

# The function of piont injection in improving learning and memory dysfunction caused by cerebral ischemia

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## ABSTRACT

This experiment has investigated the influence of Yamen (Du. 15) point injection on learning and memory dysfunction caused by cerebral ischemia and reprofusion in bilateral cervical general artery combined with bleeding on mouse tail to mimic vascular dementia in human beings. By dividing 40 mice into 4 groups (group1false operation group, group2model group, group3point injection with Cerebrolysin group4point injection with saline.) According to random dividing principles, we observed the influence of Yamen(Du. 15) point injection on the time of swimming the whole course used by model mice which had received treatment for different days in different groups , and the influence of those mice on wrong times they entered blind end. The result showed that point injection with Cerebrolysin and saline could improve learning and memory dysfunction of the mice caused by cerebral ischemia.

Key words: Yamen (Du. 15). Point Injection. Cerebral Ischemia.

Cerebral ischemia can cause excitotoxicity in the brain and results in vascular dementia, which is mainly characterized as learning and memory dysfunction. Many clinical cases have proved that point injection, which through combining acupuncture, acupoint and injection medicine together gets obvious good result, and has been popularly used to treat cerebra-vascular disease. In order to further affirm the function of point injection and provide laboratory fact for clinical treatment of vascular dementia, we observed the influence of yamen point on learning and memory dysfunction after cerebral ischemia.

## 1. Materials and Methods

1.1 Animals: male ICR mice weigh 25-30gram, provided by the animal center of Zhejiang Medical Academy. They were fed in laboratory animal center of Zhejiang University.

1.2 Grouping: The mice had been trained 3 days through Morris water maze, 3 times every day. We selected those could get on the bank in 5 minutes after 3 days training as qualified ones,

the total was 40. According to random dividing principles, they are divided into faulty operation group(group 1),model group(group 2), point injection with Cerebrolysin (group 3) , point injection with saline group(group4).

1.3 Modeling: The mice were anesthetized with 2.5% Pentobarbitalum 80mg/kg total weight) enterocelia injection and placed on their back. Both cervical general artery were dissected and blocked with vascular clip for 20 minutes followed by 10 minutes to open, repeated twice. At the same time, cut the tail at the spot 1.5 cm to the end for bleeding, the volume was 10% of the total blood volume. (the mice blood volume = 8.3% total weight),and then the broken was ligated to stop bleeding,1 ml physiological saline was injected into enterocelia to compensate the blood volume.

1.4 Laboratory dealing

1.4.1 Group1: only to expose both cervical general arteries, no other thing was done on the mice.

1.4.2 Group2: making the models in the method above, no any treatment was followed.

1.4.3 Group3: The method of making

model is same. The point injection treatment was applied to the mice 3 days before modeling,, 1 time treatment every day, until they were killed.

The location of Yamen : slightly below the depression beneath the occipital spine along the back midline in the mouse body. (Slightly below the Fengfu in mouse).

Manipulation: Fix the mouse with left hand; the right hand holds the injector. Firstly puncture the skin levelly, then the direction turned vertically and inserted the needle 3-5cm. After slightly twisting then injected slowly. The dosage used as the maximum of adult in human beings ,that is 0.01ml/19g total weight.

1.4.4 Group 4: only use the same volume of saline instead of Cerebrolysin, the others were the same.

1.5 Methods of observation: We adopted water maze to test the mice learning and memory ability and started the test in 12th day after the operation. The mice were placed at the beginning spot of the Morris water maze. And the computer would record the time how long the mice spent to get on the bank (the time of finish swimming the whole course.) and the times the mice entered

the blind end (the times of being wrong.) If the mouse failed to get on bank in 5 minutes, just record the time as 5 minutes and induce it to the bank. Did it 1 time every day and the test lasted for 6 days. The time of finish swimming the whole course and the times of failing to bank used as scores to evaluate the mice learning and memory ability.(test condition was shaded, the time :9 oclock A.M; water deepness:10 cm ; water temperature:26°C.

## 2. Result

2.1 the influence of Yamen point injection on the time used by the mice in different group, which had received treatment for different days to finish swimming the whole course. (Table 1)

From table 1 we know: In the sixth day, the time of finishing the whole course used by the mice obviously became shorter in group1 than in group2,wich indicated that the model mice got learning and memory dysfunction.

No difference was discovered between group3 and group4, but compared with themselves, the mice both in group3 and group4 got much better scores in the

sixth day than in the first day. In any way, this result could be found in group2. All of this showed that point injection with Cerebrolysin or saline has good function to improve the mice learning and memory ability.

2.1 The influence of Yamen point injection on the times of the mice in different group, which had received treatment for different days entered the blind end. (Table 2)

From table 2 we know that: The result of times that the mice entered the

blind end is quite similar to the result in table 1, that is the scores get obviously improved in the sixth day in group1 than in group2. ( $P<0.05$ ), the others have no statistic meaning; Every group but group 2 become much better in the sixth day than in the first day compared with themselves

### 3. Discussion

Point injection treatment is combination of the functions of acupuncture, penetrated stimulus of injection and

Table 1 the time of swimming whole cours

Group	number	the time of swimming whole course (second)					
		1 St. day	2 ND day	3 rd day	4 Th. day	5 Th. day	6 Th. day
Group 1	10	227.2±81.4	192.8±104.6	195.0±79.6	151.0±72.3	116.2±64.6	102.7±40.1 * △△
Group 2	10	261.2±54.3	252.6±73.8	226.3±61.7	230.8±85.4	212.2±77.0	203.8±88.4
Group 3	10	213.6±105.2	200.9±108.2	179.4±107.	191.6±105.2	148.7±100.0	124.7±98.6△
Group 4	9	219.3±97.6	228.3±94.9	193.1±97.8	172.3±92.9	170.4±109.9	168.1±89.6△

(compare with group 2: \*  $p<0.05$ ; compare with themselves:△  $p<0.05$  ,△△ $p<0.01$ )

Table 2 the times of entering the blind end

Group	number	the times of entering the blind end					
		1 St. day	2 ND day	3 rd day	4 Th. day	5 Th. day	6 Th. day
Group 1	10	16.6±4.9	14.8±5.6	13.0±4.3	12.1±4.8	8.4±5.3	7.8±2.3 * △△
Group 2	10	18.1±4.6	18.1±4.1	15.4±3.8	16.7±5.1	15.0±3.7	14.2±4.9
Group 3	10	16.8±8.7	15.7±8.2	13.6±6.3	14.9±7.6	10.7±6.5	9.7±5.9△
Group 4	9	17.2±5.5	16.6±6.9	14.8±7.2	14.4±7.0	13.0±7.2	13.2±6.6△

(compare with group 2: \*  $p<0.05$ ; compare with themselves:△  $p<0.05$  ,△△ $p<0.01$ )

medicine of injection. In one hand, the point get incessantly stimulated through the absorbing of medicine, so the point can do its special work better; in the other hand, point injection with small dosage can get the same result as great dosage in normal muscle injection, even better. So point injection not only provides many effective point stimuli in acupuncture treatment, also provide comparatively special entrance for medicine. Point injection treatment is characterized by many indications, quickly result, economical practicability and simple manipulation, so it is more and more popularly used in clinic and also is an effective point stimulant in animal laboratory.

We select yamen point injection with Cerebrolysin as method to treat VD model base on the fact that yamen points special function and matured medicine in clinic, the good connection may form a better way to treat VD. The laboratory results also prove that the result of group3 is much better than group4, not only in improving learning and memory scores, but also in inhabiting the toxicity of NO in brain tissue. Yamen point injection with Cerebrolysin can get good result

because it can dredge the local channels and nourish the brain.

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