Chart Analysis Based on Multivariate Statistics in Pediatric Clinical Drug Treatment

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Abstract: Pediatric drug treatment is the main means of prevention and treatment of pediatric diseases. Pediatric drugs refer to drugs mainly used for children. In order to explore the role of chart analysis in clinical pediatric drug treatment, this paper will evaluate and analyze the clinical drug treatment of children combined with charts. Dynamically clarify the course and effect of drug treatment, as well as the pathophysiological status and drug safety monitoring of the child, adjust the drug treatment plan and take necessary measures according to the dynamic situation. The results show that the chart analysis method can directly reflect the whole process of drug treatment in clinical drug treatment, and the analysis of drug treatment is thorough. Therefore, chart analysis is a simple and easy way to practice clinical drug treatment.

1. Introduction

The basis of clinical drug treatment is the physician's comprehensive understanding of the condition, patients and drugs and the development of the clinical thinking process of drug treatment programs [1]. Multivariate statistical analysis is a comprehensive analysis method for studying the inherent regularity of complex random phenomena. As an important branch of classical statistics, the particularity, importance and wide application of scientific research work are indispuTable facts [2]. In ancient times, its research was mainly through qualitative analysis of patients' personalized treatment. Therefore, children have very different characteristics from adults in terms of anatomy, physiology, biochemistry, case, immunity, etc. [3]. From the birth of the newborn to the maturity of the newborn, the body is in the growth and development at this stage, and its physiological, biochemical, immune, and nutrient metabolism characteristics are different from those of adults. Therefore, pharmacodynamics, pharmacokinetics, etc. are also different from adults [4]. The research objects of pediatric clinical drug therapy should be broadly defined from embryos, fetuses, newborns, infants, infants, preschool children, school-age children to adolescents [5]. In this process, the full collection and understanding of clinical information is of great significance. It is an important basis for clinicians to make medical decisions in diagnosis and treatment. It is also the basis for clinical pharmacists to carry out pharmaceutical care and medication guidance. It is difficult to accept Abstract concepts and logical reasoning because of the imprisonment of image thinking training in medical growth period.

Biomedical phenomena change in thousands of ways, and their causal relationship is more complex. In clinical drug treatment, especially complex or difficult treatment, due to inadequate access to clinical information at the beginning, and with the advancement of drug treatment time [6]. It is difficult for clinicians, especially doctors at higher levels, to quickly and fully obtain case information and master it for clinical decision-making because of the complexity of clinical information and the intersection of disease, treatment and drug interactions [7]. Nowadays, with the deepening of the understanding of diseases, TCM research needs to adapt to the needs of modern development. The overall trend is standardization and quantification, and the implementation of large-sample and multi-center clinical research models [8]. Therefore, skilled application of statistical analysis methods has become an essential quality for Chinese medicine researchers. The same drug is administered in the normal usage and dosage standards, and adult patients may be safe and uncomfortable, while neonates and infants may have obvious adverse reactions or even life-threatening [9]. Pediatric drug treatment is the main means of pediatric prevention and

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treatment of diseases, and pediatric drugs refer to drugs mainly used in children [10]. How to enable physicians to fully understand the condition and information about the treatment process while improving the efficiency in the rounds. Timely decision making and quality and safety of care are particularly relevant in clinical drug treatment, especially in complex or difficult cases.

2. Basic physiological and pathological characteristics of children and their influence on pharmacology

2.1 Effects on drug absorption, distribution, and excretion

The physiological functions of children are gradually developed and developed, and the metabolism is vigorous. The enzymes required for the drug in its metabolic conversion process are not mature in terms of quality, and the amount is still insufficient. At the same time, children's liver and kidney functions are not yet perfect, and drug intolerance or accumulation is more likely to occur than adults. The subject of pediatric clinical drug therapy research should be broadly defined from embryos, fetuses, newborns, infants, young children, preschool children, school-age children to adolescent children. In addition, the age also affects the dosage of children's medication. During the rapid development period, the blood circulation time is short, the metabolism is rapid, the liver and kidney function has not yet matured, the drug absorption rate is poor, and the excretion is fast. It improves the quality of clinical treatment while ensuring the quality and safety of medical care. However, more emphasis is placed on mathematical proof, which does not require students to memorize formulas, but focuses on training students to master the use of multivariate statistical analysis methods to deal with medical problems. At present, the research of traditional Chinese medicine is devoted to the standardization of symptoms of diseases and the evaluation of clinical efficacy. Single factor analysis method can not meet the needs of research. Multivariate statistical methods, including Logistic regression, cluster analysis and principal component analysis, have become the main means to solve the above research hotspots. When skin and mucosa were used, the osmotic absorption of drugs increased due to the large surface area of infants and young children.

The children in the study had convulsions after vomiting 2 months ago, which were characterized by complex partial seizures. They were discharged after being controlled by carbamazepine. Drug treatment includes hospitalization days, treatment drugs, treatment and safety monitoring, as shown in Table 1.

Table 1 Basic information of children

On admission	Basic information: Patient, male, 4 years old, weight: 18kg		
	Complaint: repeated convulsions for 2 months		
	Supplementary Examination	EEG: Increased abnormal EEG activity	
		Head CT: No obvious abnormality was found on plain CT scan.	
		Head MRI: Bilateral frontal subcortical lacunar changes	
		Blood routine, liver and kidney function were not abnormal.	
	Number of convulsions	Frequent seizures of convulsions at admission are unknown.	
	Therapeutic drugs	Keppra	0.25 g q12 h po
		Sodium valproate oral solution	5 mL q12 h po
		Nitrazepam Tablets	1.7 mg q12 h po 0.2 mg/(kg·d)

2.2 Effects of Physiological Characteristics of Different Systems on Pharmacodynamics

Children's nervous system is not well developed and blood-brain barrier is not mature enough. The manifestations of various drugs are different: for example, morphine has a strong inhibition on the respiratory center of neonates. According to different research purposes, it can be divided into sample clustering and index clustering. Whether it is sample clustering or index clustering, the key is how to select clustering indicators, that is, how to quantify similarity. Aminoglycoside antibiotics can cause hearing loss and mute children, while quinolone antibiotics can cause increased

intracranial pressure. This period of life is called the neonatal period, mainly the establishment of lung respiration, changes in blood circulation, the beginning of digestive and excretory functions, etc. If the skin is tender and thin in the neonatal stage, we should avoid allergic skin caused by drugs, and choose appropriate medication according to pharmacology to prevent adverse reactions. In the infant and toddler stage, the ability to swallow is poor, oral medication should be avoided as much as possible, and drugs such as antidiarrheals and dulantin are not recommended for infants and young children. In this case analysis, the initial treatment drug and the number of convulsions and the scatter plots with the adjustment of the drug and the number of convulsions were established to evaluate the treatment of the drug. The teaching focus of multivariate statistical analysis is transferred from theory to practical application, guiding students from focusing on mathematics skills to statistical applications, data analysis, presentation and interpretation of results. The discrimination results of the two discriminant methods are consistent, and they all belong to linear discriminant.

After analysis of 6000 prescription drugs, it was found that there were 1015 prescriptions with irrational use of drugs. It is obvious that the inappropriate use of these drugs is higher than other drugs, and the difference is statistically significant ($P<0.05$), see Table 2.

Table 2 Statistics on the unreasonable drug use in pediatric prescriptions

Irrational and unreasonable type of medication	Number of prescriptions	(%)
Improper dosage	314	35.5
Antibacterial drug application is unreasonable	145	12.7
Unreasonable drug use	168	16.8
Drug interaction	75	10.4
Abuse of hormones	59	8.6
Improper choice of solvent	68	9.6
Other unreasonable circumstances	14	2.4

2.3 The role of chart analysis in pediatric clinical drug therapy

2.3.1 Forms for the basic situation of children, clinical drug treatment and drug safety

The basic information includes basic information, complaints, relevant auxiliary examinations before admission, major pathophysiological conditions, and treatment medications. Mathematical theory does not need to be introduced too much (except for postgraduate students in statistics), especially to avoid hard-boiled deductions and rote memorization of complex formulas. There are also cases in which older children have higher rates of adverse reactions when using diuretics, acid-base drugs, and antibiotics, and are more tolerant to atropine, sedatives, and sulfonamides. If the study data of normal adults or older children is applied to newborns, the dose and usage may be ineffective or cause poisoning. Hormones should not be used first when the etiology is not clear, otherwise it is easy to cover up the condition. The main clustering indicators have correlation number and distance. For severe infections complicated with toxic shock, use large doses of short course of treatment, and use effective and sufficient antibiotics at the same time. The physiological and metabolic processes in neonatal period are changing rapidly, and the pharmacokinetic processes in neonatal period are also changing rapidly. Therefore, when children are ill, prescriptions should be handled carefully, according to the actual situation, according to the children's own factors, rational and compliant use of drugs. In addition, the weak foundation of mathematics, facing a large number of formula derivation and complex operations, it is easy to produce fear and frustration, and low interest in learning.

To establish scatter plots of therapeutic drugs and therapeutic effect related indicators for analysis and evaluation of therapeutic effect. For example, a scatter plot between the use of oxcarbazepine and the number of convulsions was established in this case. See Figure 1.

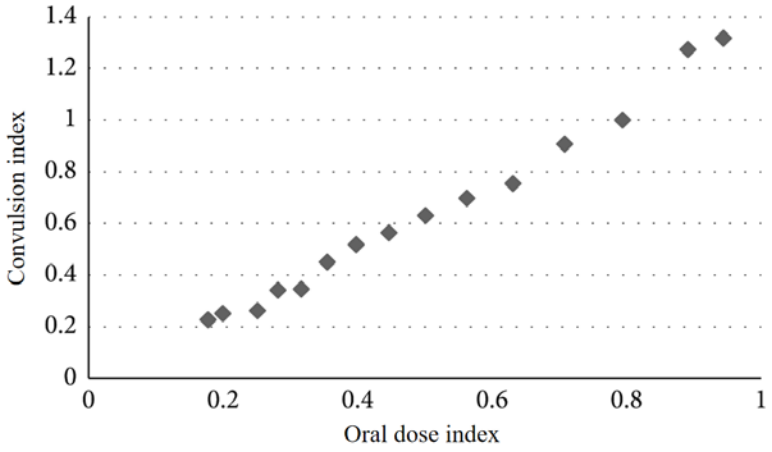

Fig.1. The relationship between the dosage of oxcarbazepine and the number of convulsions 9 days after admission

2.3.2 Therapeutic Drugs and Therapeutic Effect

At present, it is often time-consuming and laborious to rely solely on the oral report and the description of the medical records of the lower physicians during ward rounds, and it is difficult to grasp the key points and understand comprehensively. Especially in difficult cases with long treatment time and complicated treatment situation, it is often difficult to give consideration to both before and after treatment and make timely clinical decisions. To cultivate the ability of medical postgraduates to apply multivariate statistical analysis methods flexibly and skillfully to solve practical medical problems, it is necessary to integrate theory with practice closely in teaching: in theoretical learning, to strengthen the training of practical ability. To improve the rationality of drug use, we should start from the management of staff and hospitals. On the one hand, medical staff should have the relevant clinical knowledge reserve. In the specific drug use, they should not only follow the theory, but also integrate theory with practice and pharmacy knowledge. In practice, master the choice of the type, dosage and method of medication, guide children to take appropriate medications, provide medication consultation for family members, etc., and continuously enrich clinical experience in the work. The absorption, transport, distribution, metabolism, excretion and other treatment processes of drugs in the neonatal period have their own particularities. For unexplained fever should not be used rashly, children with chickenpox should be banned. The basic principle is: by calculating the eigenvalues of the correlation coefficient matrix between variables. The number of principal components is determined according to the eigenvalue and the contribution rate. Each principal component is a linear combination of the original variables, which is a kind of synthesis of the original variables, which does not increase the total information amount or reduce the total information amount.

3. Conclusion

Clinical drug treatment is a process that gradually advances over time, especially in the treatment of relatively complicated or difficult cases, due to complicated conditions, long treatment time, and the use of drugs and interactions. However, it is worth mentioning that the multivariate statistical methods involved above are mostly exploratory analysis. Each analysis method has its own advantages and disadvantages, and some internal connections. At present, pediatric drugs lack the pharmacological parameters of direct application, and the parameters of pharmacokinetics are mostly determined in the phase I clinical trial before the new drug is marketed. In addition, some unreasonable wills or medication hospitals should intervene and correct in time. Improve the efficiency of clinical treatment while ensuring the quality and safety of medical treatment. As an applied subject, the examination of multivariate statistical analysis should avoid a single written form of examination, and do not test the concepts and formulas memorized by rote in books. First of all, hospitals should establish a complete drug catalogue and prescription collection, strengthen

the training of rational drug use, and timely supplement and update the introduction of new drugs, the name of drugs, new properties and other changes. The management system of drug use in hospitals should be improved, the system of inpatient ward rounds for children should be strictly enforced, the inquiry and exchange of various information should be smooth, and the evaluation system should be made public, etc. Practice using chart analysis method, time-saving, labor-saving, convenient, intuitive and clear, improve the efficiency and quality of work, better ensure the scientific and rational clinical treatment, better improve the quality of medical care, ensure medical safety.

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