

자발성 지주막하출혈 후 발생하는 수두증에 대한
 단락술의 필요성 및 예후에 관한 분석*
 - 뇌실외배액술의 기간, 일일배액량 및 총배액량과 예후관계 -

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= Abstract =

The Analysis of the Need Rate of Shunt and the Outcome in
 Hydrocephalus Following SAH
 - Relationship between the Outcome and the Duration,
 Daily and Total Amount of CSF Drainage at EVD -

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Objective : Hydrocephalus and vasospasm are the common complications following subarachnoid hemorrhage (SAH). In spite of development of perioperative management and operative technique, hydrocephalus cause neurological deficit and poor prognosis. Usually CSF drainage procedure(external ventricular drainage(EVD) or shunt) is needed in hydrocephalus following SAH. The aim of this study was to investigate whether the need for shunting and the outcome after shunting in hydrocephalus following SAH can be related to the duration, daily and total amount of cerebrospinal fluid(CSF) drainage at EVD.

Material and Method : IVH is one of several factors which cause hydrocephalus. In this retrospective study, firstly we investigated the incidence of IVH in total cases and frequency of IVH according to aneurysmal site and then prognosis of IVH following SAH.

Among 629 patients with SAH, hydrocephalus was diagnosed by CT scan and symptoms. And then those 102 hydrocephalus following SAH were divided into two groups which were hydrocephalus with IVH group and without IVH group. In these two groups, we investigated and compared the incidence of hydrocephalus in all case, frequency of hydrocephalus according to aneurysmal site, the outcome according to H - H grade on admission and the need rate of shunt, etc.

Of those hydrocephalus, 100 EVD procedures were done. The duration, daily and total amount of CSF drainage at EVD were investigated. Fifty cases expired during EVD was excluded. We analyzed whether the need rate of shunt and the final outcome after shunting can be related to IVH, the duration and daily and total amount of CSF drainage.

Result : The incidence of hydrocephalus following SAH was 20%(with IVH group ; 64%, without IVH group ; 11%). As H - H grade on admission was better, the outcome of hydrocephalus was also better. The mortality rate of hydrocephalus with IVH was 64% which was higher than 40% that of hydrocephalus without IVH.

The need rate of shunt in all cases of hydrocephalus following SAH was 20%, but those with IVH group excluding expired patients before shunt was 40%. This was very similar to 41% of the need rate of shunt in hydrocephalus without IVH. The total amount of CSF drainage was statistically related to the need rate of shunt(total amount : need rate of shunt/<1000cc : 15%, 1000 - 2000cc : 40%, >2000cc : 50%). The duration and daily amount of CSF drainage

*5th JKFC
 *'99
 *2000 AANS

were not statistically related to the need rate of shunt, but as daily amount of CSF drainage was more and duration was longer, the need rate of shunt was increased(daily amount : need rate of shunt /<100cc : 16%, 100 - 200cc : 25%, >200cc : 40%/duration : need rate of shunt/<1week : 8%, 1 - 2weeks : 30%, >2weeks : 47%), and also the final outcome after shunting was poor. Especially the total amount of CSF drainage was significant related to the final outcome after shunting(total amount : GOS/<1000cc : I&II(3/4), 1000 - 2000cc : II(2/4), III(2/4), >2000cc : III&IV(6/7)).

Conclusion : This study revealed that the incidence and mortality rate of hydrocephalus following SAH were influenced by IVH. So SAH associated IVH has the higher incidence of hydrocephalus and poor outcome. As the CSF drainage amount was more and duration of drainage was longer, the need rate of shunt was increased and the final outcome after shunting was poor. Especially the total amount of CSF drainage were strongly related to the need rate of shunt and the outcome after shunting.

KEY WORDS : External ventricular drainage · Intraventricular hemorrhage · Subarachnoid hemorrhage · Hydrocephalus · Shunt · Outcome.

서론

가, (subarachnoid hemorrhage), 1, 2, 대상과 방법

1988 1 1998 6 (blood clot) 4 629 (arachnoid villi) 3)11)22) (arachnoid granule) 가 5) (intraventricular hemorrhage), 가, (Hunt Hess grade), 107 69 13) 522 57 (3), (4~13), (2) 11)21) 100 126 50 50 , 1 ,

GOS(glasgow outcome scale) 가 .
 1 , 1~2 , 2 ,
 1,000cc , 1,000~2,000cc, 2,000cc , 1
 100cc , 100~200cc, 200cc

posterior circulation aneurysm) 6 (5%) ,
 8 (ICA bifurcation :
 internal carotid artery bifurcation), (peri-
 callosal artery), (A1), (M1)
 가
 172 (33%), 131 (25%),
 94 (18%), 16 (3%),
 109 (21%)

결 과

1. 지주막하출혈후 뇌실내출혈 분석

1) 연령과 성별차이

629
 107 17% 26~84
 58.7 . 50 33 (31%) 가
 , 60 32 (30%) 50
 60 61% . 가 42 (39%), 가 65
 (61%)
 가 21~85 53.3 . 50 가
 146 (28%), 40 가 128 (25%), 60 가 116 (22%)
 . 가 179 (34%), 가 343 (66%)
 (Table 1).

2) 입원당시의 의식수준과 예후

H -
 H grade , V가 56%, GOS , 가 22%
 GOS 64% .
 H - H grade , 가 55%, GOS , 가 66% GOS
 25% .
 가
 64%
 25%
 가 (p<0.05)(Table 1).

3) 동맥류 위치에 따른 뇌실내출혈의 빈도

(ACoA aneurysm : anterior commu-
 nicating artery aneurysm)가 54 (51%) 가 ,
 (MCA bifurcation : middle
 cerebral artery bifurcation) 22 (21%),
 (PCoA aneurysm : posterior communicating artery ane-
 urysm) 17 (16%), (Post. circulation :

(p<0.05).

4) 뇌실내출혈에서 뇌실계측

Evans ratio
 (18~30) 13 (12%),
 (31~33) 34 (32%),
 (34~40) 48 (45%), (41) 11
 (10%) .

Table 1. Comparison of clinical characteristics between SAH with and without IVH

	No. of patient(%)	
	w/ IVH	w/o IVH
Age(year)		
29	2(2)	15(3)
30 - 39	10(9)	74(14)
40 - 49	9(8)	128(25)
50 - 59	33(31)	146(28)
60 - 69	32(30)	116(22)
70	21(20)	43(8)
Sex		
Male	42(39)	179(34)
Female	65(61)	343(66)
H-H grade		
I	2(2)	52(10)
II	18(17)	233(45)
III	28(26)	115(22)
IV	38(36)	84(16)
V	21(20)	35(7)
GOS		
I	12(11)	235(46)
II	12(11)	102(20)
III	9(8)	25(5)
IV	5(5)	17(3)
V*	69(64*)	128(25*)
Total	107(100)	522(100)

SAH : subarachnoid hemorrhage
 IVH : intraventricular hemorrhage
 H-H grade : Hunt-Hess grade, GOS : Glasgow Outcome Scale
 * : p<0.05

2. 지주막하출혈후 수두증 분석

가 (p<0.05)

1) 연령과 성별차이

(Table 2).

629
 126 20%
 69 (64%) 58.1 , 107
 81 , 60 가 26 (38%) 가 27~
 (61%) 29 (39%) 가 40
 522 57 11%
 53.2 , 27~72 , 50
 가 20 (35%) 가 가 38 (66%)
 19 (34%)

H - H grade
 H - H grade , GOS ,
 가 9 (13%) H - H grade , V GOS , V
 가 37 (53.6%) H - H
 grade , GOS , 가 23 (40.3%) H - H
 grade , V GOS , V가 15 (26.4%)

H - H grade가

(Table 3, 4).

60 (Table 2).

Table 2. Comparison of clinical characteristics between hydrocephalus with and without IVH following SAH

2) 수두증의 기간별 발생빈도

64%

59 , 91%
 6 , 4 : 35 , : 12 ,
 : 10)
 가
 가
 (p<0.05)(Table 2).

	No. of patient(%)		
	w/ IVH	w/o IVH	Total
Age(year)			
29	1(1)	1(2)	2(2)
30 - 39	5(7)	8(14)	13(10)
40 - 49	6(9)	12(21)	18(14)
50 - 59	21(30)	20(35)	41(33)
60 - 69	26(38)	14(25)	40(32)
70	10(14)	2(4)	12(10)
Sex			
Male	29(39)	19(34)	48(38)
Female	40(61)	38(66)	78(62)
Stage			
Acute(- 3days)	59(91)	35(61)	94(75)
Subacute (4days - 2weeks)	6(8)	12(21)	18(14)
Chronic(2weeks -)	4(6)	10(18)	14(11)
Total incidence*	69/107(64*)	57/522(11*)	126/629(20)
H-H grade			
I		2(4)	2(2)
II	7(10)	20(35)	27(21)
III	17(25)	17(30)	34(27)
IV	31(45)	12(21)	43(34)
V	14(20)	6(11)	20(16)
GOS			
I	3(4)	14(25)	17(13)
II	9(13)	12(21)	21(17)
III	5(7)	4(7)	9(7)
IV	8(12)	4(7)	12(10)
V*	44(64*)	23(40*)	67(53)
Total	69(100)	57(100)	126(100)

* : This value is statistical significant(p<0.05)

3) 수두증 환자의 내원시 H-H grade와 예후

H - H grade , V
 H - H grade
 가 45 (65%)
 , 18 (32%)
 가 107 32
 126 67
 53%(: 64%, : 40%)

Table 3. H-H grade and GOS in hydrocephalus with IVH following SAH

GOS	No. of patient(%)					Total
	H-H grade					
	I	II	III	IV	V	
I	1(1.4)	2(2.9)				3(4.3)
II	2(2.9)	4(5.8)	3(4.3)			9(13.0)
III				5(7.2)		5(7.2)
IV	1(1.4)	2(2.9)	5(7.2)			8(11.6)
V	3(4.3)	9(13.0)	18(26.1)	14(20.3)		44(63.8)
Total	7(10.1)	17(24.6)	31(44.9)	14(20.3)		69(100)

Table 4. H-H grade and GOS in hydrocephalus without IVH following SAH

GOS	No. of patient(%)					Total
	H-H grade					
	I	II	III	IV	V	
I		8(14.0)	5(8.8)	1(1.8)		14(24.6)
II	1(1.8)	3(5.3)	7(12.3)	1(1.8)		12(21.1)
III		2(3.5)	1(1.8)	1(1.8)		4(7.0)
IV			3(5.3)		1(1.8)	4(7.0)
V	1(1.8)	7(12.3)	1(1.8)	9(15.8)	5(8.8)	23(40.3)
Total	2(3.5)	20(35.0)	17(30.0)	12(21.1)	6(10.5)	57(100)

Table 5. Aneurysm site in hydrocephalus with and without IVH following SAH

Aneurysm site	No. of patient(%)	
	w/ IVH	w/o IVH
ACoA	24/54(44)	26/172(15)
MCA bifurcation	4/22(18)	8/131(1)
PCoA	6/17(35)	9/ 94(9)
Post. circulation A	3/ 6(50)	5/ 16(31)

Table 6. The need rate of shunt in hydrocephalus after SAH

	No. of patient	
	w/ IVH	w/o IVH
Hydrocephalus after SAH	69	57
Death before shunt	44	20
Shunt(except death before shunt)	10/25(40%)	15/37(41%)
Need rate of shunt	10/69(14%)	15/57(26%)
Total need rate of shunt	25/126(20%)	
EVD	53	47
Death during EVD	34	16
Shunt after EVD (except death during EVD)	5/19(26%)	10/31(32%)

4) 동맥류 위치에 따른 수두증 발생빈도

(50%) (44%) (31%) (15%) (Table 5). (26%),

3. 뇌실외배액술과 단락술

126 25 (20%) 69 10 (14%), 57 15 (26%) 가 H - H grade가 가 (8%), 1~2 15 7 (47%) 가 (w/ IVH vs w/o IVH : 40% vs 41%)(Table 6).

53 , 47 , 19 5 (32%) (Table 6).

(lumbar subarachnoid - peritoneal shunt) 7 , - (ventricular - peritoneal shunt) 2 , - (ventricular - atrial shunt) 1 . 3 가 , 2

4. 뇌실의 뇌척수액 배액 기간, 1일 배액량 및 총 배액량에 따른 단락술의 필요성과 예후

1 12 1 (8%), 1~2 23 7 (30%), 2 15 7 (47%) 가 1,000cc 26 4 (15%), 1,000~2,000

Table 7. The rate of shunting according to drainage amount and duration

	EVD	No. of patient	
		EVD	Shunt(%)
Duration of drainage	<1 week	12	1(8)
	1 - 2 weeks	23	7(30)
	>2 weeks	15	7(47)
Total drainage amount*	<1,000cc	26	4(15)
	1,000 - 2,000cc	10	4(40)
	>2,000cc	14	7(50)
Daily drainage amount	<100cc	6	1(16)
	100 - 200cc	24	6(25)
	>200cc	20	8(40)

Table 8. GOS according to CSF drainage amount and duration

	EVD	GOS			
		I	II	III	IV
Duration of drainage	<1 week				1
	1 - 2 weeks	1	4	2	
	>2 weeks		1	2	4
Total drainage amount*	<1,000cc	1	2		1
	1,000 - 2,000cc		2	2	
	>2,000cc		1	2	4
Daily drainage amount	<100cc				1
	100 - 200cc	1	4	4	
	>200cc		1	3	4

cc 10 4 (40%), 2,000cc 14
 7 (50%) 가
 가 (p<0.05) (Table 7).

1 100cc 6 1 (16%), 100~
 200cc 24 6 (25%), 200cc 20
 8 (40%) 1 가

(Table 7).

1

(4 3)

가

100cc 1

. 1
 가 GOS
 (H - H grade)
 가 (Table 8).

고 찰

3).

가 3)5)13)21)22).

Bagley²⁾가 1928

1930 Winkelman Fay²⁵⁾가

6~67%

가

3). Wenig²⁴⁾

85.18%

62.9%

Galera Greitz⁷⁾

34%

19%

Penn¹⁴⁾

li-

near measurement가

가

. The Cooperative Aneurysm Study⁹⁾

14%

64%

11%

13). Silver¹⁸⁾

13~37%

48~57%

22).

17%

51% 가

가

. Neil¹³⁾

29.7%,

15.9%

24.1%,

14.6%

64%

11%

(p<0.05)

가 가 .

35%, 50%, 44%, 18%, 15%, 22).

Neil ¹³⁾ 4 가 22).

Foltz Ward⁶⁾가 2 가 (catheter)

5)11) 2 가 2

6~30% H - H grade 가 2

가 가 5).

4- 7)11)12)15)17)19) 가 가 가

가 가 가 (ventriculitis)

11)22) dis 8)20)23) Staphylococcus epidermi-

(normal pressure) , , 1 100cc

가 , 100~200cc

11)22) 39% 200cc 57%

8~20% 1)3)5)13)16)17)19)26) 가 10)11).

가 1,000cc 가 44% 가

가 10% , 1,000cc 1,000cc

가 15% , 1,000~2,000cc

4 40%, 2,000cc 50%

가 가 가

H - H grade 6 1,000cc 2,000

5) cc 가 가

10 가 H - H grade

1~6 , 4 H - H grade

5) H - H grade

10 가 H - H grade

7 - H - H grade

11).
 64% (p<0.05).
 40% 20% 7~
 14% 3)22)26)
 14%,
 26%
 가
 가
 (w/ IVH vs w/o IVH : 40% vs 41%).
 결과
 가
 (64%,
 40%)
 , 1
 1,000cc 가 1,000cc
 (40% vs 15%), 2,000
 cc 50% 가 가
 가 1,000cc
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