Risk Factors of Nosocomial Infection of Inpatients in Neurology Department Based on Evidence-Based Concept

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Abstract: Objective: to explore the influencing factors of nosocomial infection of hospitalized patients in neurology department, so as to take effective preventive measures to control the occurrence of infection. Methods: nosocomial infection of hospitalized patients in department of neurology from january 2017 to march 2018 was retrospectively analyzed. Results: among 981 hospitalized patients in neurology department, 65 cases had hospital infection, with an infection rate of 6.63%. The highest hospital infection rate (12.78%) was found in patients with cerebral hemorrhage. Lung was the first infection site, followed by urinary tract infection. The high risk factors of nosocomial infection of inpatients in neurology department were age > 65 years old, diabetes history, more chronic basic diseases, hospitalization time > 2 weeks, smoking and alcohol addiction history, consciousness disorder and invasive operation. Conclusion: the risk factors of nosocomial infection in neurology department are old age, consciousness disorder, long hospitalization time, basic diseases and invasive operation. Reducing risk factors, rational use of antibiotics and strengthening the management of hospital infection can reduce the incidence of hospital infection.

1. Introduction

Neurological diseases are often complicated and critically ill. Patients are usually older and have weaker immunity. During treatment, invasive operation is often used, which is very likely to cause infection and further aggravate the disease [1]. Nosocomial infection is an infection acquired by patients in hospital during hospitalization. Most of the patients in neurology department are middle-aged and elderly, and most of them have basic diseases. There are many bedridden and critically ill patients, and there are many invasive operations, so the incidence of hospital infection is relatively high, which is easy to lead to the aggravation and even death of patients [2]. Whether it is cerebral ischemia disease, cerebral hemorrhage, peripheral nerve injury and other patients, the hospitalization time is longer, especially for patients with severe illness, consciousness disorder and long-term bed rest. There are many acute and critical patients in neurology department, especially in intensive care unit. The patients are mostly middle-aged and elderly, with many basic diseases, low resistance and high incidence of hospital infection, which is easy to lead to aggravation or death of patients [3]. Hospital infection will prolong the treatment time of patients and increase the additional medical expenses. In addition, the abuse of broad-spectrum antibiotics can also increase the incidence of hospital infection [4]. If hospitalized patients cause nosocomial infections, they will lead to prolonged hospital stays and increase financial burden, which will seriously affect the treatment and prognosis of patients.

With the development of society, people's living standards continue to improve, life expectancy is prolonged, and the incidence of cerebrovascular disease has gradually increased, which has become the number one cause of death for chinese residents [5]. Attaching importance to patient risk factors and actively intervening can reduce the incidence of nosocomial infections, thereby improving the quality of life and improving the prognosis of patients. The patients admitted to the department of neurology are mostly middle-aged and elderly, with serious illness, many basic diseases, and many coma, and often need to undergo a variety of invasive procedures, resulting in

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low patient resistance [6]. There are also more invasive procedures during hospitalization, which increases the chance of nosocomial infections. This will not only make the patient's condition worse, affect the treatment effect, or even cause the patient to die in severe cases. Due to increased health awareness, the proportion of such patients hospitalized is also relatively high [7]. Nervous system diseases are generally characterized by critical illness, older age, prolonged bed rest, and low immunity. They are a high-risk group of nosocomial infections [8]. In order to understand the risk factors of nosocomial infection in hospitalized patients of neurology department, in order to take effective prevention and control measures, the clinical data of 981 hospitalized patients of neurology department were retrospectively analyzed.

2. Materials and Methods

2.1 Materials

A retrospective analysis of 981 inpatients in neurology department from January 2017 to March 2018 showed that 65 patients had nosocomial infection. Among them, 35 were male and 30 were female, the average age was 59.8 (± 6.4) years. The average hospitalization time was (12.3 ± 7.2) days. The main related diseases are cerebral hemorrhage, cerebral infarction, subarachnoid hemorrhage, posterior circulation ischemia, central nervous system infection, Guillain Barre syndrome, multiple sclerosis, myasthenia gravis, myelitis, dementia, etc.

2.2 Methods

A retrospective survey method was used to design a survey form, including admission time, length of stay, gender, age, diagnosis of combined underlying diseases, name of invasive operation, whether glucocorticoid is used, whether broad-spectrum antibacterial drugs are used, whether infection occurs, and infection season. Investigators exported data through hospital infection monitoring software and hospital HIS system, entered the cases that met the purpose of this investigation into the form, and searched for infection risk factors, infection sites, pathogenic bacteria, etc. one by one, and summarized and analyzed them. The patients were divided into two groups according to whether they had hospital infection or not. The two groups were compared in terms of age, underlying diseases, consciousness status, smoking history, prevention and application of broad-spectrum antibiotics, hospitalization time and other factors for statistical analysis.

3. Results

Among 981 hospitalized patients, 65 had hospital infection, with the incidence rate of hospital infection being 6.63%. Among them, patients with cerebral hemorrhage had the highest nosocomial infection rate, with an infection rate of 12.61%, as shown in Table 1.

Table 1 Incidence of Nosocomial Infections in Basic Diseases (%)

Protopathy	Number of discharged cases	Number of infections	Infection rate (%)
Subarachnoid hemorrhage	113	4	3.54
Posterior circulation ischemia	398	16	4.02
Infection of central nervous system	42	5	11.9
Cerebral hemorrhage	227	29	4.4
Cerebral infarction	28	4	12.78
Other	173	7	4.05
Total	981	65	6.63

Table 2 Infected Sites And Composition Ratio (%)

Infection site	Number of cases	Composition (%)
Lower respiratory tract	32	49.2
Upper respiratory tract	15	23.1
Urinary system	10	15.4
Gastrointestinal tract	3	4.6
Other	5	7.7

The infection site is mainly the lower respiratory tract, the others are the upper respiratory tract, urinary system, etc. The distribution and composition ratio are shown in Table 2.

The risk factors of nosocomial infection: age > 65 years old, history of diabetes, chronic basic diseases, smoking, conscious disorders, invasive operation and hospital stay > 2 weeks, the incidence of nosocomial infection increased significantly ($P < 0.01$). As shown in Table 3.

Table 3 Analysis of Nosocomial Risk Factors

Related risk factors		Number of cases	Number of Infections	Infection rate (%)
Age	>65	497	47	9.46
	<65	484	18	3.72
Diabetes mellitus	Yes	299	31	10.73
	No	682	34	4.99
Chronic basic diseases	Yes	337	29	8.61
	No	644	36	5.6
Invasive operation	Yes	221	25	11.31
	No	760	40	5.26
Consciousness disorder	Yes	193	43	22.28
	No	798	22	2.76
Length of stay	>14d	398	39	9.8
	<14d	586	26	4.44
Smoking for a long time	Yes	321	30	9.35
	No	660	35	5.3

4. Discussion

Inpatients in neurology department have complicated conditions, great changes, relatively slow recovery and long hospitalization time. Most of them are middle-aged and elderly, with low body resistance, accompanied by a variety of chronic diseases, such as paralysis, bed rest, deglutition function decline, consciousness disorder, etc., which have a greater chance of hospital infection. The analysis of the risk factors of infection in this group of patients shows that the incidence of infection is higher in patients who are older, complicated with other basic diseases, long hospitalization time, invasive operation during treatment and conscious disturbance during hospitalization. The incidence of nosocomial infection in patients over 65 years old is significantly higher than that in young patients. Elderly patients suffer from degeneration of tissues and organs, functional decline, low immunity, and are often accompanied by chronic diseases such as diabetes and chronic lung diseases. Neurological patients often use invasive operation when receiving treatment, and the infection rate increases [9]. In addition, due to the influence of the level of medical personnel, a large number of antibiotics are unreasonably applied, which increases the drug resistance of bacteria and increases the probability of endogenous infections. Neurology, especially in critically ill patients, has left gastric tubes, urinary tubes, ventilator, intracranial hematoma puncture and drainage, lumbar puncture and other invasive procedures. These invasive operations can damage the human body's normal defense barrier, and cause some conditional pathogens to become pathogens and cause infections. Neurology patients are often older, and there are still some conscious disturbances. The patient's normal excretion and reduced respiratory function cause the secretions to be discharged smoothly. [10] Nosocomial infections not only increase the economic burden on families and society, but also cause patients to become more ill and affect the prognosis. How to prevent nosocomial infections is particularly important. Nosocomial infections in inpatients of neurology often occur in patients with risk factors. The study of various related risk factors of nosocomial infections is helpful for assessing prognosis, taking effective preventive measures to reduce risk factors, and improving patient survival and quality of life.

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