SAGE Open Medical Case Reports
Volume 6: 1–4

DOI: 10.1177/2050313X18784823
journals.sagepub.com/home/sco
SAGE

Septic pulmonary emboli causing recurrent bilateral pneumothoraces in a patient with right sided endocarditis: A case report and review of literature

Sumit Kapoor[1], Jyotsana Thakkar[2] and Muhammad Asim Siddique[1]

Abstract

Patients with a history of drug abuse and right sided endocarditis are prone to develop septic pulmonary emboli. Pneumothorax is a rare complication of septic pulmonary emboli reported in the literature, likely due to the rupture of thin-walled septic cavitary lesions resembling pneumatoceles into the pleural space. Only seven cases (including our case) of pneumothorax from septic pulmonary emboli due to right sided endocarditis have been described in the literature. Our patient is the first reported case of recurrent bilateral pneumothorax due to septic pulmonary emboli and tricuspid valve endocarditis.

Keywords

Septic pulmonary embolism, endocarditis, pneumothorax

Date received: 23 February 2018; accepted: 30 May 2018

Introduction

Pneumothorax (PTX) has been described as a rare complication of septic pulmonary emboli (SPE), most commonly seen in intravenous drug abusers with right sided endocarditis.[1–6] PTX should be strongly and emergently considered as an etiology of sudden onset dyspnea or chest pain in a patient with SPE. To the best of our knowledge, this is the first case of recurrent bilateral PTX described in the literature as a complication from septic emboli to lungs from tricuspid valve endocarditis.

Case presentation

A 33-year-old cachectic female with past medical history of untreated hepatitis C infection and intravenous drug abuse (IVDA) was admitted for higher level of care from an outside hospital with acute respiratory failure requiring mechanical ventilation, methicillin sensitive *Staphylococcus aureus* (MSSA) bacteremia, and tricuspid valve (TV) endocarditis complicated by development on 10th day of spontaneous right sided PTX with chest tube placement. Vital signs on admission revealed a temperature of 100.9 F, pulse of 113/min, respiratory rate of 18/min, blood pressure of 109/65 mmHg, and pulse oximetry of 100% on FiO2 of 40%. Physical examination was consistent with coarse breath sounds bilaterally in anterior lung fields and presence of 3/6 systolic murmur best heard in the right lower sternal border. Her chest tube was in place with resolution of PTX. Labs on admission showed hemoglobin of 8.2 gm/dL, white blood cell count of 10,000/mL, platelet count of 52,000/mm^3, BUN of 21 mg/dL, creatinine of 0.48 mg/dL, sodium of 138 mEq/L, potassium of 3.6 mEq/L, and normal coagulation parameters. She had persistent MSSA bacteremia on multiple blood cultures even with aggressive antibiotic treatment. Her pleural fluid cultures did not isolate any organism. Initial transthoracic echocardiography (TTE) demonstrated a large, mobile, prolapsing 3.5×1.5 cm^2 vegetation on the anterior leaflet of TV with moderate tricuspid regurgitation. Computed tomography (CT) chest showed bilateral septic emboli to lungs and cavitary lesions, small bilateral pleural effusions, and bibasilar

[1]Division of Pulmonary, Critical Care and Sleep Medicine, Department of Medicine, Baylor College of Medicine, Houston, TX, USA
[2]Division of Nephrology, Department of Medicine, Baylor College of Medicine, Houston, TX, USA

Corresponding Author:
Sumit Kapoor, Division of Pulmonary, Critical Care and Sleep Medicine, Department of Medicine, Baylor College of Medicine, One Baylor Plaza, Mail Stop BCM-621, Houston, TX 77030, USA.
Email: drkapoorsumit@gmail.com

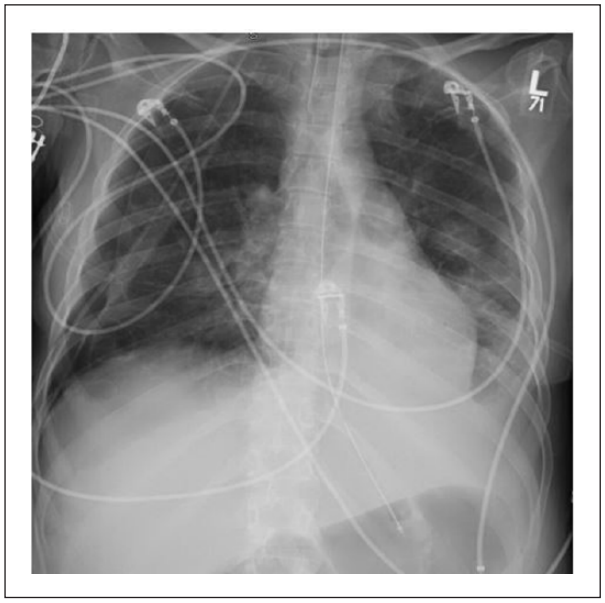

Figure 1. CXR showing right sided chest tube and resolution of pneumothorax.

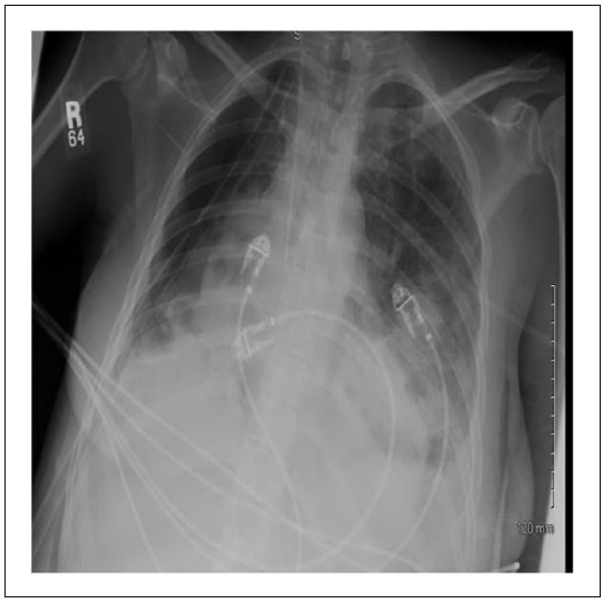

Figure 2. CXR with new right spontaneous PTX.

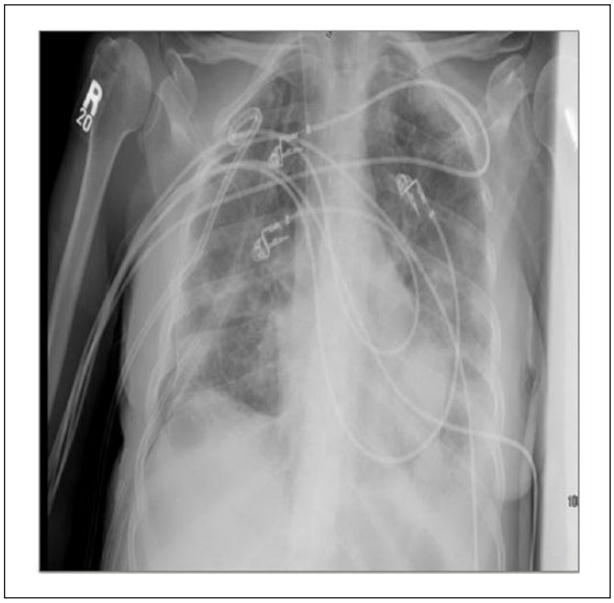

Figure 3. CXR showing second right chest tube (pig tail) in place for decompression of PTX.

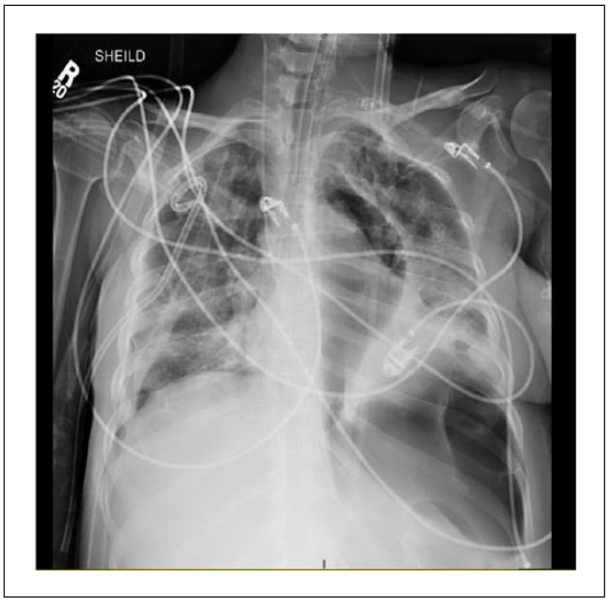

Figure 4. CXR showing new left PTX.

infiltrates. She was placed on empiric antibiotics and cardiothoracic surgery (CTS) was consulted for valve replacement surgery. Her intensive care unit (ICU) course was complicated by septic shock, acute renal failure, and urinary tract infection (UTI). Subsequently, she developed sudden onset respiratory distress and was found to have a new right sided PTX. A second chest tube was placed on the right to evacuate the PTX. CTS deemed that patient was not a suitable candidate for valve surgery due to continued IVDA and very poor nutritional status. During the course of her ICU stay, she kept developing recurrent noniatrogenic pneumothoraces, bilaterally requiring the placement of a total of three chest tubes on the right and two on the left for decompression. Figures 1–5 show the chest X-ray (CXR) findings,while Figure 6 shows the CT findings. The family decided to pursue comfort care measures due to her grim prognosis and she died post terminal extubation. Autopsy was not performed as the family refused to give consent.

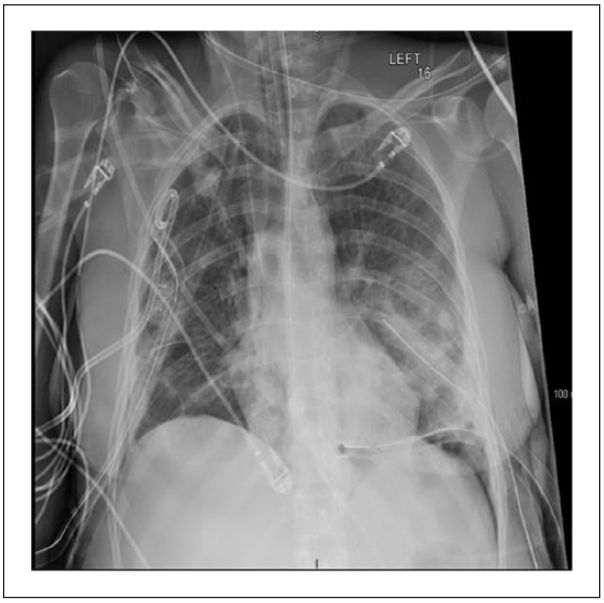

Figure 5. CXR showing three chest tubes on the right and two on the left.

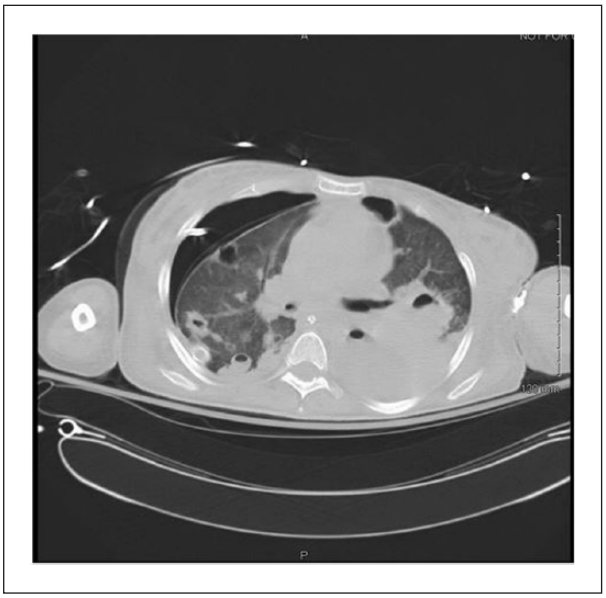

Figure 6. CT findings.

Discussion

Illicit drug use has emerged as a common worldwide health problem, affecting about 5% of the world's adult population and accounting for 0.5%–1.3% of all causes of mortality in 15–64-year-old adults.[7] Patients addicted to illicit drugs are susceptible to develop a multitude of infectious and noninfectious pulmonary complications like aspiration pneumonia, pulmonary edema (cardiogenic and noncardiogenic), pulmonary infections, hemorrhage, fibrosis, hypersensitivity pneumonitis, PTX, and so on.[5] Etiology for PTX in intravenous drug users include jugular or subclavian vein in correct self-injection causing pleural trauma, pneumocystis jirovecci pneumonia, military tuberculosis, interstitial, and bullous lung diseases and SPE.[1] The common causes of SPE include IVDA, right sided infective endocarditis (IE; TV and pulmonic valve), septic thrombophlebitis, suppurative angina, periodontal abscess, purulent infections of skin and soft tissue, infected intravascular catheters, pacemakers, and pelvic thrombophlebitis.[6] In a systemic review by Ye et al.,[6] 26% patients with SPE had a history of drug abuse, 12.5% had intravascular indwelling catheters, and 12% had IE. SPE can cause lung consolidation mimicking bronchopneumonia, thin-walled cavitary lesions simulating pneumatoceles, necrotic lung infarcts, lung abscess, bronchopleural fistula, empyema, pleural effusion, fatal pulmonary hemorrhage, and infrequently PTX.[6]

PTX due to SPE from right sided endocarditis was first described in the literature by Aguado et al.[1] in 1990, where a patient with h/o iv heroin abuse and MSSA TV endocarditis developed bilateral PTX requiring bilateral tube thoracostomy. PTX or hydro PTX is usually caused by rupture/progression of subpleural septic cavitary lesions, abscess, or empyema into the pleural cavity.

So far, seven cases (including our case) have been reported in the literature where patients with right sided endocarditis developed spontaneous PTX from SPE, three of them bilateral.[1–4,8] Table 1 lists all the reported cases. All except one had a history of IVDA. The median age of presentation is 25 years (range 19–78 years). Most of the reported cases are males (six out of seven) with sudden onset shortness of breath being the most common symptom. The PTX usually developed between days 1 and 15 with the median being 6 days. Our patient developed recurrent bilateral PTX, first episode on day 10. Of all the cases of IE, *Staphylococcus aureus* was the most common bacteria isolated in blood cultures with five out of seven cases growing MSSA. Five out of seven cases survived and no information was available for one patient. Our patient expired in the ICU. Two patients underwent valve replacement. All patients reported in the literature were treated with chest tube drainage. The poor outcome in our patient can be explained by multiple factors including large sized vegetation, persistent bacteremia, recurrent pneumothoraces, and inability to undergo surgery. Persistent bacteremia and positive pressure ventilation predisposed her to develop recurrent pneumothoraces. Our case is unique in several ways compared to previous cases. It is the first reported case in females due to drug abuse and IE; the patient developed recurrent bilateral hydro pneumothoraces (five times total) and was associated with poor outcomes (death).

Conclusion

Spontaneous PTX is a rare but serious complication seen in patients with SPE and right sided endocarditis. Intensivists

Table 1. Case reports of septic pulmonary emboli leading to spontaneous pneumothorax (PTX).

Study/year	Age/sex of patient	Drug abuse/ HIV/Hep status	Type of endocarditis	Survival	Complications	Pulmonary manifestations	**Day when developed PTX**
Aguado et al.,[1] 1990	19/male	Heroin (+), HIV (−), Hep B (−)	MSSA tricuspid valve endocarditis	Yes	Cardio respiratory arrest due to tension PTX	Bilateral PTX, b/l patchy infiltrates with cavitation, b/l pleural effusions	6th Day
Corzo et al.,[2] 1992 Case 1	23/male	Heroin(+), HIV(+), Hep B(+)	MSSA tricuspid valve endocarditis	Yes	None	Bilateral hydropneumothoraces, small, multiple bilateral patchy infiltrates	15th day
Corzo et al.,[2] 1992 Case 2	26/male	Heroin(+), HIV(+), Hep B(+)	Staphylococcus epidermidi tricuspid valve endocarditis	Yes	None	Right hydropneumothorax	1st day
Sheu et al.,[3] 2006	23/male	Heroin(+), Hep C(+), HIV(−)	MSSA tricuspid valve endocarditis	Yes	Acute renal failure, septic shock, tricuspid valve replacement	Left PTX, bilateral nodular infiltrates, thin walled cavities	7th day
Yang et al.,[8] 2012	78/male	None, source is infected hemodialysis catheter	MRSA tricuspid valve endocarditis	Not known	None	Left PTX, subpleural cavities, multiple nodular infiltrates	3rd day
Swaminath et al.,[4] 2013	25/male	Positive, not specified	MSSA pulmonic valve endocarditis	Yes	Acute respiratory failure, septic shock, pulmonic valve replacement, coagulopathy	Left sided PTX, multifocal bilateral cavitary infiltrates	1st day

should have a strong suspicion for it in patients with right sided endocarditis presenting with sudden onset dyspnea or hemodynamic instability.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical approval

Our institution does not require ethical approval for reporting individual cases or case series.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Informed consent

Written informed consent was obtained from the deceased patient's legally authorized representative (next of kin) for patient information (case report and image files) to be published in the journal.

ORCID iD

Sumit Kapoor https://orcid.org/0000-0002-5683-3445

References

1. Aguado JM, Arjona R and Ugarte P. Septic pulmonary emboli. A rare cause of bilateral pneumothorax in drug abusers. *Chest* 1990; 98(5): 1302–1304.
2. Corzo JE, Lozano de León F, Gómez-Mateos J, et al. Pneumothorax secondary to septic pulmonary emboli in tricuspid endocarditis. *Thorax* 1992; 47(12): 1080–1081.
3. Sheu CC, Hwang JJ, Tsai JR, et al. Spontaneous pneumothorax as a complication of septic pulmonary embolism in an intravenous drug user: a case report. *Kaohsiung J Med Sci* 2006; 22(2): 89–93.
4. Swaminath D, Yaqub Y, Narayanan R, et al. Isolated pulmonary valve endocarditis complicated with septic emboli to the lung causing pneumothorax, pneumonia, and sepsis in an intravenous drug abuser. *J Investig Med High Impact Case Rep* 2013; 1(4): 2324709613514566.
5. Wolff AJ and O'Donnell AE. Pulmonary effects of illicit drug use. *Clin Chest Med* 2004; 25(1): 203–216.
6. Ye R, Zhao L, Wang C, et al. Clinical characteristics of septic pulmonary embolism in adults: a systematic review. *Respir Med* 2014; 108(1): 1–8.
7. United Nations Office on Drugs and Crime. World drug report 2012, https://www.unodc.org
8. Yang SF, Yang WC and Lin CC. Infective endocarditis-related bilateral spontaneous pneumothorax in a haemodialysis patient. *Acta Clin Belg* 2012; 67(1): 51.