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=Abstract=

**Central Nervous System Complications of Coronary Artery Bypass Grafting - Comparison Between Off - Pump CABG and Conventional CABG**

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**Background:** Central nervous system complication after coronary artery bypass grafting (CABG) is one of the major prognostic determinants and the use of the cardiopulmonary bypass(CPB) may increase the incidence of this devastating complication. In this study, the outcomes after off-pump CABG were studied and compared with those following the conventional CABG using CPB. **Material and Method:** Among the consecutive isolated CABG's performed in SNUH during Feb. 1995 and Jun. 1999, 338 coronary artery bypass grafting were divided into two groups. 223 patients underwent CABG using the CPB(Group I), and 115 patients underwent CABG without CPB(OPCAB)(Group II). All patients enrolled in this study received extensive preoperative examinations including thorough neurologic examination before and after surgery, transcranial doppler study, carotid duplex ultrasonography, and magnetic resonance angiography if necessary. Central nervous system(CNS) complications were defined as stroke, seizure, metabolic or hypoxic encephalopathy and transient delirium after surgery. **Result:** There were 61 cases(27.3%) who developed postoperative CNS complication in Group I, whereas 8 cases(7.0%) of CNS complications developed postoperatively in group II(p<0.05). Statistically significant predictors of postoperative CNS complications in group I were age and the use of cardiac assist devices perioperatively. **Conclusion:** This study suggested that omitting the use of CPB in CABG resulted in significant decrease of the postoperative CNS complications. OPCAB should be more widely

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(transient delirium or post-operative psychosis)

가 , , ,  
 , , ,  
 가  
 6) 1995 2 1998 12  
 223 I , 1998 1  
 1999 6  
 115 II

7)  
 Student t-test chi square test  
 SPSS(ver. 9.0  
 General linear  
 SPSS Inc. Chicago. Illinois)

model log  
 8)  
 165 , 98  
 . I single clamp technique

(mild to moderate hypothermia) . II  
 (normothermia)  
 (side clamp)

가  
 (VAD)

1.  
 I 59 ± 8 , II 60 ± 9  
 , 60  
 , I 166 : 57, II  
 86 : 29 가 (Table 1).

2.  
 가  
 , ,  
 (Table 1).

3.  
 I 61 (27.4%), II 8  
 (7.0%)

**Table 1.** Patients characteristics including preoperative risk factors comparison for ischemic heart disease

| Group          | I        | II      | p-value |
|----------------|----------|---------|---------|
| Age            | 59 ± 8   | 60 ± 9  | ns      |
| Sex(M:F)       | 166 : 57 | 86 : 29 | ns      |
| Hypertension   | 46%      | 45%     | ns      |
| DM             | 26%      | 35%     | ns      |
| Smoking        | 58%      | 55%     | ns      |
| Hyperlipidemia | 18%      | 20%     | ns      |

ns, not significant; DM, Diabetes mellitus

**Table 2.** Patients characteristics associated with neurological risk factor

| Group           | I       | II      | p-value |
|-----------------|---------|---------|---------|
| previous stroke | 27(12%) | 12(10%) | ns      |
| ICAD            | 64(29%) | 25(22%) | ns      |
| ECAD            | 79(35%) | 39(34%) | ns      |

ICAD, intracranial artery disease; ECAD, extracranial artery disease

(Table 2)  
 가  
 (Table 3). ECAD  
 70% 가 I 9 (4.0%), II  
 4 (3.5%) , ICAD 50%  
 가 I 13 (5.8%), II 11 (9.6%)  
 4.

I 108 , 6  
 , II 22 I

5.  
 I 10 (4.5%), II 3 (2.6%)

I 61 (27.4%), II 8  
 (7.0%)

**Table 3.** Neurological risk factor according to disease severity

| Group     | I    |           | II      |           | p=ns |
|-----------|------|-----------|---------|-----------|------|
|           | ECAD | ICAD      | ECAD    | ICAD      |      |
| 0(normal) | 144  | 0(normal) | 159     | 0(normal) | 76   |
| 1(<30%)   | 50   | 1(<50%)   | 51      | 1(<30%)   | 21   |
| 2(30-70%) | 20   | 2(>50%)   | 13      | 2(30-70%) | 14   |
| 3(>70%)   | 9    |           | 3(>70%) | 4         | 11   |

ICAD, intracranial artery disease; ECAD, extracranial artery disease

**Table 4.** Frequency of CNS complications

| CNS Complication | Group I   | Group II | p=    |
|------------------|-----------|----------|-------|
| Stroke           | 8(3.6%)   | 2(1.7%)  | ns    |
| Seizure          | 7(3.1%)   | 0(0%)    | ns    |
| Encephalopathy   | 51(22.9%) | 5(4.3%)  | <0.01 |
| Delirium         | 5(2.2%)   | 1(0.9%)  | ns    |

**Table 5.** Risk factor analysis in two groups

| Factors         | Group I    |              | Group II   |              |
|-----------------|------------|--------------|------------|--------------|
|                 | Univariate | Multivariate | Univariate | Multivariate |
| Age(>60yrs)     | <0.00      | <0.0         | ns         | ns           |
| Smoking         | ns         | ns           |            |              |
| Hypertension    | ns         |              | ns         |              |
| DM              | ns         |              | ns         |              |
| Hyperlipidemia  | ns         |              | ns         |              |
| Previous stroke | <0.05      | ns           | ns         | ns           |
| ICAD(>50%)      | ns         | ns           | ns         | ns           |
| ECAD(>70%)      | ns         | 0.057        | ns         | ns           |
| IABP            | <0.005     | ns           | ns         | ns           |

DM, Diabetes mellitus; ICAD, intracranial artery disease; ECAD, extracranial artery disease; IABP, Intraaortic balloon pump.

II 3 가 , 30 II  
 가 , 2  
 (EF=34%)  
 111  
 (ARDS)  
 31 . I 10  
 2 가 ,  
 8 7  
 가 .  
 I 51  
 (22.9%), 8 (3.6%), 7 (3.1%),  
 5 (2.2%) , II  
 5 (4.3%), 2 (1.7%),  
 , 1 (0.9%) ,  
 가 II  
 (Table 4).

6. 가 .  
 II (Table  
 5). 가  
 , I ,  
 , II  
 가 .  
 , , ,

, I 61%

, 가 가 , ,

. II 가 .

, 가 , 가 , 가 - <sup>11)</sup> S-100

, 가 가 가

, 가 가 가

, 가 가 가 <sup>12,13)</sup>

1998 <sup>7)</sup> 28.9%

가 Pukas <sup>8)</sup> 2.2%

TIA , .

McKhann <sup>9)</sup> 456 5.7%

, Rao <sup>10)</sup> 3910 가 , 70% 가 (3.8%)

(normothermic systemic perfusion), 70 TIA , .

, 가 I

I II 가 가 ,

1 5% 2.9%

(encephalopathy) 가 I

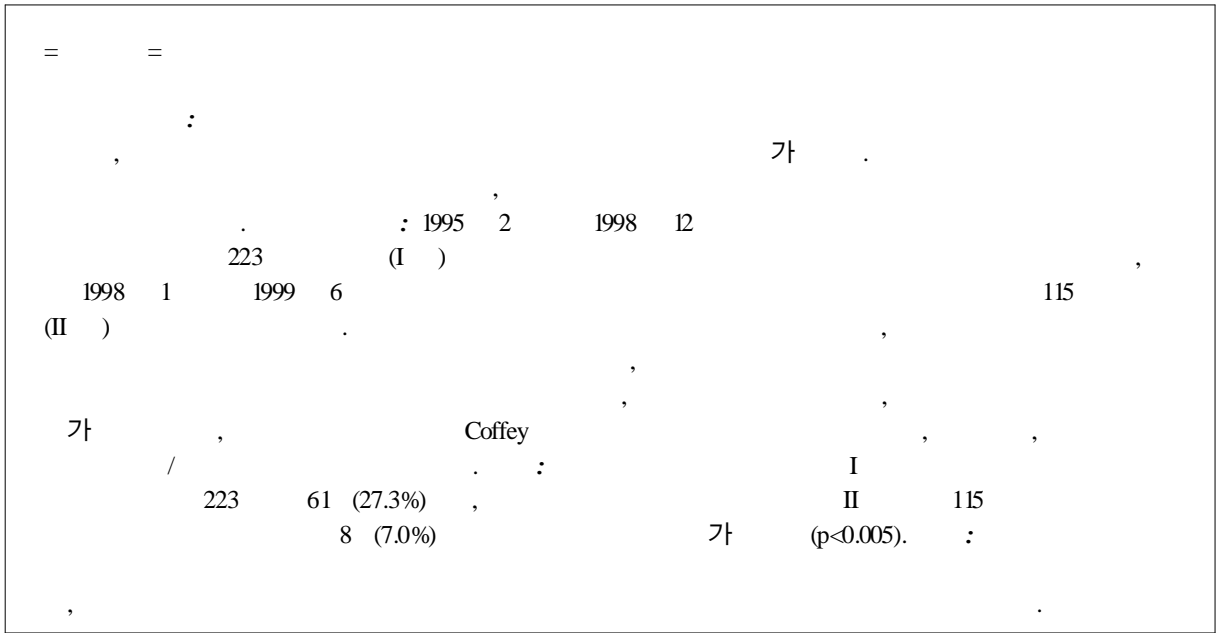
(delirium) (80 )

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- 3.