days after the desobstruction intervention the patients in the group were under triple therapy with heparin/ fractionated heparin, aspirin 75 mg and clopidogrel.

10. During the admission the patients had as treatment anticoagulants from the heparin group and platelet antiaggregants (aspirin 75 mg, clopidogrel), antiarrhythmic treatment with amiodarone and metoprolol, hypocholesterolemic /hypolipemic, diuretic, with IECA/ Sartani.

11. It was used as emergency therapy beta-adrenergic iv medication (adrenalin, dobutamine), electric shock, hydro-electrolytic rebalancing perfusions, oxygenotherapy under intubation or on a nasal probe.

12. Upon discharge of the group of all the ones who showed AF *de novo* 4 patients remained prophylactic on triple antithrombotic therapy and 14 patients on double therapy.

13. In the group with AMI (40 patients) mortality during admission was 12.5% (5 patients), of them 2 patients (40.00%) died in the first 72 hours since the infarction started and 3 patients (60.00%) died between the 12<sup>th</sup> and the 20<sup>th</sup> day.

14. A dead patient did not have coronarography, for 4 dead patients there was applied percutaneous coronary intervention, with standard pharmacologic treatment, after desobstruction.

15. Age and gender represented important risk factors, the patients who died in the first days since the AMI started were over age 80, of which 80% were women.

16. Atrial fibrillation was found in the background of 60% of the patients who died by AMI and it was present with all the patients in the evolution of AMI in the hospital being an aggravation factor and bad prognostic in the case of the dead patients.

17. Atrial fibrillation *de novo* during the AMI occurred in 2 of the deaths (40%) (40%) as a complication against a NYHA second class heart failure and of certain comorbidities such as hypertension, diabetes mellitus, dyslipidaemia, atherosclerosis.

18. Comorbidities were also present in the entire group of dead patients: hypertension, diabetes mellitus, chronic coronary disease, heart failure classes NYHA 2, 3, 4, dyslipidaemia. The patient who died after 72 hours from the admission showed heart failure class 4 NYHA.

19. Biologically, the group of dead patients showed myocardial cytolysis in dynamics (CK, CK-MB, troponin).

20. Fibrinogen as predictive marker of coronary artery diseases exceeded normal values in the case of 38 patients, with an average of 514.4 mg/dl for the ones who survived and 531.8 mg/dl with the deceased ones (odds ratio - 17.38,  $p=0.7857$ ).

21. Even though only 10 patients (3 patients deceased) had a confirmed diabetes in their background, upon admission they all showed high rates of glycaemia (183.4 mg% for the group of patients who survived and 297 mg% for the deceased). Hyperglycaemia post infarction is an evolution aggravation factor as it favours deaths. All the 5 patients deceased had hyperglycaemia.

22. The presence of a high hyperglycaemia at the beginning of the AMI can represent an infarction prognostic marker but also of therapeutic behaviour which demands treatment with amiodarone in AF even in the conditions of percutaneous coronary interventional treatment.

23. Four of the deceased ones (80%) showed on coronarography occlusion of the left coronary artery, as well as multiple stenosis of other coronary branches.

24. Desobstruction was practiced and stent was applied for 4 of the deceased patients, the fifth patients died in 24 hours after the admission.

25. Some of the ill persons showed hypoxic phenomena ( $SaO_2$  under 80%), critical hemodynamic status, hydroelectrolytic imbalances, inflammatory

phenomena (fibrinogen over 400 mg/dl, leucocytosis etc.), renal insufficiency phenomena (increased urea, serum creatinine), hyperglycaemia.

26. The deceased patients showed cardiogenic shock, ventricular fibrillation, acute pulmonary oedema or cardiac arrest.

27. As emergency therapy it was used beta-adrenergic iv medication (adrenalin, dobutamine), electric shock, hydroelectrolytic rebalancing perfusions, oxygen therapy under intubation.

28. The clinical study confirms that atrial fibrillation represents a major indicator for prognosis in AMI.

29. The atrial fibrillation – acute myocardial infarction relation is bidirectional because there were also patients to which by AMI atrial fibrillation was triggered.

30. The longer life duration determined an increase in the number of patients with AMI over 80 years, their percentage in the group being 17.5% (7 patients) of which 3 (42.71% of the 7 patients) died.

31. Elderly patients showed several comorbidities, different degrees of heart failure, chronic coronary circulatory failure, factors which contributed to the installation of the AMI and to the aggravation or occurrence *de novo* of the AF.

32. AF does not seem a singular factor of occurrence of the MI in our study because the number of patients with AMI who had AF in their background or upon admission was lower than the number of the ones who showed AF *de novo*.

33. AF contributed to serious forms of AMI with deaths in a proportion of 12.5%.

34. Percutaneous coronary intervention was linked to a medicine-based therapy which allowed a favourable evolution after revascularisation, with or without stent implantation to a percentage of 87.5% of the patients.

35. From the group with AF *de novo* after the percutaneous coronary intervention, the AF conversion found upon discharge was in a greater percentage than in the case of patients with an AF history or AF installed at the beginning of the infarction.

36. AF was converted in a large percentage in the group of patients without congestive heart failure compared to the ones with congestive heart failure class 2,3,4 NYHA.

37. Diabetes mellitus decreases the odds of survival after the AMI and the same time reduces the possibility of conversion to sinus rhythm of the AF after percutaneous coronary intervention.

38. AF is not directly connected to mortality in a hospital after percutaneous coronary intervention in the AMI, but rather it is correlated with the age, gender, high degree of heart failure, cardiogenic shock, multi-organ affectation among which the affectation of the pulmonary function, etc.

39. Even though early reperfusion can lower the prognostic of the impact of AF in AMI it is imposed a much more careful management of the AF which complicates AMI, especially for patients with risk who have structural and functional remodelling of the myocard because of the multiple comorbidities which acted for many years.

40. Even if percutaneous coronary intervention was practiced with stent application for a high percentage of patients with AMI AF represents a complication which associates to IMA thus influencing in a negative way the evolution and life prognostic.

41. At the associated univariate analysis AF associated with AMI can be more frequently found in the case of the elderly, mortality being more increased with women; it is connected to the degree of heart failure, the type of infarction is not correlated with AF.

42. At multivariate analyses the antiarrhythmic (amiodarone) is more efficient in AF *de novo* after the infarction and PCI, treatment with beta blockers in the hospital is correlated with the AF resistance to conversion.

## **II.2. RESEARCH ON THE EFFICIENCY OF CHEMICAL CONVERSION OF ATRIAL FIBRILLATION PRESENT IN SURGICAL HEART INTERVENTIONS**

### **II.2.1.Motivation of study**

With the retrospective clinical study over the possibility of AF occurrence after open-heart surgical interventions presented in the thesis, the purpose of it is to highlight the factors which can determined the occurrence of the AF in the conditions of the stress given by surgical intervention, the degree of alteration of the function and morphological structure of the heart, comorbidities, hydroelectrolytic imbalance, as well as the influence of beta blocker, antiarrhythmic, anticoagulant and platelet antiaggregant medication, ACEI, hypocholesterolemiant, in this context.

### **II.2.2.Material and method**

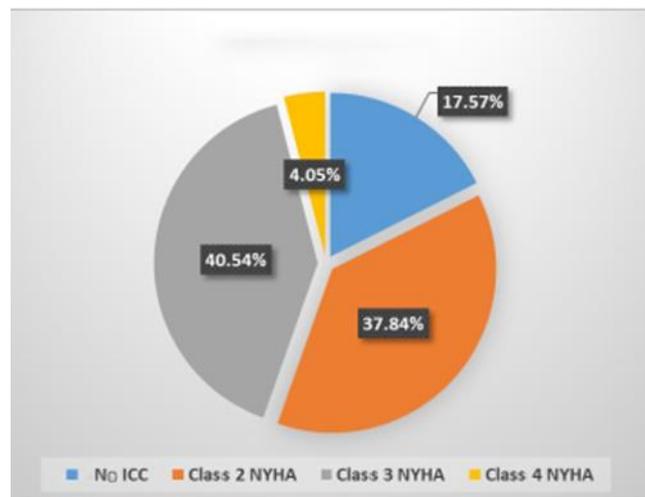
The clinical study is an observational, retrospective, synthesis one. The study was performed on a group of 74 patients who underwent heart surgeries within the Cardiovascular Disease Emergency Clinic Academician “Vasile Cârdea” of Bucharest over the period 2012-2013. The study had the approval of the Ethical Department of University of Medicine and Pharmacy of Craiova.

There were selected those certain patients who progressed in atrial fibrillation post event.

### II.2.3.Outcomes

The study was carried out on a group of 74 patients who suffered bypass type heart surgeries or interventions on the valves level (aortic, mitral or tricuspid) and a case of pericardectomy and atrial septal defect closure each. All the patients in the group showed AF post heart surgical intervention. Of the 74 patients 6 died within 9 up to 40 days after the admission, which represents a percentage of 8.09% of the cases.

Out of the heart interventions, 35 (47.29%) had bypass-type interventions on the coronaries, 33 (44.72%) surgical interventions with the valves and 4 (5.41%) were mixed interventions, both bypass-type and on the valves, and with 2 (2.70%) of the patients the interventions were for the closure of a septal defect or for pericardectomy. Of the patients with coronary bypass 4 (5.41%) had mono bypass, 14 (18.81%) double bypass, 14 (18.91%) triple bypass and 3 (4.05%) quadruple bypass (2.3), and the rest of 38 patients that is 52.71% had interventions on the valves, mixed interventions (bypass and on the valves) or other interventions.



**Diagram no. 2. Prevalence of the classes of congestive heart failure after NYHA within the group**

Most of the patients showed heart failure (82.43%). After the NYHA classification 13 patients (17.57%) did not show heart failure, 28 patients had ICC class 2 NYHA (37.84%), 30 patients (40.54%) class 3 NYHA and 3 patients (4.05%) class 4 NYHA.

Out of the 74 patients 55 (74.32%) had chronic coronary disease and 19 did not have this diagnostic. All the 19 patients without chronic coronary disease are from the group where cardiac valve interventions were made.

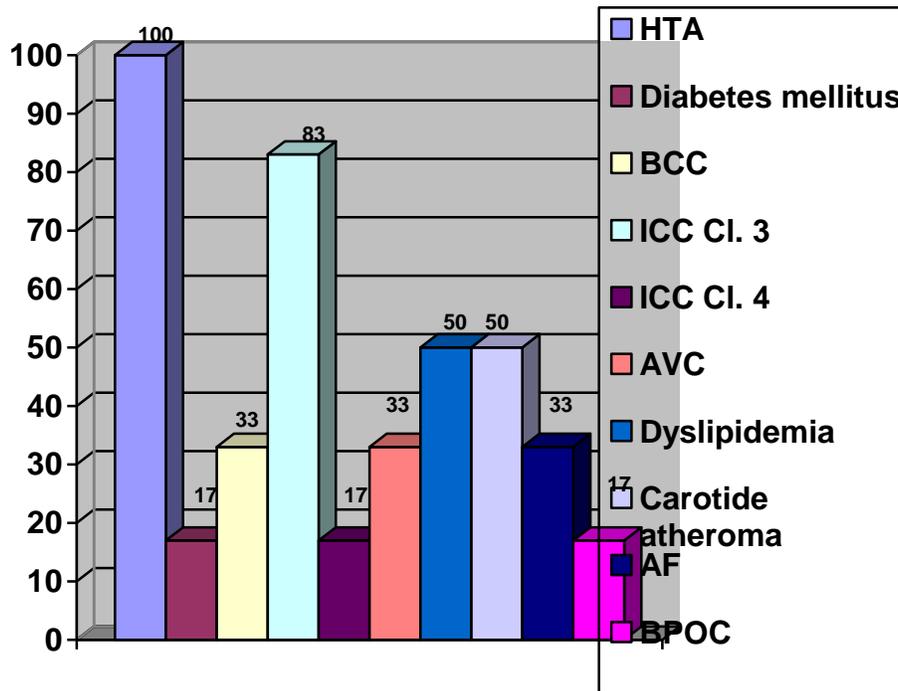


Diagram no. 3. Prevalence of comorbidities with the 6 deceased patients from the group with heart surgeries (%)

### Forms of AF, paroxysmal, persistent, permanent

Regarding the type of post-operative type of atrial fibrillation, 56 patients (75.68%) of the patients showed the paroxysmal form, 14 patients (18.92%) the permanent form and 4 patients (5.41%) the persistent form.

### Moment of AF occurrence in relation to the moment of the surgical intervention

The average period of occurrence of atrial fibrillation post-surgical intervention was 1.98 days. Atrial fibrillation appeared with 12 patients (26.53%) in the first post-operative day, with 22 patients (44.90%) 2 days after the surgery, with a reduced number of patients 3 days after (18.37%) and rarely 4 after or more (10.20%). Cumulatively, 51 patients (58.92%) progressed to AF in the first 2 days, 60 patients (81.08%) in the first 3 days and 69 patients (93.24%) in the first 4 days. Thus, it can be considered that the period comprised between days 1 and 3 is a critical one in which ECG monitoring is mandatory.

### Degree of conversion of AF to sinus rhythm upon discharge

Of the 74 patients taken for the study, with 22 (29.73%) the conversion of atrial fibrillation was not succeeded. For the rest, the conversion was made especially by pharmacologic methods (45 patients) or the conversion was made spontaneously (7 patients). The chemical conversion had a 60.81% rate of success.

**Table no. 3. Treatment applied to patients in the first 4 days after the heart surgery and upon discharge.**

<b>Medicine</b>	<b>Number of patients</b>				
	<b>Day 1</b>	<b>Day 2</b>	<b>Day 3</b>	<b>Day 4</b>	<b>Discharge</b>
<b>Beta blockers</b>	<b>64</b>	<b>69</b>	<b>64</b>	<b>66</b>	<b>61</b>
<b>Amiodarone</b>	<b>23</b>	<b>41</b>	<b>43</b>	<b>47</b>	<b>9</b>
<b>Diuretics (furosemide/diurex)</b>	<b>70/38</b>	<b>73/28</b>	<b>74/30</b>	<b>73/29</b>	<b>9/57</b>
<b>ACEI/sartani</b>	<b>31</b>	<b>43</b>	<b>44</b>	<b>43</b>	<b>45/12</b>
<b>Oral anticoagulants</b>	<b>14</b>	<b>31</b>	<b>34</b>	<b>35</b>	<b>37</b>
<b>Calcium blockers (diltiazem/C.B. vasodilatator</b>	<b>1/2</b>	<b>1/2</b>	<b>3/1</b>	<b>3/3</b>	<b>3/1</b>
<b>Heparin/heparin with low molecular weight</b>	<b>56</b>	<b>69</b>	<b>74</b>	<b>71</b>	<b>0</b>
<b>Aspirin 75 mg</b>	<b>63</b>	<b>63</b>	<b>64</b>	<b>67</b>	<b>23</b>
<b>Clopidogrel</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>
<b>Digoxin</b>	<b>7</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>8</b>
<b>Statins</b>	<b>64</b>	<b>67</b>	<b>68</b>	<b>66</b>	<b>40</b>
<b>Insulin/oral antidiabetes</b>	<b>26</b>	<b>26</b>	<b>24</b>	<b>15/3</b>	<b>3/1</b>
<b>Prophylactic antibiotics</b>	<b>74</b>	<b>74</b>	<b>74</b>	<b>74</b>	<b>24</b>

## **II.2.4.CONCLUSIONS**

1. Atrial fibrillation is a frequently encountered complication after heart surgical interventions.
2. In the group of 74 patients heart surgical interventions included: coronary bypass (47.29%), various interventions of mitral, aortic, tricuspid valves, (45.40%), coronary bypass + valve surgical intervention associations (5.41%), other types of interventions (pericardotomy, septal defect closure) (2.70%).
3. From the study performed it is ascertained that AF can be observed in the post-operative period with a greater frequency between day two and four after the surgery. The average peak of AF occurrence in the study was 1.98 days and 44.90% showed AF in the second day after the surgical intervention.

4. The risk to progress to AF is connected to epidemiologic and perioperative prediction factors.
5. The age of the patients in the group varied between 34 and 81, with an age average of  $60.42 \pm 10.23$  years. The greatest number of patients with AF was between 55 and 70-year old patients.
6. Even though the proportion between men and women in the group with AF after heart surgical interventions was 2/1, the proportion for patients  $\geq 65$  years is of 1,21/1 and with the patients exceeding the age of 70 this proportion 1/1.
7. In-hospital mortality rate after the heart surgery was 8.10%, of which 83.33% after surgical interventions on the valves, their affectation being rendered by chronic diseases of the myocardium with inflammatory phenomena and of structural alteration of the myocardial fibre.
8. Of the 6 deceased patients, 3 died by cardiogenic shock to which there was added to 1 patient multi-organ dysfunction syndrome and septic shock with 2 patients, 2 patients did by irreversible cardiac arrest and 1 patient showed resuscitated cardiac arrest but after 2 days irreversible cardiac arrest.
9. Death by coronary bypass was found with only one patient, with triple bypass which proves an old coronary disease with multiple affectations of the coronary branches and alterations of the myocardial fibre, age over 80, to which a septic shock was added. The other 5 patients were from the group of interventions on cardiac valves with an old cardiac disease and multiple comorbidities.
10. The death of the 6 patients occurred between the 9<sup>th</sup> and 40<sup>th</sup> day of admission showing that the hemodynamic and functional adaptation of the cardiovascular device was not made in optimal parameters of survival because of the multiple risk factors existing in the background which generate a multi-organ pathology. With 2 of the patients the septic shock was added.
11. Even though the percentage of men with AF after the heart surgical intervention is greater in the group, women's changes to survive are more reduced. Death of the women occurred (83.33%), with ages between years 64-68.
12. The perpetuation of AF is greater in the case of patients with cardiac valve surgeries compared to patients with surgical interventions on bypass-type coronary arteries.
13. Postoperative inflammatory phenomena were made obvious by an increase of fibrinogen over the normal limits for 51.35% of the patients.
14. Arterial pressure control with the hypertensive patients was optimised before the surgery with beta blocker medication, diuretic, ACEI/sartans and more rarely calcium blockers, especially when there are other risk factors at the same time, such as Diabetes mellitus, chronic coronary disease, hypercholesterolemia, reduced renal function.
15. After low cardiac output syndrome by cardiac dysfunction from the postoperative period which contributes to postoperative morbidity and mortality, the decrease of the number of days of admission and of the costs the patients benefited of treatment with adrenomimetic drugs in the first days after the surgery (adrenaline, noradrenaline, dopamine and dobutamine and for 1 patient a phosphodiesterase inhibitor - milrinone).

16. The risk of AFPO after heart surgeries can be influenced by epidemiologic and intraoperative factors together with cardiovascular and sometimes pre-existent pulmonary affections.

17. Beta blocker medication is used as first line indication for AFPO prophylaxis. Amiodarone was used in a large percentage so as to reduce the persistence of AF and to determine the conversion to sinus rhythm.

18. Treatment with amiodarone associated to beta blocker led to the reduction of the days of admission from an average of 18.08 days to 14.33 days.

19. In order to reduce the risk of permanent AF all the patients benefited of treatment with ACE inhibitors or Sartans (AT1-receptor antagonists) and HMG glutaryl CoA reductase inhibitors (Statins).

20. Patients with AFPO with a low risk of postoperative negative evolution can receive treatment with beta blockers and high-risk patients shall be treated in a more adequate way with amiodarone besides beta-blockers.

## **II.3.RESEARCH ON THE EFFICIENCY OF ELECTRICAL CONVERSION IN ATRIAL FIBRILLATION**

### **II.3.1.Purpose of the clinical study**

The purpose of the study was to establish the relation between the efficiency of non-pharmacologic therapeutic manoeuvre and the age, gender, comorbidities associated to AF.

### **II.3.2.Material and method**

The study included 72 patients who came from Cardiovascular Disease Emergency Clinic Academician “Vasile Cârdea” of Bucharest. The analysis period was 2006-2014. The study was an observational, retrospective one; the observation sheets were chosen from patients who had suffered electrical conversion, who had newly discovered atrial fibrillation upon cardiologic medical examination or had paroxysmal or order, persistent AF.

For each patient the AF convertibility was decided upon by the specialist physician from the cardiovascular disease centre.

For the statistical analysis there was used multivariate linear regression and multivariate logistic regression so as to simultaneously assess the influence of several factors over a continuous or discrete variable.

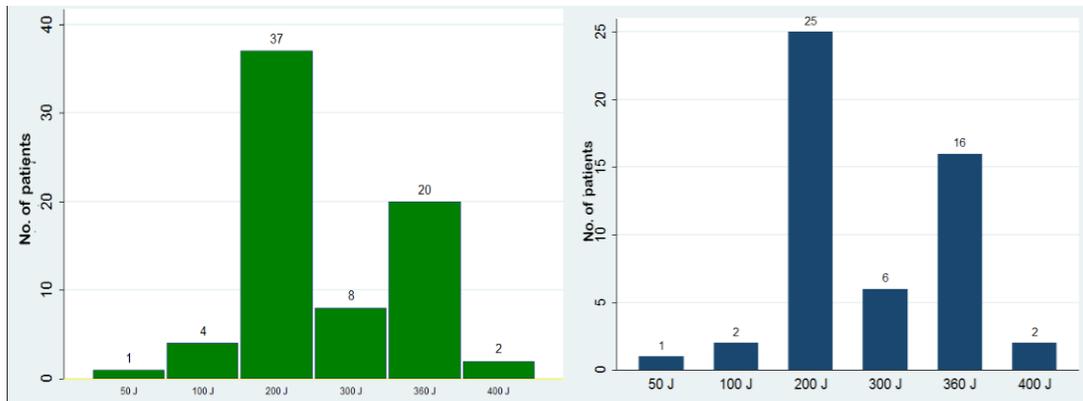
### **II.3.3.OUTCOMES**

**Table no. 4. Basic characteristics of the group of patients with atrial fibrillation to whom electrical conversion was applied**

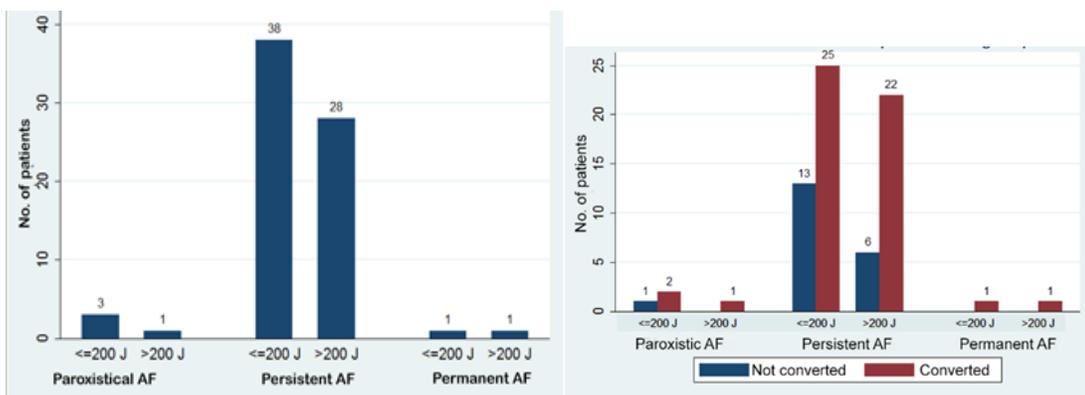
<b>Electrically converted</b>	<b>Electrically not converted</b>	<b>p</b>
<b>Age</b>		
60.81 ± 8.60 years old	59.80 ± 12.25 years old	0.695
<b>Gender</b>		
Male: 35 (67.51%)	Male: 19 (95.00%)	0.015
Female: 17 (32.69%)	Female: 1 (5.00%)	

<b>Nutrition state</b>		
Normal weight: 28 (54.90%)	Normal weight: 11 (57.89%)	0.913
Overweight: 16 (31.37%)	Overweight: 5 (26.32%)	
Obese: 7 (13.73%)	Obese: 3 (15.79%)	
<b>Hypertension</b>		
Hypertensive: 36 (69.23%)	Hypertensive: 10 (50.00%)	0.128
Normotensive: 16 (30.77%)	Normotensive: 10 (50.00%)	
<b>Diabetes</b>		
Diabetic: 10 (19.23%)	Diabetic: 3 (15.00%)	0.676
Non-diabetic: 42 (80.77%)	Non-diabetic: 10 (85.00%)	
<b>CVA in the background</b>		
No previous CVA: 49 (94.23%)	No previous CVA: 19 (95.00%)	0.898
With previous CVA: 3 (5.77%)	With previous CVA: 1 (5.00%)	
<b>Heart failure class</b>		
No CCF: 15 (28.85%)	No CCF: 10 (50.00%)	0.090
CCF class II: 25 (48.08%)	CCF class II: 10 (50.00%)	
CCF class III: 11 (21.15%)	CCF class III: 0 (0.00%)	
CCF class IV: 1 (1.92%)	CCF class IV: 0 (0.00%)	
<b>Type of atrial fibrillation</b>		
Paroxysmal: 3 (5.77%)	Paroxysmal: 1 (5.00%)	0.664
Persistent: 47 (90.38%)	Persistent: 19 (95.00%)	
Permanente: 2 (3.85%)	Permanente: 0 (0.00%)	
<b>Mitral insufficiency</b>		
With mitral insufficiency: 9 (17.31%)	With mitral insufficiency: 6 (30.00%)	0.235
Without mitral insufficiency: 43 (82.69%)	Without mitral insufficiency: 14 (70.00%)	
<b>Tricuspid insufficiency</b>		
With tricuspid insufficiency: 10 (19.23%)	With tricuspid insufficiency: 4 (20.00%)	0.941
Without tricuspid insufficiency: 42 (80.77%)	Without tricuspid insufficiency: 16 (80.00%)	
<b>Aortic insufficiency</b>		
With aortic insufficiency: 29 (55.77%)	With aortic insufficiency: 12 (60.00%)	0.745
Without aortic insufficiency: 23 (44.23%)	Without aortic insufficiency: 8 (40.00%)	
<b>Pulmonary insufficiency</b>		
With pulmonary insufficiency: 24 (46.15%)	With pulmonary insufficiency: 7 (35.00%)	0.392
Without pulmonary insufficiency: 28 (53.85%)	Without pulmonary insufficiency: 13 (65.00%)	

Size of the left atrium		
47.25 ± 5.74 mm	44.1 ± 3.87 mm	0.114
Size of the left ventricle in systole		
42.59 ± 9.21 mm	38.75 ± 8.71 mm	0.209
Size of the left ventricle in diastole		
53.75 ± 12.52 mm	51.75 ± 8.76 mm	0.610
Left ventricle ejection fraction		
45.1 ± 6.81	48.06 ± 5.46	0.102
Systolic pressure upon admission		
127.8 ± 19.19 mm Hg	126 ± 13.14 mm Hg	0.702
Diastolic pressure upon admission		
76.9 ± 12.81 mm Hg	76 ± 9.23 mm Hg	0.975



**Diagram 4. Energy of electrical shocks in J in the case of which electrical conversion was successful.**



**Diagram 5. Type of atrial fibrillation with the two subgroups with shocks is ≤200 J and >200 J**

In order to have an overview of the influence all these factors have on the type of electrical conversion a model of linear regression was made for the conversion energy and a model of logistic regression of the conversion type

(electrical shocks under 200 J inclusively or exceeding 200 J). It was ascertained that only the presence of fibrillation in the background had a noticeable influence in the electrical shock energy levels the AF converted to AF (p=0.035).

**Table 5. Model of linear regression of the influence various factors have over the level of energy applied in J to which the AF conversion was performed**

Risk factor	Robust		t	P> t	Beta
	Coeff.	Std. Err.			
Sex	32.75041	35.90871	0.91	0.366	.164003
Age group	-11.69493	20.24631	-0.58	0.566	-.0795081
ICC - NYHA	-3.203081	10.4515	-0.31	0.760	-.0427339
Sistolic pressure	-.4233341	.7712142	-0.55	0.585	-.081815
Previous AF	62.6966	29.55686	2.12	0.038	.299389
Smoking	3.143331	15.01071	0.21	0.835	.0301311
Hypertension	-3.779807	27.48178	-0.14	0.891	-.0214711
Overweight	27.02419	22.42154	1.21	0.233	.1578353
Dislipidemia	30.85519	27.20845	1.13	0.262	.1606395
Constant	236.0157	127.0348	1.86	0.068	.

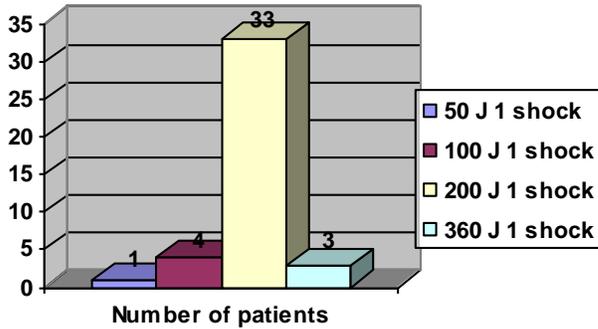
In the end there was made a logistic regression (table III.3.6.) with various factors which could influence the electrical conversion rate. Of them significant was the nutrition state and arterial hypertension. It should be noticed that the gender was omitted because almost all the women were converted. Also, all the converted patients had fibrillations in their background. It is noticed a greater success in the case of patients with persistent fibrillation and to the overweight ones. These outcomes should be carefully interpreted given the small size of the group and the multitude of cardiac and non-cardiac comorbidities.

**Table 6. Model of logistic regression regarding the influence of various factors on the success of electrical conversion**

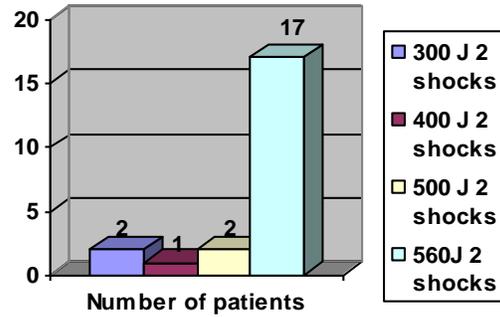
Factori de risc	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]	
sex	1	(omitted)				
grupa de varsta	.2943881	.4296942	-0.84	0.402	.0168458	5.144572
ateromatoza	2.681671	9.674661	0.27	0.785	.0022779	3157.073
ICC - NYHA	5.690782	11.32538	0.87	0.382	.1151258	281.3011
tip fibrilatie	477.1002	1477.805	1.99	0.046	1.101631	206625.2
nutritie	9.158544	11.55977	1.75	0.079	.7717092	108.6924
tensiunea sistolica	1.097179	.0869134	1.17	0.242	.9393975	1.281462
FA in antecedente	1	(omitted)				
fumat	.2585142	.4171779	-0.84	0.402	.0109359	6.111013
HTA	.0792975	.1061837	-1.89	0.058	.0057472	1.094119
dislipidemie	.7289024	1.21559	-0.19	0.850	.0277409	19.15215
constant	1.42e-06	.0000185	-1.03	0.303	1.03e-17	194783

Table no. 7. Number of electrical shocks applied and total energy (J) sent to the atriums

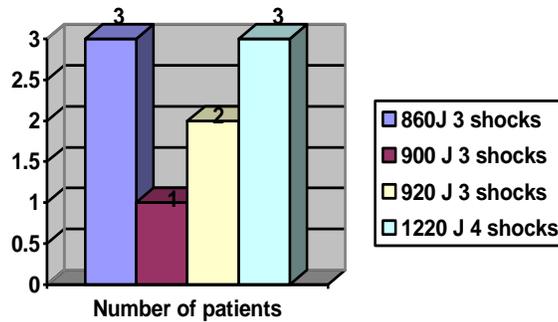
No. of patients	No. of shocks	Managed energy (Joules)	Number of patients per subgroup
1	1	50	41 patients with 1 electrical shock (56.94%)
4	1	100	
33	1	200	
3	1	360	
2	2	300	22 patients with 2 electrical shocks (30.55%)
1	2	400	
2	2	500	
17	2	560	
3	3	860	6 patients with 3 electrical shocks (8.34%)
1	3	900	
2	3	920	
3	4	1220	3 patients with 4 electrical shocks (4.16%)



A

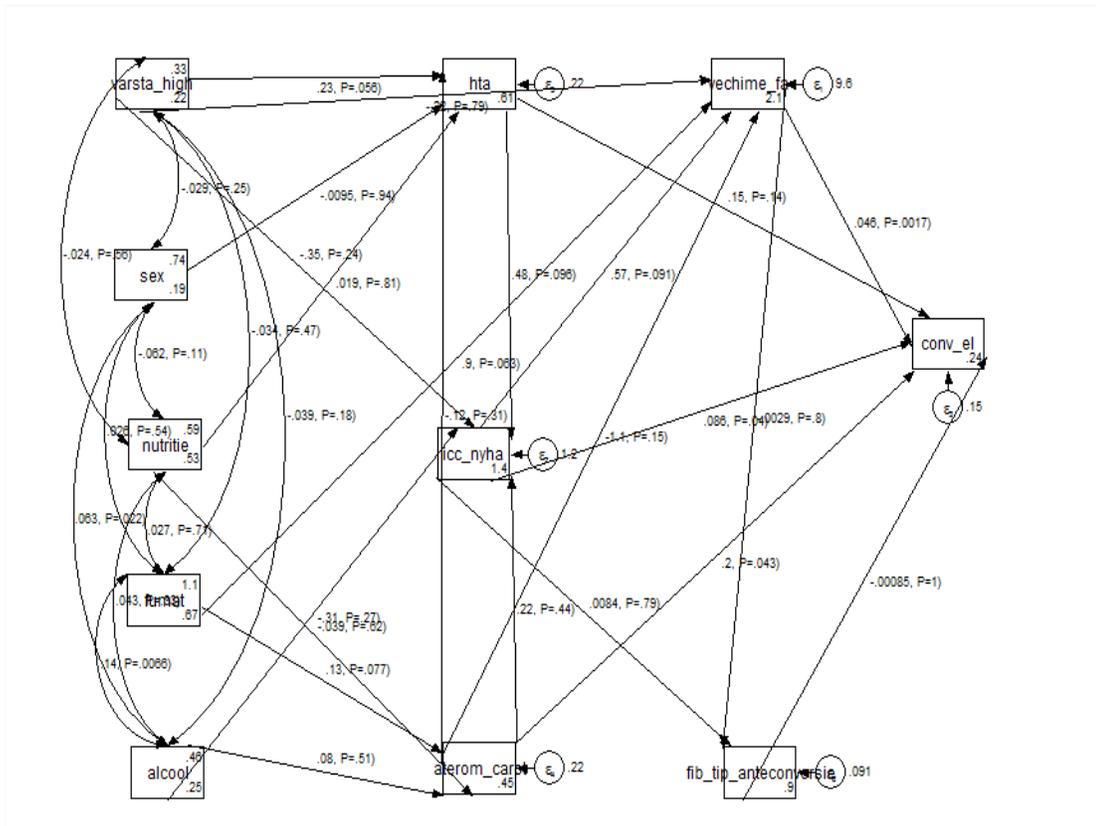


B



C

Diagram 6. Total energy applied in electric conversion with an electrical shock (A), 2 electrical shocks (B) and 3 or 4 electrical shocks (C)



**Figure no.7 . Structural equation model for studying factors that influence electrical conversion of AF**

### II.3.4.CONCLUSIONS

1. Electrical cardioversion is a procedure with a satisfying safety level, with an efficiency superior to pharmacologic cardioversion especially in the treatment of persistent AF.
2. In the study there was used a monophasic cardioverter. The paddles in the study were applied both previously and subsequently.
3. Of the 72 patients with AF of the study group 52 were converted to sinus rhythm; for 20 patients the cardioversion was not successful.
4. In the case of 41 patients there was applied only one electrical shock with energies between 50 and 360 J (for 33 patients 200 J). For 22 patients there were applied 2 electrical shocks with energies between 300 and 560 J, for 6 patients there were applied 3 shocks with total energies between 300 and 560 J and for 3 patients 4 shocks with total energies of 1220 J.
5. A number of 28 patients passed to sinus rhythm with energies lowed or equal to 200 J and 12 patients to over 360 J.
6. Patients who did not show AF in their background were converted in a larger proportion to the energy 200 J. The ones with AF in their background were converted equally to 200 J and higher.
7. The seniority of atrial fibrillation had a marginally significant influence on the type of electrical conversion.

8. There were noticed differences between the types of electrical conversion in the case of patients with different valve sufferings: mitral insufficiency, aortic insufficiency, tricuspid insufficiency, pulmonary insufficiency.
9. The energy of the shocks was  $\leq 200$  J with a success of cardioversion for 71.43% of the patients with paroxysmal fibrillation and for 56.25% of the ones with persistent fibrillation.
10. During the cardioversion and over the period of the patients' hospital admission no complications of the cardioversion were noticed.
11. Though statistically insignificant, the cardioversion to shocks under 200 J was produced for a greater number of patients under beta-adrenoblocker treatment.
12. Because of a high seniority of the AF a number of 57 patients had amiodarone in their pre-treatment, 7 patients had an antiarrhythmic class 1C (flecainide) and 1 patient Sotalol.
13. From the analysis by logistic regression it resulted that arterial hypertension, nutrition state (overweight patients) as well as atrial fibrillation in their background have an influence over electrical cardioversion.
14. The electrical cardioversion of the AF in our group was influenced both by functional and structural factors of the heart and by the comorbidities accompanying arrhythmia in most cases.
15. The factors influencing AF cardioversion in the study in a rather insignificant way are: age, presence of diabetes, duration of AF, left ventricle ejection fraction, size of the left atrium.
16. Our study showed that for external electrical cardioversion a AF an electrical shock energy level of 200 J has a higher rate of success from the first shock without any adverse post-shock effects.

## **2.4. FINAL CONCLUSIONS**

1. Atrial fibrillation represents the most frequent supraventricular tachyarrhythmia found in the evolution of certain chronic heart diseases because of the mechanisms of electrical or structural remodelling of the myocardium.
2. The clinical study presented in the thesis assesses two different states of atrial fibrillation occurrence or presence in the cardiovascular surgery department:
  - the atrial fibrillation – acute myocardial infarction interrelation to patients for whom coronary revascularisation is practiced by percutaneous coronary intervention;
  - consequences of atrial fibrillation occurrence during heart surgeries
3. In the third stage we assessed the influence of a non-pharmacologic method of conversion of atrial fibrillation to sinus rhythm.

4. The impact of atrial fibrillation on the AMI prognostic still is at the present moment a subject of debate in specialty literature.
5. Mortality in the case of the association of AF with AMI represents 12.50% of the cases in the group while mortality in the group of patients with open-heart interventions was lower than 8.10%.
6. Patients with IMA and AF in their medical background have an increased risk of mortality.
7. The presence of AF at any moment of the AMI increases mortality by myocardial infarction.
8. AF is an independent risk factor for the AMI especially for women and the elderly, with fatal evolution towards death in the two studies of minimal or major surgical interventions at a cardiovascular level.
9. AF in the phase of installation of the AMI anticipates an even more serious prognostic and can be used as a higher risk marker.
10. Optimization of the AMI treatment especially by the therapy of coronary reperfusion improves the AF prognostic and seriousness by the passage to sinus rhythm and to mortality reduction.
11. Postoperative AF after heart surgeries represents a typical and reversible transitory electrophysiological phenomenon amid an electrophysiological substrate favourable for arrhythmia which is present before the surgery or occurs as a result of the surgery. In the occurrence of AF after a heart surgery surgical trauma intervenes directly but also the pre-existent heart pathology.
12. After interventions to repair the mitral, aortic or tricuspid valve AF can occur and age and size of the left atrium can intervene as predisposing factors.
13. Both in the group with AMI and percutaneous coronary intervention and in the one with open-heart surgeries the chances of women to survive are lower than in the case of men.
14. Currently a progress was made from classical cardiology to minimally invasive interventional cardiology, with or without stent implantation, in stenosis of coronary arteries until total occlusion, with low risks for the patient and which do not require much time for intervention or admission.
15. Cardiac surgery is one of the fields which evolved extraordinarily over the last years. Aorto-coronary bypass techniques using only arterial grafts, as well as valve-plasty surgeries (in which the valve is repaired and not replaced with a prosthesis) are modern interventions practiced today in famous clinics in the country among which Cardiovascular Disease Emergency Clinic Academician

“Vasile Cârdea” of Bucharest, with results which can be compared to those of great clinics abroad.

16. Because immediate defibrillation and electrical cardioversion are crucial for the patient’s survival in is integrated in the cardiac emergency assistance system. Thus, the third study pointed out that in the group of 72 patients with AF the electrical conversion rate was 72.22% and of electrical and pharmacologic conversion of 76.39%.

17. Electrical cardioversion is a procedure with a satisfying safety level, with an efficiency superior to pharmacologic cardioversion especially in the treatment of persistent AF, after surgeries on valves after the heart returned to normal sizes.

18. In the modern therapy of atrial fibrillation there are associated and completed methods of pharmacologic or non-pharmacologic therapy for minimally invasive heart surgery or open-heart surgery. It should be carefully monitored and adequately treated.

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