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Original Research Paper

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IMPORTANCE OF POSTURE IN PROPER ANESTHESIA FOR PATIENT WITH SEVERE SCOLIOSIS : A CASE REPORT

Dr. Donghyo Kim	Department of Anesthesiology and Pain Medicine, Daegu Fatima Hospital, 99 Ayang-ro, Daegu 41199, Korea
Dr. Kyeonghyo Kim	Department of Anesthesiology and Pain Medicine, Daegu Fatima Hospital, 99 Ayang-ro, Daegu 41199, Korea
Dr. Jihyun An	Department of Anesthesiology and Pain Medicine, Daegu Fatima Hospital, 99 Ayang-ro, Daegu 41199, Korea
Dr. Eunju Kim	Department of Anesthesiology and Pain Medicine, Daegu Fatima Hospital, 99 Ayang-ro, Daegu 41199, Korea

ABSTRACT We present a case of anesthesia in patient with severe scoliosis exceeding 70 degrees of Cobb angle. Oxygen saturation did not rise despite appropriate preoxygenation treatment performed for a sufficiently long time in an urgent situation where anesthesia induction time could not be delayed. By referring to the chest X-ray, We changed the patient's position so that the dominant lung could function well, after that the oxygen saturation increased. So the emergency surgery could be completed safely.

KEYWORDS :

INTRODUCTION

Adult scoliosis is defined as a spinal deformity in a skeletally mature patient with a Cobb angle of more than 10° in the coronal plain. [1] Scoliosis is 75-90% idiopathic and accompanied by cardiopulmonary dysfunctions. In patients with airspace disease, the formation of the babylung results in an overall decrease in FRC, and shunt physiology results in inadequate maintenance of hemoglobin saturation during apnea. [2] Scoliosis patients are difficult to prepare for surgery because they often have significant airway restrictions and rigid spine. Comorbidities including restrictive lung disease increase risk of anesthesia.

We described the importance of the patient's posture to maximize ventilation of the dominant lung during anesthesia induction in patients with severe scoliosis for preoxygenation.

Case Presentation

A 51-year old male with severe scoliosis that is Cobb angle 70 degree undergoing on-call craniotomy with direct neck clipping who had epilepsy and cerebral palsy. The patient entered operation room with mental stupor state and light self respiration. The patient's O2 saturation decreased rapidly to 40% when position changed from Lt. decubitus to supine position for induction eventhough nasal O2 2L/min supplied already. After 5 minutes preoxygenation, Sp02 increased to just only 60%.

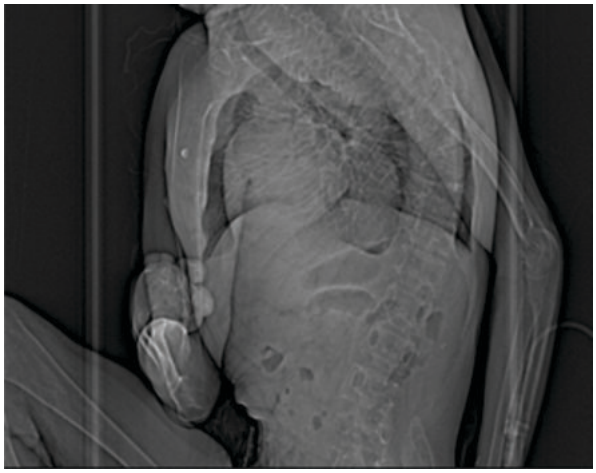

Figure 1 : Preoperation Chest X-ray

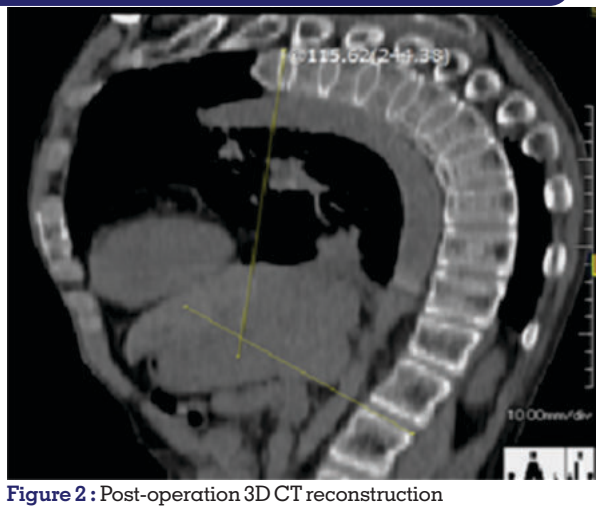

Figure 2 : Post-operation 3D CT reconstruction

(Because the patient's spine had severe kyphosis and lordosis, the cobb angle could not be measured on X-ray and 2d Chest CT. So, 3d reconstruction of the chest CT was performed and the cobb angle could be measured. Reconstruct it with an oblique coronal view so that it is perpendicular to the spinous process and measure the cobb angle on the Vertebra 8 end plate. As a result of the measurement, the Cobb angle was about 115 degrees.)

So we changed patient's position from supine to Lt. decubitus, so that the dominant lung can function well . After only 2 mins preoxygenation more, the saturation increased to 90% and EtO2 increased to 93%. After that intubation was conducted by reinforced tube 7.0 with guidewire without any problems. After induction was finished in Lt. decubitus position, Sp02 didn't fall below 90%.

DISCUSSION

Spinal column deformity is associated with potentially serious alterations of respiratory and cardiac function.[3] Decreased lung volume, chest wall distensibility decrease and respiratory muscle force decrease can cause to hypoxemia, corpulmonale, respiratory failure etc. The deformity places respiratory muscles at a biomechanical disadvantage, ultimately leading to decreased compliance of the chest wall and a restrictive syndrome that may significantly impact

respiratory function. [4] Anatomically, a patient with scoliosis will have one lung reduced and the other lung compensatoryly enlarged to become the dominant lung. So patient's position that dominant lung could function well can be solved to some extent of these problems. In our case, SpO2, which did not rise even after 5 minutes of preoxygenation, started to rise as soon as it was switched to the left lateral decubitus and reached 90% in 2 minutes.

Oxygenation, or rather denitrogenation, prior to apnea during anesthetic induction attempts to replace alveolar nitrogen with oxygen to achieve an intrapulmonary oxygen reserve that will allow apnea to be as prolonged as possible with the least possible desaturation. [5] This is accomplished in principle by denitrogenating the alveoli so that the functional residual capacity (FRC) serves as an oxygen reservoir, the efficacy of which can be evaluated by the fraction of expired O2. While in healthy individuals preoxygenation and denitrogenation may be synonymous, in critically ill patients preoxygenation must involve more than denitrogenation. [6] If induction was started when denitrogenation was achieved through sufficient pre-oxysgenation, safe and appropriate anesthesia could be performed.

Considering this case, we thought that it is important to proper position so that the dominant lung can function well and denitrogenation in decreased FRC patient by sufficient pre-oxygenation.

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