

Acute Chest Pain Following Bravo Device Placement

Received 07/31/2023

Review began 08/04/2023

Review ended 08/15/2023

Published 08/23/2023

© Copyright 2023

Reddy et al. This is an open access article distributed under the terms of the Creative Commons Attribution License CC-BY 4.0., which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Ruha Reddy¹, Brian A. Holliday¹, Marna Greenberg¹, Gavin C. Barr Jr.¹

1. Department of Emergency and Hospital Medicine, Lehigh Valley Health Network/University of South Florida Morsani College of Medicine, Bethlehem, USA

Corresponding author: Ruha Reddy, ruha.reddy@lvhn.org

Abstract

A Bravo device is a continuous pH monitor, produced by Medtronic (Minneapolis, MN), that is placed on the esophageal mucosa during endoscopy and can be used in the evaluation of gastroesophageal reflux disease (GERD). The device detaches by itself and passes with feces in approximately 7-10 days. Because of its brief presence in the body, the device is an unusual finding on imaging and could easily be mistaken for a more ominous foreign body. The Bravo device is typically well tolerated but can be a source of severe discomfort. Its presence is an important consideration in the differential of chest pain and a contraindication to MRI. Here, we discuss a case of a patient presenting to the emergency department (ED) with acute chest pain who underwent Bravo device placement several days prior.

Categories: Emergency Medicine, Radiology, Gastroenterology

Keywords: emergency imaging, gerd, radiating chest pain, retention, bravo device

Introduction

Gastroesophageal reflux disease (GERD) is a chronic digestive disorder, characterized by the regurgitation of gastric contents into the esophagus, that affects millions of people worldwide [1]. Patients whose GERD symptoms are not improved by medications are recommended to undergo endoscopy with esophageal pH monitoring [2]. One such method of monitoring is the Bravo pH monitoring system, produced by Medtronic (Minneapolis, MN), which measures esophageal acid exposure [3]. This device utilizes a wireless pH sensing capsule with a complete prepackaged system and data processing software [4].

The Bravo device is not intended to be a permanent implant. Under normal conditions, the device is designed to remain in the esophageal mucosa for 48-96 hours [5]. In rare cases, patients may experience severe chest pain after Bravo device placement requiring an endoscopy for device removal [6]. It is important for physicians to recognize and understand the implications of this device during subsequent testing. We present a case in which a patient, who was diagnosed with GERD, presented to the emergency department (ED) with severe chest and arm pain following Bravo device placement.

Case Presentation

Using an interpreter, a 56-year-old female Spanish-speaking patient presented to the ED complaining of sudden-onset chest and right upper extremity pain that began the day before. In triage, the nurses assessed her and placed standard work orders for chest pain that included a posteroanterior and lateral view chest radiograph. The radiologist who reviewed the image while the patient was still in the waiting room placed a critical alert phone notification to the emergency department that there was a foreign body evident in the image. The concern was that it needed to be evaluated for the potential time-sensitive removal of a button battery device. She was immediately brought back to an examination room, and the treating physician, as part of her care, reviewed her recent outpatient medical record.

Her previous medical history was significant for GERD that was uncontrolled by maximum-dose proton pump inhibitors, right cervical radiculopathy, small vessel disease, and fibromyalgia. Three days prior to presentation, the patient had undergone an esophagogastroduodenoscopy (EGD), and the procedural report indicated that she had received a Bravo device placement and subsequent 48-hour pH study. Either from a healthcare knowledge deficit or a limitation in translator capacity, the patient was not aware that the EGD or the placement of the device was an important historical feature. On presentation, her pain was associated with nausea and dysphagia and was not relieved with acetaminophen. The patient's initial vital signs were a blood pressure of 113/76 mmHg, pulse of 90 beats/minute, respiratory rate of 24 breaths/minute, oxygen saturation of 95%, and temperature of 36.4°C. On examination, there was tenderness to palpation present on the chest wall.

Concerned for a possible acute coronary syndrome, in triage, an EKG and a cardiac panel were additionally ordered with standard laboratory testing. Laboratory findings were unremarkable, save for minimally elevated high-sensitivity troponin (4 ng/L; reference range: <55 ng/L). Her EKG findings were unremarkable

How to cite this article

Reddy R, Holliday B A, Greenberg M, et al. (August 23, 2023) Acute Chest Pain Following Bravo Device Placement. Cureus 15(8): e43995. DOI 10.7759/cureus.43995

as well. The patient was given fentanyl and hydromorphone injections to manage her pain. The final report and interpretation after conferring with the radiologist were that the 3.4 cm foreign body in the mid-esophageal region that imaging revealed was consistent with the Bravo device (Figure 1).

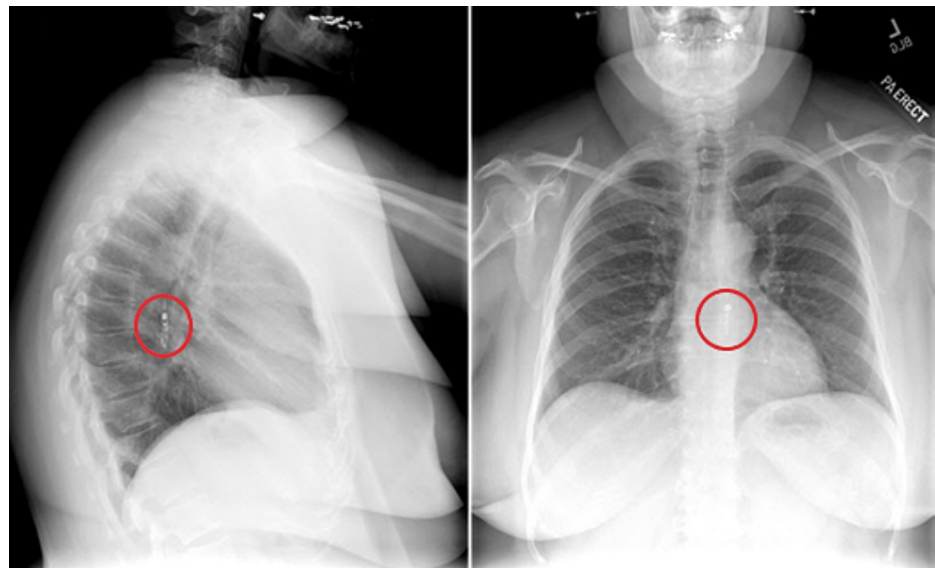


FIGURE 1: Lateral (left panel) and posteroanterior (right panel) chest X-ray images highlighting the Bravo device (red circle) placed in the patient's esophageal mucosa three days prior.

The chest pain was attributed to the placement of a Bravo device, and the patient was discharged with instructions to return the following day for the endoscopic removal of the retained Bravo device. When she was contacted to schedule a follow-up appointment, the patient remarked that her chest pain had resolved, and she planned to follow-up with orthopedics for her arm pain that day.

Discussion

The Bravo device, which consists of a pH sensor and wireless transmitter, records the pH on a recorder device kept close to a patient's body [7]. Under normal circumstances, the Bravo device sticks to the esophageal mucosa, detaches by itself, and passes through the digestive system in 7-10 days. It is important to note, however, that MRIs are contraindicated for 30 days after the placement of a Bravo device. The use of a Bravo device can be beneficial since it is usually well tolerated by patients and allows for nearly continuous pH monitoring under more physiological conditions [7]. In rare cases, device placement can aggravate the esophageal lining, causing severe discomfort [6]. The characteristics and severity of the pain can vary between patients, but it frequently mimics symptoms experienced during a cardiac event [6].

When adverse effects appear resulting from Bravo placement, it may be necessary to perform an endoscopy to remove the device before the initial study period has been completed. This case highlights the importance of accounting for various treatment and diagnostic methods used for GERD when developing a diagnostic differential. Since this is a common condition that affects millions of patients, there are a variety of management options used, and it is therefore critical to account for the function and limitations of these treatments. In this case, the patient underwent an EGD with a Bravo placement to monitor pH levels.

Conclusions

The Bravo device is an increasingly common method of esophageal pH monitoring, which is usually well tolerated but can present with chest pain mimicking acute coronary syndrome. Because of its brief presence in the body, it is rarely seen on imaging, and it may not be recognized readily by clinicians and can therefore be easily mistaken. The awareness of its presence is important for a clinician because it can explain presenting symptoms such as chest pain, and it is an important contraindication to MRI.

Additional Information

Disclosures

Human subjects: Consent was obtained or waived by all participants in this study. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the

submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

Acknowledgements

The authors would like to acknowledge Andrew J. Ferdock, BS, for the editing and submission assistance.

References

1. Clarrett DM, Hachem C: Gastroesophageal reflux disease (GERD). *Mo Med*. 2018, 115:214-8.
2. Katz PO, Dunbar KB, Schnoll-Sussman FH, Greer KB, Yadlapati R, Spechler SJ: ACG clinical guideline for the diagnosis and management of gastroesophageal reflux disease. *Am J Gastroenterol*. 2022, 117:27-56. [10.14309/ajg.0000000000001538](https://doi.org/10.14309/ajg.0000000000001538)
3. Cabrera J, Davis M, Horn D, Pfefferkorn M, Croffie JM: Esophageal pH monitoring with the BRAVO capsule: experience in a single tertiary medical center. *J Pediatr Gastroenterol Nutr*. 2011, 53:404-8. [10.1097/MPG.0b013e3182203caa](https://doi.org/10.1097/MPG.0b013e3182203caa)
4. Lawenko RM, Lee YY: Evaluation of gastroesophageal reflux disease using the Bravo capsule pH system. *J Neurogastroenterol Motil*. 2016, 22:25-30. [10.5056/jnm15151](https://doi.org/10.5056/jnm15151)
5. Moore MD, Gray KD, Panjwani S, et al.: Impact of procedural multimedia instructions for pH BRAVO testing on patient comprehension: a prospective randomized study. *Dis Esophagus*. 2020, 33:doz068. [10.1093/dote/doz068](https://doi.org/10.1093/dote/doz068)
6. Triester SL, Leighton JA, Budavari AI, Crowell MD, Fleischer DE: Severe chest pain from an indwelling Bravo pH probe. *Gastrointest Endosc*. 2005, 61:317-9. [10.1016/s0016-5107\(04\)02592-1](https://doi.org/10.1016/s0016-5107(04)02592-1)
7. Sharma VK: The future is wireless: advances in wireless diagnostic and therapeutic technologies in gastroenterology. *Gastroenterology*. 2009, 137:434-9. [10.1053/j.gastro.2009.06.029](https://doi.org/10.1053/j.gastro.2009.06.029)