A Comparative Study of MRI, TCD, CT And CDFI of Carotid Artery in Acute Stage of Ischemic Stroke

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Keywords: Ischemic Stroke, Risk Factors, Clinical Comparison

Abstract: In order to analyze the risk factors of progressive ischemic stroke, 56 ischemic stroke patients who have made progress in clinical practice were randomly selected from August 2009 to August 2009 in our hospital, and 56 non progressive ischemic stroke patients were taken as the research objects at the same time. Two groups of clinical data were analyzed, and the risk factors of patients with progressive ischemic stroke were analyzed. As a result, the proportion of progressive ischemic stroke in hypertension, diabetes and carotid atherosclerosis was higher than that in non progressive group. Conclusion: people with a history of hypertension, diabetes and carotid atherosclerosis have a significantly increased risk of progressive ischemic stroke.

1. Introduction

Clinically, high ischemic stroke (SIP) refers to the type of ischemia in which nerve damage worsens significantly within 6-7 days after treatment. Studies show that up to now, SIP is still the highest disease in the world with the highest morbidity and mortality rate, and it seriously threatens human health and life. At present, the etiology and mechanism of the disease is not clear, and there is no effective treatment in clinical[1]. The purpose of this study is to analyze the risk factors of progressive ischemic stroke and provide reliable criteria for clinical diagnosis and treatment in the future. The clinical data of patients with progressive ischemic stroke were compared and analyzed as follows.

2. Data and Methods

2.1. General Information

The data of this study come from the patients with progressive ischemic stroke and non progressive stroke in our hospital. 56 cases were selected as the study object[2]. There were 31 males and 25 females in the control group, with an average age of 63.7 ± 13.8 years. There were 32 males and 24 females in the observation group, with an average age of 64.5 ± 14.2 years. There was no statistical significance in the general data of age, gender and other differences ($P > 0.05$). All patients met the clinical diagnostic criteria.

2.2. Method

Compared with the above clinical data, the risk factors of progressive ischemic stroke were analyzed. Including: age, gender, blood pressure, hospital temperature, nicss score, previous medical records and other general information. Biochemical indexes include blood glucose value, blood lipid and fibrinogen concentration in hospital. Ultrasound examination of carotid and vertebral artery stenosis and stenosis all patients in this group were assigned neurological score according to nih-ss score standard at admission, recording various changes of state, and recording accurately and in detail when the state reached its peak[3]. A hunger strike was held on the morning of the second day of admission to the hospital in order to check the blood glucose, hemorheology and lipids in the blood on an empty stomach. Biochemical examination instrument is TBA - 120

  DOI: 10.25236/medsbe.2020.024

automatic biochemical examination instrument. SCTA inspected Lightspeed multi-layer spiral CT machine from GE, with layer thickness of 2.5mm, spacing of 1.2mm and spacing of 1.375:1. The skull from SCTA to 5.6 s was scanned from the sixth cervical vertebra, and the non-ionic contrast agent was injected into the elbow vein at a rate of 3.5-4 ml / s using a high-pressure syringe[4]. Before injection, 20ml of contrast medium was injected, and the basilar artery was used as the central layer for dynamic scanning of the same layer. The peak enhancement time was determined by the time density curve, and the peak time was taken as the delay time of SCTA scanning. The scanning images were processed by GE methods, including surface shadow display (SSD), noninvasive rendering (VR), maximum intensity projection (MIP) and vascular endoscopy (VE).

The data were processed in SPSS 18.0, and the blood pressure and blood lipid were expressed as X ± s. According to statistics, there is no significant difference in gender and age between the two groups. 39 cases of hypertension and 24 cases of diabetes in the observation group were higher than those in the control group ($P < 0.05$)[5]. The NIH SS score of the observation group (11.3 ± 3.1) was significantly higher than that of the control group ($P < 0.05$).

2.3. Biochemical Indicators

In the observation group, glucose was (7.9 ± 2.3) mm / L, fibrinogen was (4.5 ± 1.4) g / L. There were 27 cases of carotid atherosclerosis in the observation group, significantly more than that in the control group ($P < 0.05$).

Table 1 Comparison of past medical history between the two groups

Observation index	Observation group (n = 56)	Control group (n = 56)	P
Smoking history	30(53.57)	31(55.36)	>0.05
Diabetes history	24(42.86)	9(16.07)	<0.05
History of hypertension	39(69.64)	14(25.00)	<0.05
NIH SSS score	11.3±3.1	3.8±6.3	<0.05

3. Discuss

At this stage, the study on the risk factors of SIP is still in progress, but there is almost no SIP typing report. Some researchers conducted clinical typing studies on SIP based on the etiology of the patients. However, it is difficult to diagnose the early etiology of SIP, so it is difficult to carry out etiology based clinical research[6]. Clinically, ischemic stroke is a disease with multiple risk factors. In traditional patients with ischemic stroke, the main risk factors are heart disease, hypertension, diabetes, dyslipidemia, smoking and excessive alcohol consumption. Several ischemic stroke events are described, and a clear description of progressive stroke has not been developed. Compared with many clinical research reports and literatures in recent years, significant differences have been found in all research results. Therefore, in order to further understand the causes of ischemic stroke, effectively deepen the risk factors of ischemic stroke, conduct more important research, and provide a comprehensive reference for clinical diagnosis and treatment. A number of studies have confirmed that the main risk factors of progressive ischemic stroke are carotid stenosis, carotid atherosclerosis, soft spot, ulcer and so on. There are unstable plaques in the cerebral arteries[7]7. After rupture, it enters the blood to form an artery embolism. Once ruptured, a second clot will form.Studies have shown that diabetes significantly increases blood sugar levels in patients, thereby increasing the risk of disease and death, which is an important risk factor for early stroke. Diabetes can also cause the important obstacle of lipid metabolism and promote the synthesis of cholesterol. When the blood viscosity increases, it is easy to cause small condensation that causes capillary obstruction. TCD was used to measure the flow velocity of intracranial artery, evaluate the dynamic of intracranial blood circulation, show the dynamic of intracranial blood circulation and collateral blood circulation of patients with extracranial artery stenosis, and describe the stenosis and occlusion of intracranial artery wheel vessels. However, it is difficult to provide clear vascular morphology data by ultrasonic examination. The display of display and the judgment

of stenosis are related to the technique of operator. When the branch of carotid artery is high, the internal carotid artery cannot be detected by ultrasound. Because of artery stenosis, conventional ultrasound can not distinguish slow blood flow or occlusion. CTA images can be obtained by 3D acquisition and reconstruction of multiple displays. It can display vascular structure from different angles and directions, and can also add bone structure markers. Based on the enhanced spiral CT scan, different concentrations of contrast medium can be used to obtain the inner wall of the narrow vascular cavity used to observe blood flow, vascular wall and endoscope (VE). The simulation of endoscopic images can show the internal morphology of endometrial stenosis, which is helpful to understand the presence of clotting and calcifying plaque in the vascular lumen. In recent studies, high-resolution CTA has a sensitivity of 100% and a predictive value of 93.4%, which can be used to detect intracranial vascular stenosis and occlusive diseases[8]. CTA is better than TCD in the evaluation of occlusion degree of cerebral artery. In order to diagnose the occlusion of extracranial artery and basilar artery, extracranial and transcranial Doppler ultrasound can be used. TCA was used as a screening method for MCA stenosis. Only patients with TCD abnormality were reported by CCD, and good correlation between the two methods was found. In other studies, the diagnosis of carotid stenosis caused by plaque of us and CTA was consistent. Although it is 70.9%, the accuracy of CTA used to determine the severity of carotid stenosis is higher than that of us. In the comparison of TCD with SCTA in 24 cases, TCD can diagnose the stenosis of internal carotid artery, middle cerebral artery and anterior cerebral artery, but in the diagnosis of vascular occlusion, SCTA, especially anterior cerebral artery, is not evaluated. The results show that CTA is superior to TCD in the diagnosis of aortic stenosis in patients with large arterial blood flow area. CTA showed that compared with 45% of TCD, 81% of patients had more than 50% of MCA stenosis. With regard to stenosis, TCD can not diagnose the lesions in the distal M 1 and M 2 segments of the middle cerebral artery. Therefore, unlike the abnormal TCDS, which indicate vascular lesions, normal TCD can not exclude lesions, especially the distant M 1 and M 2 segments. SCTA and neck vascular ultrasound were performed in 21 patients[9]. Comparing the results of the two tests, we have a high consistency in the diagnosis of carotid stenosis. In terms of plaque number, ultrasound has more plaque than SCTA, and plaque of internal carotid artery is located in the proximal part, which may be related to the mechanical characteristics of blood circulation of carotid branches. On the branch of the carotid artery, the direction of the central branch of the carotid artery collides with the branch, forming turbulence and blood stagnation behind the carotid artery hole. This change in hemodynamics led to ultrasound examination of the neck vessels. Vascular ultrasound can evaluate the physiology of arterial blood flow, SCTA can record vascular anatomy. Therefore, SCTA is better than ultrasound in the diagnosis of vascular stenosis, especially in the formation of vortex in vascular stenosis. In addition, the potential vascular lesions of stroke patients can be detected rapidly by using SCTA for routine CT examination. SCTA can record the intima of blood vessels, so CTA is the right method to determine the proportion of stenosis. CTA has the advantages of avoiding false positive and correctly evaluating vascular stenosis. CTA has a unique advantage in the display of the calcification of vascular wall. The cross-sectional area showed increased blood flow, wall thrombus and calcified plaque. The preliminary evaluation of unstable plaque was carried out. CTA has high resolution for calcareous plaque. But CTA has disadvantages. CTA indirectly showed more insensitive vascular morphology than us in order to early diagnose plaque ulcer. In order to distinguish the uniformity of plaque and different pathological changes, we can directly detect the lumen of blood vessels, so that the early detection of ulcer, plaque hemorrhage and lipid plaque rate from 89% to 99%[10]. CTA test needs intravenous contrast agent, some patients can not participate in the test due to allergy.

4. Conclusion

The purpose of this study is to analyze and explore the risk factors of progressive ischemic stroke. The clinical data of patients with and without progressive ischemic stroke were compared. This is significantly higher than the rate of non progression patients. The results showed that the main risk factors of progressive ischemic stroke included hypertension, diabetes, carotid

atherosclerosis, hyperfibrinogen and hyperglycemia.

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