CLINICAL CHARACTERISTICS, COMPLICATIONS IN 39 PATIENTS WITH CEREBRAL ANEURYSM AFTER ENDOVASCULAR COILING IN THE FIRST 24 HOURS, AT MILITARY HOSPITAL 103

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ABSTRACT

Purpose: *We aimed to evaluate some clinical characteristics and complications after endovascular coiling in the first 24 hours at Military Hospital 103.*

Methods: *Prospective, cross-sectional descriptive study.*

Results: *The average age of the patients was 58.9 ± 27.2 years old, most patients were ≤ 60 years old (59.0%). Male patients (53.8%) accounted for a higher proportion than female patients (46.2%). Clinical symptoms before intervention: the most common were headache (97.4%) and vomiting (74.4%); 51.3% of patients had disorder of consciousness, 15.4% of patients with respiratory failure required mechanical ventilation. After intervention: 20.5% of patients still had severe disorder of consciousness, 53.8% of patients needed to maintain mechanical ventilation. Complications in the first 24 hours after intervention: systemic complications: 2.6% of patients worsened, threatened to die, 28.2% of patients developed deep coma and 87.2% of patients had fever multiplier levels; local complications: the most common were recurrent cerebral hemorrhage (10.3%) and bleeding at the femoral puncture site (10.3%), followed by vasoconstriction causing ischemic stroke (5.1%), the least common complication was cerebrospinal fluid obstruction (1.6%).*

Keywords: Subarachnoid hemorrhage, endovascular intervention, aneurysm.

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1. INTRODUCTIONS

Subarachnoid hemorrhage (SAH) accounts for about 5% of stroke [4]. The most common cause of SAH is ruptured cerebral aneurysm (more than 85%) [4]. SAH caused by ruptured aneurysms have a high mortality rate, accounting for 30%. Recurrent cerebral aneurysm rupture is the most dangerous of the complications of SAH. The basic treatment to prevent cerebral aneurysm rupture is endovascular coiling embolization. However, successful endovascular embolization does not necessarily mean a good prognosis for recovery.

Monitoring and caring for patients after endovascular embolization plays a very important role, help early detection of complications, improve the quality of treatment and enhance the chances of recovery for patients.

We conducted this study to evaluate some clinical characteristics and complications after endovascular coiling in the first 24 hours at Military Hospital 103.

2. SUBJECTS AND METHODS

2.1. Subjects

39 patients with SAH due to ruptured cerebral aneurysm, treated by endovascular coiling with metal coils at the Stroke Department, Military Hospital 103, from January to June 2022.

We excluded patients with endovascular coiling combined with surgery to remove hematoma; patient or their family member did not consent to participate in the study.

2.2. Methods

- Study design: Prospective, cross-sectional description.

- Diagnosis of stroke according to the definition of the World Health Organization. World Health Organization defined stroke as “rapidly developed clinical signs of focal (or global) disturbance of cerebral function, lasting more than 24 hours or leading to death, with no apparent cause other than of vascular origin” [2].

- Diagnosis SAH: On head CT scan, there is an increase density image in the subarachnoid space or lumbar puncture and testing the cerebrospinal fluid has all red and not coagulated 3 tubes. erythrocytes or hemoglobin-degrading components[1].

- Diagnosis cerebral aneurysm is based on the results of computed tomography angiography (CTA) or digital subtraction angiography (DSA).

- Assessment of disorder of consciousness based on the Glasgow scale: 15 points (awake); 9-14 points (mild disorder of consciousness); less than 9 points (severe disorder of consciousness).

- Ethics: this study was approved by the Military Hospital 103 Ethics Council. Patients information were confidential and used only in the study.

- Data analysis: Using SPSS 20.0 software.

3. RESULTS

3.1. Clinical characteristics of patients before and after coiling

Table 1. General characteristics of patients (n = 39)

Characteristics		Number	Percentage
Age (year)	≤ 60	23	59.0%
	> 60	16	41.0%
	Average	58.9 ± 27.2	
Sex	Male	21	53.8%
	Female	18	46.2%
Medical history	Hypertension	9	23.1%
	Alcohol consumption	2	5.1%
	Smoke	7	17.9%

The average age of patients was 58.9 ± 27.2 years old, in which, the majority age were ≤ 60 years old (59.0%). The rate of male (53.8%) was higher than female (46.2%). 23.1% of patients had a history of hypertension, 5.1% of alcohol consumption and 17.9% of smoking.

Table 2 . Clinical characteristics of patients before endovascular intervention (n = 39)

Clinical characteristics		Number	Percentage
Onset	Sudden	28	71.8%
	Acute	11	28.2%
Headache		38	97.4%
Vomiting		29	74.4%
Disorder of conciousness	Awake	19	48.7%
	Mild	12	30.8%
	Severe	8	20.5%
Stimulation		27	69.2%
Hypertension		31	79.5%
Respiratory	Satisfactory self-breathing	16	41.0%
	Non-invasive oxygen	17	43.6%
	Ventilator	6	15.4%

Almost patients had sudden onset (71.8%). The most common clinical symptoms were headache (97.4%) and vomiting (74.4%). 51.3% of patients had disorder of consciousness (mild level was 30.8%; severe level was 20.5%). In particular, 15.4% of patients with respiratory failure needed mechanical ventilation.

Table 3. Clinical characteristics of patients after endovascular intervention (n = 39)

Clinical characteristics		Number	Percentage
Disorder of conciousness	Awake	19	48.7%
	Mild	12	30.8%
	Severe	8	20.5%
Stimulation	No	16	41.0%
	Mild	14	35.9%
	Severe (requires sedation)	9	23.1%
Headache	No	5	12.8%
	Mild	15	38.5%
	Severe (need fentanyl)	19	48.7%
High blood pressure	No	14	35.9%
	Mild (oral medication)	18	46.2%
	Severe (need nicardipine)	7	17.9%
Respiratory	Satisfactory self-breathing	9	23.1%
	Non-invasive oxygen breathing	10	25.6%
	Ventilator	21	53.8%
Bladder sonde		39	100%
Gastric fistula		39	100%

After endovascular coiling, there were 8 patients (20.5%) with severe disorder of consciousness, 21 patients needed to maintain mechanical ventilation (53.8%). 100% of patients needed bladder sonde and gastric fistula.

3.2. Complications in the first 24 hours after endovascular coiling

Table 4. Systemic complications after endovascular coiling of aneurysms (n = 39)

Systemic complications		Number	Percentage
Death/serious		1	2.6%
Progressive deep coma		11	28.2%
Hypotension		2	5.1%
Refractory hypertension		5	12.8%
Hematuria (through urinary tract)		4	10.3%
Fever (degree Celsius)	No fever	18	46.2%
	37-38	18	42.6%
	> 38	3	7.7%

After endovascular coiling, 1 patient (2.6%) progressed worsened, and threatened with death; 11 patients (28.2%) had progressive deep coma and 53.8% fever.

- Local complications after endovascular coiling of aneurysm (n = 39):

The most common local complications was recurrent hemmorrhage (10.3%) and bleeding at femoral puncture site (10.3%), followed by complications vasoconstriction causes ischemic stroke (5.1%), the least common local complication was cerebrospinal fluid obstruction (1.6%).

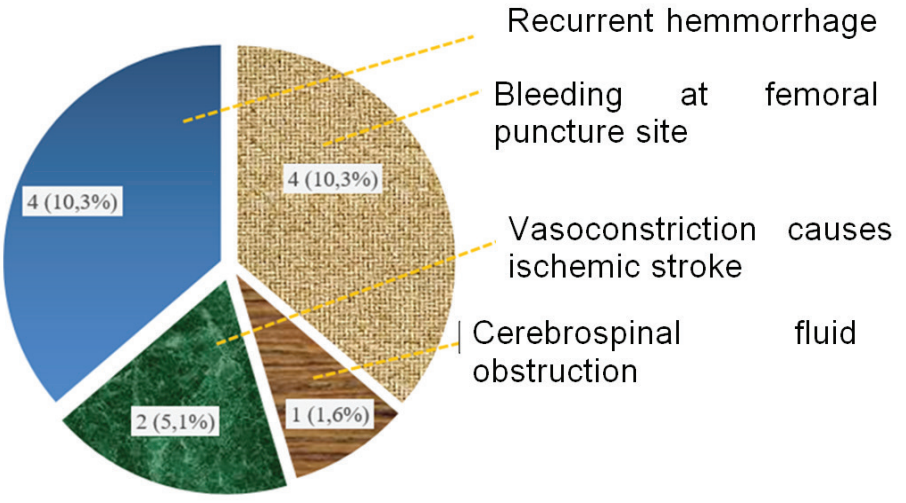

Figure 1. Local complications after endovascular coiling for cerebral aneurysms

4. DISCUSSIONS

4.1. Clinical characteristics of patients before and after endovascular coiling

- The average age of patients with ruptured cerebral aneurysms were 58.9 ± 27.2 years old; in which the majority were ≤ 60 years old (59.0%); younger than the age of stroke patients in general (65 years old). The male (53.8%) accounted more than the female (46.2%). 23.1% of patients had a history of hypertension, 5.1% of of alcohol consumption and 17.9% of smoking.

- Clinical characteristics before endovascular coiling: almost patients had headache symptoms (97.4%) and disorder of consciousness (51.3%). This study found that young patients with a good physical heath, so when they had disorders of consciousness, headaches, they were often agitated, struggling. This easily led to high blood pressure and risk of recurrent cerebral bleeding, especially when the aneurysm has not been plugged. According to the recommendations of the American Stroke Association [3], patients with SAH due to ruptured aneurysms without coiling should be kept systolic blood pressure beneath 140 mmHg. Controlling target blood pressure is very important, helping to reduce complications in stroke patients. On the other hand, there are many factors that can cause hypertension, such as pain, irritation, urinary retention, fever, nausea, vomiting... Therefore, the monitoring of patients before intervention should be very meticulous and exact.

- Clinical characteristics after endovascular coiling: 8 patients (20.5%) had severe disorders of consciousness, 21 patients (53.8%) needed to maintain mechanical ventilation. These cases needed special monitoring and care; besides, it was necessary to apply strictly monitoring for patients in a deep coma and patients with mechanical ventilation. The number of patients who needed decreased blood pressure with nicardipine through an electric pump was 7 patients (17.9%). Nicardipine is a rapid intravenous antihypertensive agent. During administration, patients should be closely monitored, as the most consider side effect of this drug is excessive lowering of blood pressure.

4.2. Complications in the first 24 hours after endovascular coiling

Complications after endorvascular coiling were very diverse and could be divided into two groups: the general complications and the specific complications after coil intervention [6]. The results of my study showed that, within 24 hours after intervention, there were 11 patients (28.2%) in progessive deep coma. These were the patients with deep coma had more severe progession (before, the patient was awake or had a mild disorder of consciousness; after intervention, the patient's consciousness deteriorated and turned into a deep coma). Progressive deep coma can be caused by many causes, such as continued bleeding during and cerebral vasoconstriction after SAH, poor blood pressure control during the intervention... Progressive deep coma was one of the prognostic factors for mortality risk after intervention [5]. 2

patients (5.1%) with hypotension were severe due to recurrent cerebral bleeding. There were no cases of excessive hypotension due to intravenous antihypertensive drug use. In our study, 100% of patients were given prophylactic antibiotics before intervention, but there were still 21 patients (87.2%) with various degrees of fever after coiling embolization. Hyperthermia has a negative impact on brain metabolism and the risk of clinical aggravation. Fever within the first 24 hours should specially attend and monitor, analyze to find the cause to take appropriate treatment, avoid the risk of infection, especially sepsis. The causes may be because these patients were undergoing endovascular intervention and performing many other invasive procedures (such as gastric fistula, bladder sonde, mechanical ventilation, some patients require central venous catheters...) .

Post-intervention local complications: 4 patients (10.3%) had recurrent bleeding and all of them were during the intervention, when the coil had not yet been completed. This is the most serious complication in the acute phase of SAH. The cases of recurrent bleeding often had symptoms: sudden severe headache, abnormally high blood pressure, sudden rapid deterioration of consciousness... Therefore, nurses need to know and find these symptoms in time.

In this study, all patients undergoing endovascular intervention received vascular access through femoral artery puncture. This is a large artery, so there is a permanent complication after intervention that is femoral artery bleeding. According to the routine procedure, after the end of the intervention, it is necessary to press the femoral artery puncture site for 60 minutes. Then, keeping the femoral artery compression bandage and immobilize the leg on the puncture side for 10 hours. The results of this study showed that 4 patients (10.3%) had bleeding at the femoral puncture site within the first 24 hours after the intervention (showing blood infiltration at the puncture site). As soon as this symptom is detected, the nurse should immediately press the puncture site and report it to the doctor.

5. CONCLUSIONS

Study on 39 patients with SAH due to ruptured aneurysm, treated with endovascular coiling at the Stroke Department, Military Hospital 103, from January to June 2022, we concluded:

- The average age of the patients was 58.9 ± 27.2 years old, most of the patients were ≤ 60 years old (59.0%). Male (53.8%) account more than female (46.2%).

- Clinical symptoms before intervention: the most common were headache (97.4%) and vomiting (74.4%). 51.3% of patients have disorders of consciousness. 15.4% of patients with respiratory failure required mechanical ventilation. After the intervention, 20.5% of patients still had severe disorder of consciousness, 53.8% of patients needed to maintain mechanical ventilation.

- Complications in the first 24 hours after endovascular coiling: the systemic complications include 2.6% of patients had a bad, life-threatening condition, 28.2% of patients had progessive deep coma and 87.2% of patients had fever; the local complications include recurrent bleeding (10.3%), bleeding at femoral artery puncture site (10.3%), vasoconstriction causing ischemic stroke (5.1%), cerebrospinal fluid obstruction (1.6%).

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