

Improvement of Training Methods in Ultrasonic Imaging

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Abstract: The ultrasonic imaging has become one of the popular imaging modality in clinical applications. The training method has played a great role in the cultivation of ultrasonic practitioners. In this paper, we introduce the improvement of training methods in ultrasonic imaging in our teaching practices. The improved training method of ultrasonic imaging could promote the teaching quality of ultrasonic imaging.

1. Introduction

The development of ultrasonic imaging is very rapid, profound and extensive. It has been accepted as one of common imaging examination in clinical practices. With the wide application in clinical practices, the requirements of ultrasonic training is elevated to a higher level. It is clear that the teaching skills of ultrasonic imaging plays a great role in the cultivation of ultrasonic practitioners^[1-2].

With the purpose of improving teaching efficiency and strengthening students' practical ability, we summarize the traditional teaching methods of ultrasonic imaging for ten years teaching experiences. Especially, the innovation ideas is presented for the betterment of ultrasonic teaching. Through the application of innovated teaching skills, the teaching quality of ultrasonic imaging is greatly improved and the comprehensive ability of trained students are promoted.

Our paper is organized as following sections: the first is training requirements of ultrasonic imaging, the second is the improved ultrasonic training, the end is the conclusion for ultrasonic training.

2. Training Requirements of Ultrasonic Imaging

Different from other imaging modalities, ultrasonic imaging is one of kind of popular technique and has its own characteristics. It is evident that the ultrasonic training should focus on the normal anatomy of medical imaging dissections. The main training contents should include the basic knowledge of the introduction of ultrasonic instrument, upper abdominal ultrasound, pelvic ultrasound and cardiovascular ultrasound, etc. The requirement of ultrasonic diagnosis is real-time, continuous and dynamic patterns and the changes of sonogram are observed in multiple sections. Sometimes, the sections always need to be distinguished by experienced doctors. The diagnosis results of the same lesion also vary greatly in patients. Therefore, ultrasonic training must emphasize the practical training and require the students to participate in the training stage.

Experimental training of ultrasonic imaging is an important supplement to theoretical teaching. It aims at cultivating students' practical skills and diagnostic ability. It plays a decisive role in strengthening students' comprehensive quality education and ability cultivation. Based on its own characteristics, the training requirements of ultrasonic imaging focuses on clinical needs. The ultrasonic diagnostics experimental teaching should reform and explore the new model of ultrasonic teaching with the rapid development of ultrasonic imaging^[3,4].

3. Improved Ultrasonic Training

3.1. Traditional Ultrasonic Training

The traditional model of ultrasonic training always paid less attention to how to identify technical problems, analyze problems and design research projects for solving clinical problems. Furthermore, the traditional teaching maybe omit the integration of teaching and learning, and probably neglect the latest developments and current hot points of ultrasonography. This kind of teaching mode is unfavorable for students to master the teaching content, to cultivate the ability of analyzing problems and creative thinking. The diagnostic ultrasound doctor always make the diagnosis by himself rather than just reading a few slides. The process of diagnosis need the doctors to review clinical symptoms and sonograms in a short time. This make the training of ultrasonic imaging more strict than ever^[5, 6]. With rapid development of ultrasound medicine in recent years, the existed training module of ultrasonic imaging have some limitations.

3.1.1. Improper Design of Training Hours

Due to the rapid development of ultrasonic imaging, the teaching contents of ultrasonic courses certainly would change. In fact, the overall teaching hours always could not immediately adjust consistently with the mentioned change. This would made the stage of teaching and learning produce imbalance to a certain extent for the wrong arrangement of teaching hours.

3.1.2. Passive Training of Ultrasonic Imaging

The traditional teaching model is alike cramming teaching, in which the students would be provided with lots of knowledge in training classes. It is a pattern of closed teaching technique that focuses on teacher-centered and text-centered teaching. Teachers arrange the courses setting and prepare the learning subjects. This make the students in a passive, mechanical learning state. It is certainly inconducive to the development of students' positive initiative and bound students' thinking of discovery and innovation in learning. It is deem that the students lacks of thinking ability and lost of the ability of using ultrasound medical knowledge to analyze and solve clinical problems.

3.1.3. Unqualified Training Quality

Due to the influence of teaching concept, teaching mode and other factors, the cultivation of comprehensive quality of ultrasonic medicine of students is neglected, which leads to the low comprehensive application ability of ultrasonic medicine of students, and the errors are easy to occur in practical operation, thus reducing the diagnostic accuracy of ultrasonic imaging.

3.2. Improved Ultrasonic Training

During the teaching process of ultrasonic courses, we should not only pay more attention to the teaching methods of ultrasonic medicine, but also emphasize the students' understanding of ultrasonic medicine and even the initiative learning for ultrasonic knowledge. The advantages of improved ultrasonic training has been listed as follows:

3.2.1. Revision of Teaching Content

Teaching contents should be revised with the development of ultrasonic imaging. Teachers should collect clinical cases and enrich the training class. In training process, we pay more attention to the demonstration teaching and multimedia teaching. For demonstration teaching, the experienced ultrasound doctors conduct ultrasonic examination and interpret the regulation and principle of ultrasonic imaging. During the training process, multimedia teaching is also important in teaching curriculum design and organization^[7]. Through multiple stimulation of practical applications, it could enhance students' perceptual understanding and improve their learning interest. As an important part of imaging medicine, the preparation of imaging materials plays an important role in the successful completion of teaching objectives.

3.2.2. Application of Problem Based Learning

The problem oriented teaching method is applied in the clinical medicine, which is based on the case as the guide, the problem as the basis, the student as the main body, the teacher as the guidance heuristic education, with the training student's ability as the teaching goal. The essence of PBL teaching method lies in giving full play to the guiding role of problems in the learning process and

arousing students' initiative and enthusiasm^[8, 9].

During the training, the students were treated as the main body. Let students to find methods to solve problems, training students image thinking and practical solutions. The ability to ask questions improves the quality of practical teaching in ultrasonic diagnostics. The setting of questions plays a key role in the implementation of ultrasonic teaching^[10].

3.2.3. Reformation of Training Plan

At present, the teaching time of relevant clinical departments of clinical medicine students is relatively short, and their understanding of clinical diseases is insufficient. In the practice of ultrasonic imaging, we should pay attention to remedy this defect, to help students broaden their thinking, and do well in diagnosis and differential diagnosis. We have designed a new mode of "three-week full-load practice teaching" in ultrasonic training for students. The new practice teaching mode arrange 3 weeks time, cultivate the student "3 weeks full load study" habit in ultrasonic imaging. It consists of three steps, one week of clinical observation, one week of clinical practice and the last week of practice evaluation^[11]. During the three weeks of practical training, the integration of ultrasound and clinical knowledge are enhanced and the interdependent thinking ability of students are greatly improved^[12].

4. Conclusion

Through the reformation of ultrasonic training method, the students' imagination, creativity and operational ability are greatly improved. The innovated method could not only greatly improve their teaching level of specialized teachers, but also cultivate the independent thinking and innovation of students. It could be used as a kind of efficient method for ultrasonic training.

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