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UDC 616.832-001-036.2

EPIDEMIOLOGY REVIEW ON SPINAL CORD INJURY

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Introduction

Spinal cord injury (SCI) is a kind of high disabling injury; it not only can lead to damage or loss of sensation and motor function, but also may lead to multiple organ dysfunction. Although some treatment methods such as cell therapy have played a beneficial clinical effect, there is no effective measure to cure SCI. Its expensive treatment cost, long recovery treatment and the loss of labour force always bring great influence to the individual and family, and also bring a heavy burden on the society. Traumatic spinal cord injury (TSCI), one of the most devastating kinds of injury, may lead to different degrees of paralysis, loss of sensory and dysfunction of bladder or bowel. TSCI not only affect one's health, but also generates a huge economic burden on the family and society. Non-traumatic spinal cord injury (NTSCI) is a special type of SCI that is not caused by traumatic reasons. The aetiologies of NTSCI include vertebral spondylosis (spinal stenosis), tumorous compression, vascular ischemia and congenital disease. No matter TSCI or NTSCI, the economic burden has become an increasingly important concern for individuals and for society at large.

Goal

The purpose of this article was to describe the epidemiological characteristics of SCI in the world in order to increase prevention awareness of individuals and society to determine the incidence of SCI and analyse the epidemiological changes with the development of economy and medical technology.

Material and Methods of research

We searched articles published in NSCID, PubMed, Medline, EMBASE and the Web of Science between January 1993 and December 2020 using the keywords «spinal cord injury», «traumatic spinal cord injury», «non-traumatic spinal cord injury», «epidemiology». The incidence, aetiology, prevalence, patient demographics, level and severity of injury, complications and mortality were reviewed from the articles. This review only included papers on human beings and that were published in English. Studies had to describe an original study involving SCI and report SCI epidemiological data.

The results of the research and their discussion

Aetiology: There are diverse causes of SCI, including falls (falls from height, simple falls), motor vehicle accidents (MVAs)/motor vehicle crashes, sports-related accidents, violence and other remaining causes of injury. Certain differences exist

between regions or countries. MVAs and falls are the most common causes of injury accounting for nearly equal percentages. The main cause of SCI in developed countries used to be MVAs, but in recent researches, it turned to be falls. However, the most common cause of SCI in non-developed countries was still falls.

Incidence: The incidence rate represents the ratio of a new disease in a particular population during a certain period of time. With the expansion of human activities, the incidence of SCI also increased gradually. The incidence varied from 13.019 per million to 163.420 per million people. Among them, the incidence rates of developed countries ranged from 13.121 to 163.420 per million people. The rates of non-developed countries varied from 13.019 to 220.022 per million people.

Prevalence: On one hand, incidence reflects the control level of SCI and the possible requirement for improved prevention, and on the other hand, prevalence poses a challenge to health care and even personal and social resources. This article shows that prevalence from 49024 to 52625 per million population among developed countries. As for non-developed countries, the prevalence is about 440.026 per million people and the total NTSCI prevalence rate was 367.2 per million in Australia.

Patients' demographics as demonstrated: The numbers of males were always more than the number of females among the SCI patients. The male: female ratio ranged from 1.10:1 to 6.69:1 among developed countries. As for non-developed countries, the ratio varied from 1.00:1 to 7.59:1. The mean age of SCI in developed countries ranged from 14 to 67 years. With regard to non-developed countries, the average age in articles varied from 29 to 46 years.

Level and severity of injury: The cervical level of spine was the most common part of injury in both developed countries and non-developed countries. Most articles reported a lower percentage of complete injury than incomplete injury, except 4 studies. In our review, when classifying the types of disabilities caused by SCI, the tetraplegia was more common than paraplegia in both developed countries and non-developed countries except Turkey and Canada. Motor-complete injuries (America Spinal Injury Association Impairment Scale [AIS]-A or -B) were more common for patients with traumatic SCI, while there were more motor incomplete injuries (AIS-C or -D) for patients with NTSCI.

Mortality: In recent years, mortality of patients was still high. Estimations of SCI mortality among developed countries varied from 3.1 to 22.2% while mortality in non-developed countries ranged from 1.4 to 20.0 %.

Therefore, SCI not only affects patients' physical, psychological health and social well-being, but also results in a heavy burden on families, communities and health care systems. Understanding and recognition of SCI epidemiology can help the health care system carry out further preventive measures and better allocate resources for disease management. In addition, by comparing epidemiology trends of SCI along with time in different regions. In our review, we have collected and integrated data, and then compared different aspects of SCI in different regions. There were significant differences in aetiology, incidence, prevalence, mortality, patients' demographics or level and severity of injury in both developed and developing countries, which may be caused by economic, science and technology, medical, geographical and even social conditions. With the development of economy and the progress of society, the main reason has become MVAs and falls. In clinical epidemiological study, the evaluation of the prevalence of SCI is difficult considering that different researchers do not have a unified standard for the definition of SCI. It is of utmost significance to establish effective safety regulations for the prevention of the injury. Once the injury happens, long-term health insurance is critical for the happiness of the patients. The aetiology of high falls was more probably related to work, resulting in thoracic and complete injury, while the cause of low falls was more like-

ly associated with cervical and incomplete motor dysfunction injury. It shows that we should pay more attention to peasants, laborers and the elderly in the prevention, hospitalization and rehabilitation of SCI. Mortality is significantly related with increasing age. Mortality of SCI patients over 60 years is much higher than that of SCI patients under 60 years of age. As for those who reach older age will typically have incomplete or lower-level SCI, and will have relatively high degrees of independence and good health. As reported, the mortality rate was highest within 1 year after SCI. Risk factors for death comprised heart disease, diabetes, lower levels of pulmonary function and cigarette smoking. The most common causes of death were circulatory system diseases (40 %) and respiratory diseases (24%). Death in SCI patients is a result of the interaction of many factors, we should aim at high-risk groups, especially older and heavier patients to strengthen nurse and treatment, and actively improve the general condition of patients; at the same time, actively manage various complications, such as prevention of respiratory infection and correcting electrolyte disturbances, and so that reduce the mortality of SCI patients. Despite these comprehensive bioinformatics analyses, the current study presents several limitations. Understanding and recognizing the epidemiological characteristics of SCI is indispensable for the optimal allocation of therapeutic resources and to provide more effective medical services to SCI patients. We expected, through our research, to understand the epidemiological characteristics of SCI much better in order to guide clinical practice and reduce social economic burden.

Conclusions

There have been a lot of changes in the trends of epidemiology of SCI. MVAs and falls are the most common causes of injury. SCI incidence varies by regions or countries. With the expansion of human activities, the incidence of SCI has gradually increased. The prevalence did not change much over time. The number of male patients was significantly more than the number of female patients. The average age of patients with SCI has a tendency to increase gradually. Cervical level of spine was the most common site of injury; patients with tetraplegia were more than those with paraplegia. Moreover, mortality has been stabilized, although still persists at a high level. Therefore, how to further reduce the incidence of SCI and improve prevention and treatment measures to promote the prognosis of SCI patients are the problems that we should study in the future.

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UDC 616.855:[616.98:578.834.1]-06

PARKINSON'S DISEASE AS A POST COMPLICATION OF COVID-19

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Introduction

Parkinson's disease is a condition in which parts of the brain become progressively damaged over many years and lead to have shaking, stiffness and difficulty with walking, balance and coordination [2].