Indian Journal of Pharmacy and Pharmacology 2022;9(2):138–140

Content available at: https://www.ipinnovative.com/open-access-journals

Indian Journal of Pharmacy and Pharmacology

Journal homepage: https://www.ijpp.org.in/

Case Report

A case report on cor pulmonale

Shamna Haris[1,*], Anusreeraj R S[1], Shaiju S Dharan[1]

[1] *Dept. of Pharmacy, Ezhuthachan College of Pharmaceutical Sciences, Kerala, India*

ARTICLE INFO

Article history:
Received 10-06-2022
Accepted 13-06-2022
Available online 12-07-2022

Keywords:
Pulmonary artery hypertension
COPD
Heart failure

ABSTRACT

Cor pulmonale is a condition in which an alteration in the function and structure of the right ventricle of heart occurs, primarily as a result of respiratory disease which leads to increased blood flow resistance in the pulmonary circulation. Pulmonary hypertension is considered to be the most common link between lungs and heart dysfunction. Chronic obstructive airway disease is a common risk factor for the development of Pulmonary artery hypertension. The management requires focus on the underlying disease condition and treatment of the complications associated with Cor Pulmonale. Here the patient was a 55 year old female patient, presented with symptoms of Cor Pulmonale with a history of COPD and a recent case of severe pulmonary artery hypertension. She had anasarca and elevated BNP which indicated the right ventricle failure of heart associated with Cor pulmonale. The treatment included Loop diuretics, PDE 5 Inhibitors, Anticoagulants, Bronchodilators, Oxygen therapy and Antibiotics. The condition of the patient improved and hence was discharged.

1. Introduction

Cor pulmonale is a condition in which an alteration in the function and structure of the right ventricle of heart occurs, primarily as a result of respiratory disease which leads to increased blood flow resistance in the pulmonary circulation. The most common link between the heart and lung dysfunction in Cor pulmonale is the pulmonary hypertension. [1,2]

The mean pulmonary arterial pressure is usually more than 20mmhg for Cor pulmonale to occur. A complete failure of right ventricle happen if the mean pulmonary arterial pressure is ≥ 40mmg hg. It is considered that the chronic hypoxia often leads to pulmonary arteriolar constriction due to the increased action of the physiological mechanism which occurs in order to maintain the balance of ventilation and perfusion in lungs.

The other mechanisms that has the potential to increase mean pulmonary arterial pressure in Cor pulmonale include chronic hypercapnia and respiratory acidosis which leads to pulmonary vasoconstriction and an anatomical disruption of the pulmonary vascular bed which may occur as a result of primary lung disease such as in the cases of pulmonary fibrosis, pulmonary thromboembolic disease and emphysema.

Cor pulmonale may also occur due to an increase in the blood viscosity which occur as a result of lung disease and its associated complications such as in secondary polycythemia. It is generally a progressive chronic process but may also occur acutely in some cases due to an acute case of pulmonary hypertension, often following a pulmonary embolism. [3]

Cor pulmonale can be generally classified as acute, subacute and chronic types. Massive pulmonary emboli is the most common cause of Acute Cor Pulmonale and it occurs when > 60 % occlusion of the vascular

* *Corresponding author*.
E-mail address: sshamnaharis@gmail.com (S. Haris).

https://doi.org/10.18231/j.ijpp.2022.024

bed occurs which can often result in immediate death. The most common cause of subacute Cor pulmonale is secondary endolymphatic carcinomatosis of lungs in which the metastatic carcinoma may diffusely infiltrate the perivascular lymphatics and further includes the pulmonary arterioles. This can interfere with the blood flow through the pulmonary circuit and often results in right ventricular failure.[4]

2. Case Report

A 55 year old female patient was admitted in the General medicine department with complaints of Anasarca since 1 month, decreased urine output since 5 days and breathlessness since 3 days. She has a medical history of COPD and was evaluated by a cardiologist 15 days back for Cor pulmonale, severe pulmonary artery hypertension, dyslipidemia and COPD. On physical examination, the respiratory system showed reduced air entry and bilateral rhonchi.

Her lab parameters included an elevated BNP, CRP, FBS and HbA1C. She was admitted in medical ICU and managed with Injection Furosemide, Methylprednisolone, Pantoprazole, Cefoperazone, Enoxaparin, Neb Ipratropium bromide, Levosalbutamol, oral doses of Sildenafil, Intermittent oxygen therapy and other supportive measures. Patient's condition improved with treatment and hence was discharged with oral doses of Furosemide, Methylprednisolone, Sildenafil, Gliclazide and intermittent oxygen therapy at home.

3. Discussion

Cor Pulmonale can be described as a condition in which failure of right ventricle occurs due to an increase in the resistance to blood flow in pulmonary circulation. Here the patient was a 55 year old female patient, presented with similar symptoms as that of Cor Pulmonale with a history of COPD and a recent case of severe pulmonary artery hypertension. She had anasarca and elevated BNP which indicated the right ventricle failure of heart associated with Cor pulmonale.

The most common drugs used for management of Cor Pulmonale includes diruretics, oxygen therapy, vasodilators, theophylline, digitalis and anticoagulation therapy.[5] Phosphodiesterase type 5 (PDE 5) inhibitors such as sildenafil are also used in Cor Pulmonale and are found to have beneficial effects in managing the pulmonary hypertension by widening and relaxing the blood vessels in lungs thus allowing the blood to flow more easily.In COPD, the synthesis of nitric oxide in pulmonay arteries are usually impaired. The inhibition of PDE 5 can act on the nitric oxide signalling pathway in pulmonary vessels and can delay the cyclic guanosine monophosphate degradation which in turn improves the vasodilator action of Nitric oxide. Thus the use of PDE 5 inhibitors such as sildenafil can be useful in such conditions for managing pulmonary hypertension related to COPD.[6]

A loop diuretic known as furosemide was prescribed to manage anasarca and fluid overload associated with Cor pulmonale. The use of diuretics must be done cautiously as it has the potential to cause adverse acid-base effects and electrolyte imbalance which can lead to cardiac arrythmias that may alter the cardiac output.[7] Anticoagulants are also beneficial in some cases of Cor Pulmonale and their use have shown to reduce the mortality in patients with Cor pulmonale and pulmonary artery hypertension.[8] Administration of systemic steroids have been shown to improve dyspnea, pulmonary function, reduce hospitalization length and relapse rate.[9–13]

4. Conclusion

Cor Pulmonale was managed efficiently at the earliest with suitable interventions. The symptoms associated with Cor Pulmonale, COPD and Pulmonary artery hypertension were treated appropriately and subsided. The patient showed improvement in health and hence was discharged with appropriate medications.

5. Source of Funding

None.

6. Conflict of Interest

The author(s) declare that there is no conflict of interest.

References

1. Weitzenblum E, Chaouat A, Pulmonale C. Cor pulmonale. *Chron Respir Dis*. 2009;6(3):177–85. doi:10.1177/1479972309104664.
2. Budev MM, Arroliga AC, Wiedemann HP, Matthay RA. Cor pulmonale: an overview. *Semin Respir Crit Care Med*. 1924;24(3):233–77. doi:10.1055/s-2003-41105.
3. Voelkel NF, Quaife RA, Leinwand LA. Right ventricular function and failure: report of a National Heart, Lung, and Blood Institute working group on cellular and molecular mechanisms of right heart failure. *Circulation*. 2006;114(17):1883–91. doi:10.1161/CIRCULATIONAHA.106.632208.
4. Das SK, Choupoo NS, Saikia P, Lahkar A. Incidence proportion of acute cor pulmonale in patients with acute respiratory distress syndrome subjected to lung protective ventilation: a systematic review and meta-analysis. *Indian J Crit Care Med*. 2017;21(6):364–75.
5. Badesch DB, Abman SH, Ahearn GS. Medical therapy for pulmonary arterial hypertension: ACCP evidence-based clinical practice guidelines. *Chest*. 2004;126(6):35–62. doi:10.1378/chest.06-2674.
6. Sastry BK, Narasimhan C, Reddy NK, Raju BS. Clinical efficacy of sildenafil in primary pulmonary hypertension: a randomized, placebo-controlled, double-blind, crossover study. *J Am Coll Cardiol*. 2004;43(7):1149–53.
7. Hansen L, Burks M, Kingman M, Stewart T. Volume management in pulmonary arterial hypertension: An expert Pulmonary hypertension clinician perspective. *Pulm Ther*. 2018;4(1):13–27. doi:10.1007/s41030-018-0052-z.
8. Johnson SR, Mehta S, Granton JT. Anticoagulation in pulmonary arterial hypertension: a qualitative systematic review. *Eur Respir J*.

2006;28(5):999–1004. doi:10.1183/09031936.06.00015206.
9. Hanania NA, Ambrosino N, Calverley P, Cazzola M, Donner CF, Make B. Treatments for COPD. *Respir Med*. 2005;99(1):28–40.
10. Neidenbach R, Niwa K, Oto O, Oechslin E, Aboulhosn J, Celermajer D, et al. Improving medical care and prevention in adults with congenital heart disease-reflections on a global problem-part II: Infective endocarditis, pulmonary hypertension, pulmonary arterial hypertension and aortopathy. *Cardiovasc Diagn Ther*. 2018;8(6):716–24.
11. Van Cleemput J, Sonaglioni A, Wuyts WA, Bengus M, Stauffer JL, Harari S. Idiopathic Pulmonary Fibrosis for cardiologists: Differential diagnosis, Cardiovascular comorbidities and patient management. *Adv Ther*. 2019;36(2):298–317. doi:10.1007/s12325-018-0857-z.
12. Yoon YS, Jin M, Sin DD. Accelerated lung aging and chronic obstructive pulmonary disease. *Expert Rev Respir Med*. 2019;13(4):369–80.
13. Smolders VF, Zodda E, Quax P, Carini M, Barbera JA, Thomson TM. Metabolic Alterations in Cardiopulmonary Vascular Dysfunction. *Front Mol Biosci*. 2018;5(1):120. doi:10.3389/fmolb.2018.00120.

Author biography

Shamna Haris, Student

Anusreeraj R S, Assistant Professor

Shaiju S Dharan, Principal

Cite this article: Haris S, Anusreeraj R S, Dharan SS. A case report on cor pulmonale. *Indian J Pharm Pharmacol* 2022;9(2):138-140.