Intermittent oro-esophageal tube feeding in acute stroke patients – a pilot study

Dysphagia is a common symptom seen in 20–60% of acute stroke patients (1), and may cause aspiration pneumonia, undernutrition, or dehydration. A proper feeding method is needed for dysphagic patients.

Methods for nutritional support include parenteral nutrition and enteral nutrition. Parenteral nutrition cannot provide sufficient nutrition and has a risk of bacterial infection. Therefore, enteral nutrition is considered to be better than parenteral nutrition in patients with an intact intestinal tract (2–4). Continuous nasogastric tube feeding (CNG) is a useful technique for providing nutritional support to dysphagic patients. However, CNG has many disadvantages, as it may lead to aspiration pneumonia due to the microaspiration of gastric contents, bacterial colonization of the pharynx, and ulceration of the skin, nasopharynx, esophagus, and cardia (5). Acute stroke patients, especially those who are alert, often refuse CNG feeding because of the discomfort and the unaesthetic appearance of the device.

In 1988, Campbell-Taylor et al. introduced a new tube-feeding procedure called intermittent oro-esophageal (IOE) tube feeding in acute stroke patients with severe dysphagia. The IOE method was used in 13 acute stroke patients (68 ± 14 years old; 12 had a brainstem infarction), who were alert, but had severe dysphagia and a weak pharyngeal reflex. IOE tube feeding was carried out as follows. A feeding tube was passed orally into the lower portion of the esophagus, food supplements were administered through the tube at a rate of approximately 50 ml/min, and the tube was removed after finishing the supplement infusion.

Results – We found that the IOE method had the following advantages: (i) IOE feeding took approximately 15 min; (ii) potentially reduced a risk of complications such as pneumonia and diarrhea; and (iii) oral tube insertion stimulated the oral cavity and pharynx, which may improve the swallowing function. However, the IOE feeding method should not be used in patients who: (i) could not understand the IOE procedure; (ii) had an esophageal hiatal hernia or incomplete peristalsis of the esophagus, as such patients are at risk of having the supplement reflux into the oral cavity.

Conclusion – The IOE feeding method may be one of the alternatives to continuous nasogastric tube feeding in acute stroke patients with severe dysphagia, who are alert.
Materials and methods

We applied the IOE method to 13 stroke patients (11 male and 2 female, 68 ± 14 years old) with severe dysphagia within 7 days of stroke onset. Nine patients were admitted to the stroke center of the Saiseikai Kumamoto Hospital between April 2001 and April 2002, and four were admitted to the stroke care unit of the National Cardiovascular Center between May 2002 and July 2003. Inclusion criteria for using the IOE method included: (i) severe dysphagia with a high risk of aspiration; (ii) an alert consciousness level; (iii) a weak pharyngeal reflex; (iv) no active respiratory infection; and (v) the ability to understand the IOE procedure. Between the study period, 627 stroke patients were admitted to the former hospital, and 246 were admitted to the latter hospital. IOE method was applied to approximately 1.5% of total stroke patients.

All patients underwent esophagography before the first IOE feeding to evaluate their esophageal function and to decide on the appropriate fixed point of the tube for feeding (the tube tip must be located in the lower part of the esophagus). First, we lay the patient on the tilt table angled about 20°. Secondly, we orally inserted a conventional enteral tube (8–12 Fr) and asked the patient to swallow it when the tube tip reached the lateral wall of the pharynx. We slowly inserted the tube under X-ray surveillance. When the tube tip reached the lower esophagus, the tube was placed on the margin of the lips and was fixed to the cheek with tape. A 30-ml bolus of contrast medium was injected via the tube. When the contrast medium showed swelling at least up to the middle esophagus, esophageal peristalsis had usually started. The patient was judged as not being a candidate for the IOE feeding method if peristalsis did not start within several minutes, or a hiatus hernia was seen. After the contents of the bolus were fully ingested into the stomach, the tube was withdrawn.

All patients were informed about the procedure, its usefulness, and potential complications. If the patients did not have a severe hemiparesis, we asked the patients to insert the tube by swallowing. We ensured that the tip of the tube was in the stomach by listening for air sounds, and then the tube was pulled out to the previously marked point (Fig. 1). In this way, the drip speed, which should nevertheless not exceed 50 ml/min, can be faster than when the tube tip is inserted directly into the stomach (6). When all the food supplement had been administered, the tube was removed and flushed out with water. Supplementary feeding (500 ml) occurred after approximately 15 min.

Results

The clinical characteristics and the course of all the cases is shown in Table 1. IOE was introduced 3 days (median) after admission. The National Institutes of Health Stroke Scale score at admission was 7.5 ± 3.1. The site of the lesion was the medulla in four patients, other brainstem locations in five, the corona radiata in one, and one patient had both a supratentorial and a brainstem infarction.

We have highlighted one case (case 12) of a patient who was admitted with complaints of right cervical pain and deglutition difficulty. He was alert, and had Horner’s syndrome on the right side, a bilateral disturbance of soft palatal movement, a weak pharyngeal reflex, dysarthria, hoarseness, dysphagia, ataxia of the right upper limb, and hypalgesia over the right half of his body. We diagnosed him as having a lateral medullary infarction based on diffusion-weighted magnetic resonance imaging and conventional cerebral angiography. On admission, his deglutition disorder was so severe that he could not swallow saliva. In this patient, we used the IOE feeding method on the day following admission. He began to insert the feeding tube himself a few days later. He could sip water on the 15th day, and as a result the IOE feeding method was stopped. The patient complained of no discomfort with the feeding, and no complications were seen.

During this study, minor complications of the IOE feeding method were encountered. Case 1 had already developed bronchitis by the time of transfer from another hospital. After starting the IOE feeding method, bronchitis was exacerbated due to increased pharyngeal secretions. Case 3 had one episode of supplement reflux into the oral cavity, but aspiration pneumonia did not develop. The other patients did not have any complications such as diarrhea and respiratory infection. Eleven of the patients started to eat orally during hospitalization, and three of the patients totally stopped the IOE feedings, as they could eat training foods.
Campbell-Taylor et al. (6) first introduced ‘IOE’ tube feeding for adult dysphagic patients including stroke patients. Recently, Kisa et al. reported on the usefulness of this method in chronic stroke patients (7). To the best of our knowledge, we are the first to apply the IOE feeding method to acute stroke patients.

One of the advantages of IOE feeding is the short time that IOE feeding takes to feed patients. Esophageal peristalsis usually occurs when the food supplement is poured into the esophagus, which is similar to drinking orally. This makes it possible for the supplement to be injected at a rate as fast as 50 ml/min by the IOE feeding method. There may be, however, some concern with the IOE feeding method in acute stroke patients with respect to reflux of supplement into the pharynx due to an esophageal hiatal hernia or decreased esophageal peristalsis. It has been reported that esophageal peristalsis may demonstrate dysmotility in the early phase following a stroke, in particular in a brainstem infarction (8) such as a lateral medullary infarction (9). Therefore, esophagography before the introduction of IOE is advisable.

Early enteral nutrition in acute stroke patients is considered to be better than parenteral nutrition because it can maintain the patient’s nutritional status and may shorten the length of hospital stay (10, 11). For this reason, CNG is frequently used in acute stroke patients with severe dysphagia. However, the appropriateness of CNG for dysphagic patients is controversial, because the CNG tube itself is a risk factor for aspiration due to the reflux of stomach contents, bacterial colonization of the pharynx, and skin or mucosal ulceration (12). Although percutaneous endoscopic gastrostomy has been proposed as yet another option for tube feeding, it also has significant potential complications such as abdominal wall sepsis, tube migration or tube blockage (13, 14), and persistence of the reflux episode (15).

When compared with CNG, the IOE feeding method has the following advantages: (i) short total time using the tube, so that patients can spend almost the whole day free of the nasogastric tube, thus reducing attendant mental stress; (ii) intermittent tube feeding avoids the risk of gastroesophageal reflux, bacterial colonization of the pharynx, and skin or mucosal ulceration; and (iii) oral insertion of the tube stimulates the oral cavity and pharynx, which may improve the swallowing function.

However, the IOE feeding method has some disadvantages, including: (i) the inability to use the IOE feeding method in patients who cannot understand the IOE procedure; (ii) the possibility of tube misplacement, as the tube is inserted two or three times a day, although patients with a normal cough reflex easily recognize tube misplacement; and (iii) the inability to use the IOE feeding method in patients with an esophageal hiatal hernia or incomplete peristalsis of the esophagus due to the possibility of the supplement refluxing into the oral cavity.

There were no controls in this study, such as the CNG method group. Therefore, the usefulness of the IOE method or the appropriate inclusion criteria is not proved. A prospective randomized controlled trial is needed to demonstrate the efficacy of this method.
In conclusion, the IOE feeding method can be used in stroke patients with severe dysphagia in both the acute and chronic phases of stroke. The IOE feeding method may be one of the alternatives to CNG in acute stroke patients with severe dysphagia, particularly if they are alert.

References
