

Unanticipated full stomach at anesthesia induction in a type I diabetic patient with asymptomatic gastroparesis

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Abstract

We encountered a case of unanticipated full stomach at anesthesia induction, despite a 12-h fasting period, in a type I diabetes patient with diabetic neuropathy presenting for elective vitrectomy for proliferative diabetic retinopathy. The patient had ingested seaweed 24 h prior to the surgery, and it was later found in the aspirated gastric content. Gastrointestinal dysfunction due to diabetic neuropathy and the high fiber content of the ingested seaweed are the probable causes of unanticipated full stomach in our case.

Key words Full stomach · Type I diabetes · Gastroparesis

Introduction

Diabetic patients with autonomic neuropathy may be at increased risk for aspiration of gastric contents during induction of anesthesia [1]. The etiology of vomiting in these patients is due to gastrointestinal dysfunction, occurring as a result of diabetic neuronal dysfunction, especially that involving the autonomic nervous system [2]. We encountered a case of unanticipated full stomach at anesthesia induction in a type I diabetes patient who presented for elective vitrectomy of proliferative diabetic retinopathy.

Case report

A 28-year-old man, 167 cm in height and 65.7 kg in weight, had been suffering from type I diabetes mellitus since 12 years of age and had now developed diabetic retinopathy. His other past history was unremarkable except for an episode of acute gastritis 5 years previously for which an endoscopic examination of the upper

digestive tract was performed; it revealed no ulceration and almost normal findings. Hence, the diagnosis of acute gastritis was made based on his complaints.

His blood glucose levels were uncontrolled, being in the range of 200–325 mg·dl⁻¹ despite a tight schedule of insulin administration in the form of Lente Insulin 52 U in the morning and regular insulin 8 U in the evening. Laboratory data showed glycosylated hemoglobin (HbA1c), urinary glucose, and urinary ketone to be 11.4%, 3+, and ±, respectively. He had never experienced any symptoms suggestive of peripheral neuropathy. However, neurological examinations revealed delayed nerve conduction of peripheral motor and sensory nerves, and there was reduced heart rate variability in response to a deep breath. Hence, his peripheral and autonomic nerves were determined to have been affected by his diabetes, and he was diagnosed as suffering from diabetic neuropathy.

His eyes, too, were complicated with proliferative diabetic retinopathy, for which vitrectomy was planned. Preoperative fasting for 8 h was advised, but the patient did not ingest anything for 12 h preoperatively. His last oral intake was a meal appropriate for a diabetic patient. It did not contain any seaweed.

The patient was premedicated with atropine sulfate 0.5 mg and hydroxyzine 50 mg 30 min before entering the operation room. Vecuronium 1 mg was administered for precurarization, followed by thiamilal 250 mg for anesthesia induction. Inhalation of sevoflurane was commenced. After an additional 5 mg dose of vecuronium, endotracheal intubation was performed smoothly. O₂/N₂O/sevoflurane were administered for maintenance of anesthesia. A gastric tube was inserted orally up to 55 cm. Surprisingly, a bulk of gastric content was suctioned, the volume of which was 150 ml. A hospital nutritionist checked the content. She found it to contain undigested steamed rice and seaweed, called *wakame* in Japan (*Undaria pinnatifida* is its scientific name), which is a common ingredient in Japanese soup.

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The soup with the seaweed had been ingested the previous morning, 24 h before the induction of anesthesia. Following the surgical procedure, endotracheal extubation was performed after the patient was completely conscious and awake. His postoperative clinical course was uneventful.

Discussion

Gastric function may be impaired in diabetic patients [2]. Delayed emptying of solids has been shown to be present in 58% of patients with type I diabetes and in 30% of those with type II diabetes [2]. Gastroparesis is defined as a disorder in which the stomach takes too long to empty its contents. The symptoms of diabetic gastroparesis are anorexia, early satiety, and postprandial abdominal fullness and discomfort. In our case, the patient had none of these symptoms and hence had never been diagnosed as having diabetic gastroparesis. However, recent studies have suggested that slowed gastric emptying is present in patients with autonomic neuropathy without any symptoms of gastroparesis [3]. Furthermore, the relation between symptoms and the rate of gastric emptying is weak, and the mechanisms by which abnormal motility causes symptoms are unclear [4–6]. These findings support the fact that delayed gastric emptying could have occurred in our patient who was suffering from autonomic neuropathy.

Hyperglycemia retards gastric emptying in type I diabetic patients [4]. Gastroparesis therefore does not necessarily reflect irreversible autonomic neuropathy [4]. In our case, the blood glucose was uncontrolled, and there was sustained hyperglycemia. Hyperglycemia might have been one cause of the unanticipated full stomach in our patient.

Nutritional support in patients with gastroparesis begins with encouraging them to eat smaller-volume, low-fat, low-fiber meals and, if necessary, liquid caloric supplements [7]. Dietary fiber inhibits gastric functions, which include contraction, pulverization of solid meals, mixing with gastric acid, and emptying only liquids and pulverized solids into the duodenum. In our case, seaweed that was ingested 24 h before the operation was found in the gastric content. The fiber in the seaweed may have been another cause of an unanticipated full stomach in our patient.

Specific interest has been paid to the dietary therapy of patients with diabetic gastroparesis. Preoperatively,

ingestion of easily digestible food is advised for these patients, thereby alleviating the problems associated with their anesthesia. On the other hand, there is no recommendation for an appropriate fasting time in the textbooks of anesthesiology for patients with diabetic autonomic neuropathy and with no symptoms of gastroparesis. We are of the opinion that the type of food eaten preoperatively is as important as the preoperative fasting period. Our recommendation is to eat smaller-volume, low-fat, low-fiber meals preoperatively. Sometimes preoperative metoclopramide is helpful as it stimulates mobility of the upper gastrointestinal tract [8].

Most patients with type I diabetes who have autonomic nerve dysfunction also have gastric dysfunction. We experienced a case of unanticipated full stomach at anesthesia induction for elective vitrectomy surgery in a type I diabetes patient with autonomic neuropathy but no symptoms of gastroparesis. In our case, sustained hyperglycemia and high fiber intake might have resulted in a full stomach. We recommend that type I diabetes patients with autonomic neuropathy and sustained hyperglycemia should not ingest high-fiber food during the preanesthetic period.

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