

Application Experience of Case-Introduction Teaching in the Pathological Regulation Teaching of the Lymphohematopoietic System

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Abstract: Pathology is the gold standard for clinical diagnosis and an important bridge between clinical work and basic disciplines. Therefore, training qualified clinical pathologists is very important for clinical work. It is challenging to diagnose lymphohematopoietic diseases in practice since they made up a large percentage of resident doctors' standardized training and there are numerous knowledge nodes associated with them. Therefore, this training base adopts the "case-introduction" teaching mode to help resident doctors master the knowledge nodes required by the outline in the study of lymphohematopoietic system pathology.

Keywords: Case-introduction teaching mode; Lymphohematopoietic system pathology; Regulation teaching

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1. Introduction

The standardized training of resident physicians has become a necessary experience stage in the lifelong education of medical students, and it is an important post-graduation medical education model ^[1]. The ultimate goal of the standardized training of clinical pathology residents is to cultivate qualified and independent practicing physicians who can undertake the work of pathological diagnosis ^[2]. In the past, the general training of pathologists mainly adopted the training mode of "passing, helping, and leading". Therefore, it is necessary to explore a new training mode in the standardized training of clinical pathology residents ^[3]. According to the characteristics of professional teaching and training, this training base implements the "case-introduction" teaching mode in the training work, which is of great significance to improve the quality of training.

2. The necessity of exploring new training models

The traditional pattern of pathological training and teaching begins with theoretical lectures, followed by practical image reading, and ends with quality feedback. This model is more practical in the teaching of relatively simple disease systems, and students can quickly master the content. However, it is not suitable for the teaching of multiple complex disease systems due to its difficulty, and the students are unable to comprehend the knowledge quickly which leads to forgetting the topic easily. Therefore, it is imminent to explore a new residential training mode. This training base takes the diseases of the lymphohematopoietic system as the entry point and conducts teaching through the "case-introduction" teaching mode, by which

the difficulties are solved and knowledge nodes are delivered, allowing the students to comprehend swiftly and easily. The “case-introduction” teaching mode is proven to be effective, hence it is well recommended for this teaching mode to be widely used.

3. Carrying out “case-introduction” teaching in the lymphohematopoietic system

There are many clinical and pathological diagnoses, and the diagnostic criteria of each system are different, especially the diseases of the lymphohematopoietic system, which is a major difficulty in teaching and learning. There are many types of classification in this system, and morphological diagnosis is difficult. Accurate diagnosis requires a comprehensive analysis based on the results of four aspects: clinical history information, pathological microscopic characteristics, immunohistochemical phenotype, and molecular genetic characteristics ^[4]. Meanwhile, molecular genetics has developed rapidly in recent years, and the WHO classification of this type of tumor has been continuously updated ^[5]. Therefore, in order to improve the diagnosis level of pathological resident trainees in diseases of the lymphohematopoietic system, it is necessary to have a systematic and comprehensive understanding and mastery of the structure, benign lesions, and malignant lesions of systemic diseases. Professional knowledge of clinical pathology given through the form of case studies allows resident physicians to get started quickly, find the skills and methods of clinical pathology learning, and improve the level of pathological diagnosis ^[6]. This method puts forward higher requirements for the teaching plan of the clinical pathology standardized training base, especially for the teaching work of the teaching teachers. The following is the operation method.

(1) Selected standardized cases: the department is the national standardized training base for resident physicians, as well as the molecular pathology and early diagnosis laboratory of tumors in Hebei Province. It has a wealth of senior talents: the chief and the deputy chief physicians have experience of more than 5 years, all the teachers in this base have a Master’s degree or above, are engaged in the lymphoma subspecialty, and are under the tutelage of Beijing Friendship Hospital affiliated with Capital Medical University and Shanghai Ruijin Hospital pathologists who have rich experience in pathological diagnosis. The hardware facilities of this training base are complete: including Hisense multimedia pathological consultation and display teaching system, multi-head high-resolution microscope, Langjia electronic graphic analysis system, electronic medical record platform, pathological slide diagnosis, Chinese and English pathology books, and CNKI network database service platform based on Baoding First Central Hospital. The teaching team of this training base has 13 members, including the teaching director, the teaching secretary, and the teaching teachers (at least senior attending physicians who have been rated as attending physicians for more than 5 years), with solid basic knowledge of pathology, rich clinical knowledge of pathology, and rich experience in clinical teaching and familiarity with the clinicopathological manifestations of lymphohematopoietic system diseases, who are competent for this teaching and training mode. The teaching team draws up the teaching plan and lesson preparation in advance: each standardized case, with typical pathological morphology, is jointly selected by at least 2 leading teachers who are deputy chief physicians or above. In the process of preparing lessons, classic cases were selected, and theoretical knowledge was interspersed across the students to avoid the traditional phenomenon of “full classroom irrigation” ^[7]. Firstly, the outline requirements are clarified to master the content, including reactive hyperplasia, inflammatory lesions, common types of lymphoma, common leukemia and lymphoma involvement in bone marrow, metastatic cancer, hypersplenism, common lymphoma, and vascular tumors. Before carrying out accurate cases, the groundwork is initially laid out, and “onion skin” teaching (explained under a multi-head microscope) on basic knowledge such as the normal structure of lymph nodes and cell differentiation is given, followed by classification and explanation based on the students’ understanding. Three cases of reactive hyperplasia and inflammatory lesions each as well as two cases

of each pathological type of small B-cell lymphoma, diffuse large B-cell lymphoma, Hodgkin's lymphoma, and peripheral T-cell lymphoma are selected. Inflammatory lesions and lymphomas are explained step by step, from simple to difficult, at various stages of disease progression, in order to help students memorize knowledge nodes as quickly as possible.

- (2) Introduce standardized cases: the teacher and students observe pathological sections under a multi-head microscope. In order to improve students' interest in learning, selected standardized cases are introduced and clinical cases are used to guide lessons so that students have an intuitive understanding of clinical pathological forms. While explaining the theoretical knowledge and organizational characteristics of cases, clinical manifestations and meaningful examination results of patients are timely interspersed, allowing the integration of theory with practice, which is more helpful for pathology trainees to comprehend and memorize the knowledge quickly. For lymphomas that are difficult to be diagnosed by ordinary hematoxylin-eosin (HE) staining, interpret the results of immunohistochemical indicators, fluorescence in situ hybridization (FISH), and gene rearrangement are interpreted and the significance of each indicator, as well as its role in diagnosis, are explained, hence students are guided to form diagnostic ideas and established clinical thinking of pathological diagnosis to improve their competency. According to the training syllabus, the teacher sets up questions in advance and guides the students on how to diagnose lymphoma through dialectical thinking. The students think and solve before the class, and observe the slices under the microscope in practice to make a preliminary diagnosis. Competent students put forward corresponding auxiliary examinations and differential diagnoses. In the process of students interpreting slices under the mirror, the teacher inspires and guides the students through the questions set in the lesson preparation, requires every student to actively participate in the discussion, stimulates students' desire for knowledge and exploration spirit, and improves students' enthusiasm for learning. During the teaching process, the clinical pathological thinking of the trainees is cultivated, and their pathological diagnosis ability is improved.
- (3) After-class summary: each student will begin by summarizing each knowledge node before consulting with their teachers, followed by emphasizing the key knowledge nodes and further discussing raised problems before leading teachers to integrate and analyze, and repeat the process until the students can make a pathological diagnosis by combining clinical manifestations and theoretical knowledge, as well as comprehending and mastering the key knowledge nodes. Special lectures can be given on the knowledge nodes that are difficult to comprehend.
- (4) Conduct systematic courses: the success of practical operations stems from solid fundamental knowledge. According to the standardized training outline, we conduct basic and professional lectures and carry out standardized systematic courses. The combination of the latest WHO classification, molecular pathology, and other disciplines guides students to study systematically and comprehensively [8]. At the same time, with the development of network information in recent years, pathological diagnosis lectures have become more and more comprehensive, and the content of lectures by national pathologists has become more and more abundant. We use this resource to conduct systematic courses for undergraduate departments and organize students to learn the essence of lectures given by experts. During the lymphohematopoietic system course, the explanation of the lymphohematopoietic system is given by Mr. Wang Chaofu in Hengdao pathology, so that students can broaden their learning ideas, learn the latest diagnostic standards and changes, and keep up with cutting-edge progress of the times. And in daily external inspection work, if one encounters typical cases, especially difficult cases, subspecialty pathologists preside over regular clinical pathology multidisciplinary team (MDT), which can not only solve the problem of pathological diagnosis of difficult cases but also improve the clinical pathology of trainees. Knowledge training goes a long way.

Through systematic courses and participation in case consultation discussions, the clinical pathology knowledge of the trainees can be greatly improved.

4. Conclusion

The standardized training of clinical pathology residents is different from other clinical specialties and has the unique features of this specialty. The training content is set and implemented according to the characteristics of the specialty^[9,10]. In order to cultivate qualified and excellent pathologists, clinical pathological diagnosis training is the core training content of the entire resident standardized training process. The application of case-introduction teaching has been affirmed and recognized by students. The team gave full play to its strength, explored various teaching modes to adapt to the characteristics of modern teaching, and diligently strived to cultivate excellent resident doctors.

Disclosure statement

The authors declare no conflict of interest.

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