

1 **The Impact Mechanism of National Centralized Drug Procurement**
2 **Policy on Prescription Behavior:**
3 **Identification, Measurement and Improvement**

4 — *Interview Records*

5 **Interview Date:** April 9th, 2025

6 **Interview Format:** Online interview, through Tencent Meeting

7 **Interview Location:** Center for Pharmaceutical Market Access and Policy Research,
8 China Pharmaceutical University

9 **Interviewees*:** Department of Anesthesiology, Anqing Municipal Hospital, Director
10 A, Director B

11 **Q** refers to the interviewer.

12 **A** refers to interviewee A.

13 **B** refers to interviewee B.

14 **Interview Summary:**

15 **Q: In general anesthesia, what is the approximate clinical proportion of**
16 **intravenous anesthetics versus inhalational anesthetics (e.g., 7:3)? Besides patient-**
17 **related factors (for example, the use of desflurane for anesthesia maintenance in**
18 **non-cardiac surgery for patients with cardiac disease or coronary artery disease[†]),**
19 **are there other factors that influence clinicians' choice between intravenous and**
20 **inhalational anesthetics?**

21 **A:**

22 In current clinical practice, anesthesia plans are usually based on
23 intravenous anesthesia. Pure intravenous anesthesia alone is relatively
24 uncommon, accounting for about 30% of all surgeries. In contrast, inhalational
25 anesthesia is used more widely; except where there are clear contraindications,
26 around 80% of surgeries involve inhalational agents.

27 In terms of administration patterns, a combined approach of “intravenous
28 induction followed by inhalational maintenance” is most commonly used
29 (often referred to as a “sandwich” technique). Using inhalational anesthesia

* To comply with interview requirements, the identities of the two interviewees have been anonymized. The 2 interviewees were interviewed separately, and their responses have been compiled into this single transcript.

† W.Z. Li, X.M. Deng. Anesthesiology, fifth ed., People's Medical Publishing House, Beijing, 2024.

alone is associated with more side effects and is therefore rarely used as a standalone method, except in a small number of young pediatric patients who are unable to cooperate. The standard process involves intravenous induction, maintenance with inhaled agents via an endotracheal tube during surgery, and supplementation with intravenous drugs toward the end of the procedure.

The use of inhalational anesthetics is influenced by several factors. From a safety perspective, inhalational agents carry a risk of malignant hyperthermia, with a higher incidence in pediatric patients. In terms of surgical type, inhalational anesthetics can increase intracranial pressure, so they are generally avoided in neurosurgical procedures. In addition, anesthesiologists' personal practice habits, convenience considerations, and concerns about operating room pollution also play an important role in decisions to limit the use of inhalational anesthesia.

B:

At present, most surgeries are performed using a combination of intravenous hypnotics and inhalational anesthetics, accounting for about 80% of all procedures.

Q: In clinical practice, are anesthesia regimens mainly based on single-agent use or combination therapy? Which drugs are typically used as single agents, and under what surgical scenarios are single-agent regimens applied?

A:

The use of a single anesthetic agent alone is very rare in clinical practice and is usually limited to minor procedures in elderly patients or superficial mass excisions. Standard general anesthesia must meet three key requirements: sedation, analgesia, and muscle relaxation. During the induction phase, anesthesiologists typically use drugs such as midazolam and etomidate to induce sleep, combined with sufentanil for analgesia and muscle relaxants, followed by tracheal intubation.

During the maintenance phase, inhalational anesthetics alone can fulfill these anesthesia requirements. If inhalational agents are not used, continuous administration of sedatives, analgesics, and muscle relaxants is required. Dosing must be carefully adjusted based on drug metabolism. Fast-metabolizing drugs are usually administered until the end of suturing, whereas slower-metabolizing drugs are often stopped about 30 minutes before the end of surgery.

After surgery, analgesics are commonly used to allow a smooth transition from anesthesia to wakefulness. In most cases, no special intervention is required, and patients recover as the drugs are metabolized. Antagonists are rarely used, except when remimazolam is administered, in which case flumazenil is usually given to accelerate recovery.

B:

Currently, most surgeries use active combination therapy together with inhalational anesthesia. For single-agent use, lidocaine or ropivacaine may be

used, mainly during anesthesia induction to reduce the intubation response.

Q: What are the commonly used combination regimens? In these regimens, how are different drug classes (e.g., intravenous anesthetics, local anesthetics, analgesics, muscle relaxants) combined across the induction, intraoperative, and postoperative phases?

A:

(Answered in the previous question.)

B:

During induction, etomidate is commonly used. During the intraoperative period, rocuronium and cisatracurium besylate are used for muscle relaxation, and fentanyl is used for analgesia. Sedation is typically achieved with propofol or ciprofol combined with etomidate, or with remimazolam combined with inhalational anesthetics. Postoperative analgesia is usually provided via an intravenous analgesia pump.

Q: In recent years, several new anesthetic drugs have been approved (e.g., remimazolam tosylate for injection in 2021 and ciprofol injection in 2022). Have there been changes in clinical drug use? For example, have newly approved drugs been adopted, or have any older drugs been phased out?

A:

Thiopental sodium has been completely replaced in recent years, and esketamine is now commonly used instead. Ciprofol has not yet fully replaced propofol or etomidate, mainly because clinicians are still not very familiar with its use.

B:

A relatively new drug used this year is oliceridine, which is a novel analgesic.

Q: Is there any seasonal pattern in surgical volume (for example, more surgeries in April–May and fewer in July–August)?

A:

Yes. For example, before and after the Spring Festival or other holidays, many people have more free time and choose to undergo surgery. There is also an increase in the summer vacation or after the college entrance examination period, especially among pediatric patients.

B:

Yes. During the Spring Festival, public holidays, and summer vacation, there are more pediatric patients, and surgical volumes tend to increase.

Q: Is it common to use four or more anesthetic drugs in a single surgery? Data

show that some individual patients receive five or more anesthetic drugs—does this reflect multiple surgeries for the same patient, or is it due to different drugs being used during induction, intraoperative maintenance, and postoperative management?

(Example combination omitted for brevity in the question but discussed below.)

A:

In clinical practice, anesthesia plans follow the principles of balanced anesthesia and precision anesthesia. The goal is to use multiple drugs at lower doses to avoid toxic effects associated with high doses of a single agent. Therefore, using four or more anesthetic drugs in a single surgery is routine.

For analgesia, two to three drugs are often combined, as a single analgesic is usually insufficient to fully block pain transmission. A common approach is to combine long-acting and short-acting agents—for example, remifentanyl for intraoperative analgesia and sufentanil for postoperative pain control.

A complete general anesthesia regimen necessarily includes both intravenous anesthetics and muscle relaxants. Cases in which a single patient receives five or more drugs usually do not reflect multiple surgeries but rather the use of different drugs at different stages—induction, intraoperative maintenance, and postoperative analgesia—to achieve optimal clinical outcomes. The roles of the drugs in the example regimen can be summarized as follows:

Intravenous anesthesia: propofol + etomidate + midazolam

Analgesia (long- and short-acting): sufentanil + remifentanyl

Muscle relaxation and adjuncts: cisatracurium besylate (to reduce doses of other drugs and postoperative discomfort) + dexmedetomidine

Postoperative infiltration anesthesia: ropivacaine + lidocaine

B:

Lidocaine is an intermediate-acting local anesthetic, while ropivacaine is long-acting. When used together, they are usually applied for nerve blocks to achieve rapid onset and prolonged duration.

Propofol combined with etomidate, or propofol plus etomidate plus lidocaine, is commonly used for outpatient painless gastroscopy or painless abortion procedures. Lidocaine helps reduce injection pain.

Dexmedetomidine provides adjunctive analgesic and sedative effects.

The combination of propofol, etomidate, midazolam, and sufentanil is a commonly used regimen in surgery.

Q: Rocuronium and cisatracurium are both centrally procured muscle relaxants. Are they used together when efficacy is uncertain, or are other drugs added to achieve the desired effect? Are their clinical use scenarios the same?

A:

Rocuronium and cisatracurium have different pharmacokinetics and onset times. Rocuronium is more suitable for induction, while cisatracurium is better for intraoperative maintenance. Typically, different drugs are used at different stages, and rocuronium is preferred during induction.

B:

Cisatracurium has an onset time of about 3 minutes, while rocuronium takes about 1 minute. Rocuronium acts quickly and is suitable for intubation. The two drugs may be used together to achieve rapid onset and longer duration. Cisatracurium may have potential effects on liver and kidney function, so combination use can also reduce the dose of each drug.

Q: For lidocaine and ropivacaine (both centrally procured), are additional drugs used when efficacy is uncertain to achieve the desired effect?

A:

The centrally procured lidocaine and ropivacaine perform well clinically. In practice, ropivacaine alone is now used in most cases. Mixing lidocaine and ropivacaine reflects older clinical habits.

B:

Lidocaine is an intermediate-acting local anesthetic and ropivacaine is long-acting. When combined, they are generally used for nerve blocks to achieve fast onset and prolonged duration.