Pneumomediastinum After Percutaneous Endoscopic Gastrostomy Tube Placement

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The incidence of esophageal perforation or confounding mechanisms of pneumomediastinum specifically introduced by the addition of percutaneous endoscopic gastrostomy (PEG) tube insertion to esophagogastroduodenoscopy have not been described, and pneumomediastinum in the absence of esophageal perforation after PEG has not been reported. Typically, pneumomediastinum is an ominous finding, although benign causes exist. We present two cases of post-PEG pneumomediastinum not correlated with esophageal perforation during follow-up imaging. When pneumomediastinum is detected after PEG, appropriate studies should be undertaken to confirm its cause and to determine treatment plans. Further investigation may be warranted to ascertain the true incidence, causes, and clinical significance of post-PEG pneumomediastinum.


Percutaneous endoscopic gastrostomy (PEG) tube placement has become the most common method for establishing enteral access at many hospitals. As the frequency of PEG has increased, thoracic surgeons have become more involved in their placement and in the management of their complications, especially esophageal perforation.

The majority of procedural risks are minor, including wound infection, leakage, and superficial bleeding. Major complications include esophageal perforation, hemorrhage, and intracolonic placement [1].

Pneumoperitoneum is a common postprocedural finding thought to be caused by the leakage of insufflated air through the needle puncture site of the gastric wall. Usually, it has no clinical significance and raises alarm only if a ruptured viscus is suspected [2].

Pneumomediastinum in the absence of esophageal perforation after PEG placement has not been reported, to our knowledge. Typically, pneumomediastinum is an ominous finding with potentially devastating consequences, although benign causes have been described [3, 4]. Most cases can be attributed to blunt or penetrating trauma, rupture of a hollow viscus, or infection by gas-forming organisms [3, 4]. The incidence and significance of post-PEG pneumomediastinum in the absence of esophageal perforation are currently unknown. We present 2 patients found to have pneumomediastinum incidentally after PEG placement without evidence of esophageal perforation.

Case Reports

Patient 1

A 44-year-old woman with progressive solid food dysphagia and substernal chest pain was found to have recurrence of a mixed adenocarcinoma and small cell lung cancer causing extrinsic esophageal compression. Four days after chest radiation therapy was begun, the decision was made to place a PEG tube for nutritional support.

Esophagogastroduodenoscopy (EGD) was first attempted with a standard gastroscope; esophagitis and intraluminal narrowing were encountered 30 cm from the incisors, prompting a second attempt with a narrower nasoenteric scope, which easily passed into the stomach. Thereafter, the PEG tube was placed in the standard fashion, and no mucosal defects were observed during withdrawal of the nasoenteric scope. Twenty minutes after the procedure, the patient experienced an episode of oxygen desaturation, which was corrected with intravenous naloxone administration. Roentgenography of the chest during the event revealed pneumoperitoneum and pneumomediastinum (Fig 1). Her preexisting substernal chest pain remained at baseline. Given the patient’s risk factors, however, a computed tomography scan was obtained, which confirmed the presence of pneumomediastinum but showed no esophageal tear or mediastinal fluid collection. Broad-spectrum, intravenous antibiotic therapy was initiated, and a follow-up water-soluble esophagram (Fig 2) did not reveal an esophageal leak. The primary team subsequently restarted a liquid diet and discontinued antibiotic therapy, which had lasted less than 24 hours. The patient was discharged to home 9 days later with no further complications.

Patient 2

A 27-year-old man was found to have new-onset dysphagia after resection of a right jugular foramen schwannoma complicated by hydrocephalus requiring placement of a ventriculoperitoneal shunt. After continued swallow evaluations demonstrated oropharyngeal aspiration, the decision was made to place a PEG tube.

Transillumination and endoscopic visualization during needle placement were appropriate, and the PEG tube was inserted without difficulty. No mucosal defects were noted during withdrawal of the gastroscope. The following day, the patient described having vague chest pain and required progressive supplemental oxygen. A CT scan demonstrated interval development of a pneumonia, likely aspiration related, and the presence of pneumomediastinum (Fig 3). A follow-up water-soluble esophagram, however, showed no evidence of esophageal leak. Sputum cultures were positive for Escherichia coli.

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coli, further increasing suspicion for aspiration pneumonia, and the patient was successfully treated with intravenous antibiotics for 7 days. He was discharged to a rehabilitation facility 8 days after PEG placement without further complications.

Comment

We report two cases of post-PEG pneumomediastinum discovered incidentally on chest roentgenology, confirmed by CT, but not correlated with identifiable esophageal perforation on the basis of additional CT findings or follow-up esophagrams.

Pneumomediastinum after EGD is most concerning for esophageal perforation, especially if clinical suspicion is high. Esophageal perforation after diagnostic EGD occurs in 0.3% of cases, with an increasing incidence when the procedure is combined with therapeutic maneuvers; however, the incidence of perforation or confounding mechanisms of pneumomediastinum specifically introduced by the addition of PEG tube placement to EGD are not reported in the literature [5].

Air may enter the mediastinum from the esophagus, lung, trachea, neck, abdomen, or retroperitoneal space to produce pneumomediastinum. Pneumomediastinum is a rare complication of intraabdominal laparoscopic procedures caused by the passage of carbon dioxide through the hiatus as the result of congenital anomalies, weak points, defects, or tears [6]. It is thought to be associated with high intraperitoneal pressures and increased case length.

High intraluminal pressures caused by excessive insufflation may occur during PEG tube placement, but case length and intraperitoneal pressure are unlikely to have been significant factors in the cases described here. In the first case, pneumomediastinum could have occurred from several mechanisms. Esophageal...
microperforation is possible, given the patient’s radiation therapy, esophagitis, and invasive cancer. Metastatic fistulization is also possible. In the second case, recent instrumentation with a ventriculoperitoneal shunt may have created a tract into the mediastinum, although this seems unlikely. In either case, the stomach could have been backwalled with air tracking retroperitoneally, but there was no difficulty with needle placement or evidence of retroperitoneal air on imaging.

Regardless of cause, a prompt workup is appropriate in all cases of post-PEG pneumomediastinum, given the morbidity of delayed diagnosis of esophageal perforation. Contrast CT has a reported sensitivity of 90%, with worrisome findings including mediastinal contrast, fluid collection, or visible perforation. A contrast esophagram, which has a reported false negative rate of 10%, is additionally indicated. The combination of both contrast CT scan and esophagram, however, has a higher sensitivity [7].

These are the first two reports of pneumomediastinum found incidentally after PEG placement with no evidence of significant sequelae or esophageal perforation. Further investigation may be warranted to ascertain the true incidence and causes of post-PEG pneumomediastinum. Such investigation will also help determine whether post-PEG pneumomediastinum is associated with clinically significant respiratory compromise or whether management with empiric antibiotic therapy to prevent mediastinitis is needed.

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References