ENTERAL NUTRITION WITHOUT THE USE OF AN ENDOSCOPE IN PATIENTS WITH SEVERE ACUTE PANCREATITIS

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One of the main elements of acute pancreatitis therapy is nutritional treatment, which should ensure the implementation of the patients’ energetic needs, limit the exocrine activity of the pancreas, and maintain the gastrointestinal passage. The most important argument in favor of the above-mentioned is the fact that enteral nutrition in case of severe acute pancreatitis prevents infectious complications. The most effective method is enteral nutrition. The unavailability of bedside endoscopy, and thus the need to transport the patient in order to obtain access, considerably complicates the procedure. Literature data described various bedside techniques consisting in the blind introduction of the feeding tube, which are rarely used, despite the fact that they are cheaper and as effective as endoscopy.

Key words: enteral feeding, acute pancreatitis, endoscopy

Acute pancreatitis is a dynamic disease connected with toxic or biliary etiology (80% of cases) leading towards pancreatic parenchymal damage. Annually, the above-mentioned disease affects nearly 240 per 1 million people (1). An estimated 80% of subjects develop the mild, self-limiting form of the disease (2, 3). Treatment is based on fluid therapy, painkillers and a few days of diet restriction. The total exclusion of oral nutrition is aimed at reducing the exocrine pancreatic function and protect the patient from disease progression (1).

Complex treatment is applied in 20% of patients fulfilling at least one of the established in 1992 in Atlanta criteria for the diagnosis of severe acute pancreatitis: necrosis, cyst, pancreatic abscess, Multiple Organ Dysfunction Syndrome (MODS), fulfilling ≥ 3 criteria, according to Ranson’s scale, or obtaining ≥ 8 points in the APACHE II scale. In such cases hospitalization is required in specialist reference centers or intensive care units. The strategy of nutritional therapy differs from that required in case of the mild form of acute pancreatitis (1).

In patients with severe acute pancreatitis we observed a relationship between the negative nitrogen balance, and worse prognosis and higher mortality (3, 4). The hypermetabolism and hypercatabolism, especially that of protein, and the accompanying systemic inflammatory response syndrome (SIRS) without adequate nutrition lead towards cachexy, immune system disturbances, and general condition deterioration (5).

Currently, there are two methods of nutritional therapy in use. The most physiological with the least number of complications, being also the cheapest is enteral nutrition (EN). In cases when EN therapy is not possible—parenteral nutrition (PN) using catheters introduced into the central veins is used. It is possible to combine EN and PN therapy when the gastrointestinal absorption capacity is insufficient (6, 7).

Enteral nutrition is applied by naso-intestinal tubes introduced by means of endoscopy, fluoroscopy, the “blind” method, gastrostomy, jejunostomy, or laparoscopy (4, 8). The tip of the feeding tube used in case of enteral nutrition, considering...
patients with acute pancreatitis should be placed in the peripheral part of the duodenum or proximal segment of the jejunum.

The typical naso-duodenal tube is made of soft polyurethane, which does not change its properties for several weeks. According to data presented by the manufacturer the tube can be safely maintained in the gastrointestinal tract for a period of 42 days. Included in the kit is a metal, flexible grooved probe. The probe contains a centimeter scale and a contrast line allowing visualization of the catheter on the X-ray images (fig. 1). Additional side holes prevent clogging of the food content. In case of enteral nutrition the following tubes are recommended: CH 8/130 cm and 10/130 cm (9).

Description of the intestinal tube introduction technique – Corpak 10-10-10 protocol

During the procedure the patient should lie in the supine position with the head slightly raised. The distance from the patient’s nose to his ear, and from the ear to the xiphoid process (nearly 40 cm) should be measured. The introduction of the catheter is preceded by the intravenous administration of 10 mg of metoclopramid. After 10 minutes one can begin introducing the tube coated with a lubricant into the nose, guided along the nasal septum and upper surface of the hard palate to the nasopharynx and esophagus. When the distance to the target is reached the tube should be located in the stomach. A bolus of 1 ml of 0.9% NaCl should be administered, in order to freely move the probe. When the catheter reaches the stomach further movement should be very slow and gentle. When the operator senses resistance he should slightly withdraw the probe and try once again. After 15 cm one should check whether the tube did not bend by attempting to withdraw the guide, no more than 5 cm. In case of resistance the probe most likely coiled up in the stomach. It should be withdrawn 5 cm until no resistance is observed. The translocation of the probe should be continued and the verification of the correct position of the catheter performed every 5 cm. After reaching a distance of 95 cm the tube can be gradually shifted to 105 cm without checking. Sample collection is possible, in order to verify, whether the probe is located in the small bowel. The guide is then removed.

After surgery a bedside abdominal X-ray should be performed in the supine position, in order to confirm the correct location of the probe (4). In our center we often apply the rotational movement (clockwise) of the naso-intestinal probe, when it is placed between the 40 and 90 cm. Thirty minute breaks are used between the introduction of the probe every 10 cm.

DISCUSSION

The first mention of the use of enteral feeding dates back to the twelfth century. However, it was Capivacceus in the fifteenth century who described a case of a tube filled with food content (10). At the beginning of the nineteenth century rubber probes were introduced, which were less traumatizing to surrounding tissues, and replaced the previously used rigid, classical catheters. In the twentieth and twenty-first century feeding became one of the main elements of therapy, considering many diseases. This contributed to the production of a variety of catheters and development of techniques, as to improve the quality of modified food (10).

Initial concerns about the negative impact of enteral feeding and risk of acute pancreatitis exacerbation have not been confirmed, and subsequent studies have shown greater safety, convenience, and lower costs, as compared to intravenous feeding. Enteral nutrition enables
to maintain the physiological function of the gastrointestinal tract, proper visceral organ vascularization, and protects the intestinal mucosa from atrophy, improving patient prognosis (5).

The most commonly used naso-intestinal probe introduction techniques require the assistance of endoscopy or fluoroscopy. The above-mentioned enable to visualize the course of the procedure, and their efficacy ranges between 85% and 95% (8). The availability of both methods is sometimes limited, due to technical and organizational reasons. This might be connected with the transportation of the patient to the endoscopic lab, which in severe cases can be difficult (4).

The technique with a similar efficacy (84%), although less frequently used is the „blind” bedside introduction of the feeding tube (11). It does not require the use of an endoscope, only bedside abdominal X-ray in the supine position, thus, being more available and much cheaper (tab. 2a, 2b). Considering Polish reality this might be an argument in favor of popularizing the method. The introduction of the tube is time consuming and requires some experience, but the procedure can be repeated if necessary. The technique is burdened with a low risk of complications, well-tolerated by the patients.

None of the techniques of introducing feeding tubes can be considered as optimal. They should be individually selected, depending on the patients situation, conditions and possibilities of the department, as well as costs (tab. 1).

Many techniques have been described enabling the introduction of the feeding tube, most of which do not require the involvement of additional personnel and equipment. This includes „corkscrewing”, which consists in the auscultation of the abdominal cavity during the injection of air when placing the tube, techniques associated with the use of magnets, and electrodes for pH, ECG, and electromyography. The Corpak 10-10-10 protocol was most often used (4).

During the introduction of the feeding tube one most often encounters technical difficulties connected with the passage through the pylorus. The above-mentioned is observed after the introduction of the tube at a depth of 65 cm. In such cases the introduction of air into the tube seems helpful (4).

The most dangerous but very rare complications associated with the blind placement of the feeding tube, include esophageal rupture,

<table>
<thead>
<tr>
<th>Patient</th>
<th>Age In years</th>
<th>Diagnosis</th>
<th>Day of hospitalization when tube was inserted</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>J. T.</td>
<td>49</td>
<td>acute pancreatitis with hemorrhagic necrosis</td>
<td>4 day</td>
<td>proper „blind” method tube placement—radiologically verified the next day. peristalsis present</td>
</tr>
<tr>
<td>J. B.</td>
<td>76</td>
<td>acute necrotic pancreatitis-biliary etiology</td>
<td>9 day</td>
<td>proper tube placement by means of endoscopy. On the 4-th day after insertion the tube was dislocated requiring endoscopic reposition</td>
</tr>
<tr>
<td>R. S.</td>
<td>63</td>
<td>acute necrotic pancreatitis acute extrahahepatic cholangitis</td>
<td>10 day</td>
<td>proper tube placement, peristalsis present</td>
</tr>
<tr>
<td>J. K.</td>
<td>37</td>
<td>acute necrotic alcoholic pancreatitis</td>
<td>10 re-placement of the tube on day 32</td>
<td>proper „blind” method tube placement in the operating room, peristalsis present. on day 32 re-placement of the tube, due to decompensation</td>
</tr>
<tr>
<td>A. B.</td>
<td>72</td>
<td>acute necrotic biliary pancreatitis</td>
<td>3 day</td>
<td>proper tube placement with „blind” reposition —radiologically confirmed</td>
</tr>
<tr>
<td>P. D.</td>
<td>41</td>
<td>acute pancreatitis with hemorrhagic necrosis</td>
<td>6 day</td>
<td>proper tube placement, peristalsis present</td>
</tr>
<tr>
<td>H. Ch.</td>
<td>65</td>
<td>ostre zapalenie trzustki / acute pancreatitis</td>
<td>7 day</td>
<td>proper „blind” tube placement—radiologically confirmed the next day; peristalsis present</td>
</tr>
</tbody>
</table>

Table 1. Patients with acute pancreatitis qualified to tube placement without the use of endoscopy at the Department of General, Endocrinological, and Transplantation Surgery, Medical University in Gdańsk during the period between 2007 and 2010
mediastinitis, and emphysema development. The improper placement of the tube, especially in the larynx is connected with the possibility of chemical pneumonia (Mendelson’s syndrome). The risk is even greater, since initially there might not be any symptoms related to the displacement of the probe. Another possible complication is the convolution of the probe in the gastrointestinal tract, characterized by reflux development (12, 13). The displacement of the tube might be asymptomatic or symptoms might be moderately expressed (14), thus, the need to verify the procedure by means of bedside abdominal X-ray examinations.

CONCLUSION

The technique of “blind” nasogastric tube placement is as effective as endoscopy or fluoroscopy. The number of complications is comparable, and as a much cheaper method it is worthy of consideration, especially in severe condition patients, when transport to the endoscopy or radiology department is contraindicated, due to organizational and technical difficulties.

REFERENCES


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Table 2a. Endoscopic costs of naso-intestinal tube placement

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Cost (PLN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedside gastroscopy</td>
<td>160*</td>
</tr>
<tr>
<td>Contrast abdominal X-ray</td>
<td>52*</td>
</tr>
<tr>
<td>Endoscopic feeding tube</td>
<td>30*</td>
</tr>
<tr>
<td>Disposable material</td>
<td>1*</td>
</tr>
<tr>
<td>**Total</td>
<td><strong>243</strong></td>
</tr>
</tbody>
</table>

* Medical Supply Department, Medical University, Gdańsk

** data do not include personnel

Table 2b. Costs connected with naso-intestinal tube placement by means of the „blind” technique, according to the Corpak 10-10-10 protocol

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Cost (PLN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contrast abdominal X-ray</td>
<td>52*</td>
</tr>
<tr>
<td>Endoscopic feeding tube</td>
<td>30*</td>
</tr>
<tr>
<td>Disposable material</td>
<td>1*</td>
</tr>
<tr>
<td>**Total</td>
<td><strong>83</strong></td>
</tr>
</tbody>
</table>

* Medical Supply Department, Medical University, Gdańsk

** data do not include personnel