

The Application Progress of Intravenous Anesthesia in the Concept of Comfort Medical Care

Hongbo Wang¹, Yutong Zhang², Fen Deng¹, Chunmei Liao¹, Haiqing Zhong¹, Shaojuan Wu^{1,*}

¹Painless Center of Gaozhou People's Hospital, Maoming, China

²Medical Imaging, Mudanjiang Medical University, Mudanjiang, China

*Corresponding author

Abstract: From 1 January 2022 to 25 March 2023, 2465 bronchoscopies, 315 general bronchoscopies (12.7%) and 2150 anaesthetics (87.3%) were performed, comparing patient comfort, medical compliance and physician experience. It was found that general intravenous anaesthesia can fully meet the requirements of bronchoscopy, with smooth circulation, low airway resistance, low incidence of tract spasm, short examination time and excellent examination results, and high patient acceptance. It is worthy of clinical promotion.

Keywords: Comfortable medical care, (Branch) tracheoscope, Narcotic drugs

1. Introduction

Bronchoscopy is to put the bronchoscope into the patient's lower respiratory tract through the mouth or nose, and into the trachea, bronchi or further away through the gylatoroscope to observe the lesions of the (bronchi) trachea. Such patients are generally in poor condition, mostly accompanied by different degrees of airway stenosis, ventilation dysfunction, poor lung function, and some with hypertension, diabetes, heart disease, etc. It is particularly important to keep the respiratory tract open during surgery. On the one hand, anesthesia can improve the tolerance, comfort and satisfaction of patients undergoing examination; on the other hand, it can provide better operating conditions for the surgeon. However, sedative and anesthetic drugs can significantly affect the patient's breathing, circulation, ventilation, diagnosis and treatment of the airway. This kind of anesthesia is a major challenge for anesthesiologists. How to maintain the stability of respiratory circulation is a difficult point in anesthesia, and the choice of anesthesia plan has become the focus of discussion.

Comfortable medical care is the trend of future medical development, and it is an advanced medical concept and medical development model. In the whole medical process, it is comfortable and humanized, achieving psychological and physical pleasure, no pain and no fear. Psychological pleasure and no pain and no fear come from the good attitude of medical staff and the medical environment. The physiological pleasure and painless and fear are completely dependent on the painless services provided by the anesthesia profession.

The ideal bronchoscopy anesthesia should take into account the comfort of the patient under the premise of ensuring the safety of the patient, without affecting the accuracy of diagnosis and increasing the risk of complications. At present, there are significant differences in the anesthesia strategies of bronchoscopy in different regions and countries, and there is no unified standard. The application of intravenous anesthesia in bronchoscopy anesthesia is reviewed.

2. The necessity of anesthesia

Previous bronchoscopy examinations, including regular bronchoscopy examinations (without anesthesia), have been interrupted due to severe coughing and patient movement, which can cause significant psychological and physiological discomfort for the patient [1]. The discomfort and anxious emotions of the patient during the (bronchoscopy) operation not only impede the smooth progress of the operation, but also trigger the secretion of catecholamines, resulting in tachycardia, vasoconstriction, myocardial ischemia, and increased risk of examination. Using sedative or analgesic drugs to maintain moderate or deep sedation before operation can reduce patients' discomfort and

complications and improve patients' cooperation [2]. Anesthesia patients have stable circulation, low airway resistance, and low incidence of choking cough and airway spasm [3].

Therefore, good anesthesia effect and patient experience are of great significance to the smooth development of bronchoscopy.

In recent years, sedation and anesthesia have been used more and more frequently in diagnostic and therapeutic digestive endoscopy. Expert guidelines state that invasive endoscopic procedures must be performed under anaesthesia, and that the aims of anaesthesia are the same as those of surgery, namely to ensure patient safety, prevent related complications, improve operating conditions for the operator and facilitate early postoperative recovery [4, 5]. (Expert Consensus on Sedation/Anaesthesia for Bronchoscopy (2020 Edition) specifies that sedative drugs should be routinely used for those without contraindications. The consensus on sedation/anaesthesia for bronchoscopy (2020 version) clearly states that sedative drugs should be routinely administered to patients without contraindications to provide good conditions for the examination.[6]The guidelines of the British Thoracic Association suggest that sedative drugs can be given during diagnostic fibrobronchoscopy to reduce the occurrence of intraoperative cough, physical movement and dyspnea, and reduce patients' fear [7]. China's Application Guide for Diagnostic Bending Bronchoscopy (2008 Edition) proposes that sedative drugs should be recommended in the absence of contraindications[8].

Total intravenous anesthesia (TIVA), also known as intravenous compound anesthesia, is a method of general anesthesia by injecting narcotic drugs through the vein and acting on the central nervous system through blood circulation [9]. Intravenous anesthesia has the advantages of convenient medication, rapid and stable induction, complete analgesic effect, fast awakening, good forgetfulness and high patient comfort [10], and has been widely used in surgery and invasive examination. Patient safety is the eternal top priority of medical treatment. How to reduce potential dangers as much as possible, increase patient comfort, satisfaction, and increase medical [11], so as to improve the doctor-patient relationship and improve the quality of medical treatment.

3. Selection of anesthetic drugs

3.1 Midazolam

A powerful sedative. From a pharmacological point of view, midazolam has typical benzodiazepine pharmacological activity, which can produce anti-anxiety, sedation, hypnosis, anti-convulsions and muscle relaxation. After intramuscular injection or intravenous injection, short-term follow-in memory loss can occur, so that patients cannot recall what happened during the peak drug. It works quickly and lasts for a short time, with no drug resistance and withdrawal symptoms or rebound. The low toxicity and specific antagonist flumazenil can competitively inhibit the binding of benzodiazepines to receptors, block its central effect, and has a large safety range. The clinical use of multiple opioids will increase the risk of respiratory depression, which can lead to deep sedation, respiratory depression, coma and even death. Individual drugs are needed to closely monitor the respiratory state and sedation state.

3.2 Metomidine

Metomidine is a relatively selective α_2 -adrenergic receptor agonist with sedative effect. It is suitable for sedation during tracheal intubation and mechanical ventilation in patients with general anesthesia.

3.3 Lidokain

Lidokain is an amide local anesthetic. After blood absorption or intravenous administration, it has obvious excitement and inhibition of the central nervous system. There is no pioneering excitement. When the blood concentration is low, there is an increase in analgesic, sleepiness and pain threshold. As the dose increases, the effect or toxicity increases, and the subtoxicity blood concentration has an anticonvulsive effect. In intravenous anesthesia, lidocaine can be mixed with propofol to reduce pain during injection.

3.4 Fentanyl, sufentanil, remifentanyl

Opioid analgesics, powerful analgesics, suitable for sedation and analgesia before, during and after anesthesia. It is the most commonly used anesthetic for compound anesthesia at present. Opioids are easy to be rapidly degraded by non-specific esterases in blood and other tissues, so the removal in the body is fast, the half-life is short, the elimination speed is not affected by the time and dose, and the removal half-life is short, with quick effect, quick regression, strong analgesic effect, but the s It is a kind of anesthetic that has been widely used in clinical practice recently. Long-term opioids have a good relative pain effect of mid-term infusion of fentanyl and sufentanil in patients with chronic pain. When used in combination with benzodiazepines or other central nervous system inhibitors to treat intraoperative pain, the initial dose should be lower, and pay close attention to the patient's respiratory depression, sedation and hypotension symptoms.

3.5 Propofenol

It is a short-acting intravenous general anesthetic, which is used for the induction or maintenance of anesthesia or sedation. The intravenous treatment dose can produce an anesthetic effect within about 40s, and the excitation time is very small. Because the drug can be quickly metabolized and eliminated, the duration is very short after, about 4-6 minutes. The effect is fast, the duration is short, and the awakening is fast and stable. It is widely used in surgical outdoor anesthesia such as digestive endoscopy, bronchoscopy, abortion, conectomy, etc.

3.6 Cyclophenol

Cyclophenol is China's first independent compound innovation Class 1 intravenous anesthetic new drug. On March 25, 2022, the State Food and Drug Administration approved and issued the "Notice of Approval of Drug Supplement Application", agreeing to the approved indications of the drug "sedation in gastrointestinal endoscopy" and "bronchoscopy" On the basis of "sedation in", the [indications] of the instruction manual is revised to "sedation and anesthesia in non-tracheal intubation surgery/operation". Cyclophenol is based on the activity of propofol and designed a new structure with a potency strength of 4 to 5 times that of propofol. It has a high curative effect index and a wide range of safety [12].

4. Discussion on the comfort of adult fiber bronchoscopy anesthesia

Main content: (bronchoscopy) examination of the comfort of anesthesia patients and ordinary patients. Methods: Regarding bronchoscopy anesthesia and general bronchoscopy, statistics from January 1, 2022 to March 25, 2023, 2,465 cases of tracheoscopy, 315 cases (12.7%) of general tracheoscopy, 2,150 cases of anesthesia (87.3%), the comfort and medical treatment of anesthesia for patients. The experience of doctors is higher than that of ordinary tracheoscopy. Conclusion: Intravenous anesthesia can fully meet the surgical requirements of bronchoscopy. The patient's circulation is stable, the airway resistance is low, the incidence of choking cough and airway spasm is low, the examination time is short, the examination effect is excellent, and the patient's acceptance is high.

5. Conclusion

As an important diagnostic and treatment technology for respiratory diseases, tracheoscopy has been widely carried out in clinic. However, it is essentially a traumatic and invasive clinical operation with high risk. Such patients are generally in poor condition, and their cardiopulmonary function is weak, and the risk of anesthesia is high. How to induce them smoothly, ensure the appropriate depth of anesthesia to complete the examination, maintain a stable respiratory circulation during the anesthesia process, and use individual drugs to ensure the effect and quality of anesthesia. Comfortable medical care is an inevitable trend in the development of medicine. While ensuring the safety of patients, comfortable medical care is maximized. With the introduction of ERAS, the requirements for anesthesia are getting higher and higher, and the technical level of anesthesiologists are put forward. The iterative update of anesthetic drugs ensures the comfort of medical treatment and ERAS. With the development of the times, a variety of narcotic drugs have been approved to be put on the market, and a variety of new narcotic drugs are combined with safety, individualization and comfort, which is of

great significance for exploring new anesthesia solutions.

Acknowledgements

This work was supported by the Maoming Science and Technology Plan Project (Project Number: 2022415).

References

- [1] Yao Siyi, Lu Xuecai. *Application of different anesthesia methods in tracheoscopy [J]. Medical review*, 2022, 28(11):2211-2216.
- [2] Li Dongmei, Li Kai, Li Longyun, Li Yunpengfei, Zhao Guoqing. *Research progress of adult bronchoscopy anesthesia [J]. China Experimental Diagnostics*, 2017, 21 (04): 739-742.
- [3] Bachmann-Mennenga B; Ohlmer A ; BoedekerRH ; Mann M ; Muhlenbruch B.«*European journal of anaesthesiology*» 2007, 24(1),33-38
- [4] Anesthesia Collaboration Group of the Digestive Endoscopy Branch of the Chinese Medical Association. *Common Digestive Endoscopy Hand Artic Drunk Management Specialized Knowledge [J]. Bedma Drunken Learning Miscellany*, 2019, 35(2): 177-185.
- [5] Teh JL, Shabbir A, Yuen S, et al. *Recent advances in diagnostic upper endoscopy [J]. World J Gastroenterol*, 2020, 26(4): 433-447.
- [6] Deng Xiaoming, Wang Yuelan, Feng Yi, etc. *(Branch) tracheoscopy sedative/anaesthetic expert consensus (2020 edition) [J]. International Journal of Anesthesiology and Resuscitation*, 2021, 42 (8): 785-794.
- [7] British Thoracic Society Bronchoscopy Guidelines Committee. *British Thoracic Society guidelines on diagnostic flexible bronchoscopy [J]. Thorax*, 2001, 56 Suppl 1 (Suppl 1) : i1-21.
- [8] Chinese Medical Association Respiratory Disease Branch. *Application Guide for Diagnostic Curvacious Bronchoscopy (2008 Edition) [J]. Chinese Journal of tuberculosis and Respiratory*, 2008, 31 (1):14-17.
- [9] Li Haiwen, Guo Hang, Wu Tingming, Li Xiangpeng, Ma Yaqun. *The progress of the application of intravenous anesthesia in pediatric surgery [J]. Medical review*, 2022,28(02):349-354.
- [10] Rsynolds L; Rauck R ; Webster L; DuPen S; Heinze E; Portenoy R; Katz N. *Pain: The Journal of the International Association for the Study of Pain [J]. 2004, 110, (1/2)182-188.*
- [11] Merigo Luca; Padula Fabrizio; Latronico Nicola; Paltenghi Massimiliano; Visioli Antonio. *Communications in Nonlinear Science and Numerical Simulation [J]. 2019, 16, 1194-2121.*
- [12] Sun Zhengqin, Wang Qiang. *Application effect of cyclopophenol for painless gastroenteroscopy anesthesia [J]. Scientific Health*, 2021, 24(24):166.