Guowei Che: precise clinical application in "enhanced recovery after surgery"

Submitted Apr 10, 2018. Accepted for publication Apr 15, 2018.
doi: 10.21037/jtd.2018.04.129
View this article at: http://dx.doi.org/10.21037/jtd.2018.04.129

"*You look like an angel smiling to suffering people and relieving their pains. Your unconditional care for patients empowers them to face up to diseases and carry on—by Bed No. 18*". This is an online comment to Prof. Guowei Che by one of his patients, displaying a deep relationship between the patient and the doctor.

As a clinician at the Department of Thoracic Surgery of West China Hospital, Sichuan University, Prof. Che has considered medical science sacred and rigorous, and a clinician should complete each process and step of clinical practices precisely. Over the years, he has upheld the hospital's philosophy of offering "people-oriented" treatment and services to patients. Meanwhile, as one of the pioneers of pulmonary rehabilitation in China, Prof. Che has promoted the concept of "precise clinical application in enhanced recovery after surgery (ERAS)" in three dimensions, namely training program, training time, and training team.

Figure 1 Prof. Guowei Che.

Expert's introduction

Guwei Che, Professor, chief physician, doctoral supervisor, and vice director of the Department of Thoracic Surgery, West China Hospital, Sichuan University. He also serves as a member of the Lung Cancer Group of Chinese Society of Thoracic and Cardiovascular Surgery, standing member of the Minimally Invasive Surgery Expert Committee of Chinese Association of Thoracic Surgeons, member of the Standing Committee of Expert Committee of Respiratory Medicine of Chinese Society of Rehabilitation Medicine, vice chairman of the expert committee of respiratory medicine of Chinese Association of Respiratory Rehabilitation Physicians, director of the Chinese Society of Clinical Oncology (CSCO), member of the expert committee of thoracic surgery of Chinese Research Hospital Association and China Health Promotion Association, member of the Standing Committee of the Thoracic/Cardiac Surgery Branch of the Sichuan Medical Association, chairman of Expert Committee of Lung Rehabilitation of Chengdu Association of Rehabilitation Medicine, member of ERAS Expert Committee of China Health Promotion Society, chief of the Thoracic Surgery Panel of China Health Promotion Committee and Chinese Research Hospital Association, executive editor of *Chinese Journal of Lung Cancer* and *Chinese Journal of Clinical Thoracic and Cardiovascular Surgery*, and reviewer of other top journals including *ATS/JTO* and the English edition of *Chinese Medical Journal*.

Committed to promoting ERAS

Unlike many other doctors, Prof. Che (*Figure 1*) did not choose to study medical science at the university after the national college entrance exam. "*My first choice was aircraft manufacturing, the second train manufacturing, and the third car manufacturing*." he smiled. At the time, China's machine manufacturing industry was underdeveloped. "*I wanted to make a difference through my learning*".

An ambitious goal is the driving force of learning. Maybe deep in his heart, Prof. Che cherished the ambition of practicing medicine to help people, so he did not feel distressed when assigned to study medical science. He then worked hard to obtain the bachelor's degree, master's degree, doctor's degree, and post-doctoral fellowship in

more than a decade and went further down to the road of clinical medicine.

According to Prof. Che, he had been trained in the departments of urology and general surgery for two years before entering the department of thoracic surgery, which explains why he always pays special attention to the "urinary catheterization" in rehabilitation protocols. "In the department of urology, it is often difficult to insert urethral catheters for chemotherapy for patients with bladder cancer because the urethra becomes narrowed after repeated catheterization. Although I was good at inserting catheters, I knew clearly how painful the patients were during this procedure. My experiences during these two years urged me to be engaged in the management of urethral catheters."

As one of the pioneers of ERAS in China, he has been working tirelessly to enable patients to recover quickly and safely. Early in 2008, Dr. Che began his work in pulmonary rehabilitation. Focusing on the word "precision", he initially worked on lung protection, followed by airway management, complication control, enhanced recovery, procedure optimization, and symptom management. He was the main responsible person for the ERAS program and the principal investigator of multi-center studies.

The past decade has witnessed his achievements in this field. The "Perioperative Pulmonary Rehabilitation Training Program", developed by an expert panel chaired Dr. Che, has been widely recognized by lung cancer surgeons as a highly feasible and effective guiding document. "*Compared with conventional treatment, preoperative pulmonary rehabilitation training significantly reduces postoperative lung complications (such as lung infections and atelectasis), antibiotic use, total hospitalization cost, and post-hospital stay in patients receiving treatment in the Department of Thoracic Surgery of West China Hospital (for especially those with high risk factors such as over 75 years of age, moderate to severe COPD, etc.). Although pulmonary rehabilitation training inevitably increases preoperative treatment costs, the post-operative medical costs is significantly reduced, which results in the decrease of the overall economic burden.*" "*This is to achieve precise clinical application in ERAS*," said Prof. Che.

In 2016, Dr. Che was involved in drafting the *Expert Consensus on Multidisciplinary Perioperative Airway Management* (2016 Edition). "This document laid the theoretical foundation for us to continuously improve and optimize the ERAS in thoracic surgery. Most importantly, it raises our awareness of this technique. The expert consensus for the first time summarized our current knowledge and experiences in ERAS, although there's always room for improvement."

In 2017, the Department of Thoracic Surgery of West China Hospital published a book titled *Enhanced Recovery After Surgery—Practice in the Department of Thoracic Surgery, West China Hospital*, which aimed to make ERAS be more down to earth and provide the peers with practical guidance. "This book was written by our front-line clinical staff. Focusing on the details of ERAS, the authors presented rich information in an easy-to-understand manner, enabling the readers to understand which links specifically belong to ERAS. Thus, ERAS is no longer an empty concept."

By writing books, Prof. Che and his team have a deeper understanding of the complete process of ERAS and their own duties. For example, medical staffs who are responsible for drainage tube now actively engage with pain management staff because the placement of drainage tube is the main cause of postoperative pain and the patient's pain can also be alleviated during the optimization of this procedure. With the deepening of their understanding of ERAS, the whole team realized that the work done by every staff member is actually an integral part of ERAS. Perfect parts will make a perfect whole. This is particularly important for the development of the entire department.

Precise clinical application, mathematically, in ERAS via four dimensions

Based on evidence-based medicine, it was further refined to optimize a series of perioperative interventions that reduce the surgical stress and complications and thus accelerate the recovery of patients with an attempt to reduce perioperative mortality and complications through multimodal interventions. Based on evidence-based medicine, it was further refined to optimize a series of perioperative interventions that reduce the surgical stress and complications and thus accelerate the recovery of patients. According to Prof. Che, a wider application of ERAS requires supports from the following three systems.

First, an objective and accurate assessment system. Accurate assessment is required for any ERAS protocol that is suitable for the "tailored or precise" treatment for patients with lung cancer. Only objective and accurate assessment can ensure the smooth and effective implementation of the ERAS protocol. During the preoperative assessment, patients are classified into "normal", "high-risk", and "symptomatic" populations, and proper ERAS protocol is applied. In the link or process assessment, whether and how a specific process should be implemented for a specific population will be assessed. For example, in an ERAS

protocol, the optimized pipeline management for a "normal" population include: has the urinary catheter been placed? If not, what needs to be done in preoperative education? What is the key point of postoperative care? High-risk factors need to be assessed. If the patient is a male smoker, enhanced airway management and expectoration should be applied in addition to advice on quitting smoking; if the patient is a non-smoking female, in contrast, the main interventions are to alleviate airway hyperresponsiveness and relieve airway spasm.

Our current assessment system for lung cancer patients mainly includes: patient education at admission and preoperative assessment series, which include chest disease questionnaire, Emotional-distress Index questionnaire, pulmonary embolism risk assessment, and perioperative pulmonary function assessment; intraoperative assessment series, which include urinary catheter application assessment form, chest drainage tube application assessment form, surgical instrument kit assessment form, and analgesia scheme assessment; and postoperative assessment series, which include postoperative diet and traditional Chinese medicine application evaluation form, symptom assessment form, cough assessment form, shortness of breath assessment form, pain satisfaction questionnaire, incision management evaluation form, and follow-up evaluation form.

Second, the operating system must be simple and easy to implement. Different patients should not be applied with the same ERAS protocol due to their different medical histories, concomitant diseases, and tumor severity. Faster pulmonary rehabilitation in these patients requires "tailored" and "repeatable" ERAS protocols.

A "tailored" protocol mainly emphasizes its operability. Patients with lung cancer requiring surgery can be divided into three categories through preoperative assessment: (I) "normal" patients: these patients are younger than 60 years, with small nodules found on physical examination but without obvious accompanying disease. For these patients, the ERAS protocol should be based on the rational application of minimally invasive techniques and optimize the surgical procedures, with the shortened average hospital stay or the application of ambulatory surgery as assessment criteria; (II) "symptomatic" patients: "symptomatic" patients refer to lung cancer patients who have clinical symptoms before surgery or those who develop common surgery-related symptoms (such as cough, shortness of breath, and pain) after discharge. For these patients, the ERAS protocols should be preoperative interventions for controlling symptoms or the improvements in or optimization of the surgical techniques or processes for preventing postoperative symptoms, with improving the patients' quality of life as the core element; (III) patients with "high-risk factors": patients with "high-risk factors" mainly refer to patients with increased rates of perioperative complications or mortality due to the patient's self-factors or health care-related factors. The patients' self-factors mainly refer to the concomitant diseases (such as chronic obstructive pulmonary disease, high blood pressure, etc.), which are mainly related to age and living habits (such as smoking); in contrast, the health care-related factors are mainly associated with the surgical factors such as long anesthesia time (including long surgery time) and surgical trauma (e.g., intraoperative pulmonary contusion, heavy blood loss, and excessive infusion), which, unfortunately, are often overlooked for various reasons. The core of the ERAS protocol for lung cancer patients with high-risk factors is pulmonary rehabilitation training. Meanwhile, optimized surgical processes and enhanced management are required for health care-related factors.

The "repeatable" program mainly means that an ERAS protocol itself can be applied in multiple settings. Based on the specific conditions in China, two or three options should be available for each link of the protocol, so that different centers can adopt one of them according to their own situations.

ERAS will not increase the workload of medical care. It requires the establishment of a standard operation procedure in the early stage of treatment, and all the ERAS protocols are established by multiple disciplines. Therefore, everyone in each discipline is familiar with the rehabilitation protocol. Meanwhile, the operating system also needs to be simple and easy to operate. For example, atomization is performed firstly, followed by breathing exercise, during which the choice of breathing apparatus must follow certain standards and norms. In addition, the training time should not be too long; if the time cannot be shortened, a graded treatment should be taken instead. All in all, the training program must be mature and have a precise evaluation system. Finally, there must be an objective evaluation system to evaluate the efficiency of each link; this is particularly important because ERAS is a continuous process and the defect of any link would have a ripple effect on the subsequent treatment.

Third, the evaluation system shall be precise and strict. Accurate evaluation of the efficiency of an ERAS protocol not only ensures the successful postoperative recovery but also provides an objective basis for optimizing the protocols and processes. The evaluation of the overall efficiency of

a ERAS protocol should be based on the following three aspects: reduced perioperative complications and shortened hospital stay; alleviated symptoms and improved quality of life; and increased social satisfaction and decreased treatment costs. For the real-time evaluation of each link during the implementation of a specific ERAS protocol, efforts should be made to ensure the efficiency of each link. The implementation of an ERAS protocol requires multi-disciplinary collaboration, which involves many processes that are continuously executed. Failure or invalidity of any link will result in failure or ineffectiveness of the entire ERAS protocol. A reasonable evaluation of each link during ERAS implementation can guarantee its continuity and ultimately ensure the effective operation of the entire protocol. Furthermore, the correct evaluation of each link will also help optimize the entire process.

Fourth, team building. "Problem-oriented" is the key to accelerating the optimization of ERAS processes, whereas "patient-centered" is the core of ERAS. A problem-oriented team-building strategy can ensure the smooth implementation of the ERSA protocols. Based on the problems found during the implementation of an ERAS protocol, the relevant departments will be contacted to form a "virtual center" to establish a team, which will be trained in a uniform manner. Identifying and addressing problems in a real-time manner enables the smooth and effective implementation and optimization of each process. Research has shown that the core and key of ERAS protocol is to improve the staff's understanding and awareness of this new concept, which emphasizes prevention and management before surgery (for patients with high-risk factors), focuses on optimization (of traditional methods) during surgery, and pay special attention to the management of (symptoms) after surgery. ERAS requires the close cooperation among doctors, nurses, and rehabilitation teams and multiple departments including rehabilitation division and respiratory medicine division will be involved. As a result, many people think ERAS is mathematically an addition. However, when the assessment system, operating system, and evaluation system are all precisely established, it will be a subtraction for each department because the work of each department will become simpler without increasing the workload of doctors and nurses. ERAS requires collaboration among departments. When a patient enters the ERAS process, each department clearly knows its work scope, which is the value of a well-established operating system. In addition, there are criteria to evaluate the results after each department finishes its own work. When an error occurs, the evaluation will find out where it is and propose the way to improve it."

Be a good doctor and a good mentor

Prof. Che received rigorous medical education. Speaking of his student experience, he said proudly, "*I was lucky that I was mentored by famous and strict teachers*". When he was a student, he imposed harsh requirements on himself and faced up to difficulties by working out solutions rather than avoiding them. He would do his best in every detail of solutions to the problems, so as to offer better help to his patients.

He is a surgeon for patients on the operating table and a strict teacher for his students when in the classroom.

He is willing to share his own experience with his students. "*Communication is important, and we should face up to our problems rather than hide them and try to find various solutions by thinking independently, learning new knowledge, or asking for help*." After a pause, Prof. Che added, "*Don't aim high but accomplish little and don't be lazy; no pain, no gain*."

The daily ward round is always a test for his students. He encourages students to learn more about patients and think more about their problems. He encourages students to ask him questions about each patient. "*If the students have questions, it means that they do care about patients*". He said , "*The duty of a clinician is to identify problems of patients and solve them, so we should help students develop a problem-solving mindset*."

Meanwhile, Prof. Che also requires students to communicate with patients effectively and conduct standard physical examination procedures on each patient. "Nowadays there are many examination methods, which increase the dependence on external aid and leads to lazy behaviors. For instance, doctors usually prefer test reports over inquiries about medical history, CT over stethoscope, and electrocardiogram over feeling the pulse. It is a problem of not just medical students but also many young doctors."

A few years ago, Prof. Che found in a research that the number of hospitalized lung cancer patients complaining of cough as a major symptom had declined. Further investigation, however, showed that the reason was that the patients had received CT scans before admission and the doctors did not ask their disease histories when writing medical records, leading to the increase of cases identified by health check-ups. In fact, up to 52.5% of patients were still hospitalized due to cough. "*The decline was because doctors did not inquire patients when writing medical records and ignored physical examination after have seen nodules in the upper left lung, as a large number of test reports had been available during diagnosis*." Speaking of this,

Prof. Che said in a more serious tone, "*Inquiry about medical history is a basic skill of a clinician. However, doctors are doing a poorer job in this regard despite improved medical technologies, which is irresponsible for patients!*"

Efforts in off-work hours are more valuable

When asked to give some advice on the learning of theory and surgical skills to young doctors, Prof. Che said, "*The concept of ERAS should be integrated into the whole process of thoracic surgery. It has been proposed that ERAS might be included in the general theory of surgery since it exists throughout the whole treatment and rehabilitation process. I hope that young doctors could understand the core elements of ERAS—protection and precision—in animal experiments at the beginning of medical study and try to avoid serious traumas. All medical students should stick to these core elements.*"

Besides, Prof. Che reckoned that young doctors should keep learning, stick to high standards, and be responsible for patients, and never forget why they decided to become a doctor at the very beginning. It is not easy to build an ERAS team. He said the team should be comprised of members from multiple disciplines and conduct problem-focused research by continuously optimizing the rehabilitation protocols. ERAS is more of a concept, and detailed, precise, and viable processes should be designed for its application in existing medical links and processes, and patient-centered protocols should be optimized constantly, which is quite demanding. "*Do one thing at a time and do it well*" is a principle that Prof. Che has stuck to.

"*If you just want to finish a job, eight hours a day is enough; but it is not the case if you want to make a difference.*" said Prof. Che, "*Many of my teachers and friends stay up to 2:00 am and get up at 5:00 am. More time is needed to obtain achievements in scientific research, teaching, outpatient service, and surgery.*"

"*For me, research achievements are attributable to efforts made in off-work hours. To coin a phrase inspired by 'All happy families are alike', all success secrets are alike—efforts made in off-work hours and perseverance.*" concluded Prof. Che.

Interview

JTD: What's your comment on the status quo of ERAS in China? Is it superior to those in foreign countries on certain aspects? In what direction will ERAS develop in the future?

Prof. Che: At present, there is not much difference between Chinese ERAS and international practice. However, the focuses are somehow different. First, the majority of fellow practitioners in China are constantly optimizing the process of ERAS in minimally invasive surgery, whereas most of our international peers pay more attention to the surgical technique itself. Second, the perioperative management in China is more comprehensive. The perioperative management mainly focuses on three elements: (I) the treatment of high-risk factors before surgery; (II) the perioperative process, including tubeless video-assisted thoracoscopic surgery (VATS) developed by Dr. Jianxing He, director of the First Affiliated Hospital of Guangzhou Medical University; and (III) management of postoperative symptoms, which is also better at home than abroad.

However, I think there is a general misunderstanding in ERAS. While we put undue emphasis on average hospital stay, many experts believe that this indicator alone is not an adequate measure of the success of ERAS, which, instead, should be judged from the following three dimensions: average hospital stay, patient satisfaction, and hospitalization costs. All patients who enter the ERAS process in our center are evaluated before surgery and will receive a second assessment after the ERAS treatment. It has been found that the average hospital stay and hospitalization costs were significantly reduced in the ERAS group compared with those in control groups. Furthermore, the complications significantly decreased, along with increased comfort and satisfaction among patients.

In fact, for patients with high-risk factors, the most important thing is to reduce the complications. For patients with milder disease, in contrast, the surgeons should change the working habits and procedures to shorten the average hospital stay and pay special attention to the post-operative symptom management. Currently, many Chinese hospitals have adopted a more comprehensive approach to ERAS. In future, the concept of ERAS should be integrated into the entire perioperative period, making it a truly problem-oriented, patient-centered clinical practice rather than emphasizing the accelerated recovery of a small link. In other words, this concept should be applied throughout any and every aspect of clinical practice.

JTD: As early as 2008, the Department of Thoracic Surgery of West China Hospital began to devote increasing attention to the study of pulmonary rehabilitation. Why were you keen to carry out this research?

Prof. Che: At that time, minimally invasive surgery was

being developing well, but the incidences of postoperative complications did not decrease significantly (in fact, they were reduced). We were growing increasingly puzzled why the advances in drugs and technology did not bring better outcomes. Many senior surgeons proposed that inadequate lung protection and airway management (especially the former) might have contributed to this phenomenon. Therefore, we began to do some research in the field of pulmonary rehabilitation, which showed many postoperative problems had certain correlations with preoperative problems (i.e., the patients' own problems) and intraoperative operations (medical procedures). Effective preoperative and intraoperative revention could reduce many problems after surgery and be well accepted by the patients' family members. Thus, we established a multidisciplinary team, which also benefited from the teamwork of the West China Hospital.

JTD: Currently, about 50% of the centers in China have adopted the application of minimally invasive surgery in treating lung cancer; in contrast, this figure was only 20% and 30%, respectively, in Europe and the United States. Do you think there are still some unresolved problems during the applications of minimally invasive surgery?

Prof. Che: Most large hospitals in China now can perform minimally invasive surgery well. However, this technique is difficult to be applied in some county-level hospitals. The reasons are complicated, but the main reason may be that there are many ways to carry out minimally invasive procedures: single-port, two-port, three-port, robotic, etc. Unfortunately, no uniform criteria have been available for the selection of a specific procedure among a variety of schemes. For instance, should we perform wedge resection, segmentectomy, or lobectomy? Why? Due to the lack of national guidelines, hospitals often select a certain scheme based on their own experiences and specific circumstances. This is a problem to be addressed.

JTD: After many years of practice in EARS, the Department of Thoracic Surgery of West China Hospital has established a series of optimization schemes in terms of surgical plan (e.g., device optimization, airway management, and incision management) and symptom management. Can you briefly introduce them? What is the future research direction?

Prof. Che: First, ERAS is a process involving both prevention and treatment; it views the treatment process from the perspective of rehabilitation. Secondly, clinicians need to change their own work habits. For example, if you want to shorten the operation time, the time needed for anesthesia, medical device counting, and operation must be shortened, which requires the close cooperation among medical staff and the optimization of each work link. In a multi-disciplinary team, each member must be involved in optimizing the entire scheme to shorten the operation time. Finally, the incision management must also be constantly improved to identify any shortcomings and enable tailored optimization.

JTD: Care and service have always been at the core of West China Hospital. How are these values implemented in the Department of Thoracic Surgery?

Prof. Che: West China Hospital attaches great importance to the humanistic care of patients. We try to help our patients in a problem-oriented manner, rather than simply asking them to sign informed consent so that the patients will bear risks. Targeting at a patient's problem, the whole medical team including nursing, rehabilitation, and other disciplines will work together to develop targeted preventive measures. During the rehabilitation, nurses, doctors, and rehabilitation staff will discuss problems and solutions with the patients. Such a patient-centered approach gives the patients a feeling of being cared and thus their satisfaction increases.

In addition, the improvement in any link in the department is the improvement of the team as a whole. For example, the placement of the catheter is not determined by a doctor but after the input of the entire team. The education and postoperative protection of the patient are performed by the nursing team. The nursing team is involved in the work of the doctors. They will also draw a lot of experiences and lessons from these works and continue to communicate with the doctors to improve the rehabilitation scheme. Thus, the culture in the department becomes more academic and the interpersonal relationships become more harmonious. When staff members meet, they are always talking about patient problems and improvement schemes. When the entire department is always concerned about the problems and worries that the patients face and thinks of ways to solve problems, the culture of the department is positive. Slowly accumulated, these experiences become suggestions, proposals, and ultimately solutions. West China Hospital's philosophy of caring and service is thus inherited in an innovative way.

Acknowledgements

We wish to express our gratitude to Lili Liao and Jie Dong of the AME Publishing Company for their strong support and assistance for this article and to Qi Li and Ciqiang Zhu of the AME Publishing Company for their support and assistance with the interview.

Cite this article as: Xie Y. Guowei Che: precise clinical application in "enhanced recovery after surgery". J Thorac Dis 2018;10(Suppl 11):S1244-S1250. doi: 10.21037/jtd.2018.04.129

Footnote

Conflicts of Interest: The author has no conflicts of interest to declare.

(Science Editor: Yiyi Xie, JTD, jtd@amepc.org)