

Aneurysmal subarachnoid hemorrhage in elderly: treatment, outcome and review of the literature.

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### **Objectives**

Aneurysmal subarachnoid hemorrhage (aSAH) is a potentially fatal disease that mainly present in middle-aged people. Due to a better life expectancy, the number of hospital admission of elderly SAH patients is increasing.

It has been demonstrated that incidence per 100.000 person-year increases with age: 24.8/100.000 person-year between 55 and 65 years of age, 25.4 between 65 and 75 years, 26.2 between 75 and 85 years and 31.3 in patients older then 85 years of age.

For this reason, a clear management strategy should be defined, mainly based on long-term outcome data.

Our aim is to analyze the outcome of our series of patients older then 60 years of age who presented at our neurosurgical service for aSAH and were treated both surgically and endovascularly.

### **Materials and methods**

Between 2009 and 2013 we treated 58 aSAH patients older than 60 years of age (18 were between 60 and 65 years-old, 25 between 66 and 75 years-old, 16 between 76 and 85 and 1 was older then 86).

Twenty six patients were treated surgically, 27 received endovascular treatment.

Five patients did not receive any kind of treatment due to massive brain damage at CT scan and died few days after admission. At our institution, experienced vascular neurosurgeons and interventional neuroradiologist make the treatment decision together considering clinical and radiological features of each case and the potential prognosis related to age dependent co-morbidities.

All patients were evaluated using the extended Glasgow Outcome Score (GOS-E) both at discharge from our institution and at distance. The mean follow-up period was 27.7 months (range from 49 to 7 months, except for patients treated in 2013).

### **Results**

Of the 58 patients 22 died (11 during the in-hospital stay and 11 after discharge in inpatient rehabilitation). All patients who died after discharge from our department had poor score at GOS-E, always less than 4 (i.e. severe disabilities or vegetative state).

In particular, percentage of death divided per age were as following:

- 22.2% (n = 4/18), age range 60-65
- 30,4% (n = 7/23), age range 66-75
- 50% (n = 8/16), age range 76-85,

The 6.8% of patients has been treated in the last 6 months so we do not have long-term follow-up data. Of these 4 patients, one (age 88) has been discharged with GOS-E of 2, one had GOS-E of 3, the remaining two patients had a GOS-E at discharge of 4 and 6.

Unfortunately, we lost at follow-up the 22.4% of patients (n = 13) but these people are surely alive as can be seen from the national archives available from our Institution.

Of the remaining 33% of patients (n = 19) all have experienced some kind of clinical improvement, except for two patients who had a GOS-E at discharge respectively of 5 and 3 which remained stable after more the 6 months from the aSAH.

Of these 19 patients, 42% had a GOS-E < 6 at discharge and 58% had a score > 6 with 7 patients having a GOS-E of 8.

Analyzing our population, we observe that all people who had a good clinical condition at admission are still alive and have only little o no disabilities. The majority of patients who presented with a poor neurological status died or are still experiencing severe disabilities.

We can assess that according to literature age and poor clinical conditions at presentation are robust predictive factors of outcome in patients suffering from aSAH.

Moreover, outcome seems to be worse with increasing age (30.4% for patients older than 65 years and 50% for patients older than 85 years).

However, the percentage of patients aged more than 60 years who undergoes a progressive clinical improvement and a return to a nearly normal quality of life is not negligible.

## **Conclusions**

We think that it should be proposed a treatment of patients older than 60 years and suffering from aneurysmal SAH who present with a good neurological performance. According to the literature, it seems evident that an endovascular treatment should be preferred when possible to avoid all the possible morbidities connected with a surgical procedure that can more easily prone an aged patient to complications.