EMERGENCY OPERATIONS IN CARDIAC SURGERY

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SUMMARY : *During the period from February 1991 to November 1992, 36 patients who had undergone cardiac surgery were studied. Patients in Group I (N=12) were operated immediately after admission into the hospital (within 75 min.) or urgently, (within 72 h) in Group II (N=12), and the remaining 12 patients were chosen from the elective cases randomly (Group III). There was no significant difference between the urgent and elective cases. The operative mortality was 25 % (3 cases) and late mortality rate was 9 % (1 case) in the immediate surgery group, in spite of the severity of the preoperative status.*

Considering the preoperative circumstances and the indications of operation in the immediate surgery group, we believe that emergency cardiac surgery in appropriate situations would be life-saving and perhaps the last chance for patients who had nothing to lose.

Key Words : *Myocardial Revascularization, Coronary Artery Bypass Grafting, PTCA.*

INTRODUCTION

In recent years, technological advances in cardiology have significantly altered the approach and the treatment of certain forms of heart diseases. These advances have secondarily impacted upon cardiovascular surgery by generating new subsets of patients requiring immediate or urgent operations.

In this study, we compared three groups of patients undergoing immediate (within 75 min following admittion to the hospital), urgent (within 72 h), and elective cardiac surgery.

MATERIALS AND METHODS

During the period from February 1991 to November 1992, 36 patients undergoing cardiac surgery were studied. The patients were divided into three groups, 12 patients each. Group I was composed of patients who underwent immediate cardiac surgery (within 75 min following admittion to the hospital). Patients in Group II were operated urgently (within 72 h) and Group III included regular elective cardiac patients chosen at random.

In Group I, 3 patients were operated as a result of failed angioplasty; two because of LAD dissection, and one because of pulmonary vein rupture during baloon mitral valvulotomy. Two patients were admitted to emergency department because of the blocking of prosthetic mitral valves (stuck valve) and two others because of the progressive dissection of the ascending aorta and they were all immediately taken into the operating theatre with cardiopulmonary resuscitation. Two cases were diagnosed to have a giant left atrial myxoma filling all over

the left atrium, diminishing diastolic filling, and were given to operation. Two other patients with end-stage, intractable congestive heart failure due to rheumatic valve disease received valve replacement immediately. The last case had an acute myocardial infarction during the operation because of another primary disease-Meniere's syndrome and was operated after coronary angiography within 75 minutes (Table 1).

Group II consisted of 8 cases with coronary artery disease assessed to be a truncal or equivalent lesion detected by coronary angiography; 2 cases with intractable endocarditis of rheumatic origin and two more cases with intractable congestive heart failure (Table 2).

Group III was composed of elective patients with coronary artery disease or rheumatic valve disease chosen randomly for the study (Table 3).

Operative Procedure

In Group I, two patients with LAD dissection had myocardial revascularization and the for the other case which had a complication in baloon valvulotomy, pulmonary artery repair and open mitral valvulotomy operations were performed. Two patients admitted with stuck prosthetic valves and received mitral valve and replacement; two others with aortic dissection received ascending aorta prosthesis and aortic valve replacement. Myxomas were resected in two patients and double valve replacement were performed to the patients with intractable congestive heart failure. The last patient having myocardial infarction during another operation had a myocardial revascularization procedure (Table 4).

In Group II, coronary artery bypass grafting was performed to the patients with a coronary artery disease. While open mitral valvulotomy was perfomed to one of the patients with endocarditis, the other patient received aortic valve replacement (Table 5).

Either coronary artery bypass grafting or valve repair - replacement was performed to the patients in Group III (Table 6).

CASE	AGE	SEX	DIAGNOSIS	NYHA	INDICATION	DURATION	STATUS
1	52	M	CAD	4	PTCA FAILURE	WITHIN 20 MIN	CARDIAC ARREST
2	42	F	CAD	4	PTCA FAILURE	WITHIN 35 MIN	CARDIAC ARREST
3	47	F	MS	4	BALOON MITRAL VALVULOTOMY COMPLIC.	WITHIN 40 MIN	CARDIAC TAMPON.
4	35	M	MS	4	PROSTHETIC VALVE BLOCK.	WITHIN 50 MIN	CARDIAC ARREST
5	32	F	MS	4	PROSTHETIC VALVE BLOCK.	WITHIN 60 MIN	CARDIAC ARREST
6	42	M	MS AI-TI	4	CONGESTIVE HEART FAILURE	WITHIN 75 MIN	CARDIOG. SHOCK
7	24	F	DISSECT AORTIC ANEUR.	4	PROGRESSIVE DISSECTION	WITHIN 65 MIN	CARDIAC ARREST
8	55	F	DISSECT AORTIC ANEUR.	4	PROGRESSIVE DISSECTION	WITHIN 60 MIN	CARDIAC ARREST
9	62	M	CAD	4	PEROPERATIVE ACUTE MI	WITHIN 75 MIN	CARDIOG. SHOCK
10	24	F	LA MYXOMA	4	CONGESTIVE HEART FAILURE	WITHIN 70 MIN	CARDIOG. SHOCK
11	43	M	LA MYXOMA	4	CONGESTIVE HEART FAILURE	WITHIN 75 MIN	CARDIOG. SHOCK
12	38	M	AI	4	CONGESTIVE HEART FAILURE	WITHIN 75 MIN	CARDIOG. SHOCK

Table 1 : Preoperative evaluation of patients in Group I just before the beginning of the surgery.

CASE	AGE	SEX	DIAGNOSIS	NYHA	INDICATION	DURATION	STATUS
1	56	M	CAD	3	TRUNCUS EQUIVALENT LESION	72 HR	SEVERE ANGINA
2	66	M	CAD	3	TRUNCUS LESION	72 HR	UNSTABLE ANGINA
3	51	M	CAD	3	TRUNCUS LESION	72 HR	SEVERE ANGINA
4	64	M	CAD	3	TRUNCUS EQUIVALENT LESION	48 HR	ECG CHANG.
5	62	M	CAD	3	TRUNCUS RCA LESION	36 HR	SEVERE ANGINA
6	62	M	LV ANEUR.	3	THROMBUS	36 HR	CONG. HEART FAIL.
7	44	M	CAD	3	TRUNCUS LESION	72 HR	SEVERE ANGINA
8	48	M	CAD	3	TRUNCUS LESION	72 HR	ECG CHANG.
9	31	M	MS - MI	3	ENDOCARDITIS	72 HR	CONG. HEART FAIL.
10	20	M	AS - AI	4	ENDOCARDITIS	72 HR	CONG. HEART FAIL.
11	34	M	AI	3	CARDIOG. SHOCK.	48 HR	CONG. HEART FAIL.
12	63	M	AI	4	CARDIOG. SHOCK.	48 HR	CONG. HEART FAIL.

Table 2 : Preoperative evaluation of Group II.

CASE	AGE	SEX	DIAGNOSIS	NYHA	LESION
1	51	M	CAD	2	LAD 90 %
2	55	M	CAD	3	LAD 75 % RCA 80 %
3	43	M	CAD	3	LAD 100 % RCA 90
4	43	F	CAD	2	LAD 90 %
5	46	M	CAD	3	LAD 80 % CX 70 % PDA 100 %
6	54	M	CAD	2	LAD 100 %
7	54	M	VALVULAR HEART DIS.	3	AI - MI
8	36	M	CAD	2	LAD 80 %
9	45	M	CAD	3	LAD 80 %
10	18	M	VALVULAR HEART DIS.	3	MI
11	38	F	CAD	2	LAD 90 %
12	34	M	VALVULAR HEART DIS.	3	MI

Table 3 : Preoperative evaluation of group III.

RESULTS

Three separate groups were compared with respect to preoperative, operative and postoperative aspects (Table 7, 8, 9).

Operative mortality was 25 % (3 patients) and the late mortality 9 % (1 patient) in Group I. Immediate coronary bypass was done because of cardiac arrest during PTCA in one of the patients, but neurological coma (Grade V according to Glasgow scale) developed postoperatively. The other patient with stuck prosthetic valve died because of low cardiac output following the operation. One of the patients with dissection of aorta (Marfanoid origin) died because of bleeding in the early postoperative period while the other died due to mediastinitis in the late (fourth month) postoperative period.

No other complication or morbidity was observed in any of the other patients in this group. The patients in Group II and III were also discharged uneventfully.

DISCUSSION

The literature on the surgical standby for PTCA suggest that 3-10 % of patients undergo emergency surgical revascularization (4). As the technology of cardiologic interventions becomes increasingly sophisticated and encouraging, the frequency of emergency operations increases either as the result of contributing, time-saving diagnostic procedures or unsuccessful invasive techniques.

In emergency operations, the important fact is the improvement of myocardial protection and more aggressive preoperative treatment of myocardial

CASE	DIAGNOSIS	PROCEDURE	CROSS CLAMP TIME	SUPPORT	PEROPERATIVE COMPLIC.
1	CAD	LAD CX (SAPH.) DIAG BYPASS	85 MIN	IABP INOTROP.	NEUROLOG. COMA
2	CAD	LAD-LIMA BYPASS	18 MIN	INOTROP.	-
3	MS	OPEN VALVULOTOMY	11 MIN	-	-
4	MS	MVR	57 MIN	IABP INOTROP.	EX.
5	MS	MVR	35 MIN	INOTROP.	-
6	MS - AI TI	MVR-AVR TP	87 MIN	INOTROP.	-
7	DISS. AORT. ANEUR.	BENTHAL	100 MIN	INOTROP.	-
8	DISS. AORT. ANEUR.	BENTHAL	112 MIN	INOTROP.	-
9	CAD	LAD-SAPH. BYPASS	14 MIN	IABP INOTROP.	-
10	LA MYXOMA	RESECTION	20 MIN	INOTROP.	-
11	LA MYXOMA	RESECTION	18 MIN	INOTROP.	-
12	AI	AVR	52 MIN	INOTROP.	-

Table 4 : Peroperative evaluation of Group I.

CASE	DIAGNOSIS	PROCEDURE	CROSS CLAMP TIME	SUPPORT	PEROPERATIVE COMPLIC.
1	CAD	LAD-LIMA CX-SAPH. BYPASS	58 MIN	-	-
2	CAD	LAD-LIMA CX-SAPH. DIAG-SAPH. BYPASS	70 MIN	-	-
3	CAD	LAD-LIMA CX-SAPH. BYPASS	55 MIN	-	-
4	CAD	LAD-LIMA CX-SAPH RCA-SAPH. BYPASS	62 MIN	-	-
5	CAD	LAD-LIMA RACA-SAPH. BYPASS	45 MIN	-	-
6	LV ANEUR.	PLICATION	18 MIN	-	-
7	CAD	LAD - LIMA	13 MIN	-	-
8	CAD	LAD - LIMA	14 MIN	-	-
9	MS	OPEN MITRAL VALVULOTOMY	35 MIN	-	-
10	AI	AVR	38 MIN	-	-
11	AI	AVR	34 MIN	INOTROP.	-
12	AI	AVR	43 MIN	INOTROP.	-

Table 5 : Peroperative evaluation of Group II.

CASE	DIAGNOSIS	PROCEDURE	CROSS CLAMP TIME	SUPPORT	PEROPERATIVE COMPLIC.
1	CAD	LAD-LIMA BYPASS	18 MIN	-	-
2	CAD	LAD-LIMA RCA-SAPH. BYPASS	36 MIN	-	-
3	CAD	LAD-LIMA RCA-SAPH. BYPASS	38 MIN	-	-
4	CAD	LAD-LIMA BYPASS	17 MIN	-	-
5	CAD	LAD CX (SAPH.) PDA BYPASS	57 MIN	-	-
6	CAD	LAD-LIMA BYPASS	21 MIN	-	-
7	AI - MS	AVR MVR	58 MIN	-	-
8	CAD	LAD-LIMA BYPASS	19 MIN	-	-
9	CAD	LAD-LIMA BYPASS	17 MIN	-	-
10	MI	MVR	25 MIN	-	-
11	CAD	LAD-LIMA BYPASS	21 MIN	-	-
12	MI	MVR	24 MIN	-	-

Table 6 : Preoperative evaluation of Group III.

CASE-DIAG	RESPIRATORY SUPPORT	HEMORRHAGE	SUPPORT	COMPLIC	NYHA	HOSPITAL STAY
1 - CAD	8 HRS	280 ml	IABP INOTROP	NEUR.COMA	-	EX.
2-CAD	20 HRS	245 ml	INOTROP	-	2B	10 DAYS
3-MS	12 HRS	600 ml	-	-	2A	7 DAYS
4-MS	PEROPERATIVE EXITUS					
5-MS	20 HRS	1490 ml	-	REVISION (BLEEDING)	2B	10 DAYS
6-MS AI TI	18 HRS	630 ml	INOTROP	-	3	14 DAYS
7-DISS AORT ANEU.	2 HRS	250 ml	INOTROP	EXITUS (2ND HOUR)		EX.
8-DISS AORT ANEU.	29 HRS	1780 ml	INOTROP	REVISION (BLEEDING) MEDIASTINITIS (EX.)		123 DAYS
9-CAD	18 HRS	670 ml	INOTROP IABP	-	3	24 DAYS
10-LA MYXOMA	22 HRS	1590 ml	INOTROP	-	3	32 DAYS
11-LA MYXOMA	14 HRS	450 ml	INOTROP	-	3	10 DAYS
12-AI	18 HRS	245 ml	INOTROP	-	3	10 DAYS

Table 7 : Postoperative follow-up of group I.

CASE-DIAG	RESPIRATORY SUPPORT	HEMORRHAGE	SUPPORT	COMPLIC.	NYHA	HOSP STAY
1 - CAD	8 HRS	360 ml	-	-	2B	7 DAYS
2-CAD	10 HRS	560 ml	-	-	2B	7 DAYS
3-CAD	11 HRS	260 ml	-	-	2B	7 DAYS
4-CAD	6 HRS	450 ml	-	-	1	7 DAYS
5-CAD	8 HRS	350 ml	-	-	2B	7 DAYS
6-CAD	5 HRS	200 ml	-	-	1	7 DAYS
7-CAD	12 HRS	460 ml	-	-	2A	7 DAYS
8-CAD	10 HRS	350 ml	-	-	2A	7 DAYS
9-MS	12 HRS	360 ml	-	-	2A	7 DAYS
10-AS	10 HRS	350 ml	-	-	2B	7 DAYS
11-AI	16 HRS	240 ml	-	-	2B	10 DAYS
12-AI	18 HRS	450 ml	-	-	1	10 DAYS

Table 8 : Postoperative follow-up of group II.

CASE-DIAG	RESPIRATORY SUPPORT	HEMORRHAGE	SUPPORT	COMPLIC.	NYHA	HOSP STAY
1 - CAD	6 HRS	350 ml	-	-	2A	7 DAYS
2-CAD	5 HRS	275 ml	-	-	2A	7 DAYS
3-CAD	7 HRS	550 ml	-	-	2A	7 DAYS
4-CAD	10 HRS	440 ml	-	-	2A	7 DAYS
5-CAD	5 HRS	230 ml	-	-	2B	7 DAYS
6-CAD	10 HRS	330 ml	-	-	2B	7 DAYS
7-AI MI	12 HRS	560 ml	-	-	1	7 DAYS
8-CAD	6 HRS	440 ml	-	-	1	7 DAYS
9-MS	7 HRS	340 ml	-	-	2B	7 DAYS
10-MI	10 HRS	350 ml	-	-	2A	7 DAYS
11-CAD	12 HRS	440 ml	-	-	2B	7 DAYS
12-MI	6 HRS	350 ml	-	-	2A	7 DAYS

Table 9 : Postoperative follow-up of group III.

ABBREVIATION INDEX FOR TABLES

PTCA : Percutaneous transluminal coronary angioplasty
CAD : Coronary artery disease
MS : Mitral valve stenosis
MI : Mitral valve insufficiency
AI : Aortic valve insufficiency
AS : Aortic valve stenosis
TI : Tricuspid valve insufficiency
LA : Left atrium
LV : Left ventricle
LAD : Left anterior descending coronary artery
RCA : Right coronary artery
CX : Circumflex artery
MVR : Mitral valve replacement
AVR : Aortic valve replacement
LIMA : Left internal mammary artery
SAPH : Saphaneous vein graft

ischemia until the beginning of the operation (5). For the coronary ischemic patients, coronary perfusion catheter application can be beneficial to prevent myocardial infarction and may improve the recovery of the heart until the beginning of the operative procedure (2).

Most authors prefer emergency operations in some certain circumstances, especially during PTCA procedures, i.e. dissection, spasm or occlusion of coronary artery and following ECG changes, intractable angina, hypotension, cardiac arrest, etc. (1, 2, 6, 8). Contrary to this, there are also studies implying that the mortality of emergency operations are higher, even up to 18 % (5, 7). Recently emergency cardiac operations are regarded as having the highest severity score for preoperative risk factors, such as left ventricular dysfunction, reoperation, advanced age and renal insufficiency (3).In our study, it is interesting that there is no significant difference between Group II and III with respect to the operative results. The mortality and morbidity is significantly higher in Group I as it may be expected. Actually, 7 of those patients were operated becuse of cardiac arrest while the remaining 4 for end-stage congestive heart failure. Postoperatively, almost all of the patients required intensive care for a very long time, because of multiorgan failure. As the preoperative status is considered, immediate operations would be lifesaving and perhaps the last chance for the patients who had nothing to lose.

It was not possible to prepose a standart in the classification of patients preoperatively, because of the emergency of the patients. But Group III were composed of patients chosen at random among the patients undergoing routine elective surgery. The comparison between the groups was done according to the criteria that had been conventionally accepted in other studies.

We believe that, immediate or urgent surgery in necessary circumstances would be the most effective means of limiting the time myocardium remains ischemic, and the surgical backup in emergency cases would be designed so as to provide the patients the best possible care among with conventional cardiologic supportive procedures.

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REFERENCES

1. Cameron D, Stinson D, Greene P, Gardner T : Surgical standby for PTCA-A survey of patterns of practice. Ann Thorac Surg 1990; 50 : 35-39.
2. Christakis G, Weisel R, Fremes S, Ivanov J, David T, Goldman B, Salerno T : Coronary artery bypass grafting in patients with poor ventricular function. J Thorac Cardiovasc Surg 1992; 103 : 1083-1092.
3. Estafanous F, Higgins T, Loop F : A severity score for preoperative risk factors as related to morbidity and mortality in patients with coronary artery disease undergoing myocardial revascularization surgery. Current Opinions in Cardiology 1992; 7 : 950-958.

4. Ferguson B, Muhlbaier L, Salai D, Wechsler AS : Coronary bypass grafting after failed elective and failed emergent PTCA. J Thorac Cardiovasc Surg 1988; 95 : 761-772.
5. Parsonnet V, Fisch D, Gielchinsky I, Hochberg M, Hussain M, Karanam R, Rothfeld L, Klapp L : Emergency operations after failed angioplasty. J Thorac Cardiovasc Surg 1988; 96 : 198-203.
6. Reul G, Cooley D, Hallman G, Duncan JM, Livesay J, Frazier OH, Ott D, Angelini P, Massumi A, Muthur V : Coronary artery bypass for unsuccessful PTCA. J Thorac Cardiovasc Surg 1984; 88 : 685-694.
7. Sethna D, Postel J : Perioperative mortality and morbidity of coronary artery bypass grafting. Current Opinion in Cardiology 1992; 7 : 973-983.
8. Wilson J, Dunn E, Creighton B, Bailey W, Callard G, Melvin D, Mitts D, Will R, Flege J : The cost of simultaneous surgical standby for PTCA. J Thorac Cardiovasc Surg 1986; 91 : 362-370.