Clinical Application of Fine Needle Puncture with Medical Big Data in Diagnosis of Bone Tumors

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Abstract: Judging from the current development trend, big data technology has penetrated into every link of medical and health management such as diagnosis, medical treatment, drug research and development, health management, etc., and has become an important technical force and management means to support the entire medical and health industry. How to build a big data platform for clinical testing and carry out research on big data mining technology to help the diagnosis and treatment of diseases has gradually become a valuable research direction. By analyzing the data, we can get information that can't be obtained by sampling data. For the current knowledge sample set with massive data and unstable data base, artificial intelligence needs a lot of human knowledge to ensure the effectiveness of its learning knowledge. This paper introduces the related concepts of precision medicine, and analyzes the fine needle puncture diagnosis and treatment strategy of bone tumors in the era of big data and precision medicine, so as to realize real-time and dynamic personalized diagnosis and treatment plan generation and implementation, thus improving the quality and effect of medical services, reducing the cost of medical services and ensuring the safety of medical services.

1. Introduction

The growth of modern information technology has changed the operating rules of the traditional medical and health industry, and big data technology has become an important fulcrum to "incite" the transformation and growth of the traditional medical and health industry. The accelerated growth of Internet and information technology has triggered great changes in the medical industry. The advantages of new technologies such as big data in retrieval ability, induction ability and discovery relevance have provided strong technical support for the growth of the medical industry [1]. Structured and unstructured texts, images, electrophysiology and other data generated in medical workflow are increasingly collected and stored by hospital information systems [2]. Not only medical data such as doctor's orders, nursing records and drug use, but also all data generated by all doctor-patient roles, medical equipment, management and service personnel in the business system. The emergence and growth of biological analysis technology, big data analysis tools and gene sequencing technology have pushed modern medicine into the development wave of precision medicine era [3]. With the growth of data storage and analysis capabilities, the concept of big data has quietly emerged in the medical field. Through the analysis of the data, we can get the beneficiaries of surgery, radiotherapy, chemotherapy and fine needle aspiration in the diagnosis of bone tumor diseases, and through accurate diagnosis and staging of bone tumor diseases, we can control the reasonable scope and indications of surgery, so as to reduce the incidence of trauma or over-treatment, and realize the real precise medical treatment in all treatment links [4].

Taking the era of big data as the development background, through the analysis of all data, we can obtain data information that is difficult to obtain by sampling data [5]. Hospital decision-making system is based on the application of the former, which can evaluate and analyze all aspects of medical activities as a whole, thus providing reference for decision-makers to manage and improve medical quality, medical safety and comprehensive operation [6]. In the era of big data and precision medicine, the diagnosis and treatment of bone tumor diseases should be based on the

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full promotion of diagnosis and treatment norms, and through the analysis of data, the beneficiaries of surgery, chemotherapy, radiotherapy and targeted therapy should be screened, and the indications and scope of surgery should be controlled by stages according to accurate diagnosis, so as to reduce unnecessary trauma and overtreatment [7]. In this paper, the related concepts of precision medicine are introduced, and the diagnosis and treatment strategies of bone tumors by fine needle aspiration in the era of big data and precision medicine are analyzed and studied, so as to realize real-time and dynamic personalized diagnosis and treatment plan generation and implementation.

2. Overview of precision medicine

In general, precision medicine refers to individualized diagnosis and treatment strategies that match the molecular biological characteristics of patients. There is no unified definition of health care big data, which generally refers to the relevant data set information generated by human health and life health activities in social life, including the whole health activity process and its results, running through the whole life cycle of human health activities. The target group of precision medicine is a group of patients or people. In the process of diagnosis and treatment, more feasible and extensive diagnosis and treatment strategies can be formulated according to the specific conditions of individual patients [8]. Due to the characteristics of large amount of information and diverse structure, how to effectively protect data security and personal privacy while promoting data application and sharing has become a major challenge for big data. Based on a large number of medical resource data, the intelligent aided diagnosis system collects, processes, stores, manages, mines, analyzes, presents and applies health medical big data through information extraction technology and language processing technology. Whether it is precision medical care or individualized medical care, both of them have the same connotation, and both involve the balance of the two concepts of standardization and individualization. Due to the serious imbalance between the supply and demand of medical and health resources, the emergence of artificial intelligence aided diagnosis technology has greatly reduced the burden of doctors' work and improved the efficiency of medical services. However, the growth of artificial intelligence aided diagnosis technology is limited by the relevant medical data, which hinders the sustainable growth of intelligent aided diagnosis technology to some extent.

The concept of precision medicine is based on the principle of individualized predictive treatment and the characteristics of molecular biology, thus forming a standardized research method. With the continuous growth of information technology and medical imaging technology, doctors can make more intelligent medical diagnosis by combining the information in data mining [9]. By using the existing outpatient data to assist doctors in daily disease diagnosis, it can effectively reduce the work intensity of medical workers, improve the accuracy of medical diagnosis, realize the information management of modern medical staff's workload by computer, support the improvement of daily management of diseases, realize a rapid disease consultation system, and realize automatic medical treatment to a certain extent. Driven by big data, how to use modern science and technology to explain the basis and mechanism of individualized symptomatic treatment in traditional Chinese medicine, especially the rational use of precision medicine in the diagnosis and treatment of bone tumor diseases, is a modern research topic with great significance and challenges. Intelligent aided diagnosis system takes computer technology, simulation technology and information technology as the means, based on the viewpoint of evidence-based medicine, aiming at semi-structured or unstructured medical problems, and provides accurate and credible diagnosis and treatment knowledge for medical workers in the process of clinical diagnosis and study through human-computer interaction, so as to help doctors make the best diagnosis, optimize treatment plans, improve patients' prognosis and realize standardized treatment.

3. Clinical application of fine needle aspiration in diagnosis of bone tumors driven by big data

In the era of big data and precision medical care, the treatment of bone tumor diseases is still based on standardization. On the basis of standardized treatment of a large number of cases, through

the accumulation of clinical data and tumor patients' samples, we can analyze the big data, and analyze and explore the "specific" cases in the genome and protein group during standardized treatment, so as to obtain the data base of precise medical treatment, and then provide an important basis for the determination of clinical treatment plan. Accurate treatment is inseparable from accurate diagnosis, especially for malignant tumors, accurate diagnosis, reasonable staging and accurate classification will be closely related to treatment plan, curative effect and prognosis. Most tumor patients have the need to preserve their body functions. Under the needs of patients, early treatment methods can be further applied and developed. The core requirement of precision medicine for perioperative comprehensive treatment of bone tumor diseases is to judge which patients can benefit from different treatment modes. In terms of neoadjuvant therapy, the purpose of treatment is to achieve the goal of radical cure by combining surgery, requiring that the treatment is practical and effective, and the tumor can be reduced or reduced, thus prolonging the patient's survival. The medical monitoring data identification model is shown in Figure 1.

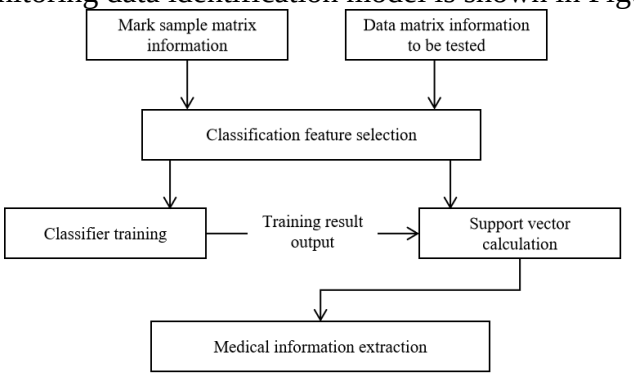

Figure 1 Medical monitoring data identification model

Through in-depth analysis of tumor molecular biological behavior, we can also identify related cases that are prone to early metastasis, and expand treatment for these patients to achieve the curative effect of radical tumor treatment. The level of medical informatization has been improved in an all-round way, and the implementation of regional health information platforms has been promoted. However, there are also problems such as lack of coordination between platforms and poor information exchange, which restrict the in-depth application of intelligent aided diagnosis technology. Through the in-depth analysis of molecular biology, high-risk patients are identified, and then the treatment modes and drugs suitable for these patients are evaluated. According to the evaluation results, the best individualized treatment combination and follow-up plan are selected to achieve the best curative effect and reduce unnecessary postoperative treatment. Figure 2 shows the basic framework of personalized medical service.

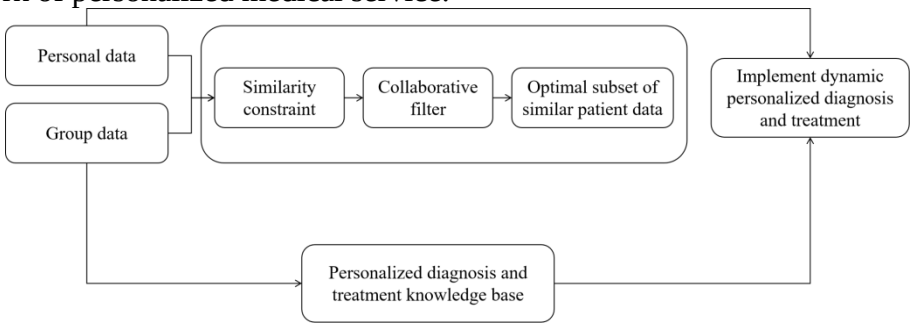

Figure 2 Basic framework of personalized medical service

It can be seen from the aspect of adjuvant therapy that the purpose of perioperative treatment is to assist surgical treatment and achieve the effect of radical cure of tumors, which requires accurate medical treatment to be effective, shrink tumors and prolong the survival time of patients. In medical treatment, compared with the concept of precise medical treatment, there is individualized medical treatment. The main difference between the two is that individualized medical treatment is a medical means to detect specific biological markers with the help of diagnostic tools, especially

for genetic markers. For patients with advanced tumor, targeted therapy is the main part of the overall treatment. The body composition of patients with advanced tumor is more complicated. Even if the stages are the same, there are still differences in biological characteristics of patients with intra-abdominal lymph node spread, liver metastasis and multiple organ metastasis. Health care big data provides more and more convenience for society, doctors and patients. In the field of medical industry and structure management, through multi-dimensional results presentation, it can provide strong data support for managers to make scientific and reasonable decisions. Through the analysis of clinical data, patients' drug sensitive reactions can be judged by big data, which may also become the main development direction in the future of precision era.

4. Conclusions

Driven by big data, disease diagnosis and treatment will provide reference for clinical decision-making by finding cases matched by each individual from past data. Massive data analysis leads to the complexity of the network structure, which requires expensive human resources, computing resources and storage resources, resulting in a large number of technologies that may encounter difficulties in actual deployment. For basic research, at present, all units attach importance to the collection and preservation of samples, and apply the detection methods of multiple platforms, which is expected to form a huge amount of data that was unimaginable in the past. The development and application of big data will be possible only if sufficient data is generated, which will be the cornerstone of precision medical care in the future. Perfecting management methods and using computer technology can quickly obtain and analyze statistical data, and explore the development trend and other correlations of the disease. In the practical application of personalized medical care, it is necessary to solve the problems of full structure and semantic standardization of electronic medical records, storage and parallel processing of medical big data, seamless and efficient docking of medical services and so on. On the one hand, the application of medical big data needs to strengthen the standardization of clinical diagnosis and treatment, and provide feasible data for the formulation of diagnosis and treatment strategies; On the other hand, it is necessary to improve the data collection process and match and integrate data collection with clinical medical services. Only when enough data is generated can the growth of big data become possible.

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