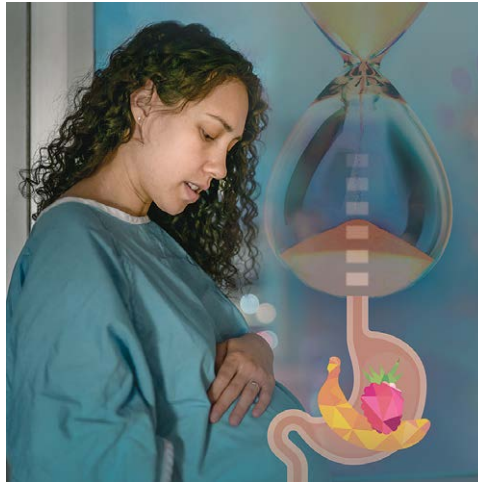


# Limiting Oral Intake during Labor: Do We Have It Right?

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Limiting oral intake during labor is part of our standard orders for most parturients admitted to labor and delivery suites, but what exactly is the science that underlies our rote inclusion of the order? As a specialty that prides itself on practice based on science, there is surprisingly little science underlying this practice. In this issue of ANESTHESIOLOGY, Bouvet *et al.*<sup>1</sup> shed a little more light on the subject, giving us better insight into gastric motility in parturients.

Reported here, Bouvet *et al.*<sup>1</sup> conducted a well-designed prospective observational study and determined the dynamic of gastric emptying after intake of a light meal (less than 5 ounces of yogurt) in healthy nonpregnant women, term pregnant women, and parturients undergoing vaginal delivery with or without labor epidural analgesia.<sup>1</sup> Confirming what we already know, they found that gastric emptying in parturients is significantly delayed compared to that of nonpregnant or term pregnant women not in labor. The authors observed the gastric antral cross-section–area change (%) fraction over the period 15 to 90 min after ingestion. They found that the gastric–emptying fractions in term pregnant women (median [95% CI], 45 [31 to 56]), parturients with epidural analgesia (31 [17 to 39]), and parturients without epidural analgesia (7 [5 to 10]) are 87%, 60%, and 14% of that of the nonpregnant women (52 [46 to 61]), respectively. This means that gastric emptying of a parturient with labor epidural is reduced by approximately 40%, while in parturients without labor epidural analgesia, it is reduced by nearly 90%, compared to healthy nonpregnant women. Somewhat counterintuitively, labor epidural analgesia does not worsen but actually facilitates gastric emptying compared to parturition without labor epidural analgesia. In other words, labor epidural analgesia leads to regaining gastric emptying on average by 46%.



**“Is it time to rethink our current recommendations on oral intake during labor and delivery?”**

Another interesting finding observed in the study by Bouvet *et al.*<sup>1</sup> was that 9 of the 10 parturients without labor epidural analgesia still had solid food in the stomach 2 h after ingestion, in contrast to only 3 of the 10 parturients with labor epidural analgesia. The finding of facilitating gastric emptying with labor epidural analgesia is important. Labor pain itself may be the most important cause of delayed gastric emptying, as gastric volume is significantly larger among parturients who received no pain relief than among those who received labor epidural analgesia.<sup>2</sup> Simulated stress by a low-dose infusion of adrenaline in dogs stimulates the release of gastrin and therefore of gastric acid secretion.<sup>3</sup> It is well demonstrated that labor epidural analgesia reduces the stress associated with labor pain.<sup>4</sup> In this regard, labor epidural analgesia seems not only to facilitate gastric emptying but also likely to reduce the acidity of gastric content.

It is also worth noting that this difference in gastric emptying in parturients with and without labor epidural analgesia might be underestimated as only parturients without systemic opioids were included in the no epidural group in the study by Bouvet *et al.*<sup>1</sup> However, in actual practice, parturients without epidural analgesia often choose systemic opioids, which cause delay in gastric emptying.<sup>5,6</sup> Even more interesting, in another study, it was observed that women who were allowed to eat a low-residue diet throughout labor, in general, became increasingly disinterested in eating as labor progressed; women with labor epidural analgesia, however, were an exception.<sup>7</sup>

The routine of standing orders limiting oral intake during labor has its origin early in the development of our specialty. In 1946, Mendelson<sup>8</sup> published a review of the 15-yr experience of the delivery service at the New York Lying-In Hospital. He recounted 44,000 deliveries over

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that period, and reported the occurrence of 66 cases of aspiration among the parturients there, 2 of which were fatal. While early development of the subspecialty of obstetric anesthesia aimed to alleviate the pain that many women experienced, of course, we also strove to “do no harm.” For lack of a better option, prohibiting food during labor became a bedrock of our practice. However, let us step back and take a more careful look at this problem, which came to be known as “Mendelson’s syndrome.” The series he reported stretched back well into the 1920s, and the practice of obstetric anesthesia was very different over 90 yr ago. Some would be surprised to learn that very few of the aspiration cases he reported were cesarean deliveries—in fact, almost 80% were “normal spontaneous deliveries” and “operative ether deliveries.” General anesthesia was commonly used for vaginal deliveries, with a black rubber mask strapped to the parturient’s face to administer ether. It is not difficult to realize that our current practice is very different from what Mendelson was describing.

Given the variety of practice settings common in the United States today, it can be difficult to precisely describe our current practice of obstetric anesthesia in aggregate terms, but we can make some valid generalizations. First, general anesthesia for cesarean delivery is used very infrequently in modern practice and almost never for vaginal deliveries. Bucklin *et al.*<sup>9</sup> reported in 2005 that general anesthesia was used for less than 5% of cesarean deliveries, and the rate was as low as 3% in many practices. Clearly, regional anesthesia has come to dominate current practice, which has all but eliminated the risk of aspiration for the vast majority of parturients. In addition, when we do use general anesthesia, we do it much better and much more safely: we preoxygenate (denitrogenate) our patients; we use intravenous induction agents; we place an endotracheal tube to protect the airway; and we routinely prophylax with sodium citrate, histamine H<sub>2</sub>-receptor antagonist, ranitidine, metoclopramide, and others.

So, what is the current incidence of aspiration in the United States in the obstetric population? It is very low—so low, in fact, that it is difficult to answer the question. A retrospective review by Creanga *et al.*<sup>10</sup> suggested a rate of one case per million deliveries, but even the largest practices take years to accumulate such statistics. One prospective series that did accumulate a substantial case total was the Society for Obstetric Anesthesia and Perinatology (Lexington, Kentucky) Serious Complication Repository (SOAP SCORE) project, reported by D’Angelo *et al.*<sup>11</sup> Aggregating data from more than 20 large centers in the United States, the SOAP SCORE project reported 307,495 deliveries, including more than 96,000 cesarean deliveries, 5,332 of which were under general anesthesia. However, even in this well-designed, prospective data set, there was not a single incidence of aspiration reported! The actual incidence of the complication is so low, we cannot accurately describe it. It is notable that this dramatic and

continuous decrease in the rate of aspiration over the last several decades is not likely attributed solely to restricted oral intake during labor. Anesthetic practice has continuously and consistently improved, while the decrease in the incidence of aspiration takes place in the absence of a significant change in oral intake recommendations. If any change, the recommendation in oral intake is getting more liberal.

The finding of the beneficial effect of labor epidural analgesia on gastric emptying in parturients is very encouraging. However, there are two weaknesses in the study by Bouvet *et al.*<sup>1</sup> As the authors point out, only women who had an empty stomach at screening were included in the study. It was not described how many subjects in each group were excluded due to a nonempty stomach at this time. Therefore, the gastric-emptying dynamic in the excluded subjects may be different from that of the included subjects. To generalize the observations of the study, a further study that includes all screened subjects regardless of the gastric empty status is needed. Another weakness is that the sample size in each group is small, with only 10 subjects per group. A larger study is necessary to determine whether the differences apply to a broader population.

The question remains of what we will do with these findings. Is it time to rethink our current recommendations on oral intake during labor and delivery? Should those parturients receiving labor epidural analgesia be assessed differently? It is probably too soon to propose liberal intake for all parturients before further large-scale studies become available to validate the findings of Bouvet *et al.*,<sup>1</sup> but these important findings and others<sup>12</sup> enable us to at least start reevaluating current recommendations with scientific evidence rather than just relying on “opinions of experts” and largely baseless fears.

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