Surgical Outcomes of Emergency Cardiac Operations.

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Abstract

Objectives: Emergency cardiac operations have more complications and mortality than elective operations. We have evaluated the complications and mortality and the most predicted cause of them in emergency cardiac operations.

Methods: In a retrospective, case series, descriptive study that was done in Rajaei Heart Center in Tehran between March 2005 to March 2007 from 6881 patients that were operated for cardiac disorders, we selected 208 of them that the operation was done before 24 hours of diagnosis and evaluated them as emergency operations. Parameters like age, sex, Kind of operation, Pump Time and Clamp Time, ICU Stay, Hospital stay, complications and early and late mortality were collected and analyzed.

Results: From 208 patients who were operated as emergency setting, 51.9% were Female and 48.1% were male. Mean age was 39.14+_21.32 years, mean admit time was 14.7+_9.8 days and mean follow-up time was 8 months. Early mortality rate was 17.78% and in operation room mortality was 3.33%.There were no relationships between age, sex and mortality
(P-value 0.378, 0.467). Congestive heart failure in 51.8%, respiratory failure in 24.3 % and multiple organ failure in 24.3% were the conductive causes of mortality. Other complications that didn't lead to death were seen in 5.4%. In follow-up period 76.5% of patients were in American function class 1,and others were in function class 2 .Factors that were related to mortality were general condition of the patients before operation, kind of operation, use of high dose Inotropic agent after operation, need of balloon pump usage, valve exchange in valve malfunction states, redo operation and pump time above 180 minutes and clump time above120 minutes .

Conclusions: Emergency cardiac operations have a high mortality rate and the kind of operation and the general condition of the patient are the most predicted causes of mortality.

Key words: Emergency operation, cardiac surgery, Post MI –VSD, MOF (multiple organ failure).

IIntroduction:

Emergency operations must be done as early as possible with the emergency operating team and the patient has already had a bad condition and any delay in this situation may conduct to worse outcome. These includes situations like Endocarditis,Prosthetic valve malfunction, diagnosis of clot and tumor inside heart, acute aortic dissection, cardiac tamponade, cardiac infarction and unstable angina pectoris, post infarction complications like post MI VSD and acute Ischemic mitral regurgitation, surgical hemorrhage

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after cardiac surgery and congenital cardiac malformations that need emergency shunt or septectomy operations.
There is no systematic study in the literature about these situations and the outcomes of these operations are not identified. It seems that complications and mortality of these operations are more than elective operations.(1) An operation that must be done in a shocked patient with lower blood pressure is very complicated for surgical and anesthesiology team .(2) In Redo operations adhesion from previous operations is an additional problem for surgeons.(3)
In cardiac operations we use cardiopulmonary pump and cardiac or circulatory arresting in some kind of operations and the pump, clamp and total time of operation are important factors that contribute in the outcome of patients. Poor conditions of patients with circulatory, respiratory, neurologic, urinary and gastrointestinal complications also exists and complete diagnosis of these co-morbidities take a lot of time while the surgeon and patients don't have enough time to evaluate all this systems. Because of all the above mentioned causes, morbidity and mortality of these patients are high and we need a basic study to evaluate the risk factors of morbidity and mortality in these groups of patients.
Also the use of some techniques for reduction of bleeding like the use of aprotinin,(4) cell-saver,(5) hemo-filter (6) and the use of assist devices like balloon-pump,(7) bio-pump,(8) ECMO (9) and other assist devises for bridge to cardiac transplant are now helping these patients for better outcome.
Also studying the early and late outcomes of these groups of patients is another thing that we are doing in this study.
Material and method:
This retrospective descriptive case series of study was done from March 2005 to March 2007 in Rajaei Heart Center on 6681 cardiac surgery cases. All emergency operations that were carried out on referral before the beginning of the next working day, or before 24 hours after admit were selected. Pericardial effusion drainage and post operative surgical hemorrhage cases were excluded. Data are given as mean ± SD. Analysis was performed with SPSS software. Pearson chi-square and fishers exact test were performed to asses associations between the qualitative variables and quantitative variables and discrete predictor variables were compared by independent samples Students T-test. All operations were done with an attending cardiac surgeon with the help of one or two assistance of cardiac surgery.

Results:

Table1: Kind of emergency operations.

Kind of operations	Frequency	Percent
CABG	16	7.7
Valvular malfunction	74	35.6
Aortic dissection	17	8.2
Clot removal from cardiac chambers	6	2.9
Heart Mixoma	18	8.7
Septectomy	8	3.8
Post infarction ventricular septal perforation	4	1.9
Rupture of the heart	2	1.0
Pace maker insertion	9	4.3
Mediastinitis	7	3.4
Shunt	25	12.0
Peripheral artery exploration	8	3.8
Heart valves endocarditis	8	3.8
Emergency mitral valve replacement	2	1.0
Heart Mixoma+CABG	1	0.5
Emergency Laparatomy	1	0.5
Total	206	99.0
Missing	2	1.0

In this retrospective study from 6881 operated patients during 2 years, 208 patients (3%) who were operated as emergency setting were selected, 51.9% were Female and 48.1% were male. Mean age was 39.14±21.32 years, mean admit time was 14.7+_9.8 days and mean follow-up time was 8 months (from 1 to 26 months). Kind of operations are shown in table 1. Early mortality rate was 17.78% and in operating room mortality was 3.33%.There were no relationships between age (P value 0.378), sex (P-value, 0.467) and mortality. Congestive heart failure in 51.8%, respiratory failure in 24.3 % and multiple organ failure in 24.3% were the conductive causes of mortality .Other complications that didn't lead to death were seen in 5.4%.In follow-up period 76.5% of patients were in American function class I, and others were in function class II.

Table2: Relation between preoperative condition of patients and mortality rate.

Condition	DEATH			Total
	In operating room	In hospital	Alive	
Alert+Extubate+Normal BP	1	13	146	160
Intubate	4	7	6	17
GCS Sub-normal	0	0	1	1
BP Subnormal	2	4	11	17
Shock	0	6	5	11
Total	7	30	169	206

Table 3: Relation between Inotropic agent usage after operation and mortality

Inotropic usage	DEATH			TOTAL
	In operating room	In hospital	Alive	
High Dose	4	8	24	36
Low Dose	1	10	54	65
Without Inotrope	2	5	45	52
TOTAL	7	23	123	153

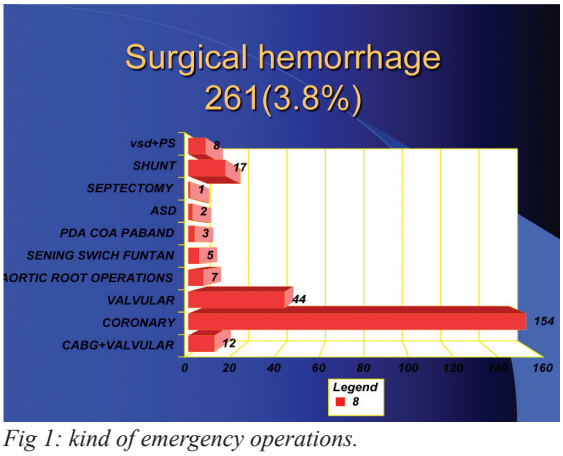

Fig 1: kind of emergency operations.

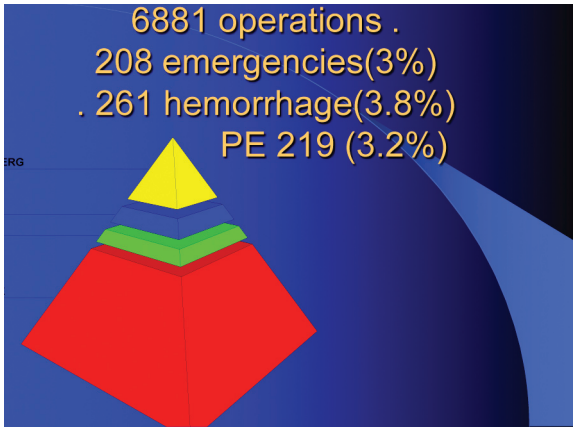

Fig 2: Rate of emergency operations

Discussion:

In this study from 6881 cardiac surgery patients that were operated during 2 years in Rajaei Heart Center, we selected 208 operations (3%) that were done by the emergency cardiac teams, and studied their risk factors, complications and mortalities in 1 to 26 months follow up time (mean 8 months).

One of the most important factors that conduct to higher mortality was general condition of the patients before operation (Table 2). From 37 patients that were conducted to operating room with low blood pressure and cardiogenic shock, 20 patients were dead afterward (3 in operating room and 17 in hospital) (Table 1). kind of operation was the second important factor that leads to death in this group of patients (P-value 0.031), Post MI VSD patients have had the highest mortality rate and after that, mediastinitis patients and Atrial septectomy were the second and third causes of death. Use of high dose inotropic agents after operation was another leading cause of death (P-value 0.032) but low dose usage of inotropic agents was not (Table 3). Needs for balloon pump and bio-pump insertion before and after operation was a leading cause of death (P-value 0.021), from 13 patients that needs balloon pump insertion, 10 were died and 3 patients needs bio-pump that 2 of them are alive. Valve exchange in valve malfunction status (in compare with valve cleaning) was another factor that leads to higher mortality (P-value 0.031), also redo operations with adhesions that need to de-cortication was a risk factor for death. Pump time above 180 minutes and clump time above120 minutes were both related to higher mortality (P-value 0.047). There were no relations between sex and age of patients, duration from last operation, clump time below 120 minutes, pump time below 180 minutes and the rate of mortality. Also there were no relationships between low dose Inotrope usage, operations without cross clump and cardiac arrest, size and kind and the place of the valve usage and kind of cannulation with the mortality rate.

Conclusion:

Emergency cardiac surgery operations have higher mortality and morbidity than the elective operations and for estimating the risk factors of mortality and morbidity the situation of patient before operation, kind of operation, usage of inotropic agents before and after operation, and clamp and pump time, are the most effective factors in the outcome. Other co morbidities of the patients must play a role in this setting that we must study in the future. We conclude that the use of assist devices like balloon pump, biopump, ECMO, for bridge to recovery and bridge to transplantation can improve the survival of this group of patients in the near future.

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