

# Analysis of the application effect of scenario simulation combined case teaching method in the residential training of anesthesiology residents

Ting LU

Anesthesiology and Perioperative Medicine Department, The First Affiliated Hospital with Nanjing Medical University, Nanjing 210029, China

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**Abstract:** Objective: To investigate the effect of scenario simulation combined with the case teaching method in the standardized training of residents in the department of anesthesiology. Methods: A controlled trial was conducted. A total of 30 anesthesiologists who underwent standardized training in the hospital from October 2022 to October 2023 were selected as the research objects. They were divided into the traditional group with the traditional teaching method and the combined group with the scenario simulation combined with case teaching method, with 15 cases in each group. The examination results and satisfaction with the training program of the two groups were statistically analyzed and compared. Results: The assessment scores of the combined group were theoretical knowledge ( $90.61 \pm 3.97$ ) points, skill operation ( $92.74 \pm 4.44$ ) points, and comprehensive case analysis ( $92.90 \pm 3.16$ ) points, which showed a significant improvement compared to the traditional group's ( $84.44 \pm 2.89$ ) points, ( $86.92 \pm 5.25$ ) points, and ( $82.34 \pm 4.71$ ) points ( $P < 0.05$ ); the satisfaction rate of the combined group with the standardized training program was 93.33%, which showed a significant improvement compared to the traditional group of 53.33% ( $P < 0.05$ ). Conclusion: The scenario simulation combined case teaching method has a good effect in the standardized training of anaesthesia residents, which can significantly improve the professional ability of anesthesiologists and increase their satisfaction with the training program. It is worth promoting.

**Key words:** case teaching method; department of anesthesiology; situational simulation teaching; resident standardization training; examination results

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## 1 Introduction

Anesthesia is a key part of surgery, and the ability of anesthesiologists is directly related to the success rate of patient treatment and the risk of surgery. Therefore, anesthesiologists must have a high level of expertise. The standardized training of resident doctors (also known as residential training), as the main training stage of anesthesiology medical students from graduation to internship, directly affects the work level of resident training doctors, so the choice of more scientific and reasonable training methods is helpful to improve the professional level of anesthesiologists. Case teaching method is a case-based teaching method, which can guide students to conduct case analysis through controlling the situation [1]. Context simulation is a kind of simulation of actual work situations without safety risks, to mobilize the

enthusiasm and initiative of students, to help them acquire clinical knowledge and operational skills, and to train practical ability [2]. This can effectively solve the problem of case teaching method that only emphasizes the theory and has the limitation of disease types. Therefore, this paper adopts the method of combining scenario simulation and case teaching to train some resident anesthesiologists in the department of anesthesiology, and probes into its application effect. The report is as follows.

## **2 Data and methods**

### **2.1 General information**

A controlled trial was conducted. A total of 30 anesthesiologists who underwent standardized training in the hospital from October 2022 to October 2023 were selected as the research objects. They were divided into the traditional group with the traditional teaching method and the combined group with the scenario simulation combined with case teaching method, with 15 cases in each group. In the traditional group, there were 8 male and 7 female doctors, respectively, and the age distribution was from 22 to 26 years old, with an average age of  $(23.96 \pm 0.85)$  years old. In the combined group, there were 6 male and 9 female physicians, respectively, and the age distribution was from 21 to 27 years, with an average age of  $(24.17 \pm 0.98)$  years old. In terms of general information such as gender and age, there was no significant difference between the two groups ( $P > 0.05$ ).

### **2.2 Methods**

#### **2.2.1 The teaching method of traditional group**

The traditional group implements the traditional teaching mode: teaching doctors focus on the interpretation of knowledge, and make the study plan according to the residential doctor training program.

#### **2.2.2 The teaching method of combined group**

For the combined group, the scenario simulation combined with case teaching method was implemented: ① The changes of patients' vital signs are simulated by computer program, the problems that may occur in the operation are set by the instructor, and the teaching tasks are formulated and the case simulation is carried out according to the teaching syllabus. ② The teaching form is group practice, and the team members play different roles to make the whole practice process smooth and complete. During the whole training process, attention should be paid to regular role rotation to ensure that each resident physician plays various roles, so as to help them fully understand the relevant knowledge and operation skills of anesthesiology. ③ In the whole process, the instructor should set the occurrence of emergencies at an appropriate time, with the clinical response ability of the resident physician, and give appropriate guidance to the team to help them to complete the whole simulation process smoothly, and the mistakes should be pointed out and informed the correct operation mode and re-operation. ④ At the end of the simulation, the mode of self-evaluation, mutual evaluation and teaching physician comment for evaluation should be adopted, the good places and bad places should be summarized, and improvement measures through the form of discussion should be formulated.

### **2.3 Observing indicators**

#### **2.3.1 Performance assessment**

Before and after the training, the performance assessment will be conducted and the theoretical papers and skill operation scoring standards made by the hospital will be used for evaluation. Theoretical knowledge, case analysis, and skill manipulation scores range from 0 to 100, and each ability is positively correlated with the obtained score.

#### **2.3.2 Satisfaction evaluation of teaching methods**

Satisfaction with teaching methods was evaluated by the hospital-made satisfaction questionnaire, which was divided into three categories: very satisfied, generally satisfied, and dissatisfied. The sum of all cases except the percentage of the

total cases is satisfaction.

#### 2.4 Statistical methods

Using SPSS 25.0 data analysis software, measurement and counting data were described using sum rates, and t-tests and  $\chi^2$  tests were used for inter group comparisons. If the conclusion difference is obvious,  $P < 0.05$ .

### 3 Results

#### 3.1 Assessment results of the two groups

The assessment scores of the combined group were theoretical knowledge ( $90.61 \pm 3.97$ ) points, skill operation ( $92.74 \pm 4.44$ ) points, and comprehensive case analysis ( $92.90 \pm 3.16$ ) points, which showed a significant improvement compared to the traditional group's ( $84.44 \pm 2.89$ ) points, ( $86.92 \pm 5.25$ ) points, and ( $82.34 \pm 4.71$ ) points ( $P < 0.05$ ). See Table 1.

Table 1. Assessment results of the two groups ( $\bar{x} \pm S$ , points)

Group	Period	Speculative knowledge	Skills operation	Comprehensive case analysis
Traditional group (n = 15)	Before the training	$62.61 \pm 7.02$	$80.34 \pm 4.09$	$70.32 \pm 5.44$
	After the training	$84.44 \pm 2.89^*$	$86.92 \pm 5.25^*$	$82.34 \pm 4.71^*$
Combined group (n = 15)	Before the training	$63.13 \pm 6.85$	$80.27 \pm 5.12$	$69.43 \pm 5.48$
	After the training	$90.61 \pm 3.97^*$	$92.74 \pm 4.44^*$	$92.90 \pm 3.16^*$
Pre-training comparison between the groups	t-value	0.205	0.041	0.446
	P-value	0.839	0.967	0.659
Post-training comparison between the groups	t-value	4.866	3.278	7.211
	P-value	$< 0.001$	0.003	$< 0.001$

Note:  $P < 0.005$  for \*.

#### 3.2 Teaching satisfaction of the two groups

The satisfaction rate of the combined group with the standardized training program was 93.33%, which showed a significant improvement compared to the traditional group of 53.33% ( $P < 0.05$ ). See Table 2.

Table 2. Teaching satisfaction status (n (%))

Group	Example number	Very satisfied	Generally satisfied	Dissatisfied	Degree of satisfaction
Traditional group	15	3 (20.00)	5 (33.33)	7 (46.67)	9 (53.33)
Combined group	15	8 (42.86)	6 (40.00)	1 (6.67)	14 (93.33)
$\chi^2$ value					6.929
P value					0.008

### 4 Discussion

Anesthesia is an important medical discipline that involves a wide range of fields and numerous clinical operations, making it a multidisciplinary and comprehensive discipline. In addition to mastering relevant knowledge of pathophysiology and anesthesia pharmacology, it is also necessary to master knowledge of other disciplines, as well as proficiently mastering various puncture and surgical techniques, making learning difficult. In the traditional residential training of anesthesiology, the training mostly takes knowledge explanation as the main content, and residential doctors passively acquire knowledge, and the effect is not good. Therefore, it has been one of the most important tasks to explore a

scientific and interesting training method to arouse the interest and enthusiasm of resident doctors [3][4]. In recent years, many new teaching models have appeared [5][6]. By optimizing the teaching process, the overall quality of resident doctors has been comprehensively improved, and their ability to solve problems and respond to accidents has been improved.

Scenario simulation, as a teaching method that can simulate real-life scenarios, has been widely used in the medical field due to its advantages of low risk, mobilizing learning enthusiasm and initiative, and being able to exercise practical and emergency response abilities. Chen Hongjiao et al [7], made a systematic evaluation of the application effect of scenario simulation teaching in cardiopulmonary resuscitation training for medical students. They pointed out that the use of typical scenario design, student's role-playing, and teachers' participation and guidance can enhance the flexibility of training time and space, improve their practical ability, deepen their theoretical knowledge and improve their interest. It is worth promoting in the teaching of intensive care medicine cardiopulmonary resuscitation. Zhu Jing [8] and others studied the application of scenario simulation teaching rounds in the teaching of intern medical students in the field of oncology. It is suggested that the application of scenario simulation can improve students' knowledge and satisfaction, and it is worth promoting and applying. Zhong Juan et al [9], studied the application of situational simulation teaching method in clinical nursing teaching. It is pointed out that the teaching method can provide nursing staff with good practice in real-life simulation, improve their proficiency in professional skills, increase their clinical experience, and discover their own problems in practice. It is an effective way to improve their professional abilities. The application of this teaching method in clinical nursing teaching can improve classroom effectiveness, so as to cultivate more professional talents for clinical practice.

Case teaching method is an open and interactive teaching method that takes cases as the theme and enables teachers to know students to read and organize them to discuss cases through situational control. It has been widely used in the medical field in recent years. Zhang Xueshan [10] conducted a study on the cultivation of doctor-patient communication skills among medical graduate students by using case teaching method. It is pointed out that the application of case teaching method in the training of medical postgraduates has a significant effect, which can improve the doctor-patient communication ability, practical diagnosis and treatment ability of postgraduates and the training method has high satisfaction and is worth promoting. Li He [11] made a comparative study on the application of case teaching method and conventional teaching method in general surgery practice, and concluded that applying case teaching method in general surgery internship can significantly enhance students' learning interest, improve learning efficiency, cultivate teamwork spirit, improve medical theoretical knowledge and clinical practice skills, and have higher teaching satisfaction. Deng Guangrong [12] conducted research on the application analysis of case teaching method in medical laboratory internship teaching, and concluded that applying case teaching method to laboratory internship teaching can effectively mobilize interns to actively learn.

In recent years, there have been many studies on the application of scenario simulation combined with case teaching method in medical field, and all of them have achieved good results. Liu Yujie [13] and his colleagues explored the application of scenario simulation and case teaching in ophthalmology, and the conclusion shows that the teaching method applied in the ophthalmology teaching can achieve good teaching effect and improve the students' professional quality and comprehensive ability, which is worth promoting. Qin Xia et al [14], conducted a study on the application of case combined scenario simulation teaching method in rehabilitation practical skills curriculum. The conclusion was that this teaching method, when applied to rehabilitation therapy practical skills courses, can significantly improve students' academic performance, enable them to understand clinical rehabilitation scenarios in advance, and lay a foundation for

entering clinical internships as soon as possible. Zhu Yanlei et al [15], studied the effect of case and scenario simulation combined teaching method in standardized training of nurses in operating room. The conclusion pointed out that this teaching method applied in standardized training of operating room can improve the comprehensive theoretical and practical ability of nurses, cultivate critical thinking, and is highly recognized by nurses.

In addition, there are also a number of studies on the application of scenario simulation combined with case teaching method in anesthesia. Zhu Furu et al [16], conducted a study on the application of simulated teaching combined with case review in anesthesia crisis resource management training. It is pointed out that the combined application can make the advantages of the two teaching methods complement each other, and can fully mobilize the enthusiasm and initiative of students, and can improve their clinical practice ability and the ability of prevention, identification and treatment of anesthesia crisis. Shan Xisheng [17], Duan Caiping [18], Li Qianqian [19], Song Xuesong [20], and others have conducted research on the application of SST combined with CBL teaching method in standardized training of anesthesiologists. The result indicates that the teaching method is effective in the standardization training of anesthesiologists, and can improve the clinical thinking ability, teamwork and adaptability ability, as well as the overall satisfaction of the training.

In this research, the results indicated that the combination group had significantly improved in all kinds of evaluation scores and the satisfaction of teaching methods ( $P < 0.05$ ).

In conclusion, scenario simulation combined with case teaching has a good effect in the residential training of anesthesiologists, which can significantly improve the professional ability of anesthesiologists and their satisfaction with the teaching plan. It is worth promoting.

### **Conflicts of interest**

The author declares no conflicts of interest regarding the publication of this paper.

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