

## 3 steps to reduce postoperative ileus

A new assessment of the evidence favors a counter-intuitive approach. Here, a practitioner reviews the role of postoperative feeding, nasogastric tube placement, and type of anesthetic.

**F**or many years, a single standard of care governed the prevention of postoperative ileus following cesarean delivery and other abdominal surgeries; now it appears the thinking behind that strategy is outdated.

Traditionally, the routine approach to avoiding this complication consisted of placing a nasogastric (NG) tube to decompress the bowel and delaying feeding until bowel function resumed.

More recent studies indicate that a different tactic may be preferable. These suggest that postoperative ileus—which has an estimated annual cost of \$750 million<sup>1</sup>—can be significantly reduced with a simple 3-step process:

- withholding the nasogastric (NG) tube,
- feeding the patient early in the recovery process, and
- continuing epidural local anesthesia postoperatively.

### Pathogenesis of ileus

**W**e now know that the return of bowel function following surgery is an orderly event. The return of the small intestine's action begins first, usually 4 to 8 hours post-

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operatively, and generally becomes complete around 24 hours. The colon resumes its function between 48 and 72 hours postoperatively.<sup>2</sup>

**Very little has been written** about the pathogenesis of postoperative ileus, but multiple causes have been suggested: sympathetic reflexes; inhibitory humoral agents; release of norepinephrine from the bowel wall; and the effects of anesthesia agents, opiates, and inflammation.<sup>3</sup> The 2 most frequently mentioned etiologies are:

- the inhibitory neural reflex and
- inflammatory mediators released from the site of injury. (Inflammation is thought to trigger the release of macrophages, cytokines, and other inflammatory mediators, causing neutrophil infiltration.<sup>4</sup>)

We also know that many types of anesthesia can affect bowel motility. Delayed gastric emptying—which can cause aspiration,

### KEY POINTS

- Rather than contributing to ileus, early postoperative feeding now appears to help diminish its occurrence.
- There is no justification for routine postoperative placement of nasogastric tubes in asymptomatic patients.
- Thoracic epidurals block the reflex that causes postoperative ileus and can be used to prevent its occurrence.

**TABLE 1**

**Complication rates associated with early feeding versus traditional management**

COMPLICATION	EARLY FEEDING* (N = 92)	TRADITIONAL MANAGEMENT† (N = 103)
Nausea	43.5%	24.3%
Nasogastric tube use	3.3%	6.7%
Febrile morbidity	54.3%	55.3%
Pneumonia	0%	1.9%
Wound complications	21.7%	21.4%
Atelectasis	8.7%	10.7%
Length of hospital stay (mean ± standard deviation)	4.6 ± 2.1	5.8 ± 2.7

\*Clear liquid diet on postoperative day 1

†Feeding delayed until return of bowel function

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postoperative nausea and vomiting, and delayed absorption of medicine<sup>4,5</sup>—is observed after exposure to systemic anesthesia. Atropine, halothane, and enflurane all decrease gastric emptying.

**Controversy remains** as to what actually initiates the ileus. Is it manipulation of the bowel or the rigors of surgery and anesthesia? Kalff et al<sup>6</sup> conducted bowel muscle studies in rats and concluded that manipulation of the bowel—and not the laparotomy per se—causes a failure of gut circular muscle function 24 hours later. They also noted an increase of phagocytes and mast cells. Their data support the hypothesis that abdominal surgery initiates a cascade of inflammatory events that leads to postoperative ileus.<sup>2</sup>

**The case for early feeding**

In the past 10 years, several studies have demonstrated that—rather than reduce the incidence of ileus—inserting an NG tube and withholding regular feeding following abdominal surgery can cause an ileus or prolong a preexisting one. Other trials have shown that

feeding a patient early in the postoperative period can actually prevent ileus.<sup>7,8</sup>

Physiologic studies have shown that neither electrical activity of the bowel nor motor activities in the stomach are affected by surgery.<sup>8</sup> Schilder et al<sup>9</sup> reported bowel activity before the passage of flatus, indicating that the bowel is on its way to recovery much earlier than had been assumed. Thus, early postoperative feeding is well tolerated in most patients and associated with reduced discomfort and a more rapid recovery.<sup>7</sup>

For example, MacMillan et al studied 139 women undergoing gynecologic surgery for benign conditions; 67 were randomized to “early” feeding and 72 to traditional management. Early feeding involved a low-residue diet given 6 hours postoperatively, while traditional feeding consisted of clear liquids, which were withheld until the return of normal bowel sounds. Patients progressed to a regular diet with the passage of flatus. No increase in gastrointestinal complaints occurred in the early feeding group.<sup>7</sup>

Pearl et al<sup>8</sup> compared similar groups of patients (TABLE 1). Patients in the first group were fed a clear liquid diet on the first postoperative day and progressed to a regular diet as soon as it could be tolerated. The traditional group was not fed until the return of bowel function, which was defined as the passage of flatus and no abdominal distension or vomiting; they were then started on clear liquids and, later, solid foods. While the incidence of complications was the same in both groups, hospitalization was shorter in the early feeding group.

A Cochrane review compared early versus delayed oral fluids and food after cesarean delivery. Of 12 studies considered, 6 were included in the review. No evidence was found to justify a policy of withholding oral fluids after uncomplicated cesarean sections.<sup>5</sup>

**Simple versus complex procedures.** Early feeding is not only safe in standardized surgeries such as cesarean section, but

**TABLE 2**  
**Complications associated with selective versus routine NG tube placement**

	SELECTIVE PLACEMENT (N)	ROUTINE PLACEMENT (N)	P VALUE	RELATIVE RISK
Patients	1,986	1,978		
Tubes placed/replaced	103	36	<.001	2.9
Complications	833	1,084	.03	0.76
Deaths	13	25	.22	0.36
Pneumonia	53	119	<.0001	0.49
Atelectasis	44	94	.001	0.46
Fever	108	212	.02	0.51
Vomiting	201	168	.11	1.19
Oral feedings (days)	3.53	4.59	.04	
Length of stay (days)	9.32	10.1	.22	

NG = nasogastric  
 Reprinted with permission from Cheatham ML, Chapman WC, Key SP, Sawyer JL. A meta-analysis of selective versus routine nasogastric decompression after elective laparotomy. *Ann Surg.* 1995;221:469-478.

extends to complicated surgeries as well, as demonstrated in the trials by MacMillan et al<sup>7</sup> and Pearl et al,<sup>8</sup> which involved major gynecologic surgery. Trials with gynecologic oncology patients have shown the same result.<sup>2,8</sup> Even patients undergoing colorectal surgery can tolerate oral feeding very early in their postoperative course without bowel complications.<sup>2,8</sup>

**Not all studies have reported similar findings.** Several concluded that other, nonmedical reasons, such as insurance requirements, accounted for the shorter hospital stays in many patients receiving early feeding.

**Nasogastric tubes only when indicated**

The use of NG tubes after laparotomy has been studied extensively. A review of the literature suggests that routine placement of the tubes in asymptomatic patients is not justified and may possibly be harmful.<sup>10</sup>

In their meta-analysis of the issue, Cheatham et al<sup>11</sup> showed that although abdominal distension and vomiting are more frequent in patients who forgo NG tubes postoperatively, fever, atelectasis, and pneumonia are less com-

mon, and the interval between surgery and oral feeding is reduced (TABLE 2).

The authors concluded that for every NG tube inserted after abdominal surgery, at least 20 patients can be managed without it.

Forgoing an NG tube also lowers the risk of pulmonary complications, which increases 10-fold when a tube is inserted.<sup>12</sup>

**Continue the epidural anesthetic**

A number of experts believe that postoperative ileus is caused by stimulation of neural reflexes, which appear to be of 2 kinds: afferent stimuli to the spinal cord and efferent stimuli to the intestines through the sympathetic nervous system. The latter inhibits motility of the intestinal tract. Numerous studies demonstrate that this sympathetic reflex can be blocked by the use of epidural anesthesia.<sup>10</sup>

For example, Holte et al<sup>4</sup> found that postoperative administration of thoracic epidural blockade with local anesthesia significantly reduced both ileus and pulmonary complications. They concluded that continuous epidural anesthesia with local anesthesia and minimally invasive surgery are the 2 most critical events in reducing postoperative ileus.

In a Cochrane review, Jorgensen and colleagues<sup>12</sup> compared the effects of epidural local anesthesia and opioid-based analgesic regimens on postoperative gastrointestinal paralysis, nausea and vomiting, and pain after abdominal surgery (TABLE 3). Epidural local anesthetics reduced gastrointestinal paralysis, as compared with systemic or epidural opioids, but provided the same postoperative pain relief. They also found that the addition of opioids to

local epidural anesthesia provided superior postoperative analgesia—compared with epidural local anesthetics alone—without increasing the likelihood of ileus.

A study<sup>10</sup> of patients undergoing colectomy found postoperative ileus was prevented or decreased with a 2-day regimen that included:

- continuous thoracic epidural anesthesia for 48 hours;
- withholding NG tubes;
- having the patient drink a liter of fluid on the day of surgery;
- initiating feeding after 24 hours;
- administering milk of magnesia; and
- mobilization after 8 hours, if possible.

Other studies have suggested that movement of the patient does not help eliminate postoperative ileus. It does, however, help prevent other postoperative complications, especially deep vein thrombosis.

Physicians in this study also used transverse surgical incisions to reduce pain and pulmonary problems.

### Clinical recommendations

The deregulation of the autonomic nervous system during surgery alters the gastrointestinal tract postoperatively, with neurotransmitters, local factors, and hormones playing a large role. Some forms of anesthesia also contribute to postoperative ileus, as does the use of narcotic analgesia after surgery.

The most efficient ways to activate the bowel postoperatively are:

- Continuing the thoracic epidural from 24 to 48 hours, which increases the splanchnic blood flow and blocks afferent and efferent sympathetic inhibitory nerve impulses. Note, however, that comparative studies of thoracic

**TABLE 3**

### Anesthetic effect on GI function, postoperative pain, and nausea and vomiting: A comparison

ANESTHETIC	GI FUNCTION RETURNS	PAIN RELIEF	NAUSEA AND VOMITING
Epidural plus local	24 hr	Comparable	No significant difference
Epidural plus opioids	37 hr	Comparable	No significant difference
Systemic plus opioids	37 hr	Comparable	No significant difference

GI = gastrointestinal  
Data from Jorgensen H, et al<sup>12</sup>

epidural anesthesia with local anesthesia are needed to quantify its impact.

- Hydrating the patient with a large amount of fluid in the first 24 hours after surgery.

Early feeding also seems to stimulate propulsive bowel motility.

Following these steps routinely can significantly decrease the risk of postoperative ileus and thus its resulting complications. ■

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Dr. Rosenman reports no financial relationship with any companies whose products are mentioned in this article.