Case Report

Perforated gastrointestinal ulcers presenting as acute respiratory distress

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BACKGROUND: Dyspnea is one of the most common complaints facing the emergency medicine physician. Some of the gastrointestinal causes of dyspnea are self-limited and not life-threatening, yet others are, and early diagnosis and treatment are crucial.

METHODS: In this article we presented one of these life-threatening conditions through a clinical description of a patient presenting with acute respiratory distress that was finally diagnosed to be the result of a perforated gastric ulcer.

RESULTS: An emergent thoracotomy revealed a small ulcer with perforation in the fundus of the stomach. The patient was transferred after the operation to the intensive care unit and after a prolonged hospitalization discharged home. Biopsies taken from the ulcer showed diffuse inflammation, with no evidence of microorganisms or malignancy.

CONCLUSION: Perforation of gastric and duodenal ulcers is a rare yet existing cause of dyspnea and respiratory failure and should be kept in mind by the emergency physician, especially when other more common causes are ruled out.

KEY WORDS: Dyspnea; Perforation; Gastric and duodenal ulcers

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INTRODUCTION

Dyspnea is one of the most common complaints facing the emergency medicine physician. The differential diagnosis of dyspnea is wide and the evaluation is challenging. The main etiologies of dyspnea are of cardiovascular and respiratory origins. Although gastrointestinal etiologies are also included in the differential diagnosis of dyspnea, they are considered to be much rarer, and are many times overlooked, especially in the acute setting. Some of the gastrointestinal causes of dyspnea are self-limited and not life-threatening, yet others are, and early diagnosis and treatment are crucial.

In this article we present one of these life-threatening conditions through a clinical description of a patient presenting with acute respiratory distress that was finally diagnosed to be the result of a perforated gastric

ulcer, the management of the case, and a review of the literature regarding pathophysiology, management and evaluation, outcome, and practice recommendations of this potentially life-threatening condition.

METHODS

We discussed the clinical approach, emergency room management and recommendations via a clinical presentation of a patient presenting to the emergency room, described the clinical presentation, course, evaluation and management, and then summarized all similar cases and articles published in the English language, searched using the key words "ulcer", "dyspnea", "pneumomediastinum" and "pneumothorax" and extracting as much useful data for practice as possible from the sum of these sources.

Case report

A 61-year-old patient with a medical background of cerebral palsy and hiatal hernia was brought by a mobile emergency care unit to the emergency department intensive care unit due to an acute onset of dyspnea that began about half an hour before arrival, and that aroused him from sleep. On arrival the patient was alert, severely tachypneic, and diaphoretic.

Vital signs on arrival included O₂ saturation 88% on room air, rising to 95% with 15 L/m oxygen supplied through a tight air mask, pulse 139 beats/m, blood pressure 123/80 mmHg, and rectal temperature 38. There was no distension of neck veins, cardiac bruits or abnormalities on auscultation of the lungs; the abdomen was a little distended, with no tenderness and peritoneal signs. The peripheral pulses were felt. There were no signs of limb deep venous thrombosis. Twelve lead EKG showed sinus tachycardia with no evidence of acute ischemia. Chest roentgenogram showed clear lung fields, severe kyphoscoliosis, with no widening of the mediastinum, congestion, opacities or free air under the diaphragm (Figure 1).

At this stage, the differential diagnosis included the following cardiorespiratory etiologies: pulmonary embolism, pneumonia (maybe aspiration), and aortic dissection. Short time after arrival to the ED, and after most of the data above was already available and CT scan of the chest was ordered, facial and cervical subcutaneous emphysema was rapidly expanded (Figure 2). Orotracheal intubation of the patient was performed and a CT scan of the neck and chest showed a significant subcutaneous emphysema, a large pneumomediastinum, an orotracheal tube placed in the trachea, a large hiatal hernia containing the whole stomach with no evidence of strangulation. There was no change when compared to a CT scan made in 2009. Moreover a large volume pleural effusion on the left side and an infiltrate with atelectasis component were noted in the left upper lobe. No obvious reason for the pneumomediastinum was demonstrated.

In this stage chest surgeons were summoned to the ED for consultation, a chest drainage tube was inserted on the left side, draining stomach content similar to that in the nasogastric tube, and an emergent thoracotomy was performed to reveal a small ulcer with perforation in the fundus of the stomach. The stomach wall was sown. The patient was transferred after the operation to the intensive care unit and after a prolonged hospitalization he was discharged. Biopsies taken from the ulcer showed diffuse inflammation, with no evidence of microorganisms or malignancy.

Figure 1. Chest X-ray of the patient demonstrated severe kyphoscoliosis and unspecific opacity.

Figure 2. Chest CT scan showed the stomach above the diaphragm, found whole in the thoracic cavity, and also demonstrated the pneumomediastinum, subcutaneous emphysema.

DISCUSSION

Dyspnea is one of the most common and most challenging conditions facing the emergency physician. The most common causes for acute dyspnea are related to the respiratory and cardiovascular systems, followed by metabolic derangements.^[1,2] Although esophageal pathologies (spontaneous, e.g. Boerhaave syndrome, or iatrogenic) are known as etiologies of dyspnea and thoracic emergencies,^[3] the esophagus is itself primarily a thoracic organ. Abdominal pathologies and specific perforation of abdominal organs are a rare cause for dyspnea and pneumomediastinum, with an incompletely understood pathophysiology but it is assumed that air travels through inflamed peritoneum and retroperitoneal space and through anatomical orifices in the diaphragm with resultant changes in intra-abdominal, intra-thoracic and mediastinal pressures and accumulation of air in the subcutaneous tissues.^[4]

In review of the literature published in the English language, only 2 cases were reported with perforation of abdominal organ ulcers presenting clinically as dyspnea^[5,6] and 10 others which presented in other ways but eventually resulting mainly in pathologies of the respiratory system (from subcutaneous emphysema with no other manifestations to abdominal pain and vomiting during the evaluation of which thoracic pathologies were demonstrated – pneumomediastinum and pneumothorax).^[8-11]

Due to the paucity of descriptions no clear conclusions of risk factors, clinical manifestations, course and outcomes of this rare condition of abdominal visceral perforation as a cause of thoracic injuries can be made, but some trends may be observed as follows:

1) There are descriptions in all ranges of age: 23 to 91 years.

2) Many of the patients did not suffer from the known predisposing conditions for peptic disease, including alcohol abuse or frequent use of non steroidal analgesics, though some did,^[4] and some of them had known peptic disease.^[10,13]

3) In most of the cases the presentation was relatively acute and rapidly progressive, with no long standing heralding symptoms.

4) Most of the patients did not suffer from difficult chronic illnesses and none were immunosuppressed.

5) On physical examination most patients were mildly to moderately tachypneic, tachycardic and diaphoretic, and hemodynamically stable on presentation and oxygen desaturation on room air. Pathologic breath sounds were described when pleural effusion in large amounts or pneumothorax was present, but not otherwise. The initial abdominal examination was quite benign in most descriptions, with no signs of peritoneal rigidity and with located epigastric tenderness in some of the cases, though in some of the cases this picture changed with the clinical course. In cases where subcutaneous emphysema was described it was also of rapid progression.

6) As anamnesis and physical examinations, laboratory studies were also not contributing mostly: on blood counts usually mild to moderate leukocytosis is described (values of 12-20000 wbc/s/μL), blood chemistry was normal (it is worthwhile to emphasize that blood and urine amylase for example were not taken many times initially, probably because abdominal pathology was not suspected). Blood gases, when described, demonstrated that respiratory alkalosis and lactate values were not significantly elevated and even within normal limits. In one case it was even described

that troponin levels were taken (most probably to rule out acute coronary syndrome), and the patient was treated initially with aspirin.^[4]

7) In most of the cases the exact diagnosis was not straightforward, with the primary ancillary tests (laboratory studies, chest roentgenograms) unrevealing, except in few cases where free air under the diaphragm was discovered and prompted for evaluation of the abdomen, or when findings on physical examination (e.g. peritoneal signs on palpation of the abdomen) used for the same purpose.

In some of the cases described during the last decades (parallel to the wide spreading of CT scanners), the first suspicion of abdominal pathology arisen due to findings on chest scans made to discover thoracic pathologies responsible for the patient's condition, the CT scan may demonstrate the presence of pneumomediastinum, which is not readily apparent on chest X-rays, especially when performed by mobile units and not interpreted by an expert roentgenologist, a common scenario in many emergency rooms, especially during evening and night shifts or weekends.

8) In none of the patients, the exact abdominal pathology responsible for the situation was discovered by imaging studies, though many of them underwent advanced imaging studies including CT scans of the abdomen during the evaluation. At the end all patients (as the patient in our case description) underwent exploratory operations that revealed the site of perforation and also offered a definitive treatment.

9) Surprisingly, most of the patients in the reports survived this acute condition to be discharged from hospital.

Perforation of gastric and duodenal ulcers is a rare yet existing cause of dyspnea and respiratory failure and should be kept in mind by the emergency physician, especially when other more common causes are ruled out. Base on the limited information from the literature, we consider that there will be no risk factors for peptic disease, the patient can be of almost any age, with or without known chronic illnesses and on many occasions physical examinations, laboratory studies and chest roentgenograms will be unrevealing.

CT is a useful tool for evaluation and can show some findings that will guide the physician (pneumomediastinum and /or free abdominal air – findings that will promote emergent evaluation – usually surgery) and only then the exact pathology responsible for the whole presentation, e.g. the exact site and extent of perforation is detected and treated. It may be suggested that even when there is no

direct suspicion of abdominal etiology for the patient's condition and a chest CT is ordered, it may be suitable to also include the upper abdomen and in this way help to quicken recognition of abdominal gross pathologies, e.g. free abdominal air, signs of peritonitis or liquid (it is important to emphasize that in most cases described chest X-rays did not demonstrate free air under the diaphragm).

Overall, in spite of the difficulty in diagnosis and the need for emergency surgery, most patients survived to be discharged from hospitalization. Although there are scarce data of this subject and thus no evidence-based data about it, this article is the only summary of the cases described so far, and of management options and considerations, especially for the emergency physician, since the work by Vonheimburg et al^[4] in 1963.

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REFERENCES

- 1 Tintinalli JE, Stapczynski JS, Ma OJ, Cline DM, Cydulka RK, Meckler GD. Tintinalli's Emergency Medicine A comprehensive study guide 7th edition. McGraw Hill Publishers, 2011.
- 2 Ray P, Birolleau S, Lefort Y, Becquemin MH, Beigelman C, Isnard R, et al. Acute respiratory failure in the elderly: etiology, emergency diagnosis and prognosis. *Crit Care* 2006; 10: R82.
- 3 Brauer RB, Liebermann Meffert D, Stein HJ, Bartels H, Siewert JR. Boerhaave's Syndrome: analysis of the literature and report of 18 new cases. *Dis Esophagus* 1997; 10: 64-68.
- 4 Vonheimburg RL, Alexander SJ, Sauer WG, Bernatz PE. Subcutaneous emphysema from perforated gastric ulcer: case report and review of the literature. *Ann Surg* 1963; 158: 1-5.
- 5 Bruner DI, Gustafson C. Respiratory distress and chest pain: A perforated peptic ulcer with an unusual presentation. *Int J Emerg Med* 2011; 4: 34.
- 6 Assar AN, Sinclair CL, Shresta DB. Chest pain and dyspnea resulting from a perforated duodenal ulcer. *Br J Hosp Med* 2009; 70: 594.
- 7 Abdullah M, Al Akeely MH, Al Mustafa AA. Pneumomediastinum, pneumothorax and subcutaneous emphysema due to duodenal ulcer. *Saudi Med J* 2010; 31: 703-735.
- 8 Basak F, Kinaci E, Aksoy S, Aren A. Duodenal ulcer perforation and pneumothorax: a case report. *Acta Chir Belg* 2006; 106: 344-345.
- 9 Stahl JD, Goldman SM, Minkin SD, Diaconis JN. Perforated duodenal ulcer and pneumomediastinum. *Radiology* 1977; 124: 23-25.
- 10 Whang KC, Kim CS, Kim Y, Youn TY. Subcutaneous emphysema due to perforation of the stomach. *Yonsei Med J* 1970; 11: 203-207.
- 11 Rudick J, Mack AJ. Spontaneous mediastinal emphysema from perforation of a duodenal ulcer. *Bri J Clin Pract* 1966; 20: 37-39.

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