RISK FACTORS FOR POSTOPERATIVE INFECTION IN NEUROSURGICAL PATIENTS

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ABSTRACT

Objective: To explore the related risk factors of intracranial infection (ICI) after elective surgery in neurosurgery and provide the basis for clinical prevention and control of intracranial infection. Methods: The clinical data of 14 infected patients and 144 non-infected patients undergoing neurosurgery in our hospital from October 2016 to September 2017 were collected. The incidence of postoperative intracranial infection was calculated, and the affected patients were followed Factor analysis, using SPSS 22. 0 software for statistical analysis. Results: Of the 158 patients, 14 developed intracranial infection. Conclusion: There are many risk factors for intracranial infection after neurosurgical aneurysm surgery. In clinical practice, specific preventive measures should be taken to reduce the incidence of intracranial infection.

1. INTRODUCTION

Craniotomy, craniocerebral injury and external drainage tend to lead to intracranial infection, which is a common complication after neurosurgery. The mortality rate is extremely high, which seriously threatens the life and health of neurosurgical patients. Antibiotics are generally used in anti-infective treatment after neurosurgical surgery, but the prevention and treatment of intracranial infection is not good, further aggravating the degree of intracranial infection, there is a great security risk. In neurosurgical patients after intracranial infection prevention, which need to further analyze the risk factors exist, and then take targeted prevention and treatment methods for neurosurgical patients with postoperative recovery to provide strong support. Under physiological conditions, the central nervous system is in a relatively closed environment [1].

Due to the multiple protection of the cranial cavity and the blood-brain barrier, the central nervous system can be hampered to some extent by pathogenic microorganisms. However, neurosurgical craniotomy Can directly or indirectly damage the central nervous system protection barrier, so that the cranial cavity with the outside world, external pathogenic microorganisms can directly invade the central nervous system, postoperative attention and improper use of antibiotics, leading to intracranial infection. It is also because the above protection of the central nervous system barrier exists, oral, intramuscular or intravenous antibiotics, the drug in the brain, subarachnoid cerebrospinal fluid in the effective antimicrobial concentration was significantly lower than the blood, in most cases cannot be effective of the antibacterial effect and treatment, often require direct medication in the central nervous system, this approach has become another factor to increase the risk of infection.

In addition, due to differences in the chemical composition of the cerebrospinal fluid itself, cellular immune and humoral immune function is far less than the blood, its anti-infection can be poor, due to the rich nutrition of cerebrospinal fluid, it becomes an excellent medium for pathogenic microorganisms [2]. Under normal circumstances, neurosurgical craniotomy is not just a simple occurrence of intracranial infection, it is often associated with other serious complications, clinically common intracranial pressure, brain swelling, hydrocephalus, hydrocephalus, etc. Associated complications, these complications and intracranial infection affect each other and aggravate the patient's condition or directly affect the prognosis of patients. In the event of intracranial infection, the mortality rate was significantly increased, such as improper treatment will seriously affect the prognosis of patients and the quality of life later, and even seriously endanger the lives of patients, so that patients and their families to bring a very heavy blow.

Intracranial infection is one of the more rare but serious consequences of neurosurgical craniotomy. Once the patient has intracranial infection, it often accompanies symptoms such as intracranial hypertension, disturbance of consciousness and epilepsy. If not handled properly, it not only prolongs the patients Hospital stay and increased medical costs, and with the patient's prognosis and quality of life is closely related to later, serious cases will threaten the lives of patients. Relevant literature reports at home and abroad, neurosurgical craniotomy occurred after the risk of intracranial infection dozens of common intracranial infection factors are:

①Intraoperative exposure time: the central nervous system anatomical structure is complicated, cumbersome surgical procedures and surgical operation for a long time, operative field exposure time longer than the average operation, the original protective barrier was destroyed.

② Postoperative intracranial drainage tube: Intracranial drainage tube after craniotomy is one of the important factors leading to intracranial infection, it may be because the built-in drainage tube provides favorable conditions for the formation of pathogenic microorganisms and living environment, thereby increasing craniotomy Postoperative risk of intracranial infection.

③Postoperative cerebrospinal fluid leakage: due to the destruction of tissue structure after craniotomy, cerebrospinal fluid leakage is easy to form, cerebrospinal fluid leakage is an important risk factor for intracranial infection, is a typical representative of intracranial retrograde infection, cerebrospinal fluid leakage longer, infected the greater the probability.

④ Auxiliary equipment applications: surgical procedures often require surgical microscopy assisted because of its surgical exposure is more difficult, assisted by a microscope, it is bound to extend the operation time, increase surgical exposure time and increase the chances of contamination of the surgical area caused by intracranial infection.

⑤Damage to the blood-brain barrier; due to the presence of central nervous system blood-brain barrier, blood-cerebrospinal fluid barrier and cerebrospinal fluid-brain barrier, the majority of antibiotic routes of administration are not easily penetrated by the above barrier, making it difficult for antibiotics to form effective antibacterial in this area Concentration, often require other direct central nervous system administration. In addition, the chemical composition of CSF itself differences, cellular immunity and humoral immunity is far less than the blood, anti-infection can be poor, due to the cerebrospinal fluid is rich in nutrients, has become an excellent medium for pathogenic microorganisms.

⑥Basic diseases: neurosurgical diseases related to the diagnosis and treatment process, combined with underlying diseases such as diabetes, extreme weight loss and other systemic low resistance and other diseases,

craniotomy, its tissue after prolonged unhealed, but also lead to intracranial infection susceptibility factors one. In addition, intracranial infection in addition to the above risk factors, the scalp disinfection is not strict, surgical operation of the pollution, postoperative dressing is not timely, etc., can increase the chance of postoperative intracranial infection.

⑦Invasive operation and pollution: In the neurosurgical intensive care unit, a variety of treatment and nursing methods with invasive, such as endotracheal intubation, incision and artificial suction, etc., can easily lead to respiratory mucosal damage, so that the lungs In addition, routine treatment and support such as inhalation of smoke and oxygen can reduce the function of the respiratory defense barrier and promote the occurrence of pulmonary infection.

⑧Drug factors: drug abuse, especially abuse of antibiotics is caused by the high incidence of pulmonary infection, one of the reasons in the drug sensitivity test is not yet clear case of large doses, multi-drug combination, frequent replacement of the phenomenon is more common, The one hand, due to the patient's condition crisis, cannot wait for the specific result of drug sensitivity test, on the other hand, the medical staff's influence is not ruled out. In the end, it causes a great deal of drug resistance and makes the infection uncontrollable.

2. NORMAL INFORMATION

2.1 Research object

Collecting patients who underwent elective craniotomy during neurosurgery in our hospital from October 2016 to September 2017, of which 14 cases were intracranial infection after operation, and all cases were from the control and control department of our hospital data. The youngest is 23 years old, the oldest is 74 years old, with an average of 57.3 ± 1.3; 8 males and 6 females. 144 patients who had no intracranial infection during the same period as elective craniotomy were chosen as the control group.

2.2 Clinical symptoms and diagnostic criteria

All patients with clinical symptoms developed symptoms of fever or headache 3-15 days after surgery. Patients with headache, fever, vomiting and meningeal irritation positive signs and other clinical manifestations. Laboratory tests, including blood tests and other body fluids, mainly among bacteria, viruses, fungi and mycobacteria were isolated and cultured, both blood count and antibody titration. Patients with peripheral blood leukocytes> 10 * 10^9 / L; cerebrospinal fluid leukocytes> 10 * 10^6 / L;. Cerebrospinal fluid protein in more than 0.45g / L, less than 2.25 mmol / L of sugar. For cerebrospinal fluid or intracranial drainage head bacterial culture positive results, can be diagnosed as intracranial infection.

2.3 Methods

The clinical data of 14 infected patients and 144 non-infected patients were statistically analyzed to determine the risk factors leading to intracranial infection.

2.4 Statistical Analysis

Using SPSS22.0 statistical software for statistical analysis of the data, first the risk factors for single-factor statistical analysis, screening and neurosurgical intracranial infection with statistically significant risk factors, and then quantify these risk factors into multivariate Logistic regression analysis to obtain the risk factors of P <0.05, and evaluate the independence of this study the relationship between risk factors and intracranial infection after elective craniotomy.

3. METHOD AND RESULT

A total of 14 patients with intracranial infection who underwent selective craniotomy in our Department of Neurosurgery between October 2016 and September 2017 were enrolled in this study and 144 patients undergoing craniotomy without intracranial infection during the same period the control group were retrospectively analyzed and studied. The risk factors that may lead to intracranial infection were input into the statistical software SPSS22.0 first, single factor analysis of the respective risk factors, screening out the relevant risk factors with statistical significance, the quantitative assignment After using multivariate Logistic regression analysis, P <0.05 was considered statistically significant. Table 1 shows the survey statistics.

Table 1: Survey statistics

Related risk factors		Number of investigations	Number of cases of infection
Gender	Male	82	8
	Female	76	6
Diabetes	Yes	48	11
	No	110	3
Postoperative cerebrospinal fluid leakage	Yes	16	10
	No	142	4
Postoperative drainage tube	Yes	89	12
	No	69	2
Whether to implant supplies	Yes	126	11
	No	32	3
Surgical duration	≥4	106	9
	<4	52	5
Hypertension	Yes	86	8
	No	72	6
Regulate the use of antibiotics	Yes	82	4
	No	76	10
Intraoperative bleeding	≥100	38	9
	<100	120	5

The results showed that diabetes mellitus, postoperative cerebrospinal fluid leakage, postoperative catheter retention, duration of operation, number of operations and posterior fossa surgery were important risk factors for postoperative craniotomy infection. Further Logistic regression analysis found that postoperative cerebrospinal fluid leakage, prolonged indwelling drainage tube, operation duration and posterior fossa were the independent risk factors for intracranial infection after neurosurgical elective craniotomy.

Therefore, neurosurgical craniotomy after selective cranial infection may be due to a single factor, but in most cases, is often the result of multiple risk factors together. Postoperative cerebrospinal fluid leakage, catheter retention time, duration of surgery) are independent high-risk factors for intracranial infection after craniotomy.

4. CONCLUSIONS

Intracranial infection after craniocerebral surgery is one of the important complication of neurosurgery, which will cause great harm to patients, mainly manifested as body temperature continues to rise, blood is higher than normal, neck stiffness and cerebrospinal fluid pathogen culture can be seen Pathogens, etc., and neurosurgical postoperative intracranial infection drainage is poor, low positive rate of cerebrospinal fluid culture, there are some difficulties in the treatment. Postoperative intracranial infection will prolong the length of hospital stay, increase the patient's medical costs, and affect the prognosis.

Therefore, we must fully understand the neurosurgical patients with intracranial infection of risk factors, pathogens and antibiotics rational use, in order to reduce the incidence of intracranial infection after neurosurgical surgery. Under normal circumstances, the central nervous system from the outside to the inside of the scalp, skull, brain membrane and blood-brain barrier and other organizations, are not susceptible to bacterial invasion, and neurosurgery will destroy these barriers, leading to empyema and ventricle Meningitis and other intracranial infections increased the chance of occurrence.

Therefore, in the process of surgery by improving the surgical techniques, strict adherence to aseptic technique, the rational use of antibiotics, shorten the time of CSF drainage, postoperative local pressure bandaging, suture stricture to avoid postoperative cerebrospinal fluid leakage, shorten the time of craniotomy and Avoid re-surgery and other positive comprehensive prevention measures to reduce the incidence of postoperative intracranial infection.

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