Research on the Application of Mind Map Combined with PBL Teaching Method in the Standardized Training of Anesthesiology Residents

Jingjing Fan, Junbei Wu[*]

Department of Anesthesiology, The First Affiliated Hospital of Nanjing Medical University, Nanjing, Jiangsu Province, China, 210029.

Abstract

Objective: To study and analyze the effect and value of mind mapping combined with PBL teaching method in the standardized training of anesthesiology residents. **Methods:** The standardized training of anesthesiology residents in our hospital from January 2020 to May 2022 was retrospectively analyzed, among which 60 residents were selected for the study, and 30 residents who received standardized training in the anesthesiology department from January 2020 to February 2021 were included in the control group. A total of 30 residents who received standardized training in the Department of anesthesiology from March 2021 to May 2022 were included in the study group. The control group was given conventional teaching method, while the study group was given mind mapping combined with PBL teaching method. The teaching results, teaching satisfaction and teaching effect of standardized training in the department of anesthesiology were compared between the two groups. **Results:** The theoretical and practical scores of anesthesiology standardized training in the study group were higher than those in the control group, and the difference was statistically significant (P < 0.05). The total satisfaction of anesthesiology standardized training teaching in the study group was higher than that in the control group, and the difference was statistically significant (P < 0.05). In the evaluation of the teaching effect of standardized training in anesthesiology department, the excellent and good rates of learning initiative, learning interest, clinical thinking ability and clinical practice ability in the study group were higher than those in the control group, and the differences were statistically significant (P < 0.05). **Conclusion:** The application of mind mapping combined with PBL teaching method in the standardized training of anesthesiology residents is helpful to improve academic performance, teaching satisfaction and teaching effect.

Keywords

Mind map, PBL teaching method, Anesthesia, Resident standardized training, Teaching satisfaction, The teaching effect

Standardized resident training is an important education stage for medical students when they graduate from medical colleges and enter medical institutions, and belongs to the second-level discipline training [1]. It mainly carries out professional training in professional courses, clinical practice courses and public compulsory courses,

which plays an important role in training high-level clinicians and ensuring the quality of medical services in medical institutions at all levels. In 2013, seven departments led by the Commission of Health and Family Planning jointly issued the "Guiding Opinions on the Establishment of standardized training System for Residents", which clarified the basic goal of starting and implementing standardized training for residents nationwide by 2015 [2]. The following year, a working conference on the establishment of a national standardized training system for residents was held in Shanghai. It is an important symbol of standardized training system of residents in China [3]. The Department of Anesthesiology is one of the important departments in the standardized training of residents. As a comprehensive department including internal medicine, surgery, anatomy, physiology and other disciplines, the department of anesthesiology has extremely high requirements on the practical ability and professional level of clinicians [4, 5]. In recent years, our hospital has actively explored the teaching methods of standardized training for anesthesiology residents. PBL teaching method, namely problem oriented learning teaching, is a widely used teaching method in clinical teaching and has been widely recognized [6, 7]. Mind map is a graph-form thinking tool to express divergent thinking. It clearly and intuitively presents the mutual subordination and hierarchical relationship of various topics through text and text, facilitating the establishment of related memory links [8]. In recent years, PBL teaching method and mind mapping have been combined in our hospital, aiming to give full play to their respective advantages and promote the standardized training of anesthesiology residents through the superposition effect. In this study, the data of residents who received standardized training in anesthesiology department were analyzed.

1. General data and Methods

1.1 General data

The standardized training of anesthesiology residents in our hospital from January 2020 to May 2022 was retrospectively analyzed. Sixty residents were selected for the study, including 20 males and 40 females, aged 23-30 years, with an average age of (26.85 ± 3.15) years. Thirty residents who received standardized training in the Department of anesthesiology from January 2020 to February 2021 were included in the control group, and 30 residents who received standardized training in the department of anesthesiology from March 2021 to May 2022 were included in the study group. There was no statistical significance in the general situation of residents between the two groups $(P > 0.05)$.

1.2 Methods

The class hours, teaching syllabus, teaching content, and teacher qualification of residents receiving standardized training in anesthesiology were consistent between the two groups. The specific teaching methods were as follows:

1.2.1. In the control group, conventional teaching method was carried out, and the teachers prepared the lessons according to the teaching syllabus. Before the anesthesiology teaching work was carried out, the residents were introduced to the main class arrangement, and the residents prepared the lessons independently after their daily work. According to the teaching arrangement, teaching work was carried out through teaching videos and PPT, focusing on the practical operation, principle of action, scope of application, common adverse events and management of anesthesia, perioperative management and other daily work content of anesthesiology department. In selecting typical cases for clinical teaching in the teaching process, and by the resident in combination with cases data through data refer to anesthesia, group discussion, clear anesthesia risk, special case processing and establishment of artificeal air passage considerations such as the processing of common problems, teachers on the basis of residency Chong DianXing teaching specific anesthesia systems.

1.2.2. Study group: The mind mapping combined with PBL teaching method was implemented. The teachers made the teaching plan based on the assessment of each resident's professional knowledge of anesthesiology according to the teaching syllabus and class arrangement, and selected appropriate cases and set corresponding questions. The basic teaching process was as follows:

(1) Preparation of teaching content: teachers arranged phased teaching plans for residents, and residents studied and reviewed by themselves through the daily work of anesthesiology department, professional literature retrieval, and professional book reading.

(2) Raise questions: Combine specific cases to raise questions, such as what are the elements of preoperative anesthesia evaluation? What is anesthesia related in the patient's medical record? What are the key points related to anesthesia in physical examination, laboratory examination, and imaging examination? Specific ways to com-

municate with patients and surgeons, etc. Allow residents to learn and answer specific questions independently.

(3) Case teaching: the corresponding teaching work was carried out in combination with specific cases, and the main deficiencies and problems were identified and summarized based on the answers of residents. The mind map was drawn under the guidance of teachers, and the preoperative anesthesia evaluation was carried out according to the case diagnosis and the planned surgical plan. There are three elements involved in the evaluation of anesthesia, namely, the patient, the operation and the anesthesia. Which elements are included in the patients with medical records (now history, medication history, past medical history, surgical history, history of anesthesia, allergies, blood, body quality, etc.), the hospital inspection (neck situation, trachea, spine, limb muscle strength level, important viscera function, etc.), difficult airway evaluation (physiological anatomy, chronic disease situation, airway Mallampati hierarchical levels), ASA classification assessment, etc., and it is necessary to focus on the evaluation of whether the patient has factors related to the risk of surgery and anesthesia, such as the blood pressure control of hypertensive patients, previous surgery, and the existence of difficult airway. Surgical elements include specific surgical plan (selection of anesthesia method for open and minimally invasive surgical plan, and influence of anesthetic drugs and surgical methods on intraoperative vital signs of patients), surgical difficulty degree, special circumstances of the case (such as the risk of deep vein thrombosis, muscle relaxation monitoring, etc.), etc. Anesthesia elements include the patient's allergy history (to evaluate whether there is a risk of abnormal heart rate, blood pressure, shock, etc.), specific anesthesia methods (possible risks of different anesthesia methods, such as the difficulty of endotracheal intubation during general anesthesia), and anesthetic assistive techniques (possible risks caused by various assistive techniques, etc.). Such as thromboembolism, subcutaneous hematoma, etc.), adverse reactions of anesthesia and management plan (mainly adverse events such as abnormal vital signs and cardiac arrest), etc.
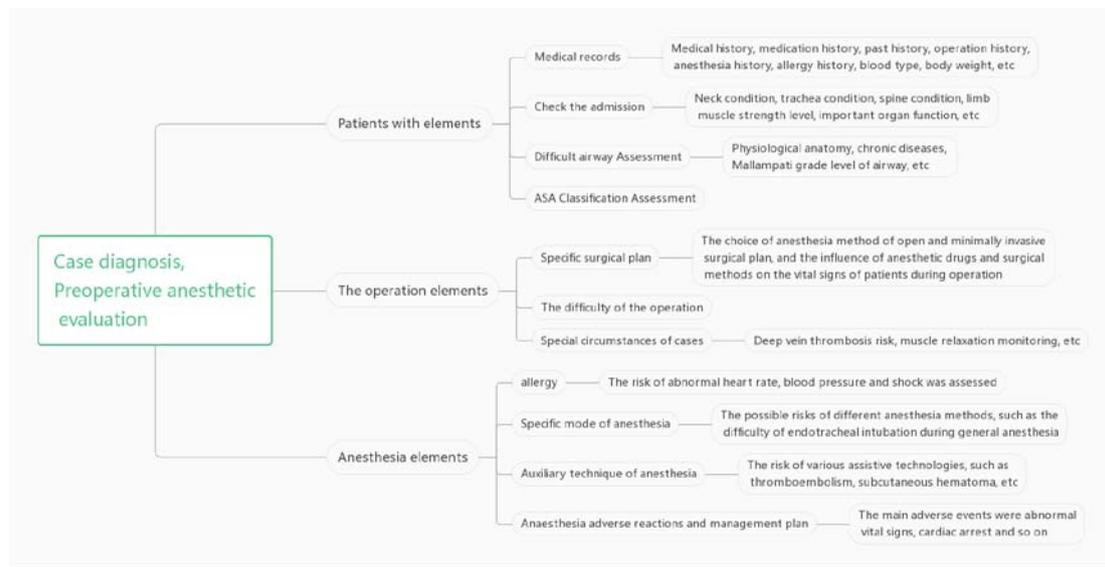
See Figure 1 for the mind map.

Figure 1. Mind map of preoperative anesthesia assessment combined with the case.

1.3 To observe

1.3.1. Investigation on the teaching results of standardized training for residents in anesthesiology department: After the two groups of resident standardization training in anesthesiology, were given a test, test consists of two aspects of theory and practice, to avoid differences affect the objectivity of the results of the study, the difficulty of examination questions all resident examination questions difficulty consistent, examination questions within the scope in the syllabus, theory and practice of the test with a score of 100 points.

1.3.2. Survey of residents' satisfaction with standardized training in Anesthesiology department: Before leaving the department, residents in both groups filled out the Scale of Residents' Satisfaction with Standardized Training in Anesthesiology Department, which needed to be filled in accordance with the filling requirements. The survey scale was filled out anonymously and only grouped. It can be divided into three dimensions: very satisfied, satisfied and dissatisfied. Total satisfaction = 100% - dissatisfaction rate.

1.3.3. Effect of standardized training of resident anesthesiology teaching evaluation: from two groups of learn-

ing situation in the process of standardization training of resident anesthesiology teaching effect evaluation, mainly include the learning initiative and interest in learning, clinical thinking ability, practice ability, etc., all aspects are divided into excellent, good, medium and poor four dimensions, in to the final result.

1.4 Statistical methods

SPSS23.0 statistical software was used for processing, measurement data were expressed as ($\overline{x} \pm s$), comparison was performed by t test, count data were expressed as percentage, comparison was performed by χ^2 test, P < 0.05 was considered statistically significant.

2. Results

2.1. Comparison of anesthesiology standardized training teaching results between the two groups: the theoretical and practical results of anesthesiology standardized training teaching results of the residents in the study group were higher than those in the control group, and the differences were statistically significant (P < 0.05), as shown in Table 1.

Table 1. Comparison of standardized training teaching results between the two groups ($\overline{x} \pm s$)

Group	Theory test (points)	Operation assessment (points)
research team/30	89.75±3.51	88.74±4.33
control group/30	84.82±4.05	82.09±5.12
t	5.038	5.432
P	＜0.001	＜0.001

2.2. Satisfaction compared two groups of standardized training of resident anesthesiology teaching: the team standardized training of resident anesthesiology teaching satisfaction survey in overall satisfaction was 96.67%, control group was 76.67%, the standardized training of resident anesthesiology teaching team of total satisfaction is higher than the control group, the difference is statistically significant (P < 0.05), as shown in Table 2.

Table 2. Comparison of residents' satisfaction of standardized training in anesthesiology between the two groups (case ％)

Group	Very satisfied	Satisfied	Not satisfied	The total satisfaction
research team/30	20 (66.67)	9 (30.00)	1 (3.33)	29 (96.67)
control group/30	12 (40.00)	11 (36.67)	7 (23.33)	23 (76.67)
χ2				5.192
P				0.023

2.3. Two sets of standardized training of resident anesthesiology teaching effect comparison: the team in the standardized training of resident anesthesiology teaching effect evaluation, learning initiative and interest in learning, clinical thinking ability and clinical practice ability of crop were higher than that in control group, difference has statistical significance (P < 0.05), are shown in Table 3.

Table 3. Comparison of teaching effects of standardized training in anesthesiology department between the two groups (case ％)

Group	Initiative in learning	Interest in learning	Clinical thinking ability	Clinical practice ability
research team/30	27 (90.00)	26 (86.67)	27 (90.00)	28 (93.33)
control group/30	20 (66.67)	19 (63.33)	19 (63.33)	21 (70.00)
χ^2	4.812	4.356	5.963	5.455
P	0.028	0.037	0.015	0.020

3. Discussion

Mind mapping, also known as mind mapping, is a simple but highly practical thinking tool, which has been increasingly applied in various fields in recent years. Human brain thinking mainly have divergent thinking and convergent thinking type, such as the former is the most natural way in daily thinking, in the brain can be through a single graphics, text, Numbers, symbols, etc as the center, radiate thousands of key points, and then form different ideas, and in the process forming self cognition and memory. Mind map is to make full use of the natural characteristics of human beings, concretize and classify ideas and keywords one by one, radiate several related ideas and contents, realize high-quality thinking, and play a unique role in learning, thinking and memory [9, 10]. Mind mapping is put forward by foreign scholars, as early as at the end of the last century was introduced into the domestic, was originally applied to "overcome learning difficulties", after gradually broadened its application category, in the field of industrial and commercial, discipline education plays a unique value, until now has been applied in mind maps and work, life, learning and other related fields, such as planning, taking notes, results show. It greatly facilitates People's Daily life [11, 12]. PBL teaching method is a teaching model that raises practical questions based on teaching content. The raising of questions can promote students' independent thinking and search professional books and literature with specific questions. Learning in the context of discussion among students and interaction between teachers and students can deepen students' impression and memory, and stimulate students' enthusiasm and initiative in learning. It can be used in the standardized training of residents to improve their problem solving ability and gradually cultivate their clinical thinking ability. This study applying mind mapping with PBL teaching method, the results show that the standardized training of resident anesthesiology team of theory and practice of grade teaching achievement scores were higher than control group resident, standardized training of resident anesthesiology teaching team of overall satisfaction higher than that of control group, at the same time the team the effect of standardized training of resident anesthesiology teaching evaluation. The excellent and good rates of learning initiative, learning interest, clinical thinking ability and clinical practice ability were higher than those of the control group, and the teaching effect was satisfactory. The combination of mind map and PBL teaching method can draw mind map based on actual problems of specific cases in the teaching process, establish links between key points through primary and secondary relations and parallel relations, concretize abstract content, stimulate students' interest and enthusiasm in learning, and thus improve the teaching effect.

In conclusion, the application of mind mapping combined with PBL teaching method in the standardized training of anesthesiology residents has outstanding value in improving academic performance, teaching effect and satisfaction, which is worth carrying out.

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