

PHYSIOLOGICAL CHARACTERISTICS OF HIGH-FREQUENCY ONE-LUNG VENTILATION in thoracic surgery

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2013



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1931
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INTRODUCTION.

In the present day, one-lung jet ventilation is applied in case of a necessity to isolate the healthy lung during operations involving abscedation, occurrence of fluid buildings, cysts or retrostenosis pneumonitis in the operated lung (1,2).

But convective one-lung ventilation in thoracic surgery accompanying symptoms include considerably decreased diffusion in surface area, sharp increase in intrapulmonary arteriovenous blood circulation, increase in transpulmonary pressure, decrease in venous return and cardiac output, increase in amount of extravascular lung water (3,5).

All this can lead to decrease in oxygenation of arterial blood, development of an uncorrectable hypoxia, disorders of central hemodynamics and development of post-surgery complications (4,5,6).

At the same time, a number of authors consider application of high frequency jet ventilation during lung surgeries to be without any alternative (1,2,5).

HFJV of lungs ensures excellent oxygenation of arterial blood, keeps the lungs in a relaxed state without execution of a recruitment maneuver and increases venous return and cardiac output by lowering the workload of the left ventricle (2,6,7).

We believe no alternative use during operations in the light of high-frequency jet ventilation.

HFJV provides excellent oxygenation of arterial blood in the lungs supports expanded position without the use of recruitment-maneuver, increases venous return and cardiac output, reducing intrapulmonary shunting.

MATERIALS AND METHODS.

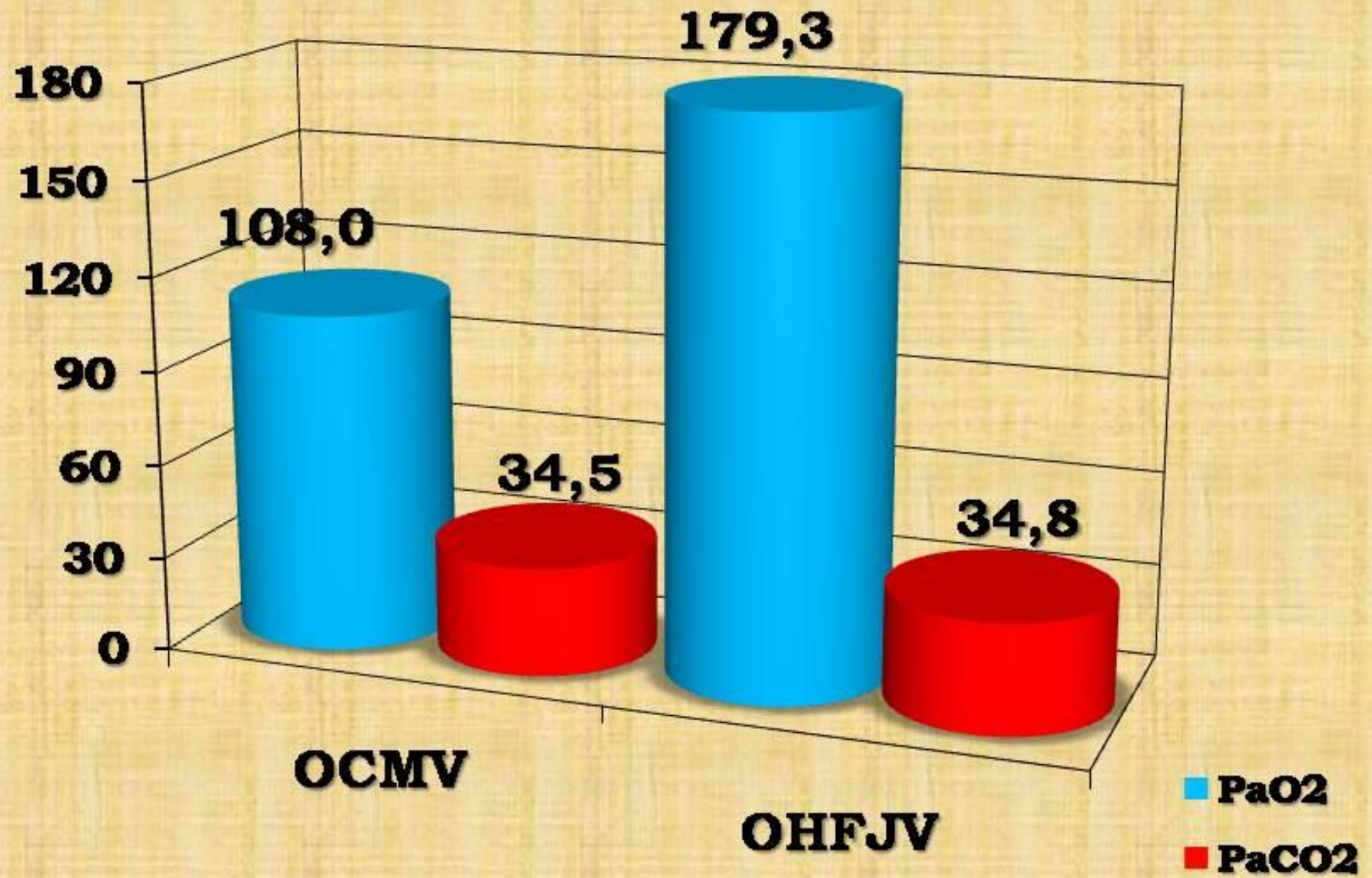
The two groups are comparable (in terms of volume of surgery, comorbidities, age) of 50 patients compared the parameters of gas exchange and hemodynamics in patients undergoing surgery for lung during one-lung convective (OCMV) and one-lung high-frequency (OHFJV) ventilation.

Artificial ventilation was applied through a single-lumen endotracheal tube located in the main bronchus of the healthy lung. In case of necessity of left main bronchus intubation, a correcting triple maneuver was executed. Usage of standard single-lumen endotracheal tubes ensured a good isolation of the healthy lung, facileness of sanitation and bronchoscopic control of the location of the tube.

RESULTS.

Results of the study demonstrated a reduction in OHFJV versus OCMV:
PIP - to 26,5%; Pes - by 81.6%; PVR - by 41.7%; Qs/Qt - by 45.5%
and the increase in PaO₂ – 66. 1%;
MI - by 32.5%; VA - by 13.3%;
CVP - by 28.3%
while maintaining the normal pH of 7.42
and PaCO₂ = 34.5 mm Hg.

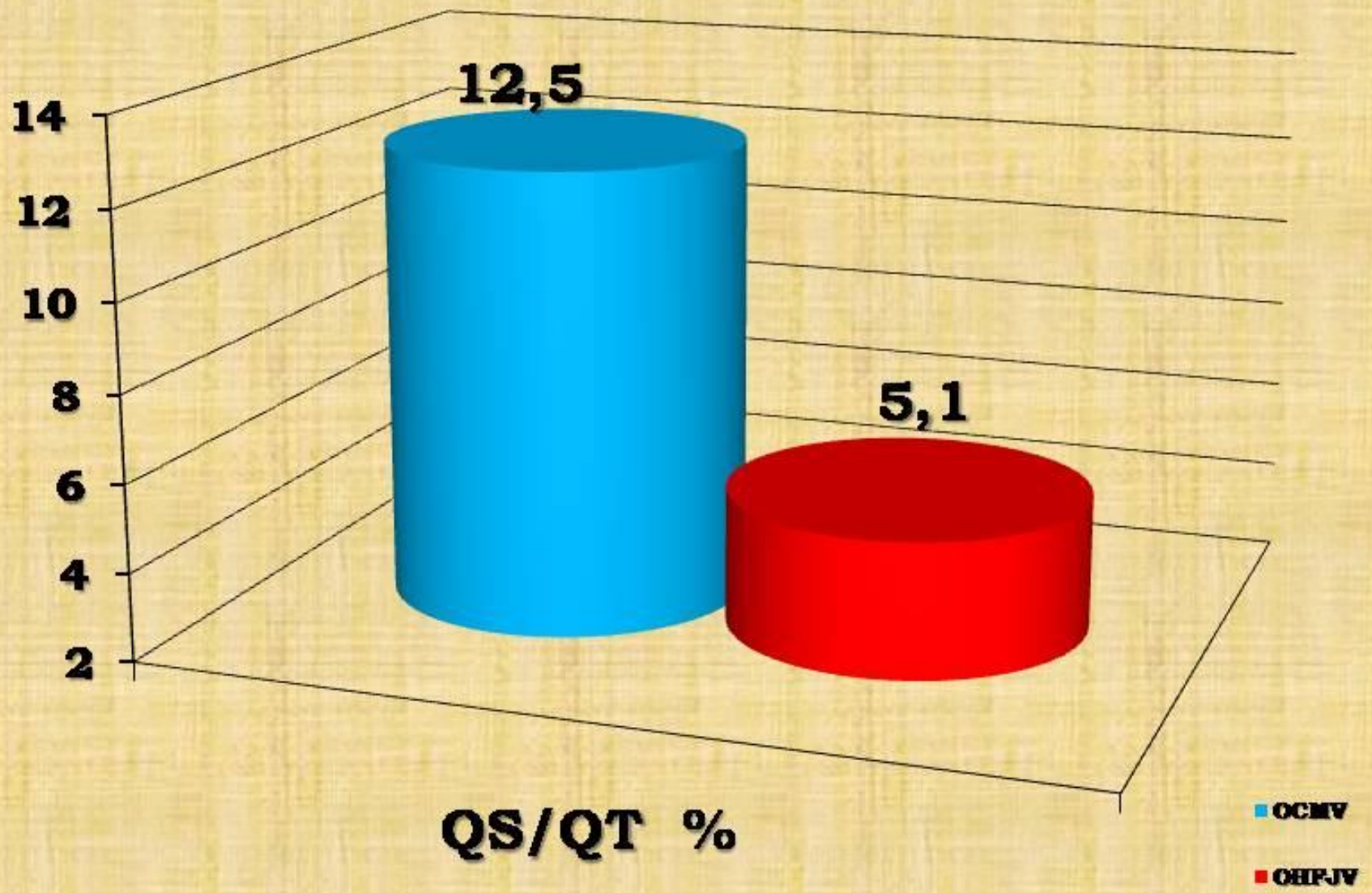
(N=50)



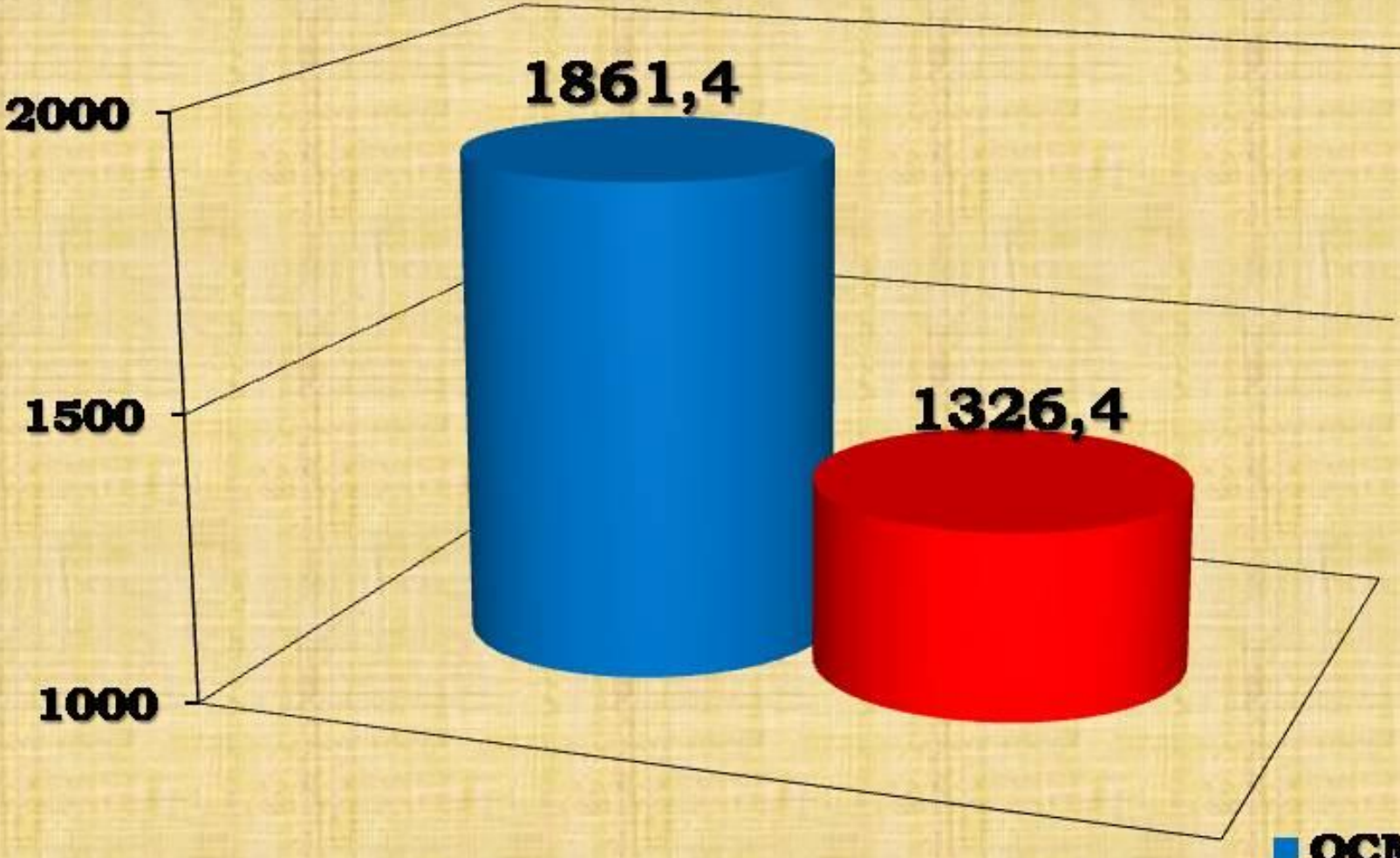
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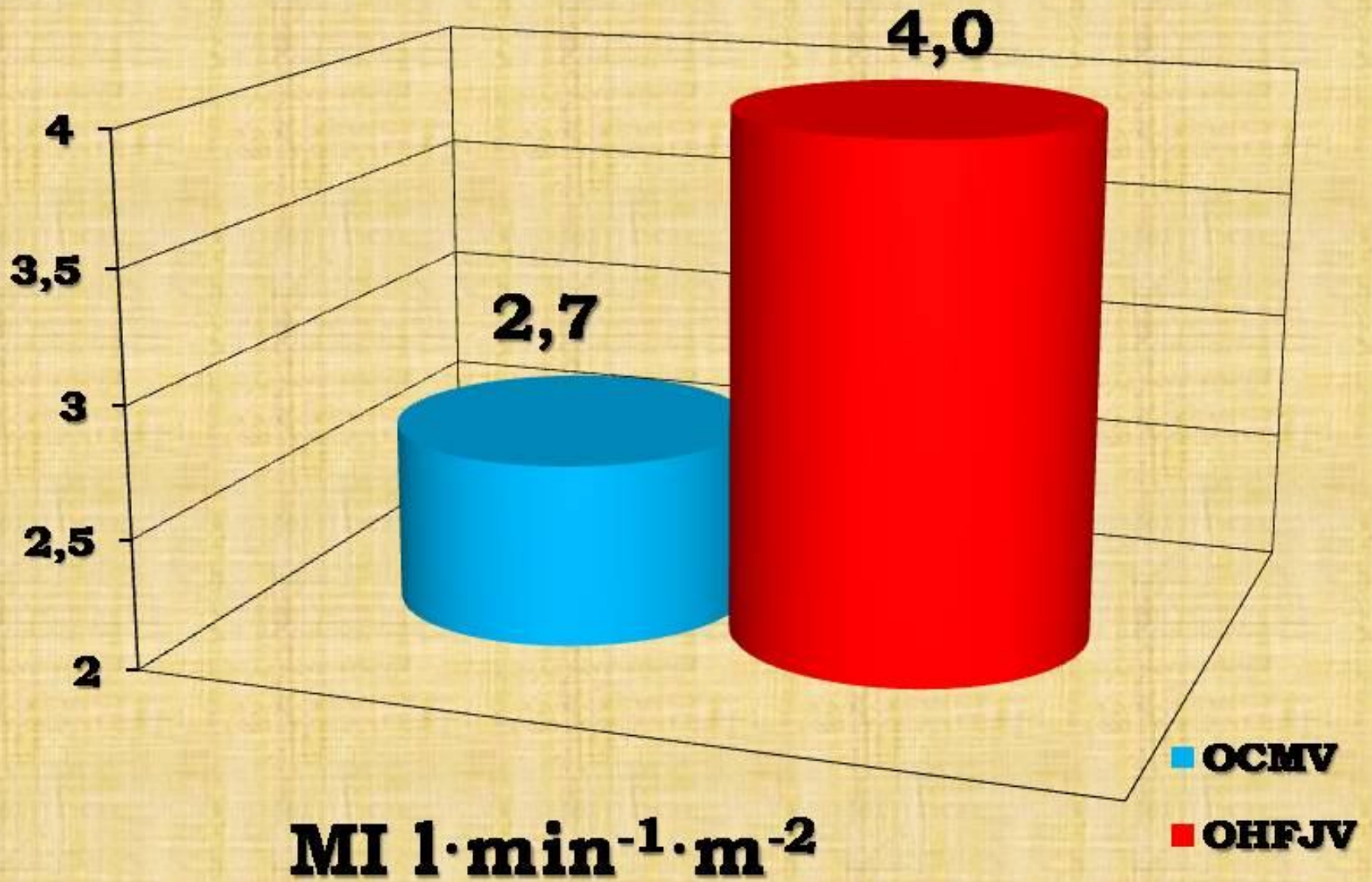
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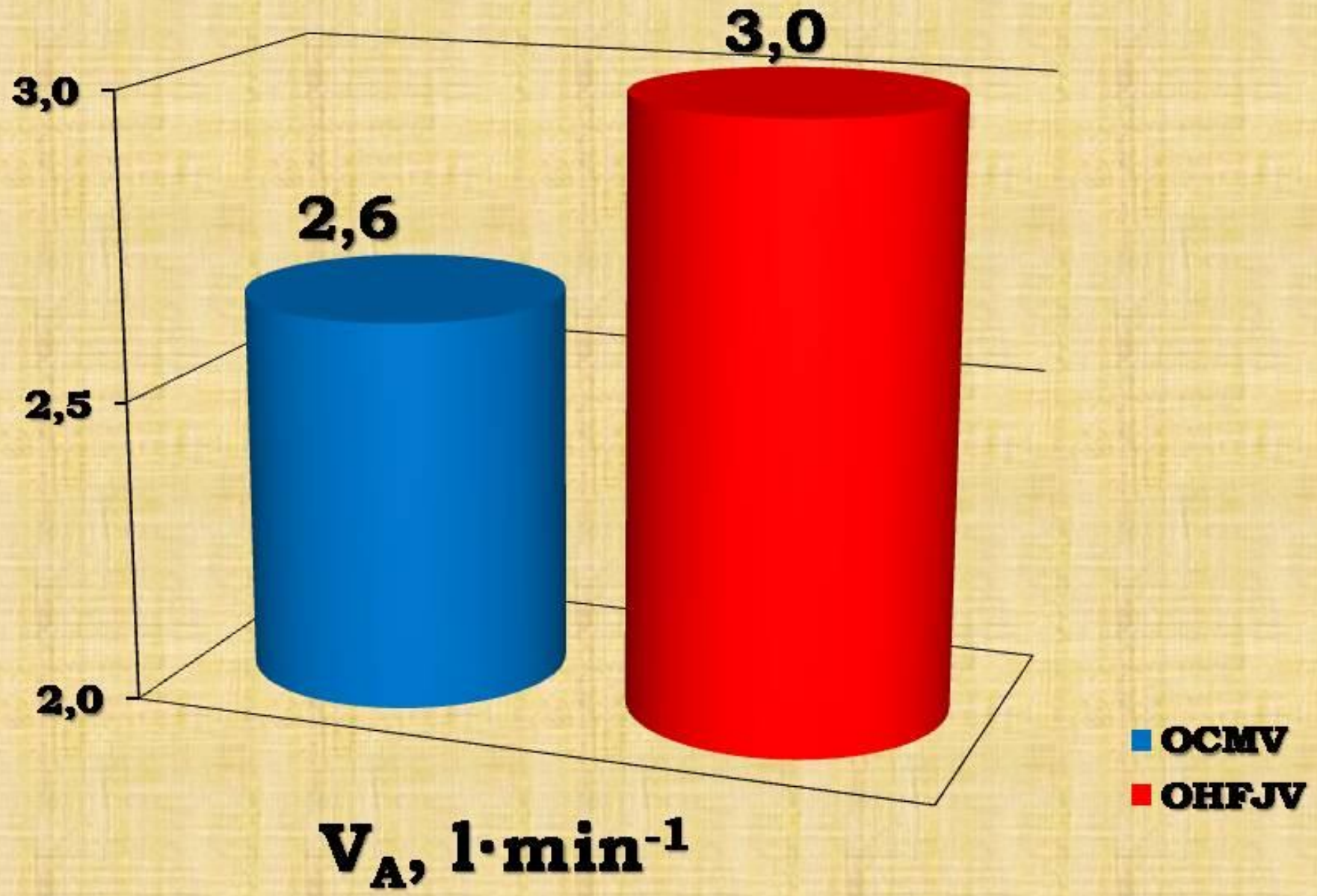
PVR $\text{din/cm}^5/\text{s}$

■ OCMV
■ OHFJV

(N=50)



(N=50)



CONCLUSIONS.

Under conditions of OHFJV, even a complete atelectasis of one lung does not go along with a considerable disorder of gas exchange in contrast to OCMV.

This enabled a wider application of this kind of ventilation for lung surgeries on patients with distinct gas exchange and hemodynamics disorders.

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