

뇌동맥류의 조기수술 전 재출혈 방지를 위한 항섬유소용해제 투여의 효과

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= Abstract =

The Effect of Antifibrinolytic Therapy in Prevention of Rebleeding before Early Aneurysm Surgery

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Object : This study was conducted to evaluate whether short - term intravenous infusion of tranexamic acid (AMCA) was able to improve the management outcome by preventing rebleeding without increasing vasospasm and hydrocephalus associated with the long - term administration of this agent in the patients with aneurysmal subarachnoid hemorrhage(SAH) who were planned for the early surgery.

Methods : During the period from June, 1996 to May, 1998, 137 patients admitted within 3 days of their SAH and planned for early surgical intervention were subject to study population. Of these, 60 patients who had been treated with AMCA were classified as AMCA treated group and 77 patients without AMCA treatment as AMCA untreated group. Initially, prognostic factors for rebleeding, vasospasm, hydrocephalus and outcome following SAH including age, sex, clinical grade, CT grade, site of ruptured aneurysms, admission day after SAH, surgery day after SAH, number of aneurysms and hypertension history, were analyzed and compared between AMCA treated group and untreated group. Secondly, the incidence of rebleeding, symptomatic vasospasm and hydrocephalus were compared between the two groups. Also, the management outcome of the patients was compared between the two groups.

Results : There were no significant differences in prognostic factors between the two groups. The rebleeding rate was 0% in the AMCA treated group whereas the rate was 7.8% in the untreated group. This difference was statistically significant. The incidences of symptomatic vasospasm and hydrocephalus were found not to be significantly different between the two groups. Of the treated group, 31.7% of patients developed hydrocephalus compared to 32.5% of those at the untreated group. Fourteen(23.3%) patients in treated group developed symptomatic vasospasm and 6 of them(10%) suffered stroke whereas incidences of these in untreated group were 25.9% and 11.7%, respectively. The AMCA treated group showed more favorable outcome than that of untreated group. There was no case of death by rebleeding in the AMCA treated group while one of the main causes of death in the untreated group was rebleeding.

Conclusion : Short - term high - dose AMCA administration is considered beneficial in improving outcome and diminishing the risk of rebleeding in the patients who suffer from an aneurysmal SAH prior to early surgical intervention.

KEY WORDS : Aneurysm · Early surgery · Rebleeding · Antifibrinolytic therapy.

서 론

가

17)28)

48

2

20% 19)28).

70~90%
 23)28)
 가
 24)
 가
 20)
 17)
 1990 International Co-operative Study on the Timing of Aneurysm Surgery (IC-STAS)
 5.7%
 21)
 22)
 tranexamic acid(trans-aminomethyl cyclohexane carboxylic acid, AMCA)
 가 , 가

재료 및 방법

1. 연구 대상

1997 6 1998 3 9
 96
 3
 AMCA 60
 1996 6 1997 5 1
 3
 4
 77 . AMCA 60
 , AMCA 77 AMCA
 . AMCA transamin(,)
 2g
 4g
 가
 가
 가

2. 연구 방법

, , , ,
 (CT)
 20)30)
 AMCA 가
 Statistical Analysis System(SAS)
 Chi-square test Fisher's exact test
 0.05
 0
 Hunt & Hess¹³⁾ , CT
 Fisher⁸⁾ Jennett
 16)
 가 , ,
 가
 AMCA 가 59
 10 (: 7 13),
 가 72 19
 (: 13 25).
 가
 CT
 CT

결 과

1. AMCA 투여군과 비 투여군에서 예후에 영향을 미칠 수 있는 인자들에 대한 양군간 비교분석

AMCA 가
 73.3%, 70.1%, 56.2 , 56.1 ,
 가 31.7%, 29.9%, 가
 25.0%, 16.9% .
 AMCA 가 48.0%,
 52.2% 가 54.5%,
 45.5% . CT AMCA
 6.7%, 88.3% , 3.9%, 91.0%

가 AMCA 75.0%, 66.2%

AMCA 3.4%, 6.4%

Table 1. Comparison of prognostic factors between tranexamic acid treated group and untreated group

Factors	No. of patients(%)	
	AMCA treated group(N=60)	AMCA untreated group(N=77)
Age(mean years)	28 - 75(56.2)	36 - 82(56.1)
Less than 40	3(5.0)	5(6.5)
41 - 50	20(33.3)	20(26.0)
51 - 60	17(28.4)	23(29.9)
More than 61	20(33.3)	29(37.6)
Sex		
Male	16(26.7)	23(29.9)
Female	44(73.3)	54(70.1)
No.of aneurysms		
Single	45(75.0)	64(83.1)
Multiple	15(25.0)	13(16.9)
Hypertension history		
Yes	19(31.7)	23(29.9)
No	41(68.3)	54(70.1)
Clinical grade*		
I	29(48.0)	42(54.5)
II	24(40.0)	27(35.1)
III	7(12.0)	8(10.4)
CT grade**		
I	4(6.7)	3(3.9)
II	53(88.3)	70(91.0)
III	3(5.0)	4(5.1)
Sites of ruptured aneurysms		
ACA	22(36.7)	34(44.2)
ICA	19(31.7)	24(31.2)
MCA	16(26.7)	15(19.5)
VBA	3(4.9)	4(5.1)
Admission day after SAH		
0	45(75.0)	51(66.2)
1	12(20.0)	21(27.3)
2	2(3.3)	4(5.2)
3	1(1.7)	1(1.3)
4		
Surgery day after SAH		
0	2(3.4)	5(6.4)
1	16(26.7)	26(33.8)
2	17(28.3)	18(23.4)
3	17(28.3)	20(26.0)
4	8(13.3)	7(9.1)

* : Hunt & Hess grade on admission ** : Fisher's grade
 AMCA treated group vs. untreated group : p>0.05
 Abbreviation : SAH=subarachnoid hemorrhage ; ACA=anterior cerebral artery ; ICA=internal carotid artery ; MCA=middle cerebral artery ; No=number ; AMCA=tranexamic acid

AMCA 95.1%, 94.9%, 5.1%

(Table 1).

2. 재출혈의 발생률

AMCA 77 6 (7.8%)

(p=0.035)(Table 2).

3. 증상적 혈관연축의 발생률

AMCA 77 20 (25.9%)

9 (11.6%) 60 14 (23.3%)

6 (10%)
 (Table 2).

4. 뇌수두증의 발생률

AMCA 77 25 (32.5%)

14 (18.2%) 60

19 (31.7%)

14 (23.3%)

, AMCA

(Table 2).

Table 2. The incidence of complications

Complications	No. of patients(%)		Significance (p value)
	AMCA treated group(N=60)	AMCA untreated group(N=77)	
Rebleeding	0(0.0)	6(7.8)	0.035
Symptomatic vasospasm	14(23.3)	20(25.9)	NS
Infarction	6(10.0)	9(11.7)	NS
Hydrocephalus	19(31.7)	25(32.5)	NS
Transient	5(8.4)	11(14.3)	NS
Permanent	14(23.3)	14(18.2)	NS

Abbreviation : NS=no significance ; AMCA=tranexamic acid

Table 3. The results of outcome

Outcome	No. of patients(%)	
	AMCA treated group(N=60)	AMCA untreated group(N=77)
Favorable*	54(90.0)	59(76.6)
Unfavorable**	8(10.0)	18(23.4)

* : Favorable outcome includes good recovery and moderate disability

** : Unfavorable outcome includes severe disability, vegetative state and death

AMCA treated group vs. untreated group : p<0.05

Abbreviation : AMCA=tranexamic acid

Table 4. Causes of unfavorable outcome

Causes	AMCA treated group(N=60)			AMCA untreated group(N=77)		
	Poor	Dead	Total	Poor	Dead	Total
Direct effect of bleeding	1	0	1	3	2	5
Rebleeding	0	0	0	0	3	3
Vasospasm	2	2	4	3	3	6
Hydrocephalus	0	0	0	1	0	1
Surgical complication	0	0	0	0	1	1
Medical complication	0	1	1	0	2	2
Total	3	3	6	7	11	18

Abbreviation : AMCA=tranexamic acid

5. 양 군의 치료결과

AMCA 60 가
 가 54 (90%), 가 8 (10%)
 , 77 가 59 (76.6%),
 가 18 (23.4%) AMCA

(Table 3).

6. 치료결과가 불량한 예 및 사망한 예들의 원인

, AMCA
 4 (66.7%) 가
 1
 6 (33.3%), 5 (27.8%),
 3 (16.7%) AMCA
 , AMCA
 2 (66.7%) 가
 3 (27.3%)
 (Table 4).

고찰

가 15)32)34)
 Tovi 34)
 가 가
 plasminogen plasmin
 가 plasminogen
 plasmin
 가 5)
 acid(EACA) 1962 Okamoto
 acid(AMCA) 4)5)10)
 Patterson 27) 가
 Tovi 32) AMCA
 AMCA가
 가 Norlen
 25) 14 AMCA
 , Gibbs 12)
 AMCA가 가 2)6)10)19)35)
 가
 50%
 7 가
 가 1)9)20)35)36) Fodstad
 9)
 . Kassell 20)
 가

가 21

14)17)

가 2 3

가 17) Leipzig 22) Tovi³¹⁾ Fodstad¹¹⁾ AMCA 가 AMCA

8 24

5.1%

가 4g

AMCA Fodstad¹¹⁾ AMCA 가

24 가

1990 ICSTAS 3 2g stad¹¹⁾ Tovi³¹⁾ Fod- 4g

5.7% AMCA IC- AMCA

21) 77 6 (7.6%) 가 7.8%

STAS AMCA 가 가

22) 1974 Corkill⁷⁾ 가

1997 Leipzig²²⁾ 307 EACA 가

5 10g 9)20)26)35)

36 48g AMCA 25.9%

, 1.3% AMCA EACA 8 20 23.3%

3)4)29) AMCA 2)12)28)33) 11.6%, 10%

Tovi³¹⁾ Tovi³³⁾ AMCA 가

AMCA 1

1g 6 , 2 1g 4

AMCA AMCA 가 2mg/l AMCA

32.5%

15 20mg/kg 18.2%

6 Schisano²⁹⁾ AMCA 31.7%

7 2 4g , 28 Trasylool 23.3%

2 3g , 20 1g AMCA

가
 AMCA
 가 90%
 AMCA
 , AMCA
 66.7% 가
 ,
 27.3% 가
 . AMCA
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