



Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.casereports.com

A rare case of cardiac tamponade masquerading as acute abdomen

Francesco Maffione^a, Lucia Romano^{a,*}, Alessandra Di Sibio^b, Denise Brandolin^c,
Mario Schietroma^a, Francesco Carlei^a, Antonio Giuliani^a

^a Department of General Surgery, Department of Applied Clinical Science and Biotechnology, University of L'Aquila, Italy

^b Department of Radiology, S. Salvatore Hospital, Via L. Natali, 1, 67100, L'Aquila, Italy

^c Department of General and Emergency Surgery, Giuseppe Mazzini Hospital, Teramo, Italy

ARTICLE INFO

Article history:

Received 8 June 2020

Received in revised form 31 August 2020

Accepted 31 August 2020

Available online 3 September 2020

Keywords:

Cardiac tamponade

Acute abdomen

Case report

ABSTRACT

INTRODUCTION: Acute abdomen is any acute abdominal condition requiring a quick response. The incidence varies according to age and disease aetiology. The abdominal discomfort associated with extra-abdominal pathophysiology and thoracic conditions could mimic acute abdomen. In this case we report a rare case of a young patient with cardiac tamponade masquerading as acute abdomen.

PRESENTATION OF CASE: A 25-years-old African man presented to the Emergency Department with abdominal pain. An EKG was performed, which revealed sinus tachycardia, with electrical alternans and borderline reduced voltage. At the time of the admission to our unit, he had a clinical worsening and a CT scan of abdomen was performed, which demonstrated hepatomegaly, abundant pericardial effusion and thin right pleural effusion at the lung bases. An echocardiogram confirmed a circumferential pericardial effusion with initial collapse of the right ventricular free wall. It was decided to immediately transport the patient to the Cardiosurgery Unit of another hospital to undergo pericardiocentesis.

DISCUSSION: Our experience with this case underlines the important point that patients with a large pericardial effusion may present with the clinical features of acute abdomen and peritonitis. Abdominal pain was the primary symptom that prompted this patient to seek medical attention.

CONCLUSION: Acute abdomen is any acute abdominal condition requiring a rapid, often surgical, treatment. Cardiac tamponade is a medical emergency. The differential diagnosis could be kept in mind by any emergency physician, surgeon and anaesthesiologist, because an incorrect diagnosis and therefore an incorrect treatment or a delay in pericardial evacuation can be life-threatening.

© 2020 The Author(s). Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Acute abdomen is any acute abdominal condition requiring a quick response. The most frequent causes of acute abdominal pain seen in the Emergency Room are nonspecific abdominal pain (22.0–44.3%), acute appendicitis (15.9–28.1%), biliary disease (2.9–14.0%), gastrointestinal perforation (2.3–15.0%), adynamic ileus (4.1–8.6%), diverticulitis (8.2–9.0%), pancreatitis (3.2–4.0%), ureteral colic (5.1%), inflammatory bowel diseases (0.6%), obstetrics and gynecological diseases (4%) [1–8]. The incidence varies according to age and disease aetiology; acute acalculous cholecystitis is one of the dreaded causes of acute abdomen with a mortality rate higher than 30% [9]. However, the abdominal discomfort associated with extra-abdominal pathophysiology and thoracic conditions, such as acute myocardial infarction and pneumonia, could at times

mimic acute abdomen. Non-surgical causes of acute abdomen could be endocrine and metabolic (uraemia, diabetic crisis, Addisonian crisis, acute intermittent porphyria, hereditary Mediterranean fever), hematologic (sickle cells crisis, acute leukaemia, other blood dyscrasias), related to toxins and drugs (lead poisoning, other heavy metal poisoning, narcotic withdrawal, black widow spider poisoning), vascular (embolism or thrombosis, dissecting aortic aneurysm, rectal sheath hematoma), cardiological (myocardial infarction, acute pericarditis) and pulmonary (pneumonia, lung infarction). The acute abdomen is managed by different physicians and requires accurate diagnosis and treatment within a time limit to prevent mortality [10,11].

In this case we report a rare case of a young patient with cardiac tamponade masquerading as acute abdomen, who was initially considered of surgical interest and referred to our Surgical Unit.

The work reported is in line with the SCARE criteria [12]. The authors obtained patient consent to use all the images presented.

* Corresponding author at: Lucia Romano Department of Surgery, San Salvatore Hospital, Department of Biotechnological and Applied Clinical Sciences, University of L'Aquila, Italy.

E-mail address: lucia.romano@graduate.univaq.it (L. Romano).

<https://doi.org/10.1016/j.ijscr.2020.08.062>

2210-2612/© 2020 The Author(s). Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

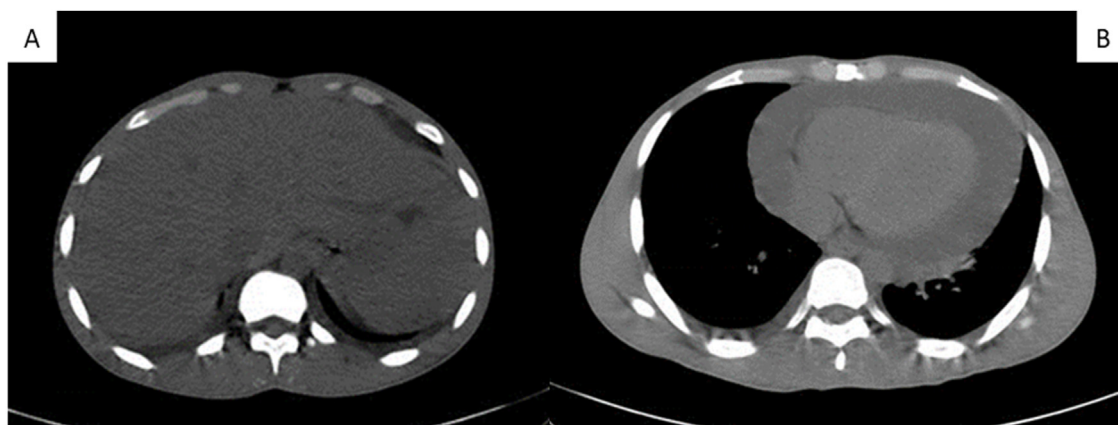


Fig. 1. CT scan showing important hepatomegaly and perihepatic fluid (A) and abundant pericardial effusion of about 30 mm thickness (B).

2. Case report

A 25-years-old African man presented to the Emergency Department with diffuse abdominal pain, initially occurring mainly in right upper quadrant of abdomen. His past medical history was silent, as well as his drug history. His blood pressure was 110/70 mmHg, the heart rate was 107 bpm, the oxygen saturation (SpO₂) was 96%, temperature was 38 °C. The physical exam showed a positive Murphy's sign. Laboratory exams were significant for CRP (13.12 mg/dl), ALT (75 u.i./L), AST (99 u.i./L), myoglobin (86 ng/mL), LDH (289 u.i./L), CPK (302 u.i./L); WBC values were within normal values (4510 /μL). An EKG was performed, which revealed sinus rhythm and tachycardia (107 bpm), with electrical alternans and borderline reduced voltage. Owing to this initial presentation of abdominal pain, abdominal X-ray was performed to verify the presence of perforation or intestinal obstruction. It did not reveal air fluid levels or free intraperitoneal air. After that, suspecting a diagnosis of acute cholecystitis, abdominal ultrasound was performed, which evidenced increased liver size and gallbladder wall thickness with pericholecystic and perihepatic fluid. The patient was referred to the surgical team for further assessment of abdominal pain and was admitted to the General Surgery Unit, with clinical and radiological diagnosis of acute acalculous cholecystitis. At the time of the admission to our unit, he had a clinical worsening: physical examination was characterized by abdominal distension, tenderness, positive Blumberg's sign and involuntary guarding in all quadrants; blood pressure was 80/65 mmHg, heart rate was 190 bpm, SpO₂ was 98%. Clinical examination did not reveal any clinical modifications at the respiratory system, no jugular turgescence, muffled heart sounds. Considering the worsening of the clinical picture, in the suspicion of a perforation, a CT scan of abdomen was performed in urgency; it confirmed the previous reports, demonstrating hepatomegaly, gallbladder wall thickness with pericholecystic and perihepatic fluid; moreover it showed abundant pericardial effusion (30 mm thickness) and thin right pleural effusion at the lung bases included in the scan (Fig. 1). In view of surgery indicated for acute abdomen for cholecystitis, an echocardiogram was performed, which confirmed a circumferential pericardial effusion (it appears as an echo-free space between the two layers of the pericardium) with initial collapse of the right ventricular free wall (Fig. 2). This cardiac condition could lead to imminent heart failure, and since the hemodynamic conditions were stable, it was decided to immediately transport the patient to the Cardiosurgery Unit of another hospital to undergo pericardiocentesis, postponing the decision on the surgical indication.

A few hours after the procedure was performed by an expert interventional cardiologist, the abdominal pain along with physical

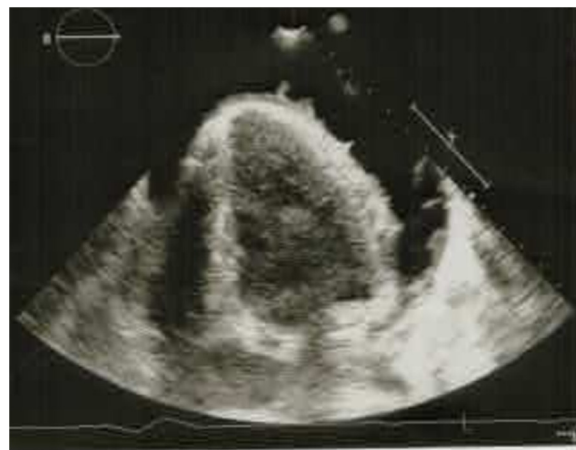


Fig. 2. Echocardiogram showed a circumferential pericardial effusion with initial collapse of the right ventricular free wall.

signs of peritonitis completely disappeared. Chemical examination of pericardial fluid showed yellow milky fluid and pH = 8,5; cytological examination revealed no neoplastic cells, some lymphocytes (T-cell almost 93%) and neutrophil. Bacterial examination did not reveal presence of bacteria or fungi. After a short hospitalization for the control of post-procedural parameters in the cardiology department, the patient was dismissed three days after pericardiocentesis, in good general conditions and without any residual abdominal symptoms.

3. Discussion

Our experience with this case underlines the important point that patients with a large pericardial effusion may present with the clinical features of acute abdomen and peritonitis. Abdominal pain was the primary symptom that prompted this patient to seek medical attention. The paper of Gibbs et al. [13] reported that among all patients with pericardial effusions presenting to a city hospital over a 10-year period, the abdominal pain was a symptom in 61% of the cases, but pericardial tamponade presenting as acute abdomen rarely has been described [14–17].

Cardiac tamponade is a medical emergency. Prompt diagnosis and treatment are important to prevent mortality. Pericardial effusion is a fluid collection in the pericardial space, whose diagnosis is made by echocardiography: it appears as an echo-free space between the two layers of the pericardium. Pericardial effusion can occur following a number of different conditions, primarily related

to inflammation. Depending on the underlying aetiology and on the rate of accumulation, the clinical presentations may range from being asymptomatic to a life-threatening scenario [18–21].

Large pericardial effusion may be unexpectedly found without significant elevation of intrapericardial pressure and it is usually asymptomatic if it formed slowly, whereas rapidly accumulating effusions may result in a compressive physiology and hence tamponade, characterized by a progressive limitation of ventricular diastolic filling and a reduction in cardiac output [22].

Acute cardiac tamponade occurs within minutes, due to trauma and rupture of the heart or great vessels, resembling cardiogenic shock that requires urgent drainage [23]. Subacute events are usually less dramatic and occur over days to weeks and usually are due to non-traumatic causes. In patients who develop subacute pericardial tamponade, the characteristic profile may not be apparent. Large effusion may be associated with muffled heart sounds. Sinus tachycardia and hypotension are signs of hemodynamic impairment. Among the effusions that progress to tamponade, patients are known to classically exhibit Beck's triad, that describes the combination of venous distension, distant heart sounds and absolute or relative hypotension. Pericardial rub may be audible, particularly in inflammatory pericarditis, and cardiac apical impulse could be reduced or absent [24]. The classic EKG finding in large effusions consists of low voltage tracing. Electrical alternans is a fairly specific sign of massive effusion [25–27]. In our case no venous distension was present, but the patient had sinus tachycardia, hypotension, distant heart sound and EKG demonstrating electrical alternance, associated with abdominal pain. Because gallbladder venous return flows into the portal system in the hepatic parenchyma, gallbladder edema is caused by the blockage of portal and systemic venous drainage [28], owing to congestive hepatopathy from causes such as liver cirrhosis and acute hepatitis, congestive heart failure, or cardiac tamponade [29,30]. The abdominal pain (false acute surgical abdomen) in the pericardial effusion with cardiac tamponade is determined by the distention of the liver capsule during the hypodiastolic syndrome with liver stasis. These reports (increased liver volume, gallbladder wall thickness, pericholecystic and perihepatic fluid) were reported in TC scan also in our case.

The aetiology of a pericardial effusion can greatly vary, including post-myocardial infarction, infectious, autoimmune, uremic or malignant diseases. In our patient, the disease was probably of viral origin, since it was reported the presence of T-cells in pericardial fluid.

4. Conclusion

Acute abdomen is any acute abdominal condition requiring a rapid, often surgical, treatment. Cardiac tamponade is a medical emergency, that could sometimes present with the signs and symptoms of an acute abdomen and so it could mimic a surgical disease. Therefore, patients with acute abdomen, sinus tachycardia and at least two of the symptoms characterizing the Beck's triad (hypotension, muffled heart sounds, venous distension), with TC exam that reveals no air fluid levels or free intra-peritoneal air, but increased liver size, gallbladder wall thickness, pericholecystic and perihepatic fluid, should be suspected for cardiac tamponade. The differential diagnosis could be kept in mind by any emergency physician, surgeon and anaesthesiologist, because an incorrect diagnosis and therefore an incorrect treatment or a delay in pericardial evacuation can be life-threatening.

Declaration of Competing Interest

No conflict of interest.

Funding

No funding.

Ethical approval

N/A.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

Francesco Maffione, Romano Lucia: Writing the paper.
Brandolin Denise, Di Sibio Alessandra, Schietroma Mario: Data collection and analysis.
Carlei Francesco, Giuliani Antonio: Study concept.

Registration of research studies

N/A.

Guarantor

Prof. Mario Schietroma.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Acknowledgments

This article is part of a supplement entitled Case reports from Italian young surgeons, published with support from the Department of Surgical, Oncological and Oral Sciences – University of Palermo. We are grateful to the Anonymous Reviewers for the contribution provided to the improvement of the article.

References

- [1] F.T. De Dombal, The OMGE acute abdominal pain survey. Progress report, 1986. *Scand. J. Gastroenterol. (Supplement 144)* (1988) 35.
- [2] Alex R. Attard, et al., Safety of early pain relief for acute abdominal pain, *Br. Med. J.* 305 (6853) (1992) 554–556.
- [3] Cecilia Strömberg, Gunnar Johansson, Anders Adolffson, Acute abdominal pain: diagnostic impact of immediate CT scanning, *World J. Surg.* 31 (12) (2007) 2347–2354.
- [4] A. Giuliani, L. Romano, G. Coletti, et al., Lymphangiomatosis of the ileum with perforation: a case report and review of the literature, *Ann. Med. Surg. (Lond.)* 41 (March) (2019) 6–10, <http://dx.doi.org/10.1016/j.amsu.2019.03.010>, eCollection 2019 May.
- [5] B. Pessia, L. Romano, A. Giuliani, et al., Rare case of upper gastrointestinal bleeding: Dieulafoy's lesion of duodenum. A case report, *Ann. Med. Surg. (Lond.)* 45 (July) (2019) 19–21, <http://dx.doi.org/10.1016/j.amsu.2019.07.022>.
- [6] M. Schietroma, E.M. Cecilia, G. De Santis, et al., Supplemental peri-operative oxygen and incision site infection after surgery for perforated peptic ulcer: A randomized, double-blind monocentric trial, *Surg. Infect. (Larchmt)* 17 (February (1)) (2016) 106–113, <http://dx.doi.org/10.1089/sur.2013.132>, Epub 2015 Nov 10.
- [7] A. Giuliani, L. Romano, V. Vicentini, et al., Sporadic perivascular epithelioid cell tumor of the wall of the jejunum A case report, *Ann. Ital. Chir.* 8 (June) (2019), pii: S2239253X19030767.
- [8] A. Giuliani, L. Romano, M. Marchese, et al., Gastric leak after laparoscopic sleeve gastrectomy: management with endoscopic double pigtail drainage. A systematic review, *Surg. Obes. Relat. Dis.* 15 (2019) 1414–1419, <http://dx.doi.org/10.1016/j.soard.2019.03.019>.
- [9] C.N. Desautels, D.M. Tierney, F. Rossi, T.K. Rosborough, Case report: an unrecognized etiology of transient gallbladder pain in heart failure diagnosed

- with internist-performed point-of-care ultrasound, *Crit. Ultrasound J.* 7 (2) (2015), <http://dx.doi.org/10.1186/s13089-014-0019-8>.
- [10] M. Schietroma, S. Cappelli, F. Carlei, et al., Acute abdomen? early laparoscopy or active laparotomic-laparoscopic observation? *Hepatogastroenterology* 54 (June (76)) (2007) 1137–1141.
- [11] M. Schietroma, B. Pessia, A. Mattei, et al., Temperature-neutrophils-multiple organ failure grading for complicated intra-abdominal infections, *Surg. Infect. (Larchmt)* 21 (February (1)) (2020) 69–74, <http://dx.doi.org/10.1089/sur.2019.092>, Epub 2019 Aug 28.
- [12] R.A. Agha, M.R. Borrelli, R. Farwana, K. Koshy, A. Fowler, D.P. Orgill, For the SCARE Group, The SCARE 2018 statement: Updating Consensus Surgical CASe REport (SCARE) Guidelines, *Int. J. Surg.* 60 (2018) 132–136.
- [13] C. Gibbs, R. Watson, S. Singh, et al., Management of pericardial effusion by drainage: a survey of 10 years experience in a city centre general hospital serving a multiracial population, *Postgrad. Med. J.* 76 (2000) 809–813.
- [14] A. Muniz, Pericardial tamponade presenting as abdominal pain in a patient with systemic lupus erythematosus, *Case Rep. CJEM* 2 (2000) 117–120.
- [15] E.A. Dy, D.L. Shiltz, Haemopericardium and cardiac tamponade associated with dabigatran use, *Ann. Pharmacother.* 46 (2012) e18.
- [16] Wf Chang, K. Wu, K. Liu, et al., Hypovolaemia-induced cardiac tamponade in a patient with hypothyroidism, *J. Emerg. Med.* 43 (2012) e409–412.
- [17] W. Al-Jundi, N. Rubin, Cardiac tamponade secondary to haemopericardium in a patient on warfarin, *BMJ Case Rep.* (2012), bcr 01.2010.2606 website address: <http://casereports.bmj.com/content/2010/bcr.01.2010.2606.abstract> (Accessed 1 April 2013).
- [18] M.M. LeWinter, Pericardial diseases, in: P. Libby, R.O. Bonow (Eds.), *Braunwald's Heart Disease, A Textbook of Cardiovascular Medicine*, 8th edition, Saunders Elsevier, Philadelphia, 2008, pp. 1829–1854.
- [19] D.H. Spodick, Acute cardiac tamponade, *N. Engl. J. Med.* 349 (7) (2003) 684–690.
- [20] D.H. Spodick, How do the clinical findings in patients with pericardial effusions influence the success of aspiration? *Br. Heart J.* 74 (4) (1995) 476.
- [21] A.J. Weekes, D.P. Quirke, Emergency echocardiography, *Emerg. Med. Clin. North Am.* 29 (4) (2011) 759–787, <http://dx.doi.org/10.1016/j.emc.2011.08.002>, vi–vii. Epub 2011 Sep 23.
- [22] P. Perera, V. Lobo, S.R. Williams, L. Gharahbaghian, Cardiac echocardiography, *Crit. Care Clin.* 30 (1) (2014) 47–92, <http://dx.doi.org/10.1016/j.ccc.2013.08.003>, v.
- [23] J. Sagrista-Sauleda, J. Angel, A. Sambola, G. Permyer-Miralda, Hemodynamic effects of volume expansion in patients with cardiac tamponade, *Circulation* 117 (12) (2008) 1545–1549.
- [24] R. Hashim, H. Frankel, M. Tandon, R. Rabinovici, Fluid resuscitation-induced cardiac tamponade, *J. Trauma* 53 (6) (2002) 1183–1184.
- [25] D.H. Spodick, Images in cardiology. Truly total electric alternation of the heart, *Clin. Cardiol.* 21 (6) (1998) 427–428.
- [26] E.L. Ivens, B.I. Munt, R.R. Moss, Pericardial disease: what the general cardiologist needs to know, *Heart (Br. Cardiac Soc.)* 93 (8) (2007) 993–1000.
- [27] P.H. Seidenberg, J. Haynes, Pericarditis: diagnosis, management, and return to play, *Curr. Sports Med. Rep.* 5 (2) (2006) 74–79.
- [28] S.A. Teeffey, R.L. Baron, S.A. Bigler, Sonography of the gallbladder: significance of striated (layered) thickening of the gallbladder wall, *Am. J. Roentgenol.* 156 (1991) 945–947.
- [29] H.J. Cho, C.H. Park, J.S. Kim, et al., Edema of pancreas and gallbladder misread as inflammation in cardiac tamponade, *Ann. Thorac. Surg.* 97 (1455) (2014), <http://dx.doi.org/10.1016/j.athoracsur.2013.09.075>.
- [30] L.F. Donnelly, T.R. Kimball, L.L. Barr, Purulent pericarditis presenting as acute abdomen in children: abdominal imaging findings, *Clin. Radiol.* 54 (1999) 691–693.

Open Access

This article is published Open Access at [sciencedirect.com](https://www.sciencedirect.com). It is distributed under the [IJSCR Supplemental terms and conditions](#), which permits unrestricted non commercial use, distribution, and reproduction in any medium, provided the original authors and source are credited.