

Urgent EC-IC Bypass for Symptomatic Atherosclerotic Ischemic Stroke

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Introduction

Previous studies have shown that extracranial-intracranial (EC-IC) bypass surgery has no preventive effect of subsequent ipsilateral ischemic stroke in patients with symptomatic atherosclerotic internal carotid occlusion and hemodynamic cerebral ischemia. However, few studies have assessed whether an urgent EC-IC bypass surgery is an effective treatment for main trunk stenosis or occlusion in acute stage.

Methods

The authors retrospectively reviewed 58 consecutive patients who underwent urgent EC-IC bypass for symptomatic stenosis or occlusion at internal carotid artery or middle cerebral artery between January 2003 and December 2011. Clinical characteristics and neuroimaging were evaluated and analyzed.

Results

Based on preoperative angiogram, the responsible lesions were internal carotid artery in 19 (32.8%) patients and middle cerebral artery in 39 (67.2%). No hemorrhagic complication occurred. Sixty nine percent of patients showed an improvement of neurological function after surgery and 74.1% of patients had favorable outcome. Unfavorable outcome was associated with insufficient collateral flow and new infarction after bypass surgery.

Conclusions

Although EC-IC anastomosis for acute ischemic stroke is still debatable, it may be a good option for medication-resistance stenooclusive disease.

Table 1

Table 1. Demographic data in 58 patients undergoing urgent EC-IC bypass

Characteristic	Value (%)
Left-sided lesions	34 (58.6)
Preoperative symptoms	
Conscious disturbance	38 (65.5)
Motor weakness	43 (74.1)
Aphasia	20 (34.5)
Cognitive disturbance	7 (12.1)
Crescendo TIA	5 (8.6)
Affected arteries	
Cervical ICA	9 (15.5)
Intradural ICA	10 (17.2)
Proximal M1	17 (29.3)
Distal M1	11 (19.0)
M2	11 (19.0)
Procedures	
Single bypass	37(63.8)
Double bypasses	21(36.2)
Postoperative state	
Improved	40 (69.0)
Unchanged	13 (22.4)
Worsened	5 (8.6)
New infarction after surgery	23 (40.0)
Surgical complication	
major	4 (6.9)
minor	4 (6.9)
Outcome at discharge	
Favorable (GR, MD)	43 (74.1)
Unfavorable (SD, VS, D)	15(25.9)

TIA: transient ischemic attack, ICA: internal carotid artery, MCA: middle cerebral artery, GR: good recovery, MD: moderate disability, SD: severe disability, VS: vegetative state, D: dead

Table 2

Table 2. Minor and major complications after bypass surgery

Complication	Value
Minor	
Wound necrosis	2
Wound infection	1
Forehead palsy	1
Major	
Myocardial infarction	2
Perforator infarction	1
Remote infarction	1

Table 3

Table 3. Clinical relationship between favorable and unfavorable outcome of patients who underwent urgent EC-IC bypass.

	Outcome (%)		p Value (test)
	Favorable	Unfavorable	
No. of patients	43	15	
Mean age ± SD (years)	69.3 ± 11.4	73.7 ± 7.0	.17*
Sex			.82†
Female	13	5	
Male	30	10	
Affected side			.28†
Right	16	8	
Left	27	7	
Location of steno-occlusion			.18†
ICA	12	7	
MCA	31	8	
Collateral flow			.003†
Good	21	5	
Moderate	21	5	
Poor	1	5	
Bypass			.21*†
Single	25	12	
Double	18	3	
New infarction			< .001*†
Present	10	13	
Absent	33	2	

* Unpaired t test.

† Pearson's chi-square test.

*† Fisher's exact test