

BMJ Open Current practice of postoperative fasting: results from a multicentre survey in China

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ABSTRACT

Objective A gap between clinical practice and evidence is common. The present multicentre study was designed to explore the actual postoperative fasting practice, including the instructed fasting time from the ward staff and the actual postoperative fasting time.

Design Multicentre survey.

Setting Four tertiary hospitals in Shenzhen City, China.

Participants A total of 988 patients completed a survey on instructed and actual postoperative fasting.

Outcomes All patients received postoperative instructed fasting time from the ward staff. The median instructed fasting time for fluids from ward staff was 6 hours (IQR, 4–6 hours), and the median instructed fasting time for solid food was also 6 hours (IQR 5–6 hours) after surgery. The actual postoperative fasting time, including fluid and solid food intake, was significantly longer than the time recommended by the ward staff (both $p < 0.001$).

Results The median time to postoperative first flatus (FFL) was 16.5 hours (IQR 8–25.5 hours), and the median time to postoperative first faeces (FFE) was 41 hours (IQR 25–57 hours). The fasting time was significantly shorter than the time to FFL and the time to FFE, regardless of surgery type or anaesthesia type (all $p < 0.001$). Postoperative nausea and vomiting (PONV) occurred in 23.6% of patients. After surgery, 58.70% of patients reported thirst, and 47.47% reported hunger. No ileus occurred.

Conclusion Approximately half of the patients reported thirst and hunger postoperatively. Patients initiated oral intake earlier than the time to FFL or FFE without increasing serious complications. This study may support the rationale for interventions targeting postoperative oral intake time in future studies.

INTRODUCTION

Traditional postoperative oral nutrition is usually initiated after the indication of return of bowel function, including passage of flatus, passage of stool and bowel sounds. This traditional approach has been used to prevent postoperative complications. It is believed that tradition can reduce the incidence of paralytic ileus or anastomotic leakage. However, there is little evidence to support the traditional postoperative oral nutrition regime. In contrast, evidence indicates that early postoperative oral intake is safe and beneficial, even in gastrointestinal surgery.^{1–4} Postoperative

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The present study was a multicentre survey conducted in a large city in China.
- ⇒ The present study provides unique data on postoperative fasting times in a large cohort of patients from four tertiary hospitals.
- ⇒ This study may support the rationale for interventions targeting postoperative oral intake time in future studies.
- ⇒ The results of this study may not be generalisable to other regions or countries.

care in major gynaecologic surgery even recommends oral intake immediately after surgery.^{5,6} Meanwhile, a gap between clinical practice and feeding evidence or guidelines is common.^{7,8} Even in guidelines, there were little data about how early is ‘early’.⁹ Patients were also confused about when to start oral intake, and had to endure thirst and hunger. Therefore, the present multicentre study was designed to explore actual oral intake practices after surgery.

METHODS

Data were collected from four tertiary hospitals: the Seventh Affiliated Hospital of Sun Yat-sen University, Shenzhen Qianhai Shekou Free Trade Zone Hospital, Integrated Traditional Chinese and Western Medicine Hospital and Shenzhen University General Hospital. This study was conducted in accordance with the principles of the Declaration of Helsinki. Patients were assured that their answers were confidential, and that no data compromising privacy could be obtained. The patients were informed that they could quit the survey at any time. Verbal informed consent was obtained from all patients before they completed the survey. The requirement for written informed consent was waived by the Ethics Committee because the survey was retrospective.

Participants

No previous study has calculated the sample size. Therefore, referring to a previous survey which explored preoperative fasting,¹⁰ we conducted surveys for four consecutive work weeks from the four hospitals mentioned above. Inclusion criteria were adult patients with American Society of Anesthesiologists (ASA) physical status I–III without cognitive impairment who underwent elective surgery from 13 September 2021 to 17 October 2021 and were administered anaesthesia by anaesthesiologists. The exclusion criteria were day surgery, cardiovascular surgery, neurosurgery and transplant surgery. Patients whose anaesthesia was managed by the interviewers were also excluded. Patients who refused to complete the survey or who were lost to follow-up were excluded from the final analysis.

Survey

Patients were surveyed by the researchers from the second day after surgery until the day they were discharged from the hospital. The questions included whether they received instructions and who they received them from about when to initiate postoperative oral intake, the actual time that they started oral intake, whether they endured postoperative nausea and vomiting (PONV), the time to postoperative first flatus (FFL) and the time to postoperative first faeces (FFE). Other clinical data were collected from the medical records if the patients agreed to complete the survey.

Statistical analysis

The Statistical Package for the Social Sciences (V.21.0) was used to perform statistical analyses. Qualitative and ordinal data are expressed as absolute frequencies. The normality of the distribution of quantitative data was tested using the one-sample Kolmogorov-Smirnov test. Quantitative data are expressed as the mean±SE or median values with IQRs for normally and non-normally distributed data, respectively. The Wilcoxon signed-rank test was used to compare differences between paired data that were not normally distributed. The Mann-Whitney U test was used to compare differences between different populations. Differences were considered statistically significant when two-tailed p values were <0.05.

Patient and public involvement

No patients or public members were involved in the development of the research question, recruitment, outcome measures or design of the study. There are no plans to disseminate the results of this study to the participants.

RESULTS

In total, 1086 patients were approached to participate in the survey. After excluding 98 patients who refused to participate or were lost to follow-up, 988 patients completed the survey and were included in the final analysis. The characteristics of these patients are shown

Table 1 The sociodemographic characteristics of patients

| Variables | N | Percentage |
|--|-------------|------------|
| Gender | | |
| Male | 425 | 43.0% |
| Female | 563 | 57.0% |
| Age | 44.24±0.43* | |
| ASA | | |
| I | 268 | 27.1% |
| II | 702 | 71.1% |
| III | 18 | 1.8% |
| Post opioids used | 107 | 10.8% |
| Surgery type | | |
| Gastrointestinal surgery | 65 | 6.6% |
| Non-gastrointestinal surgery | 923 | 93.4% |
| Abdominal non-gastrointestinal surgery | 91 | 9.2% |
| Thyroid, breast and body surface surgery | 143 | 14.5% |
| Gynecologic surgery | 186 | 18.8% |
| Obstetric surgery | 17 | 1.7% |
| Thoracic surgery | 57 | 5.8% |
| Otolaryngology surgery | 87 | 8.8% |
| Urological surgery | 213 | 21.6% |
| Orthopaedic | 109 | 11.0% |
| Spinal surgery | 20 | 2.0% |
| Anaesthesia type | | |
| General anaesthesia | 815 | 82.5% |
| Endotracheal intubation (EI) | 524 | 53.0% |
| Laryngeal mask (LMA) | 203 | 20.5% |
| Intravenous without EI or LMA | 88 | 8.9% |
| Regional anaesthesia | 173 | 17.5% |
| Intraspinal anaesthesia | 133 | 13.5% |
| Peripheral nerve block | 40 | 4.0% |
| Complications | | |
| PONV | 233 | 23.6% |
| Ileus | 0 | 0 |
| Thirsty | 580 | 58.70% |
| Hungry | 469 | 47.47% |

*Mean±SE error.
ASA, American Society of Anesthesiologists; PONV, postoperative nausea and vomiting.

in table 1. Of the 988 patients, 268 were ASA I, 702 were ASA II and 18 were ASA III. In total, 107 patients were prescribed opioids for postoperative analgesia. A total of 815 patients underwent general anaesthesia, and 173

Table 2 The instructed postoperative fasting time, actual postoperative fasting time and the time to FFL and FFE in different population

| | Instructed fasting time for fluids (hours) | Instructed fasting time for solid food (hours) | Actual fasting time for fluids (hours) | Actual fasting time for solid food (hours) | Time to FFL (hours) | Time to FFE (hours) |
|-------------------------------|--|--|--|--|---------------------|---------------------|
| Total populations* | 6 (4–6) | 6 (5–6) | 6.5 (5.5–7.5) | 7 (6–8) | 16.5 (8–25.5) | 41 (25–57) |
| † | 6.18±0.19 | 7.52±0.28 | 7.46±0.18 | 9.72±0.31 | 18.57±0.44 | 44.58±0.87 |
| Surgery type | | | | | | |
| Non-gastrointestinal surgery* | 6 (4–6) | 6 (5–6) | 6.5 (5.5–7.5) | 7 (6–8) | 16 (8–25) | 41 (25–58.0) |
| † | 6.12±0.19 | 7.44±0.28 | 7.35±0.18 | 9.59±0.32 | 18.33±0.45 | 44.73±0.90 |
| Gastrointestinal* | 6 (4–6) | 6 (4–6) | 7 (6–8.25) | 7.5 (6–12.75) | 20 (10.75–28.25) | 36.5 (22–55.5) |
| † | 7.05±0.90 | 8.71±1.36 | 9.02±0.89 | 11.65±1.34 | 21.92±1.65 | 42.49±2.97 |
| Anaesthesia type | | | | | | |
| General anaesthesia* | 6 (4–6) | 6 (4–6) | 6.5 (5–7.5) | 7 (6–8) | 16 (8–25.5) | 40.5 (25–57) |
| † | 6.22±0.22 | 7.55±0.31 | 7.47±0.21 | 9.66±0.35 | 18.32±0.48 | 44.19±0.94 |
| Regional anaesthesia* | 6 (6–6) | 6 (6–6) | 7 (6–8) | 7.5 (6.5–8.75) | 18 (9–25) | 41 (24–62) |
| † | 6.00±0.28 | 7.36±0.61 | 7.41±0.30 | 9.99±0.65 | 19.71±1.00 | 46.45±2.23 |

*Median with IQR.
†Mean±SE error.
FFE, first faeces; FFL, first flatus.

underwent regional anaesthesia. Considering the surgery distribution, 65 patients underwent gastrointestinal surgery and 923 underwent non-gastrointestinal surgeries (table 1).

Instructed and actual postoperative oral feeding time among patients

All patients received postoperative instructions on fasting time after surgery from the ward staff. However, only 124 (12.55%) patients received information about the postoperative fasting time from anaesthesiologists. The median instructed fasting time for clear fluids from ward staff was 6 hours (IQR, 4–6 hours; table 2). The median instructed fasting time for solid food from ward staff was also 6 hours (IQR, 5–6 hours; table 2).

The instructed fasting time for fluids by ward staff was significantly shorter than that for solid food (6.18±0.19 vs 7.52±0.28 hours, $p<0.001$, table 2 and figure 1). The actual fasting time for fluids was also significantly shorter than the actual fasting time for solid food (7.46±0.18 vs 9.72±0.31, $p<0.001$; table 2, figure 1).

Furthermore, regardless of the intake of oral fluids or solid food, the actual postoperative fasting time was significantly longer than that instructed by the ward staff (both $p<0.001$, figure 1). The above phenomenon was observed regardless of surgery or anaesthesia type (figures 2 and 3).

When comparing gastrointestinal and non-gastrointestinal surgeries, the instructed postoperative fasting times did not differ between them (figure 2). Of note, the actual postoperative fasting times were statistically longer in patients

who underwent gastrointestinal than those who underwent un-gastrointestinal surgeries (9.02±0.89 vs 7.35±0.18 hours, $p=0.032$ for fluids, 11.65±1.34 vs 9.59±0.32 hours, $p=0.036$ for solid food; table 2, figure 2).

Considering the differences between anaesthesia types, the instructed postoperative fasting times did not differ significantly between general and regional anaesthesia (figure 3). Intriguingly, the actual postoperative fasting time differed significantly between general and regional anaesthesia (7.47±0.21 vs 7.41±0.30 hours, $p=0.006$ for fluids, 9.66±0.35 vs 9.99±0.65 hours, $p=0.002$ for solid food; table 2, figure 3).

The time to postoperative FFL and FFE

The median time to FFL was 16.5 hours (IQR, 8–25.5 hours, table 2), and the median time to FFE was 41 hours (IQR, 25–57 hours; table 2).

The time to FFL or FFE was significantly longer than the patients' actual fasting time (including fluids and solid food), regardless of surgery or anaesthesia type (all $p<0.001$; figures 1–3, table 2). The time to FFL was significantly longer in patients who underwent gastrointestinal surgery than in those who underwent non-gastrointestinal surgery (figure 2), whereas no significant difference was observed between the two surgery types when considering FFE (figure 2). There were no significant differences between general and regional anaesthesia with regard to FFL or FFE (figure 3).

Complications

PONV occurred in 23.6% of patients (table 1). A total of 98 patients experienced nausea after the first oral feeding,

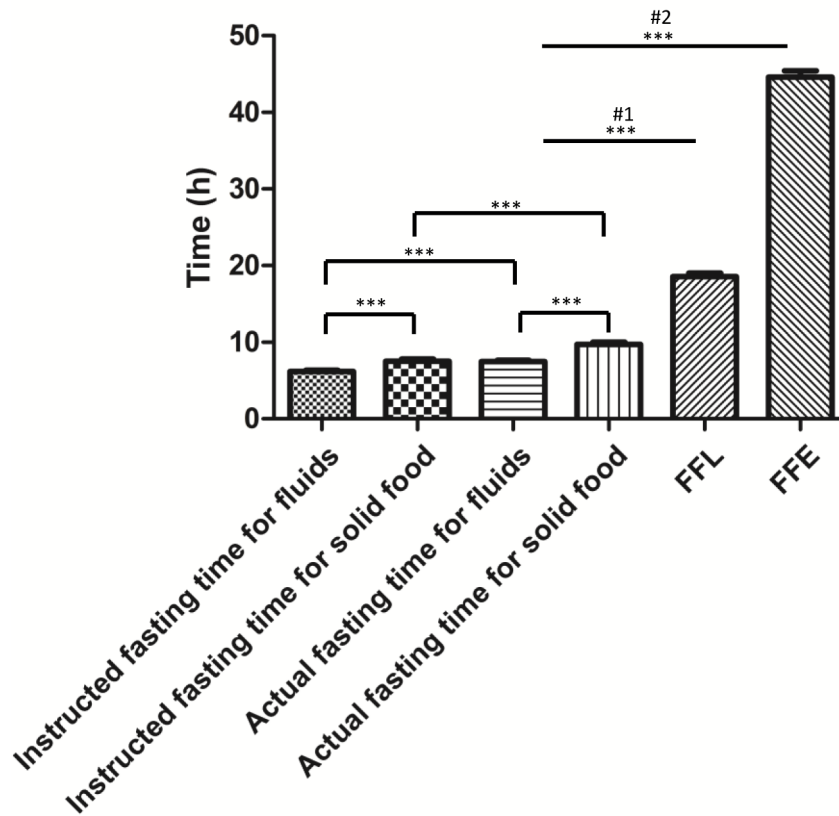


Figure 1 The instructed and actual postoperative fasting time, and the time to FFL and FFE. * $P < 0.05$; ** $p < 0.01$; and *** $p < 0.001$. #1, comparison between the time to FFL and actual postoperative fasting time (fluids or solid food); #2, comparison between the time to FFE and actual postoperative fasting time (fluids or solid food). FFE, first faeces; FFL, first flatus.

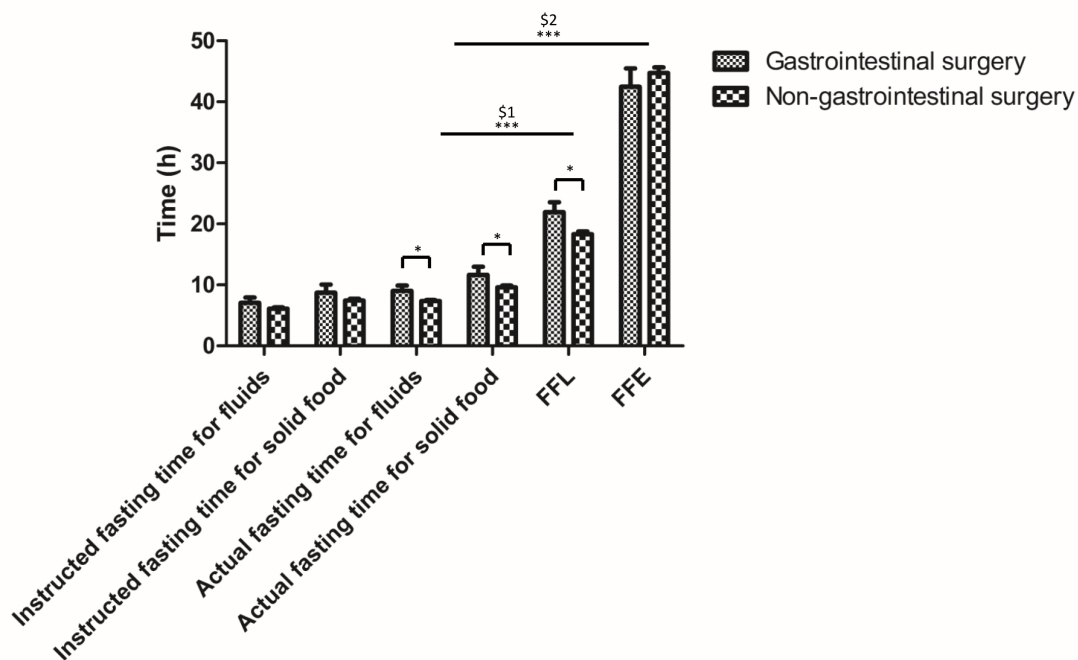


Figure 2 The comparisons between gastrointestinal and non-gastrointestinal surgery. * $P < 0.05$ and *** $p < 0.001$. \$1, comparison between the time to FFL and actual fasting time (fluids or solid food) regardless of surgery type; \$2, comparison between the time to FFE and actual fasting time (fluids or solid food) regardless of surgery type. FFE, first faeces; FFL, first flatus.

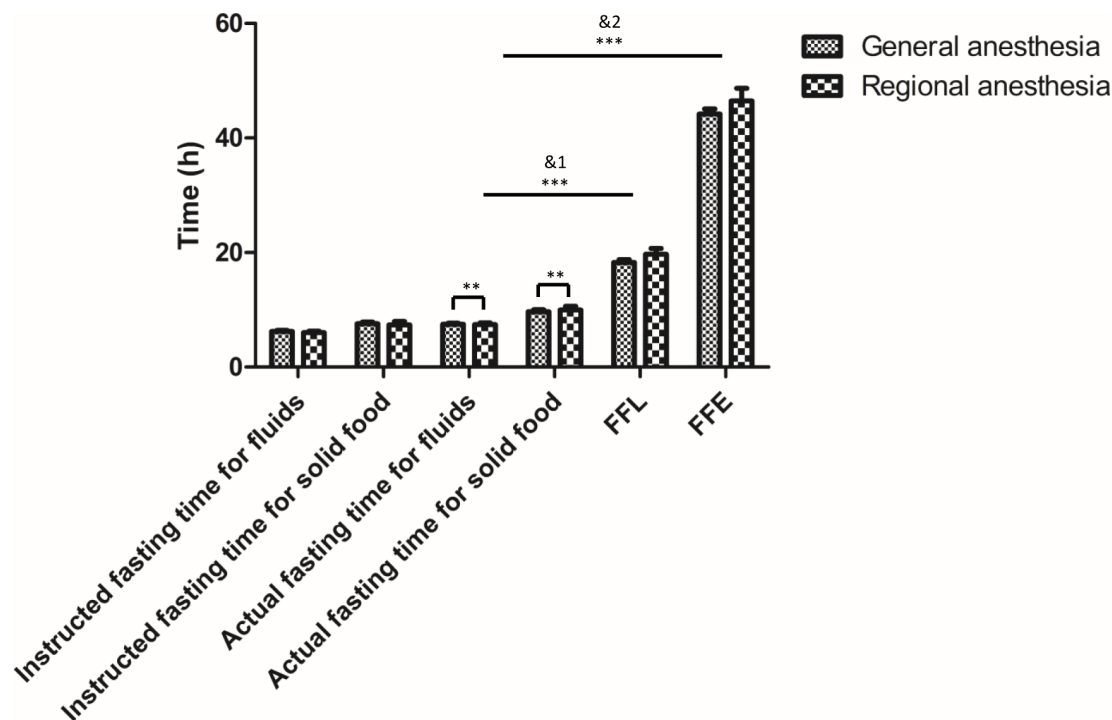


Figure 3 The comparisons between general and regional anaesthesia. ** $P < 0.01$; and *** $p < 0.001$. &1, comparison between the time to FFL and actual fasting time (fluids or solid food) regardless of anaesthesia type; &2, comparison between the time to FFE and actual fasting time (fluids or solid food) regardless of anaesthesia type. FFE, first faeces; FFL, first flatus.

and 81 vomited after the first oral feeding. Furthermore, both the time to oral fluids and solid food were significantly shorter in patients without PONV than those with PONV (6.72 ± 0.15 vs 9.86 ± 0.58 hours, $p < 0.001$ for fluids, 8.40 ± 0.26 vs 14.00 ± 0.95 hours, $p < 0.001$ for solid food, results are not shown in table 1).

Paralytic ileus was not observed. Of the patients, 58.70% reported thirst, and 47.47% reported hunger after surgery (table 1). No cases of ileus were observed.

DISCUSSION

This multicentre study demonstrated that all patients received information regarding postoperative intake initiation from ward staff. The actual initiation times for oral fluid and solid food intake were significantly higher than those instructed by the ward staff. Notably, the instructed postoperative fasting time did not differ regardless of the surgery or anaesthesia type. Furthermore, the time to initiate drinking or eating was significantly earlier than the time to FFL or FFE. PONV occurred in 23.6% of the patients, and no paralytic ileus was observed.

A previous study demonstrated that risk factors, including opioid use, surgical complexity and fluid overload, are associated with postoperative ileus.¹¹ Chewing gum, the advent of laparoscopy, and perioperative nutrition are beneficial in the recovery of bowel function and prevention of postoperative ileus.¹² Various studies and guidelines have clearly recommended preoperative fasting times,^{13 14} and preoperative fasting abbreviation protocols such as enhanced recovery after surgery

could avoid nausea, vomiting and ileus and accelerate postoperative recovery.^{15–18} As an important part of perioperative nutrition, early feeding after surgery has been shown to accelerate postoperative bowel function recovery.^{19 20} Previous studies have supported early intake after gastrointestinal surgery and total laryngectomy, with some guidelines recommending early oral feeding after surgery.^{21–24} A guideline from the European Society of Anaesthesiology and Intensive Care recommends that patients resume drinking soon after elective surgical procedures.¹⁴ However, the evidence for the guideline was from only four articles, of which two evaluated oral fluid intake after caesarean delivery under regional anaesthesia.^{25 26} A survey of French anaesthesiology practices demonstrated that the majority of anaesthesiologists allowed fluid intake 2 hours or immediately after surgery, and solid food 4 hours after surgery, based on airway management.⁸ In the present study, patients' actual postoperative fasting times were significantly longer than those instructed by ward staff. In line with the preoperative fasting in our previous study, the patients might always be conservative.²⁷ Notably, in the present study, patients initiated oral intake before the passage of flatus or stool, and no serious ileus occurred.

In addition to postoperative ileus, PONV is another concern for postoperative oral intake. Early oral intake (within 24 hours), irrespective of the presence or absence of the indicated return of bowel function after major abdominal gynaecologic surgery, although safe, was associated with increased PONV.²⁸ In contrast, another study



demonstrated that in an outpatient setting, early postoperative oral fluid intake was associated with a reduction in the incidence of PONV.²⁹ The present study found that the incidence of PONV was 23.6%, and fewer than 10% of patients reported nausea or vomiting after the first postoperative oral feeding. Furthermore, both the time to first drink and eat was significantly shorter in patients without PONV than those with PONV. Therefore, PONV should not be the main concern of early oral intake.

Early oral intake after surgery was associated not only with bowel function recovery and PONV incidence reduction but also with fewer infectious complications and shortened hospitalisation.³⁰ Irrespective of the different scheduled surgeries, including those involving the gastrointestinal system, or different anaesthesia types, including intraspinal anaesthesia, early oral intake has shown benefits and no harm.^{3 20 22} However, the gap between clinical practice and evidence is common.^{7 31} Patients scheduled for surgery usually undergo a much longer preoperative fasting than the evidence-based guidelines recommend,²⁷ and most patients still have to endure long postoperative fasting. In the present study, the ward staff always instructed the patients to initiate oral feeding 6 hours after surgery. The guidelines encouraged patients to drink when they were awake and nausea free after the operation.¹⁸ An oral diet can usually be started within 4 hours after surgery.¹⁸ Approximately half of the patients in the present study experienced thirst and hunger after surgery. There are several reasons for this finding; first, although guidelines recommend early oral intake after surgery, the exact time is not always as clearly mentioned as that in preoperative fasting guidelines. Therefore, the clinical staff were cautious and conservative about early postoperative oral intake. The reason for the gap between guidelines and clinical practice remains to be explored in future studies. Second, the patients were more conservative than the clinical staff. Similar to preoperative fasting, which lasted longer than the durations instructed by clinical staff from our previous observation,²⁷ patients' actual postoperative fasting time was also longer than that instructed by clinical staff. The reason for the conservative nature of the patients also needs to be elucidated in future studies.

The present study has certain limitations. First, the existing knowledge of the clinical staff on postoperative fasting was not investigated, which might potentially affect patients. Whether the instructions from anaesthesiologists and ward staff influence the actual postoperative fasting time differently remains to be explored. However, in order to decrease the potential bias brought by the anaesthesiologists who were involved in the research of present study, patients whose anaesthesia were managed by the researchers were excluded from the survey. Second, some indicators of gastrointestinal function, such as bowel sounds, were not obtained in the present study. Bowel sounds appeared approximately 2 hours earlier than the passage of the flatus in a previous study on caesarean sections.³² The lag time between postoperative

oral intake and bowel sounds in clinical settings was not analysed in the present study. Third, the reason why some patients were conservative and initiated oral intake later than instructed by medical staff remains to be clarified. Fourth, 10.8% of patients were prescribed opioids for postoperative analgesia, which might affect postoperative feeding. Finally, the multicentre was from a big city in China. These results may not be generalisable to other regions or countries.

In conclusion, approximately half of the patients reported thirst and hunger after surgery; however, in practice, postoperative fasting lasts longer than 6 hours regardless of surgery or anaesthesia type. Most patients initiate oral intake earlier than the time to FFL or FFE, without increasing the rate of serious complications. The present results might support the rationale for interventions targeting postoperative oral intake time in future studies.

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Competing interests None declared.

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Patient consent for publication Consent obtained directly from patient(s)

Ethics approval This study involves human participants and was approved by the Institutional Review Board of the Seventh Affiliated Hospital of Sun Yat-sen University (chairperson: Professor Chun Chen, approval number: KY-2021-076-01).

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Data availability statement All data relevant to the study are included in the article or uploaded as supplementary information.

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