Dicle Tıp Dergisi / Dicle Med J (2019) 46 (3) : 583-586

www.diclemedj.org

Case Report / Olgu Sunumu

Negative Pressure Pulmonary Edema: A Case Report

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Received: 31.10.2018; Revised: 19.03.2019; Accepted: 24.04.2019

Absract

Aim: Negative pressure pulmonary edema (NPPE) is a rare postoperative complication that arises due to upper airway obstruction and appears within an hour of extubation.

Case: The patient was a 19 years-old male with no chronic diseases or complaints in his preoperative assessment. Forty-five minutes after extubation, the patient reported dyspnea, hemoptysis, chest pain and oxygen saturation was 60%. Computer Tomography (CT) scans revealed bilateral infiltration and consolidation, more prominent in the central and apical regions. His bedside echocardiogram was normal. NPPE was considered in the diagnosis; oxygen support, intravenous furosemide, nebulized salbutamol and budosenide were administered in addition to non-invasive mechanical ventilation. Two hours later, the symptoms abated. His repeat X-ray taken after 12 hours showed reduction in lung infiltrates and patient was discharged after five days.

Conclusion: Abrupt decrease in oxygen saturation after extubation, dyspnea, chest pain and hemoptysis point to negative pressure pulmonary edema; the patient must immediately be moved to the intensive care unit and promptly treated.

Keyword*:* Hemoptysis, pulmonary edema, mechanical ventilation.

DOI: 10.5798/dicletip.620633

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Negatif Basınçlı Pulmoner Ödem: Olgu Sunumu

Öz

Amaç: Negatif basınçlı akciğer ödemi (NBAÖ), ekstübasyondan ilk bir saatte üst hava yolu obstrüksiyonuna bağlı olarak ortaya çıkan nadir bir komplikasyondur.

Olgu: 19 yaşında erkek hasta operasyon öncesi değerlendirmede herhangi bir şikâyeti yoktu. Operasyondan sonra ekstübasyonu yapılan hastanın 45 dakika sonra nefes darlığı, hemoptizi ve göğüs ağrısı şikâyeti gelişti ve saturasyonu %60 olarak ölçüldü. Hastaya çekilen bilgisayarlı tomografide her iki akciğer üst alanlarda daha yaygın olan ve daha çok santral yerleşimli bilateral infiltrasyon ve konsolide alanlar mevcuttu. Hastaya yatak başı yapılan ekokardiyografisi normaldi. Negatif basınçlı pulmoner ödem düşünülen hastaya oksijen desteği, furosemid ampul, salbutamol ve budesonidnebül verildi ve noninvaziv mekanik ventilasyon uygulandı. Hastanın 2 saat sonra klinik şikayetlerinde gerileme oldu ve 5. gün İnfiltrasyonları tamamen gerileyen hasta taburcu edildi.

Sonuç: Ekstübasyon sonrası oksijen saturasyonunda ani düşmesi, solunum güçlüğü, göğüs ağrısı ve akciğer ödeminde görülen tipik hemoptizi eşlik ettiğinde negatif basınçlı akciğer ödemi akla getirilmeli ve hasta hızlı bir şekilde yoğun bakım ünitesine alınmalıdır. Hemen tedavisine başlanılmalıdır.

Anahtar kelimeler: Hemoptizi, pulmoner ödem, mekanik ventilasyon.

INTRODUCTION

Negative pressure pulmonary edema (NPPE) is a rare postoperative complication that arises due to upper airway obstruction and appears within an hour of extubation[1]. Despite its rarity, its prominent signs and easy management render NPPE a condition that needs prompt recognition and treatment[1,2]. The present study aims to describe a case of NPPE arising in a young male patient that underwent elective ophthalmological surgery.

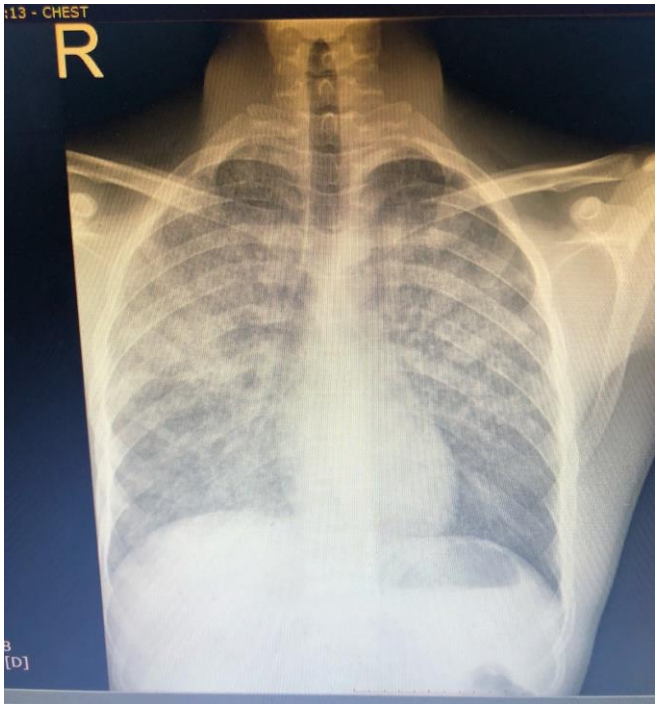
CASE

The patient was a 19 years-old male with no chronic diseases or complaints in his preoperative assessment done for his elective ophthalmological surgery. His preoperative chest X-ray was normal. Dormicum and propofol were administered during surgery. The surgery lasted 50 minutes and there were no complications. Forty-five minutes after extubation, the patient reported dyspnea and chest pain. The blood pressure at this time was 100/70 mm Hg, his pulse was 123/min and oxygen saturation was 60%. In addition, the patient had three episodes of hemoptysis. The physical examination revealed bilateral rales in the middle and lower regions. His chest X-ray showed bilateral nodular infiltrations spanning all lung regions, especially the upper parts. Computer Tomography (CT) scans revealed bilateral infiltration and consolidation, more prominent in the central and apical regions. The paitent was moved to the intensive care unit. His bedside echocardiogram was normal. NPPE was considered in the diagnosis; oxygen support (4 lt/min), intravenous furosemide, nebulized salbutamol and budosenide were administered in addition to non-invasive mechanical ventilation. Two hours later, the symptoms abated. His repeat X-ray taken after 12 hours showed reduction in lung infiltrates. He was removed from the intensive care unit after the second day, and a control CT scan was done on the fifth day. The infiltrations had disappeared completely at this time and the patient was discharged.

DISCUSSION

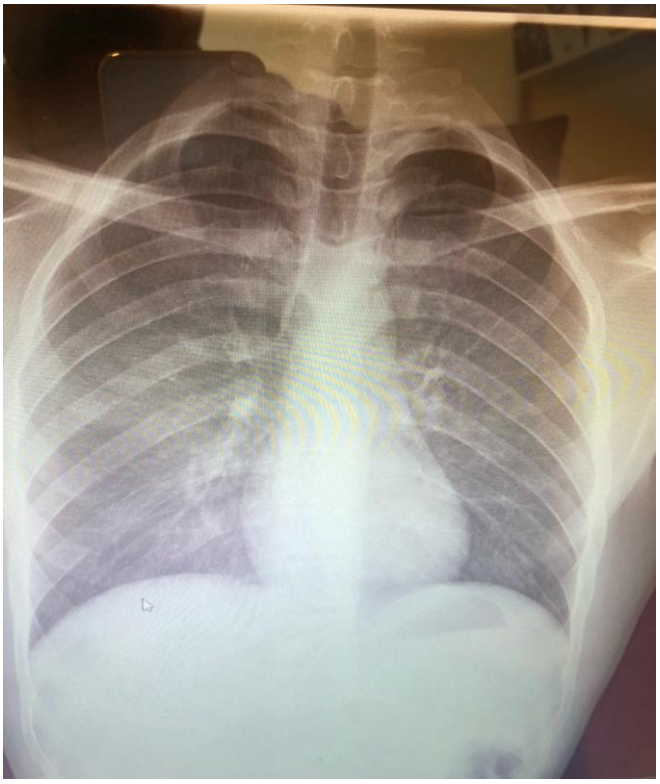
The reports of NPPE are limited in our country. Because these cases are considered to be pneumonia or acute respiratory distress, these cases are resolved with symptomatic treatment without being diagnosed[3-10]. NPPE is a rare complication seen after general anesthesia and

appears because of forced inspiration upon an obstructed upper airway[11]. Its pathogenesis involves increased negative pressure after forced inspiration and resulting increase in the venous return to the right heart with increased pulmonary capillary pressure. Increased venous return and capillary occlusion pressure forces fluid permeation into the interstitium; pulmonary edema develops[12,13]. NPPE is more frequently encountered in young patients with ample muscle mass, overweight patients, patients with upper airway obstruction, upper airway operations, sleep apnea syndrome or mediastinal tumors[14]. The risk factors in our patient are his young age and relatively high muscle mass.



Figüre 1: Chest X-ray on first day after post-operation

NPPE can develop immediately after extubation but generally appears in the first hour after extubation. The development of the clinical findings is rapid and the findings are pathognomonic. Generally, laryngospasm during extubation and dyspnea with hypoxia seen after the resolution of the laryngospasm help in diagnosis. Hemoptysis, albeit rare, can be seen[4]. The present case had hemoptysis 50 minutes after extubation and had recurrent episodes of hemoptysis in the intensive care unit.



Figüre 2: Chest X-ray on fifth day after treatment

The differential diagnosis of NPPE includes cardiogenic pulmonary edema, volume overload and aspiration pneumonia[4]. The normal pre- and post-operative ECG readings of the patient helped exclude cardiogenic edema. Because his white blood cell counts and serum CRP levels were normal and there was no report of vomiting during intubation or extubation, aspiration pneumonia was ruled out. Volume overload was excluded as there was no fluid administered during the operation.

NPPE must be treated fast in an intensive care unit. Oxygen administration and supportive measures are of paramount importance and must be provided promptly. In some cases, oxygen alone is not sufficient and noninvasive mechanical ventilation is useful; some require

re-intubation and mechanical ventilation for optimal oxygenation. Pharmacologically, beta-2 agonists were shown to alleviate pulmonary symptoms. The need for administration of diuretics and steroids is less clear; yet diuretics were seen to help decrease alveolar fluid load, and some studies show steroids restore negative pressure-related alveolar damage[10]. Our patient was also transferred immediately to the intensive care unit. When his hypoxia did not resolve with adequate oxygen, non-invasive mechanical ventilation was administered. Furthermore, a beta-2 agonist and diuretic were given. After two hours, the paitent had no more need for non-invasive mechanical ventilation and was followed with oxygen alone.

CONCLUSION

Abrupt decrease in oxygen saturation after extubation, dyspnea, chest pain and hemoptysis point to negative pressure pulmonary edema; the patient must immediately be moved to the intensive care unit and promptly treated.

Congressl of Lung Health and Intensive Care 2019 Antalya.

Conflicts of interest: The authors have no conflict of interests to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

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