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Analysis of Clinical Characteristics and Prognostic Risk Factors of Pediatric Rhabdomyosarcoma

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Abstract: Rhabdomyosarcoma is a common malignant soft tissue tumor in the field of pediatric hematological oncology. It has an insidious onset and complex and diverse clinical manifestations, and its prognosis is affected by many factors, which seriously endangers children's physical and mental health. With the rapid development of medical informatization, online databases have become an effective way to integrate multi-center clinical data and conduct large-scale research, providing a convenient and efficient research approach for the clinical study of pediatric rhabdomyosarcoma. From the perspective of clinical physicians and based on the discipline of pediatric hematological oncology, this paper analyzes the current clinical research status of pediatric rhabdomyosarcoma, and deeply studies the clinical significance and practical approaches of conducting research on this disease by using online databases. It aims to provide theoretical support for the improvement of clinical diagnosis and treatment in hospitals and the establishment of prognostic evaluation systems, so as to help improve the standardized diagnosis and treatment level of pediatric rhabdomyosarcoma and optimize the quality of life of sick children.

Keywords: Online database; Prhabdomyosarcoma; Clinical characteristics; Prognostic risk factors

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1. Introduction

Pediatric hematological tumors are major, serious diseases endangering children's lives and health. Rhabdomyosarcoma is the most common soft tissue sarcoma in children, falling within the scope of diagnosis and treatment of pediatric hematological oncology. It has a complex pathogenesis and diverse clinical phenotypes, and there are great differences in disease progression, treatment response, and prognosis among different sick children. In clinical work in hospitals, the diagnosis and treatment of pediatric rhabdomyosarcoma face many difficulties. Its early symptoms are not typical and can be easily confused with other benign soft tissue lesions in children, which easily leads to delayed diagnosis of some children and misses the best treatment opportunity. Moreover, the prognosis of the disease is affected by many

factors such as tumor location, pathological type, treatment regimen, and individual physical constitution of children. Therefore, accurate identification of prognostic risk factors is of great significance for improving treatment regimens and optimizing the prognosis of sick children. With the continuous advancement of medical informatization construction, online databases are gradually applied in clinical research of pediatric hematological oncology due to their advantages of large data storage capacity, convenient retrieval, and integration of multi-center resources. They not only overcome the problems of small sample size and narrow research scope in traditional single-hospital research, but also comprehensively analyze the clinical characteristics of pediatric rhabdomyosarcoma, providing a new research platform for exploring prognostic risk factors.

2. Current clinical research status of pediatric rhabdomyosarcoma

Rhabdomyosarcoma is a malignant tumor formed by rhabdomyocytes or mesenchymal cells differentiated toward rhabdomyocytes. It has obvious age distribution characteristics, mostly occurring in infants and adolescents, and is the most common malignant soft tissue tumor in childhood, accounting for a certain proportion of childhood malignant tumors. From the perspective of hospital clinical diagnosis and treatment practice, pediatric rhabdomyosarcoma shows obvious heterogeneity. Tumors can occur in all parts of the human body, and there are great differences in the incidence of different parts [1]. Most of the early symptoms are atypical, often manifested as painless masses, local swelling, and pain, which are easily misdiagnosed as benign cysts, inflammation, and other diseases, resulting in the diagnosis of some children only in the middle and late stages of the disease, which also increases the difficulty and risk of treatment. At present, the treatment of pediatric rhabdomyosarcoma has formed a comprehensive treatment model dominated by surgery, chemotherapy, and radiotherapy. With the development of medical technology, new treatment methods such as immunotherapy and targeted therapy have also been applied clinically, which have improved the quality of life of patients to a certain extent [2]. However, high-risk, recurrent, refractory, and metastatic rhabdomyosarcoma is still an important disease that seriously threatens the health and life of children and adolescents, with a relatively high mortality rate. From the perspective of research, most traditional studies on pediatric rhabdomyosarcoma are based on small-sample clinical data of a single hospital, with the disadvantages of small sample size, poor representativeness of research results, and difficulty in data integration. They cannot well reflect the overall clinical characteristics and prognosis of the disease, nor can they effectively identify various factors affecting prognosis [3]. With the development of medical informatization, the establishment and application of online databases have provided an effective way to solve this problem. Online databases can integrate clinical data of pediatric rhabdomyosarcoma from hospitals in different regions and at different levels. The database includes various data such as basic information of sick children, clinical symptoms, pathological characteristics, treatment regimens, and follow-up results, laying a foundation for large-sample and multi-center clinical research. At present, research based on online databases has become an important research direction in the field of pediatric rhabdomyosarcoma. By sorting out and analyzing massive clinical data in online databases, we can better understand the clinical characteristics of the disease and find out the relationship between different clinical indicators and prognosis, providing more reliable theoretical support for the improvement of clinical diagnosis and treatment strategies and the establishment of prognostic evaluation systems [4]. However, there are also problems, such as a low

degree of data standardization, uneven data quality, and difficulty in privacy protection in the application process, which need continuous improvement and perfection in the research process.

3. Clinical significance of researching pediatric rhabdomyosarcoma based on online databases

3.1. Helping improve the cognition of clinical characteristics

The clinical manifestations of pediatric rhabdomyosarcoma vary greatly. Different lesion locations and pathological types lead to great differences in clinical symptoms, disease progression speed, and therapeutic effects. Traditional small-sample research of a single hospital is difficult to fully reflect these differences, resulting in limitations in clinicians' overall understanding of the disease. Research based on online databases can collect multi-center and large-sample clinical data, covering cases in various regions and age groups, as well as cases with different lesion locations [5]. Comprehensive analysis of these data can help clinicians summarize the phenotypic rules of pediatric rhabdomyosarcoma more comprehensively and find out the distribution of various clinical characteristics, thus effectively making up for the limitations of single-hospital research. From the perspective of hospital clinicians, a comprehensive understanding of the clinical characteristics of pediatric rhabdomyosarcoma is an important prerequisite for early diagnosis, accurate classification, and individualized treatment. Massive data in online databases enable clinicians to have a clearer understanding of the pathogenesis, symptom manifestations, and classification differences of the disease, effectively avoiding misdiagnosis and missed diagnosis caused by insufficient clinical experience and providing more comprehensive reference for clinical diagnosis [6]. In addition, data analysis using online databases can also identify clinical features overlooked in previous small-sample studies, enrich the clinical knowledge of pediatric rhabdomyosarcoma, provide new perspectives for early detection and differential diagnosis of diseases, and promote in-depth clinical research in the field of pediatric hematological oncology [7].

3.2. Providing support for accurate identification of prognostic risk factors

Traditional research is limited by a small sample size, making it difficult for clinicians to comprehensively and accurately screen key factors affecting prognosis and clarify the interaction between different risk factors. Online databases gather massive follow-up data of children with rhabdomyosarcoma, providing sufficient sample support for the study of prognostic risk factors. Through multi-dimensional analysis of data, it can help clinicians systematically screen risk factors closely related to the prognosis of sick children, clarify the intensity and mechanism of each factor, so as to construct a more scientific and comprehensive prognostic evaluation system [8]. For hospital clinicians, prognostic risk factors obtained from online databases can be used to evaluate the prognostic risk of sick children quickly. Clinicians can formulate more individualized treatment and follow-up plans for high-risk children, strengthen disease monitoring in subsequent treatment, and adjust treatment plans in a timely manner, which can effectively reduce the incidence of adverse prognosis [9].

4. Practical paths of researching pediatric rhabdomyosarcoma based on online databases

4.1. Screening of online databases and data integration

To carry out research on pediatric rhabdomyosarcoma smoothly, researchers first need to select appropriate

online databases, which is the premise of ensuring research quality. Doctors can select suitable online databases according to the actual needs of hospital clinical research. The selected databases should have the characteristics of large data volume, wide coverage, complete data types, timely updates, and high security. At the same time, priority should be given to professional databases related to pediatric hematological oncology and containing clinical data of rhabdomyosarcoma, and ensure that the data sources are legal and standardized and can be used after strict review [10]. After determining the database, start data extraction and integration. Determine the scope and content of data extraction according to research purposes, mainly including basic information of sick children, clinical symptoms, pathological examination results, treatment regimens, follow-up conditions, and other multifaceted data [11]. Unified data extraction standards shall be formulated during data extraction, and the data extraction process shall be standardized. Experienced clinicians shall be assigned to perform data extraction to avoid research deviation caused by inadequate and inconsistent data extraction. Meanwhile, the extracted general data shall be sorted and cleaned to remove invalid information, duplicate information, and abnormal information, so as to ensure the integrity and accuracy of data [12]. In addition, data from different databases need to be standardized with a unified data format and coding to eliminate data differences and realize effective data integration, so as to finally obtain standardized research datasets and lay a good foundation for the analysis of clinical characteristics and the study of prognostic risk factors.

4.2. Theoretical analysis of clinical characteristics and prognostic risk factors

After data integration, systematic theoretical analysis shall be conducted on the data in online databases from the perspective of pediatric hematological oncology, combined with hospital clinical diagnosis and treatment experience. Specifically, in the analysis of clinical characteristics, we mainly start from the aspects of age distribution, gender differences, lesion location, clinical symptoms and pathological types of sick children, summarize the distribution rules and internal relations of different clinical characteristics combined with the pathogenesis and clinical diagnosis and treatment characteristics of pediatric rhabdomyosarcoma, so as to find out the phenotypic differences of the disease and provide theoretical support for clinical diagnosis and classification [13]. At the same time, scientific theoretical analysis methods can be adopted to screen tumor-related factors, treatment-related factors, and individual factors affecting prognosis, combined with clinical practice experience, and deeply analyze the correlation between each factor and prognosis so as to find out the mechanism of each risk factor [14]. In the process of analysis, attention shall be paid to the combination of theory and clinical practice, fully consider the actual situation of hospital clinical diagnosis and treatment, and ensure that the analysis results can provide a feasible reference for clinical work. At the same time, attention should be paid to the interaction among various factors, and the synergistic or antagonistic effects among various risk factors should be determined to provide a theoretical basis for establishing a comprehensive prognostic evaluation system and help clinicians evaluate the prognosis of sick children more accurately.

4.3. Verification and clinical transformation of research results

After completing data integration and theoretical analysis, it is necessary to verify the results to ensure their reliability and accuracy scientifically. The verification process can adopt a multi-center verification method, selecting clinical cases of pediatric rhabdomyosarcoma from hospitals in different regions and

different levels to verify the summarized clinical characteristic rules and prognostic risk factors, compare the consistency between verification results and research conclusions, and correct deviations in the research in a timely manner to optimize research conclusions [15]. At the same time, cases in our own hospital can be selected for verification, combined with hospital clinical practice, to make research conclusions closer to the actual diagnosis and treatment of the hospital, and improve the practicality of research results. In terms of clinical transformation, apply the summarized clinical characteristic rules to clinical diagnosis, optimize early diagnosis and differential diagnosis procedures, and improve the accuracy of early diagnosis and reduce the incidence of misdiagnosis and missed diagnosis. At the same time, it is necessary to apply the screened prognostic risk factors to clinical prognostic evaluation, establish an individualized prognostic evaluation model, and allow clinicians to accurately judge the prognostic status of sick children and formulate appropriate treatment and follow-up plans. Finally, it is necessary to apply the effective treatment rules found in the research to the improvement of treatment regimens, enrich the comprehensive treatment system of pediatric rhabdomyosarcoma, and optimize therapeutic outcomes. In addition, research results should be linked with the diagnosis and treatment specifications in the field of pediatric hematological oncology to promote the popularization and application of research achievements, raise the overall diagnosis and treatment level of various hospitals, and ultimately achieve the goals of improving the quality of life of sick children and reducing disease mortality.

5. Conclusion

Pediatric rhabdomyosarcoma is a common malignant soft tissue tumor in the field of pediatric hematological oncology, with complex clinical manifestations and numerous prognostic influencing factors, which seriously endangers children's physical and mental health. A comprehensive understanding of its clinical characteristics and accurate identification of prognostic risk factors are of great significance for improving clinical diagnosis and treatment level. With the rapid development of medical informatization, online databases can provide a new impetus for clinical research of pediatric hematological oncology. They have the advantages of large data volume, wide coverage, and convenient integration, which can well solve the limitations of small-sample research in a single hospital and lay a good foundation for large-sample and multi-center research on pediatric rhabdomyosarcoma.

Disclosure statement

The author declares no conflict of interest.

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