

Review Article

Outcome of Patients of Subarachnoid Hemorrhage Due to Ruptured Anterior Communicating Artery Aneurysm after Surgical Clipping

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This prospective study was done to determine the outcome of subarachnoid haemorrhage (SAH) due to ruptured anterior communicating artery (a Com) aneurysm in 8 consecutive patients after craniotomy and clipping of the aneurysm. The study was conducted at Mayo Hospital, Lahore from September 1999 to January 2002. All patients presented with history and examination suggestive of SAH had CT scan brain as first radiological investigation. Patients of SAH were graded clinically according to Hunt and Hess scale. After confirmation of diagnosis of SAH, four vessels cerebral angiography was done to localize site of aneurysm in patients of Hunt and Hess grade I, II and III or after they improved to at least grade III. Craniotomy and clipping of aneurysm was done only in patients with Hunt & Hess grade I, II and III. Maximum patients presented during 6th decade i.e., 38%. Male to female ratio was 6:2. Hunt & Hess grade I, II and III was observed in 5, 2 and 1 patients respectively. Outcome was assessed according to Glasgow Outcome Scale (GOS). Good outcome was present in 75% patients and moderate disability in 25%.

Key words: Subarachnoid hemorrhage, anterior communicating artery aneurysm, outcome, clipping.

This prospective study was conducted at Mayo Hospital Lahore Pakistan, from September 1999 to February 2002 to determine the outcome of subarachnoid hemorrhage due to ruptured ACom aneurysm. In this study, outcome of 8 consecutive cases was assessed after craniotomy and clipping of the aneurysm.

All patients of different of age and sex who presented with history and examination suggestive of SAH had CT scan brain as first radiological investigation (Photograph-1). Patients of SAH were graded clinically according to Hunt & Hess scale. After confirmation of SAH, four vessels cerebral angiography was done to localize site of aneurysm, its operability and associated vasospasm of cerebral vessels (Photograph 2). Craniotomy and clipping of aneurysms was performed only in patients with Hunt & Hess grade I, II & III or when they improved to above grades (Photograph 3). Patients of Hunt & Hess grade IV and V, multiple aneurysms and non-ACom aneurysms were excluded from the study.

In this study, all cases had frontal craniotomy and clipping of aneurysm through sub-frontal approach. Right frontal craniotomy was done in patients in whom ACom aneurysm was filling only from right or from both sides while left frontal craniotomy was preferred in cases where cerebral angiogram showed filling of aneurysm from left side only. Yasargil aneurysm clips were used for clipping aneurysm in all cases.

Results:

In this study, age range of patients was between 27 to 60 years. Maximum patients were admitted in 6th decade 38% (3/8). It was followed by next commoner group of patients in 3rd and 4th decades i.e. 25% (2/8) each. One patient was

admitted in 5th decade (Table-1). Minimum and maximum age of ACom aneurysm rupture in this group was 27 and 60 years with mean of 40 years.

Male predominated significantly in this study and male to female ratio was 6: 2. (Table-2). Patients admitted with Hunt & Hess grade I, II and III were 5, 2 and 1 respectively.

Four vessels cerebral angiogram was done in all cases. ACom aneurysms filling from the left anterior cerebral artery were 50% (4/8) while filling from right was one only. In 38% (3/8) cases, aneurysm was filling from both sides.

In this study, all cases had frontal craniotomy and clipping of aneurysm through sub-frontal approach (Photograph-4). Left frontal craniotomy was done in 50% (4/8) aneurysm, all cases had filling of ACom aneurysm from left anterior cerebral artery. Right frontal craniotomy and clipping of aneurysm was done in 50% (4/8).

In this study, good outcome was observed in 75% (6/8) patients and 25% (2/8) patients had moderate disability. Both cases of moderate disability had hemiparesis (Table 3). In one patient right hemiparesis was preoperative. Second patient had right hemiparesis after surgery which improved gradually in 3 months follow up.

Table 1: Age distribution (n=8)

Age(years)	=n	%age
10-20	0	0
21-30	02	25
31-40	02	25
41-50	01	12
51-60	03	38
61-70	0	0
71-80	0	0

Table 2: Sex distribution

Gender	=n	%age
Male	06	75
Female	02	25

Table 3: Outcome according to Glasgow Outcome Scale

Gender	Good	Moderately disable	Severely disable	Dead	Total
Male	04	02	0	0	6(75%)
Female	02	0	0	0	2(25%)



Photograph 1: CT brain (plain) showing haemorrhage suggestive of Acom bleed



Photograph 2: Cerebral angiogram showing Acom aneurysm



Photograph 3: Peroperative view of Acom aneurysm



Photograph 4: Cerebral angiogram after craniotomy and dipping of Acom aneurysm

Discussion:

Natural history of ruptured ACom aneurysm is not known exactly. It was observed that 46% of group of patients admitted within 24 hours after subarachnoid hemorrhage due to ruptured ACom aneurysm died. It was also reported that the cases that died after admission on 14th day after hemorrhage were 25%¹. Patients who survived 2 weeks post hemorrhage, mortality rate decreased significantly. Fifty percent patients rebled within next 6 months. After 6 months, risk of rehemorrhage falls to 3.1% per year¹.

A Com artery is a transverse anastomosis vessel connecting two anterior cerebral arteries. Its diameter is 2-3.4 mm and length varies between 0.8 to 4.6 mm². Single A Com artery is present in only 40-60% and in others it may be absent, branched, duplicated or fenestrated³. One to 13 perforators take origin from A Com artery. Patient may have memory disturbances due to damage to these perforating vessels^{4,5}.

Hyperplasia of A1 segment predisposes to formation of A Com aneurysm at its junction with A Com artery. Disparity in diameter of two A1 segments is more than 1mm in 6-12% of general population and in 50% patients of ruptured A Com aneurysms. Seventy to eighty percent aneurysms arise at junction of anterior cerebral with ACom artery. And in 85 to 97% cases, it arises from side of dominant A1. Eighty five percent patients have aneurysm at the junction of hyperplastic A1 and A Com artery.

Ruptured A Com aneurysm in 55% patients was 6-10 mm in diameter while the size was 6mm and 11-25 mm in 20% and 25% of patients respectively in rest of the group¹.

Recurrent artery of Heubner arise from within 3 mm of anterior cerebral-ACom junction in 80 % of cases and in 85% cases supplies structures anterior to anterior commissure e.g. anterior limb of internal capsule, anterior striatum and pre-commissural septal grey matter. Its occlusion may present as contralateral weakness of face and upper limb with change in emotions and personality¹.

Surgical options other than clipping of aneurysm used in the past were wrapping of the aneurysm, carotid or anterior cerebral ligation from the side of filling of the aneurysm and ligation of both anterior cerebrals. More recently, cerebral angiogram and coiling of aneurysm is another good option.

The outcome of A Com aneurysm after craniotomy and clipping has been reported worse compared to carotid bifurcation and middle cerebral artery aneurysms⁸.

Good outcome was present in 75% (6/8) patients and moderate disability in 25% (2/8) in group of patients (Table-3). Operative mortality reported by Crowell RM and Park SK for A Com aneurysm is 15% and 4.9% respectively^{9, 10}. In our patients group, no patient died may be due to less number of patients.

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