

Application of Report Analysis in Standardized Training for Resident Physicians in Biochemistry Sub-specialty of Laboratory Medicine

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Abstract: In recent years, with the continuous deepening of educational reform in the medical field, standardized training, as an important stage of providing excellent laboratory physicians to the clinic, not only needs to strengthen various professional skills of laboratory physicians, but also needs to integrate medical ethics education into the education. Report analysis uses clinical case test reports as teaching content. Under the guidance of attending physicians, resident physicians are the main body of standardized training. Teaching activities for report analysis are carried out by combining theoretical knowledge and case information. Through detailed planning of report analysis teaching activities and adequate preparation, standardized training activities are smoothly carried out. This targeted and comprehensive teaching model can effectively improve the clinical thinking and clinical laboratory professional ability of resident physicians, strengthen medical ethics, and make biochemistry sub-specialty resident physicians in laboratory medicine more adaptable to clinical work, thus achieving teaching goals.

Keywords: Report analysis; Laboratory medicine; Biochemistry sub-specialty; Standardized training

Online publication: July 8, 2025

1. Introduction

Standardized training for resident physicians is an important component of medical education, aimed at improving the professional skills, clinical thinking, and overall quality of resident physicians through systematic training and practice. This training process not only helps resident physicians consolidate and deepen their theoretical medical knowledge, but also enables them to gradually master clinical diagnosis and treatment skills through practical training, laying a solid foundation for becoming a qualified clinical laboratory physician^[1, 2]. At the same time, standardized training also emphasizes the cultivation of medical ethics, guiding resident physicians to establish correct values and professional views, and providing patients with better medical services. The report is a medical document provided by the laboratory department to the clinic, which plays a crucial role in the medical process. It is an important basis for doctors to understand the patient's condition and formulate treatment plans. Through

the analysis of inspection and examination reports, doctors can obtain the patient's physiological and biochemical indicators, thereby judging the patient's health status and disease types. Secondly, report analysis helps doctors detect abnormalities in patients in a timely manner and take corresponding treatment measures to prevent the disease from worsening^[3,4]. In addition, report analysis can also provide doctors with dynamic information about disease development, which helps to evaluate treatment effects and adjust treatment plans. Therefore, proficiency in report analysis skills is important for improving doctors' clinical decision-making abilities and patient treatment outcomes. This article explores the process and effectiveness of report analysis based on its application in the standardized training of resident physicians in biochemistry sub-specialty of laboratory medicine in the hospital.

2. Clarifying teaching objectives

Clarifying teaching objectives, specifically through the analysis of biochemical test reports, serves as the cornerstone of the entire teaching process. The aim of this teaching approach is to enable resident physicians to master the analytical methods of biochemical test reports, deeply understand the clinical significance of various biochemical indicators, and thereby improve diagnostic accuracy and clinical decision-making abilities. This objective not only requires resident physicians to grasp theoretical knowledge but also demands flexible application in practice, transforming knowledge into the ability to solve practical problems. Understanding the clinical significance of biochemical indicators is essential to enhancing diagnostic accuracy and clinical decision-making. The teaching objectives primarily include the following points:

- (1) Mastering detection methods, influencing factors, and reference ranges of biochemical testing items.
- (2) Accurately interpreting various data in biochemical test reports and understanding the physiological and pathological mechanisms behind them.
- (3) Combining patient history, clinical manifestations, and laboratory test results to conduct comprehensive analysis and make correct diagnoses.
- (4) Providing further examination suggestions, formulating or adjusting treatment plans based on biochemical test results in clinical practice, and promoting the improvement of treatment effects.
- (5) Explaining complex biochemical test results in an easy-to-understand manner to patients or their families through effective communication, enhancing patient trust.

3. Consolidating basic knowledge

3.1. Theoretical knowledge explanation

Through systematic classroom teaching combined with carefully crafted PPT presentations, resident physicians are introduced to the basic principles of biochemical tests, including the mechanisms of various biochemical reactions and the principles of testing methods. Simultaneously, common biochemical indicators, their reference ranges, the clinical significance of abnormal values, and the relationship between these indicators and diseases are explained.

3.2. Report case analysis

Typical biochemical test reports are selected for detailed analysis. By analyzing specific reports, theoretical knowledge is integrated with practical applications, assisting resident physicians in understanding the practical use of various indicators in clinical work. The selected reports should cover different types of diseases, such

as liver disease, kidney disease, diabetes, etc., enabling resident physicians in the laboratory department to comprehensively understand the application of biochemical tests in the diagnosis of various diseases.

4. Teaching skills for report analysis

4.1. Identifying key information

Resident physicians are instructed on how to quickly identify key information from reports, such as basic patient information (e.g., name, gender, age, medical history), testing items, result values, and units. By recognizing key information, resident physicians can rapidly grasp the basic situation of the test report, laying an informational foundation for subsequent analysis and judgment.

4.2. Explaining detection methods, influencing factors, and reference ranges of biochemical testing items

This allows resident physicians to gain a preliminary understanding of the basic information of each item.

4.3. Analyzing abnormal values

Abnormal values are a particularly important aspect of biochemical test reports, often reflecting abnormal conditions in certain aspects of the patient's health. Residents first need to determine whether the abnormal results are caused by the disease itself or by unqualified samples, taking into account factors such as sample conditions and influencing factors. Secondly, combining information such as the patient's medical history and clinical manifestations, they should identify possible causes of the abnormal values. This requires residents to have solid medical knowledge and keen clinical thinking skills, enabling them to accurately link abnormal values to diseases and provide evidence for diagnosis. During teaching activities, mentors guide residents in mastering methods for analyzing abnormal values.

4.4. Comprehensive interpretation of reports

The various indicators in biochemical test reports are interrelated, collectively reflecting the patient's physiological and pathological state. Therefore, residents need to have comprehensive medical knowledge and proficient analytical skills to integrate and comprehensively analyze these biochemical indicators, and then draw accurate diagnostic conclusions. This requires residents to accurately grasp the intrinsic relationships between the various indicators, enabling them to make correct diagnoses and conclusions.

5. Clinical communication and exchange

Through simulated communication scenarios with patients or clinical healthcare workers, residents are trained to explain the results of biochemical test reports to clinical staff, patients, and their families. These simulations should cover different situations and audiences, such as explaining to clinicians, clinical nurses, patients, and their families. Through simulated communication, residents can master effective communication skills and methods, improve their communication abilities, and enhance patient trust.

6. Group discussion

Organize residents from different grades to discuss specific biochemical test reports, allowing them to share their experiences and insights on analyzing the reports. Comprehensive analysis is conducted based on various aspects such as sample condition, patient medical history, clinical manifestations, and laboratory results, ultimately leading to diagnostic opinions and treatment suggestions. Through group discussions, residents can learn from each other, leverage each other's strengths, and collectively improve their ability to analyze reports. This practice deepens their understanding and application of biochemical test indicators. Simultaneously, group discussions can stimulate residents' thinking vitality and promote the emergence and development of innovative thinking.

7. Evaluation and feedback on teaching effectiveness

7.1. Regular assessment

Regular assessments are conducted to evaluate the mastery level of resident physicians in biochemical subspecialty of laboratory medicine regarding report analysis. The assessment covers various aspects such as theoretical knowledge and practical analysis, comprehensively examining the professional ability of resident physicians. The assessment results should be promptly fed back to the resident physicians and instructors, facilitating timely identification of issues and provision of targeted guidance.

7.2. Feedback mechanism

During the teaching process, resident physicians may encounter various questions and confusions, thus they are encouraged to actively raise questions and seek help from their mentors. Resident physicians can also provide suggestions and opinions on teaching methods and content, continuously optimizing the teaching plan and improving teaching quality. The feedback mechanism can be implemented through Q&A sessions during teaching activities, daily mentorship discussions, and other means.

8. Continuous learning and improvement

8.1. Follow-up learning

Resident physicians are encouraged to continue learning new knowledge, techniques, and methods in the field of biochemical testing after the training. During the teaching period, they can participate in academic conferences, seminars, and other activities to stay updated on the latest research progress and clinical application. Mentors can encourage resident physicians to acquire new knowledge through online courses, professional books, and other resources, constantly updating their knowledge systems.

8.2. Learning exchange

Organize participation in academic conferences, seminars, and other activities to broaden horizons and learn about the latest biochemical testing research achievements and clinical application progress. These events serve as important platforms for exchange in the medical field, allowing resident physicians to access the latest research findings and clinical experience. Discussing and exploring with peers at these events can enhance their academic level and clinical abilities. These activities also provide important opportunities for resident physicians to expand their network resources and establish academic connections, laying a foundation for future work and learning development.

9. Precautions

During the teaching process, attention should be paid to the following aspects:

- (1) Biochemical test report analysis requires strong practicality, so practical teaching should be emphasized
- (2) The cultivation of comprehensive analytical ability should be stressed during the teaching process
- (3) Individual differences should be considered, and teaching should be tailored to individual needs. For example, resident physicians with a weaker foundation should receive additional teaching and guidance on basic knowledge, while those with stronger learning abilities can be provided with more challenges and expansion opportunities
- (4) Communication skills should be developed, and resident physicians are encouraged to take initiative in learning in the field of biochemical testing to enhance their abilities and proficiency.

10. Conclusion

The analysis of laboratory reports can significantly improve resident physicians' theoretical knowledge and practical skills. Through deep interpretation and analysis of the reports, resident physicians can not only consolidate and deepen their understanding of biochemical test indicators but also practice how to make accurate diagnoses based on the results of the reports. This combination of theory and practice allows resident physicians to master theoretical knowledge while continuously improving their practical skills and clinical thinking^[5, 6].

Report analysis helps improve the peer evaluation scores among resident physicians in the biochemical sub-specialty of laboratory medicine. In the process of jointly analyzing and discussing the reports, resident physicians can learn from each other, draw on each other's strengths, and thus more comprehensively understand and apply biochemical testing knowledge^[7, 8]. Moreover, when guiding resident physicians in analyzing reports, teachers can demonstrate their profound professional knowledge and rich clinical experience. This professional guidance not only benefits resident physicians greatly but also enhances their trust and respect for the teachers, leading to higher recognition in evaluations. Through report analysis, resident physicians can deeply appreciate the benefits of the teaching mode that combines theory with practice. This teaching mode not only enhances their learning interest and enthusiasm but also allows them to constantly challenge and surpass themselves in practice, resulting in higher evaluations of the teaching mode^[9, 10].

In the standardized training of resident physicians in the biochemical sub-specialty of laboratory medicine, report analysis can help resident physicians master the analysis methods of biochemical test reports, understand the clinical significance of various biochemical indicators, and improve diagnostic accuracy and clinical decision-making abilities. This is achieved through deepening theoretical knowledge, enhancing practical operations, promoting mutual learning, strengthening respect and trust for teachers, enhancing recognition of teaching modes, and improving patient satisfaction. In summary, adopting report analysis can cultivate resident physicians' practical ability to analyze reports, communication skills with patients and their families, and independent learning abilities, laying a solid foundation for their future career development.

Disclosure statement

The author declares no conflict of interest.

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