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Early oral intake after arthroscopic surgery under spinal anesthesia

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Abstract

Purpose. We investigated the tolerability of early oral feeding (EOF) and its effects on the recovery of bowel function after spinal anesthesia.

Methods. Thirty-one healthy adult patients undergoing knee arthroscopy or arthroscopic surgeries were randomly assigned to either the EOF group (n = 16) or the nil per os (NPO, n = 15) group. Spinal anesthesia was performed using hyperbaric tetracaine solution in all patients. Patients in the EOF group were allowed free access to solid and liquid food immediately after surgery before analgesia from spinal tetracaine resolved. Oral intake was prohibited for 24 h after completion of surgery in the NPO group.

Results. Two patients in each group were mildly nauseated without the need for treatment. While degree of appetite determined by a visual analog scale before the first meal and time to the first gas emission showed no significant differences between groups, the median time to the first defecation in the EOF group (20.6 h) was significantly shorter than that of the NPO group (33.5 h, P = 0.005). No other complications associated with anesthesia, surgery, or EOF were noted.

Conclusion. Our results suggest that the restriction of EOF after surgery not involving the gastrointestinal tract under spinal anesthesia may not be rational, and that EOF may facilitate recovery of bowel function.

Key words: Early oral intake, Spinal anesthesia, Bowel function

Introduction

Early oral feeding (EOF) is an important determinant in improving postoperative outcome or decreasing hospital stay after surgery [1,2]. In contrast to preoperative fasting, optimal fasting time after surgery has neither been extensively studied nor prospectively defined. Restriction of liquid and solid food has been a commonly accepted practice after surgery involving the gastrointestinal tract via laparotomy, because EOF may result in abdominal distension, postoperative nausea, and vomiting. In general, the inability to tolerate EOF is attributed largely to the failure of food to pass down to the small intestine, i.e., decreased gastric motility, rather than inability of the small intestine to accept it [3]. In addition to surgical manipulations involving the gastrointestinal tract, per se, impaired gastric emptying is also a common consequence of postoperative sympathetic hyperactivity as a result of perioperative stress and postoperative pain and narcotic use [4,5].

A previous study by Guedj, et al. [6] demonstrated in postcesarean section patients under epidural anesthesia that no significant differences were seen in those who were permitted oral fluid intake immediately after surgery and those who fasted for 24 h in the incidence of nausea and the time to the first gas emission and defecation. Other studies have shown no significant association between the degrees of postoperative gastric emptying and age, plasma potassium level, duration of surgery, dose of barbiturate used for induction of anesthesia, or postoperative analgesic requirement [5]. Based on these observations, it seems appropriate to permit EOF after surgery not involving the gastrointestinal tract under spinal anesthesia, because the regional anesthetic technique provides some analgesia after surgery and may facilitate gastrointestinal motility due to sympathectomy [7].

In some countries in Europe and North America, lower extremity surgery under regional anesthesia have been performed routinely and successfully under ambulatory settings. To the best of our knowledge, however, there are no available data regarding the issue of EOF studied in a randomized, prospective manner. Accordingly, this study was undertaken to determine the effects of EOF on emesis, appetite before first food

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intake, and time to gas emission and defecation, and to assess the tolerability of EOF after arthroscopic knee surgery under spinal anesthesia.

Materials and methods

The study protocol was approved by our institutional research committee and informed consent was obtained from each patient. Thirty-four nonpregnant patients were enrolled. They were of American Society of Anesthesiologists' physical status I or II and were scheduled to undergo spinal anesthesia for elective arthroscopic knee surgeries. Patients taking any analgesics preoperatively or with a history of gastrointestinal disorders were excluded.

All patients were premedicated with diazepam 5 or 10 mg orally 90 min before spinal anesthesia was performed, and were subsequently randomized to either the EOF group ($n = 17$) or the nil per os (NPO) group ($n = 17$). On arrival at the operating room after 8 to 10 h fasting, spinal puncture was performed at either the L3-4 or L4-5 interspace using a 25-gauge Quincke needle. Hyperbaric tetracaine solution dissolved in 10% dextrose was then injected. Sensory analgesia was determined by the pinprick method every 5 min until 20 min after intrathecal injection of tetracaine. No other sedatives or antiemetics were administered intraoperatively. If the level of analgesia was not adequate or additional intravenous analgesics were required during surgery, these patients were excluded from the study. Hypotension (systolic blood pressure less than 80% of resting values) and bradycardia (heart rate less than 60 beats·min^{-1}) were treated by incremental doses of intravenous ephedrine 5 mg and intravenous atropine 0.5 mg, respectively.

Immediately after returning to the ward, usually within 15 min of the completion of surgery, the EOF group patients were allowed free access to any kind of food or beverage in addition to the regular hospital meal, which they were encouraged to eat. In contrast, any kind of oral intake was prohibited in those of the NPO group for 24 h after the end of surgery, while intravenous fluid infusion of a balanced salt solution was continued at a rate of 2 ml·kg^{-1}·h^{-1} in both groups of patients. The postoperative analgesic regimen consisted of diclofenac suppository on request, but no narcotics were given. For intractable nausea not relieved by vomiting, metoclopramide was given intramuscularly. The presence of nausea and/or vomiting, time to first gas emission and defecation, and other postoperative complications were specifically asked by ward nurses, who remained blinded to the treatment of the patients, on their visits every 2 h postoperatively. Appetite immediately before the first oral intake in both groups was measured using a visual analog scale (VAS) from 0 to 10, with 0 indicating no appetite at all, and 10 indicating the strongest appetite ever experienced [8].

All data are expressed as mean ± SD or median. Patients' demographic data, mean tetracaine dose, and time to the first gas emission were analyzed using the unpaired Student's *t*-test, while gender distribution, number of patients requiring atropine intraoperatively, and incidence of side effects were assessed by the χ-square test. Analysis of appetite, level of analgesia, and time to the first defecation were performed with Mann-Whitney's U-test. $P < 0.05$ was considered the minimum level of statistical significance.

Results

Two patients from the NPO group and one from the EOF group were excluded from the study because additional analgesics were required intraoperatively. Thus, data from the remaining 31 patients were used for subsequent comparison and statistical analyses. All patients left the operating rooms within 3 h of tetracaine injection with rectal temperatures between 36 and 37.5°C. Two patients, one in each group, requested supplemental analgesics and received a single dose of diclofenac suppository (50 mg) within 24 h of completion of surgery, but no other analgesics or sedatives were used.

There were no significant differences between groups in terms of age, weight, height, gender, tetracaine dose, median level of analgesia by spinal tetracaine, and number of patients requiring intravenous atropine intraoperatively (Table 1). Average times from the completion of surgery to the first oral intake in the EOF and NPO groups were 0.8 ± 0.2 h and 26.4 ± 0.7 h, respectively ($P < 0.05$). Even though VAS scores for appetite and times from the end of surgery to the first gas emission were similar between groups, the median time to the first defecation was significantly shorter in the EOF group

Table 1. Patient characteristics and intraoperative data

Group	EOF ($n = 16$)	NPO ($n = 15$)
Age (years)	26 ± 10	32 ± 13
Weight (kg)	67 ± 10	65 ± 13
Height (cm)	167 ± 8	164 ± 8
Gender (M/F)	13/3	9/6
Tetracaine dose (mg)	11.3 ± 1.8	11.0 ± 1.6
Median sensory analgesia	Th 9	Th 7
Number of patients		
Requiring atropine	8	6
Requiring ephedrine	3	2

Data are mean ± SD, median, or numbers of patients.
No significant differences between groups.
EOF, early oral feeding; NOP, nil per os.

Table 2. Recovery of bowel function and appetite, and incidence of side effects

Group	EOF (n = 16)	NPO (n = 15)
Time to first gas emission (h)	14.4 ± 6.5	13.8 ± 7.8
Time to first defecation (median, h)	20.6*	33.5
Appetite before first meal (median, VAS)	5	8
Incidence of side effects		
Nausea	2	2
Vomiting	0	0

Data are mean ± SD, median, or numbers of patients.
EOF, early oral feeding; NPO, nip per os; VAS, visual analog scale.
* $P < 0.05$ versus the NPO group.

(Table 2). Two patients in each group were mildly nauseated after surgery. In both patients of the EOF group, nausea occurred immediately after oral intake 14–17h after surgery, while both patients of the NPO group developed nausea within 6h of surgery. These episodes were not associated with hypotension as defined previously. Since no vomiting occurred and the nausea spontaneously resolved, no treatment was initiated in any patient.

None developed postdural puncture headache within 5 days postoperatively or complications related to EOF or intravenous hydration, such as small-bowel obstruction, persistent vomiting, aspiration of the stomach content, local infection, phlebitis, or thrombotic episode. Postoperative courses were uneventful in all patients.

Discussion

To the best of our knowledge, this is the first prospective study on the tolerability of EOF after lower extremity surgery performed under spinal anesthesia. The results of our preliminary study suggest that it may not be rational to restrict immediate postoperative oral intake in otherwise young and healthy subjects undergoing minimally invasive procedures under regional anesthesia. Initiating EOF of clear liquid may be a commonly accepted practice in some institutions after analgesia from regional anesthesia wears off. However, our study also suggests that even solid food ingestion may be well tolerated even before analgesia ceases after surgery. However, larger and definitive studies are warranted to evaluate the safety of EOF after spinal anesthesia involving a larger variety of patient populations and surgeries. Furthermore, whether the type of anesthesia, i.e., general versus regional, affects the tolerability of EOF has never been investigated in a prospective study.

The rate of postoperative bowel function is determined by the nature and extent of surgery, stress-induced sympathetic overactivity and organ dysfunction, and postoperative pain and modalities of analgesia [1]. Surgical procedures may cause local accumulation and increase in circulating catecholamines [4,9], and cholinergic nerve damage [10]. Gastric immobility from perioperative narcotic uses may also retard gastric emptying [5]. In addition, disturbances of body temperature, electrolytes, and hypoxemia are also known to contribute to postoperative paralytic ileus [11,12]. In our study, none of the above factors were present in the perioperative period. Furthermore, sympathetic blockade from spinal anesthesia during the early postoperative period may have facilitated gastrointestinal peristaltic movement, thus minimizing retardation of the ingested food. A possible limitation due to the extended neuraxial blockade would be that abdominal pain or discomfort, if present at all, may be masked in the immediate postoperative period.

Even though our results clearly demonstrated a shortened time to the first defecation in the EOF group, possibly as a result of stimulating intestinal motility, times to the first gas emissions were similar between groups. Retrospective power analysis revealed that at least 3000 patients would be needed to draw any definitive conclusion as to whether a significant difference existed in times of first gas emission between those permitted early oral intake and those forbidden oral intake for 24h after surgery [13]. Larger studies are, therefore, warranted to evaluate whether EOF accelerates recovery of bowel function shortly after spinal anesthesia.

No agreement has been reached based on previous scientific evidence as to when, without compromising patient safety and comfort, oral feeding should be started after spinal anesthesia. Maintenance of intravenous hydration or hyperalimentation, especially for a prolonged period of time via central venous access, has been associated with phlebitis, local pain, thrombosis, leakage, and infections of various degree [14]. Hunger associated with perioperative restriction of oral intake can be stressful, and greatly compromises patient comfort. In addition, EOF and its associated early recovery of normal bowel function have been shown to be an important determinant for improving postoperative outcome and to facilitate early hospital discharge [1,2].

In conclusion, our preliminary study suggests that EOF including regular hospital meals can be well tolerated in young and healthy subjects undergoing minor surgical procedures under spinal anesthesia.

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