

# Bloqueio do Plexo Braquial por Via Interescalênica, Efeitos sobre a Função Pulmonar \*

## Interscalene Brachial Plexus Block. Effects on Pulmonary Function

Alexandre Hortense <sup>1</sup>, Marcelo Vaz Perez <sup>2</sup>, Jose Luis Gomes do Amaral, TSA <sup>3</sup>, Ana Cristina Martins de Vasconcelos Oshiro <sup>4</sup>, Heloisa Baccaro Rossetti <sup>5</sup>

### RESUMO

Hortense A, Perez MV, Amaral JLG, Oshiro ACMV, Rossetti HB – Bloqueio do Plexo Braquial por Via Interescalênica. Efeitos sobre a Função Pulmonar.

**JUSTIFICATIVA E OBJETIVOS:** A via interescalênica é um dos acessos mais comumente utilizados no bloqueio do plexo braquial. Todavia, tem-se demonstrado associação dessa técnica com o bloqueio do nervo frênico ipsilateral. A disfunção diafragmática daí resultante provoca alterações na mecânica pulmonar, potencialmente deletérias em pacientes com limitação da reserva ventilatória. O objetivo do estudo foi avaliar a repercussão do bloqueio interescalênico sobre a função pulmonar por meio da medida da capacidade vital forçada (CVF).

**MÉTODO:** Estudo duplamente encoberto com 30 pacientes, estado físico I ou II (ASA), distribuídos aleatoriamente em dois grupos de 15. Foi administrada solução a 0,5% de ropivacaína (Grupo Ropi) ou bupivacaína a 0,5% com epinefrina (Grupo Bupi). O bloqueio foi realizado utilizando estimulador de nervo periférico e sendo injetados 30 mL de anestésico local. Quatro espirometrias foram realizadas em cada paciente: antes do bloqueio, 30 minutos, 4 e 6 horas após. Os pacientes não receberam sedação.

**RESULTADOS:** Um paciente do Grupo Ropi e três pacientes do Grupo Bupi foram excluídos do estudo por falha de bloqueio. A redução da CVF no Grupo Ropi foi máxima aos 30 minutos (25,1%) e a partir de então houve tendência progressiva à recuperação. Já com bupivacaína, a redução da CVF pareceu ser menos acentuada nos diversos momentos estudados; observou-se redução adicional entre 30 minu-

tos (15,8%) e 4 horas (17,3%), sendo esta sem diferença estatística. A partir de 4 horas, notou-se tendência à recuperação. Em ambos os grupos, após 6 horas de bloqueio a CVF encontra-se ainda abaixo dos valores prévios.

**CONCLUSÕES:** O bloqueio interescalênico reduz a CVF na maioria dos casos; as alterações foram mais acentuadas no Grupo Ropivacaína.

**Unitermos:** ANESTÉSICO, Local: bupivacaína; TÉCNICAS ANESTÉSICAS, Regional: plexo braquial; SISTEMA RESPIRATORIO: função respiratória

### SUMMARY

Perez MV, Hortense A, Amaral JLG, Oshiro ACMV, Rossetti HB – Interscalene Brachial Plexus Block. Effects on Pulmonary Function.

**BACKGROUND AND OBJECTIVES:** The interscalene is one of the most common approaches used in brachial plexus block. However, the association of this approach with the ipsilateral blockade of the phrenic nerve has been demonstrated. The resulting diaphragmatic dysfunction causes changes in lung mechanics, which can be potentially deleterious in patients with limited respiratory reserve. The objective of the present study was to evaluate the repercussion of interscalene brachial plexus block on pulmonary function by measuring forced vital capacity (FVC).

**METHODS:** This is a double-blind study with 30 patients, physical status ASA I or II, randomly separated into two groups of 15 patients each; 0.5% ropivacaine (Ropi Group) or 0.5% bupivacaine with epinephrine (Bupi Group) was administered. A peripheral nerve stimulator was used, and 30 mL of the local anesthetic were administered. Four spirometries were done in each patient: before the blockade, 30 minutes, four hours, and six hours after the blockade. Patients were not sedated.

**RESULTS:** One patient in the Ropi Group and three patients in the Bupi Group were excluded from the study due to failure of the blockade. The Ropi Group showed maximal FVC reduction at 30 minutes (25.1%), with a tendency for recovery from this point on. With bupivacaine, the reduction in FVC was less important at the different study moments; an additional reduction was observed between 30 (15.8%) and four hours (17.3%), but it was not statistically significant. A tendency for recovery was observed from four hours on. In both groups, the FVC six hours after the blockade was still below baseline levels.

**CONCLUSIONS:** Interscalene block reduces FVC in most cases. Changes were more pronounced in the Ropivacaine group.

**Keywords:** ANESTHETIC, Local: bupivacaine; ANESTHETIC TECHNIQUES, Regional: brachial plexus; RESPIRATORY SYSTEM: respiratory function.

\* Recebido (**Received from**) da Escola Paulista de Medicina – Hospital São Paulo, SP

1. Mestre em Medicina; Médico Assistente do Hospital São Paulo – UNIFESP
2. Doutor em Medicina; Médico Assistente da Casa da Mão do Hospital São Paulo – UNIFESP
3. Livre-docente; Professor Titular da Disciplina de Anestesiologia Dor e Terapia Intensiva – UNIFESP
4. Anestesiologista; Medica Assistente da Casa da Mão do Hospital São Paulo – UNIFESP
5. Mestre em Reabilitação; Chefe da Equipe de Fisioterapia da UTI do Hospital São Paulo – UNIFESP

Apresentado (**Submitted**) em 21 de agosto de 2009  
Aceito (**Accepted**) para publicação em 24 de dezembro de 2009

Endereço para correspondência (**Correspondence to**):  
Dr. Marcelo Vaz Perez  
Rua São Carlos do Pinhal, 152/92  
Bela Vista  
01333-000 São Paulo, SP  
E-mail: marcelovazperez@gmail.com

## Interscalene Brachial Plexus Block. Effects on Pulmonary Function

Alexandre Hortense, M.D., Marcelo Vaz Perez, M.D., Jose Luis Gomes do Amaral, TSA, M.D., Ana Cristina Martins de Vasconcelos Oshiro, M.D., Heloisa Baccaro Rossetti

### INTRODUCTION

The interscalene is one of the approaches used more often in brachial plexus block. However, the association of this technique with ipsilateral phrenic nerve block has been demonstrated<sup>1,2</sup>. The resulting diaphragmatic dysfunction causes changes in lung mechanics, asymptomatic in the majority of healthy patient, but potentially deleterious with limited respiratory reserve<sup>3</sup>. This technique is not recommended for patients with severe pulmonary disease<sup>4</sup>. Urmev and McDonald (1992) contraindicated the interscalene block in patients who do not tolerate a 25% reduction in pulmonary function<sup>5</sup>. The objective of the present study was to evaluate the effects of the interscalene brachial plexus block, with 0.5% bupivacaine associated with epinephrine 1:200,000 or 0.5% ropivacaine on pulmonary function.

### METHODS

After approval by the Research Ethics Committee of the Universidade Federal de São Paulo and signing of the informed consent, 30 patients (between 14 and 67 years of age), physical status ASA I or II (American Society of Anesthesiologists), scheduled to undergo interscalene brachial plexus block for elective upper limb surgery, were included in this study. Patients with failure of the blockade (insufficient analgesia for the surgical procedure) were excluded.

To calculate the size of the study population, the FVC was considered the main variable. When comparing both groups, an alpha error of 0.05 was accepted, as well as an expected difference among the means of 15%, and 20% within each group. The aim was a study power of 80%.

Patients were randomly separated into two groups, with 15 patients each, who received 30 mL of 0.5% ropivacaine (Ropi Group) or bupivacaine associated with epinephrine 1:200,000 (Bupi Group).

Patients were taken to the operating room without pre-anesthetic medication, after an 8-hour fasting period, monitored, and basal spirometry (Koko Spirometer<sup>®</sup>) was done to determine the forced vital capacity (FVC).

Ringer's lactate (6 mL.kg<sup>-1</sup>.h<sup>-1</sup>) was administered through a 20G venous access. Monitoring consisted of electrocardioscope (D<sub>II</sub> and V<sub>5</sub>), pulse oximetry, and blood pressure every five minutes.

After local antisepsis, the needle (Stimuplex<sup>®</sup> A 50 mm) was connected to the peripheral nerve stimulator (Stimuplex<sup>®</sup> –

DIG). The depression between the anterior and middle scalene muscles was identified by palpation, and the puncture was performed at the level of the cricoid cartilage. With an initial current of 1 mA and frequency of 1 Hz, the needle was introduced in the medial, caudal, and slightly posterior direction<sup>6</sup>. Proper positioning of the distal extremity of the needle on the brachial plexus was confirmed by the presence of one or more of the following signs: wrist extension/flexion, flexion of the forearm, or contraction of the deltoid muscle. If the motor response was still positive with currents below 0.5 mA, 30 ml of the anesthetic was injected. In all patients, the interscalene block was complemented with intercostobrachial and medial brachial nerve block with 5 mL of 1% lidocaine with epinephrine 1:100,000 (2.5 µg.mL), since those nerves are T<sub>2</sub> branches.

Spirometries were performed, according to the norms of the Brazilian consensus on spirometry<sup>7</sup>, before the blockade, and 30 minutes and four and six hours after the blockade. Patients were not sedated during the study.

Paired Student *t* test was used to compare the percentage variation in FVC before and after the blockade in each group, and non-paired Student *t* test was used for intergroup comparison at each moment of the study. P < 0.05 was considered significant.

### RESULTS

One patient in the Ropi Group and three in the Bupi Group were excluded from the study due to failure of the blockade. Two patients (one in each group) did not have the spirometry at 30 minutes after the blockade done due to dyspnea. Two patients in the Ropi Group did not have the spirometry done four hours after the blockade because they were still undergoing a surgical procedure.

Table I shows the demographic data of the study patients.

Both groups were homogenous regarding weight (Ropi group: 70.4 ± 9.4 *versus* Bupi group: 64.1 ± 12.3; p = 0.154), gender (p = 0.926), and height (Ropi group: 165.8 ± 11.5 *versus* Bupi group: 169.2 ± 11; p = 0.453). However, a statistically significant difference was observed in the age of both groups (Ropi group: 42.9 ± 11.8 *versus* Bupi group: 29.9 ± 11.5; p = 0.01) and body mass index (Ropi group: 25.7 ± 3.2 *versus* Bupi group: 22.3 ± 3; p = 0.01).

Table I – Demographic Data

	Ropi Group (n = 14)	Bupi Group (n = 12)	p
Gender (M / F)	9 / 5	7 / 5	0.926 (ns)
Age (years) *	42.9 ± 11.8	29.9 ± 11.5	0.01 #
Weight (kg) *	70.4 ± 9.4	64.1 ± 12.3	0.154 (ns)
Height (cm) *	165.8 ± 11.5	169.2 ± 11	0.453 (ns)
BMI (kg.m <sup>-2</sup> ) *	25.7 ± 3.2	22.3 ± 3	0.01 #

\*Results expressed as Mean ± Standard Deviation

BMI = body mass index; p = statistical significance ≤ 0.05; ns = non-significant; # = significant.

Table II – Comparison of FVC (percent variation) between the Study Groups

	Ropi Group	Bupi Group	p
% FVC <sub>30</sub>	74.9 ± 10.1 (n = 13)	84.2 ± 11.1 (n = 11)	0.042*
% FVC <sub>4</sub>	75.6 ± 12.2 (n = 12)	82.7 ± 11.6 (n = 12)	0.156 (ns)
% FVC <sub>6</sub>	81.3 ± 13.5 (n = 14)	87 ± 15 (n = 12)	0.317 (ns)

%FVC<sub>30</sub> = percentage of forced vital capacity 30 minutes after the blockade; %FVC<sub>4</sub> = percentage of forced vital capacity 4 hours after the blockade; %FVC<sub>6</sub> = percentage of forced vital capacity 6 hours after the blockade; p = statistical significance ≤ 0,05; na = non-significant; \* = significant.

**Evolution of Forced Vital Capacity along Time**

Assessment of the percentage evolution of the FVC of all patients in each group included the comparison of the values obtained before the blockade (FVC<sub>0</sub>) with those observed 30 minutes (FVC<sub>30</sub>), four (FVC<sub>4</sub>), and six hours (FVC<sub>6</sub>) after the blockade, as well as comparison the results obtained 30 minutes and 4 hours after the blockade, 30 minutes and six hours after the blockade, and four and six hours after the blockade. The results of the FVC before the blockade were considered equal to 100%.

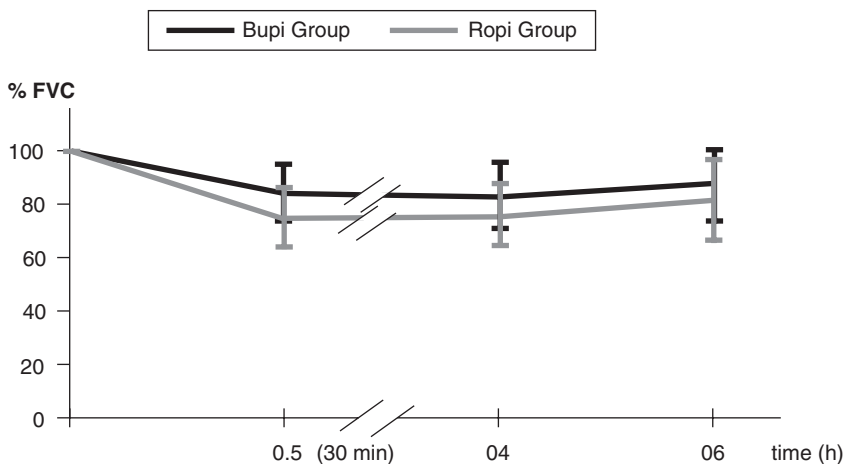
In the Ropi group, a reduction in FVC (100 ± 0 versus 74.85 ± 10.1, p = 0.000\*) was observed 30 minutes after the blockade,

which remained below baseline levels up to six hours after the blockade (100 ± 0 versus 81.3 ± 13.5, p = 0.000\*). Significant differences in FVC at 30 minutes and four hours were not observed (76 ± 10.3 versus 76.9 ± 11, p = 0.632 NS), but a tendency for recovery could be observed between four and 6 hours (75.6 ± 12.2 versus 83.5 ± 13.2, p = 0.003\*).

Analysis of the Bupi group 30 minutes after the blockade showed a reduction in FVC (100 ± 0 versus 84.2 ± 11.1, p = 0.000\*), which remained below baseline levels up to six hours after the blockade (100 ± 0 versus 87 ± 15, p = 0.012\*). Significant changes in FVC were not observed between 30 minutes and four hours (84.2 ± 11.1 versus 82.4 ± 12.1, p = 0.362 NS). However, a tendency for recovery was observed between four and six hours after the blockade (82.7 ± 11.6 versus 87 ± 15, p = 0.037\*).

Thus, greater reduction in forced vital capacity was observed 30 minutes after the blockade in the Ropi Group. Between four and six hours, this difference is not significant. Figure 1 shows the behavior of the FVC in both groups during the study.

Maximal reduction in FVC in the Ropivacaine Group was observed 30 minutes after the blockade, and the chart indicates a tendency for recovery from this point on. With bupivacaine, the reduction in FVC at the different study moments was less pronounced; the FVC reduced even further between 30 minutes and four hours (this difference was not statistically significant) and, from four hours on, a tendency for recovery can be observed. In both groups, the FVC remained below baseline levels six hours after the blockade.



The reduction in FVC in the ropivacaine group reached its maximum after 30 minutes and, from then on, a tendency for recovery can be observed. In the bupivacaine group, the reduction in FVC is less marked throughout the study; an additional reduction was observed between 30 minutes and 4 hours (not statistically significant), and, after four hours, a tendency for recovery can be observed. After 6 hours, FVC was still below baseline levels in both groups.

Figure 1 – Forced Vital Capacity (%FVC) Throughout the Study in Patients Undergoing Interscalene Brachial Plexus Block with 30 mL of a Solution Containing 0.5% Ropivacaine or Bupivacaine

## DISCUSSION

Forced vital capacity was chosen to assess pulmonary function because diaphragmatic dysfunction causes restrictive changes. Peak flow and forced expiratory volume in the first second, used in some studies, are excellent for obstructive changes. Arterial blood gases would not be sensitive enough to detect changes in gas diffusion, which would probably be irrelevant in patients ASA I and II.

Phrenic nerve block causes unilateral diaphragmatic paralysis, which is expressed in pulmonary function tests<sup>5,8</sup>. A mean reduction of 25% was seen in 17 patients with pathologic hemidiaphragmatic paralysis<sup>9</sup>.

Several investigators observed phrenic nerve block in almost 100% of patients undergoing interscalene brachial plexus block<sup>1,2</sup>. It can result from dispersion of a large volume of the local anesthetic commonly used for surrounding structures<sup>10</sup>. Phrenic nerve block can also be the result of the cephalad dispersion of the local anesthetic, affecting more proximal cervical segments (C<sub>3</sub> to C<sub>5</sub>) that form the roots of this nerve<sup>11</sup>. Reduction in the volume of the local anesthetic and proximal digital compression during infusion (in an attempt to avoid the cephalad dispersion) do not seem to decrease the frequency and degree of the diaphragmatic paralysis<sup>12,13</sup>.

In the present study, significant reduction in FVC after interscalene block was observed in both groups. Maximal percentage reductions in FVC were 25.15%, in the Ropi Group, and 17.3%, in the Bupi Group. Variations in weight, height, and age were tolerated because the analysis focused on the variation of individual parameters during the study, and the patient was his/her own control.

Umery & McDonald (1992), observed, after interscalene block with 45 mL of 1.5% mepivacaine (in 8 patients), a reduction in FVC of 27 ± 4.3%<sup>5</sup>. In another study, Urmey & Gloeggler (1993) observed a reduction of 40.9% ± 11.7% in patients who received 45 mL of 1.5% mepivacaine (10 patients), and 32 ± 8.9% in patients who received 20 mL of the same drug (10 patients)<sup>14</sup>. Dagli et al. (1998), using 20 mL of 1% lidocaine and 20 mL of 0.5% bupivacaine in posterior interscalene block, observed a mean reduction of 36.8% in FVC (29 patients)<sup>15</sup>.

The volume and concentration used in the present study are commonly used; besides, bupivacaine and ropivacaine in concentrations of 0.5% produce similar blockade, both in interscalene<sup>16</sup> and axillary blocks<sup>17,18</sup>. Changes in FVC after interscalene blocks are common, but they are not observed in all cases. Spirometry might be normal, even in the presence of bilateral diaphragmatic dysfunction, especially when done with patients in the orthostatic position<sup>19</sup>.

In this study, changes in FVC were not observed in one patient in the Ropi Group. In the Bupi Group, four patients showed a reduction of less than 10% throughout the study. In those cases, either phrenic nerve block was not present or they were capable of maintaining the forced vital capacity using the accessory muscles of respiration.

In the ropivacaine group, maximal FCV reduction was seen 30 minutes after the blockade, and a tendency for recovery was observed from 4 hs on. In the Bupi Group, the additional

reduction between 30 minutes and 4 hours was not significant. After six hours, FVC remained below baseline levels in both groups. It was not possible to determine which anesthetic produced more prolonged reduction in FVC, since the observation period was limited to six hours.

Two patients complained of dyspnea 30 minutes after the blockade, and they were unable to complete the spirometry. However, four and six hours after the blockade, their spirometry was successfully done. In healthy patients, this change in diaphragmatic mobility after interscalene block is usually asymptomatic, except when patients are anxious<sup>20</sup>.

The ratio of the anesthetic potency between bupivacaine and ropivacaine is 1.3/1<sup>21</sup>. Besides, ropivacaine causes less motor blockade than bupivacaine<sup>22</sup>. Therefore, less severe changes in pulmonary function were expected in the Ropi Group. But that was not the case; patients in this group showed more expressive changes in pulmonary function at 30 minutes, a significant difference was observed between both groups (FVC<sub>30</sub> Ropi Group 74.9 ± 10.1 *versus* FVC<sub>30</sub> Bupi Group 84.2 ± 11.1 p = 0.042\*).

Indeed, comparing bupivacaine and ropivacaine, both at a concentration of 0.33%, bupivacaine is associated with greater changes in pulmonary function<sup>23</sup>. However, in the present study, a higher concentration (0.5%), probably above the minimal effective concentration (the lower anesthetic concentration capable of blocking nerve conduction) capable of blocking the motor fibers of the phrenic nerve, was used<sup>24</sup>. The differences in FVC between both groups were not significant four and six hours after the blockade. One could consider that the difference observed 30 minutes after the blockade was a reflection of the faster motor blockade of ropivacaine. But this is not corroborated by the literature: the latency for the maximal blockade of the phrenic nerve in interscalene brachial plexus block is approximately 15 minutes<sup>4</sup>.

Analysis of the data obtained in this study allows the conclusion that interscalene brachial plexus block with 0.5% bupivacaine associated with epinephrine 1:200,000 or with 0.5% ropivacaine: a) Reduces FVC in most cases; b) Changes were more pronounced in the Ropi Group; c) Those changes were maintained for at least six hours and they were not associated with relevant clinical repercussions.

## REFERÊNCIAS – REFERENCES

01. Urmey WF, Talts KH, Sharrock NE – One hundred percent incidence of hemidiaphragmatic paresis associated with interscalene brachial plexus anesthesia as diagnosed by ultrasonography. *Anesth Analg*, 1991;72:498-503.
02. Casati A, Fanelli G, Cedrati V et al. – Pulmonary function changes after interscalene brachial plexus anesthesia with 0.5% and 0.75% ropivacaine: a double-blinded comparison with 2% mepivacaine. *Anesth Analg*, 1999;88:587-592.
03. Cangiani LH, Rezende LAE, Giancoli Neto A – Bloqueio do nervo frênico após realização de bloqueio do plexo braquial pela via interesca-lênica. Relato de caso. *Rev Bras Anestesiol*, 2008;58:152-159.
04. Gottardis M, Luger T, Florl C et al. – Spirometry, blood gas analysis and ultrasonography of the diaphragm after Winnie's interscalene brachial plexus block. *Eur J Anaesthesiol*, 1993;10:367-369.

05. Urmey WF, McDonald M – Hemidiaphragmatic paresis during interscalene brachial plexus block: effects on pulmonary function and chest wall mechanics. *Anesth Analg*, 1992;74:352-357.
06. Mulroy MF – Peripheral Nerve Blockade, em: Barash PG, Cullen BF, Stoelting RK – *Clinical Anesthesia*, 4<sup>th</sup> Ed. Philadelphia, Lippincott Williams & Wilkins, 2001;724-725.
07. Quanjer PH, Lebowitz MD, Gregg I et al. – Peak expiratory flow: conclusions and recommendations of a Working Party of the European Respiratory Society. *Eur Respir J*, 1997;(suppl 24):2S-8S.
08. Gould L, Kaplan S, McElhinney AJ et al. – A method for the production of hemidiaphragmatic paralysis. Its application to the study of lung function in normal man. *Am Rev Respir Dis*, 1967;96:812-814.
09. Arborelius Jr M, Lilja B, Senyk J – Regional and total lung function studies in patients with hemidiaphragmatic paralysis. *Respiration*, 1975;32:253-264.
10. Bashein G, Robertson HT, Kennedy Jr WF – Persistent phrenic nerve paresis following interscalene brachial plexus block. *Anesthesiology*, 1985;63:102-104.
11. Lombard TP, Couper JL – Bilateral spread of analgesia following interscalene brachial plexus block. *Anesthesiology*, 1983;58:472-473.
12. Bennani SE, Vandenamele-Teneur F, Nyarwaya JB et al. – An attempt to prevent spread of local anaesthetic to the phrenic nerve by compression above the injection site during the interscalene brachial plexus block. *Eur J Anaesthesiol*, 1998;15:453-456.
13. Sala-Blanch X, Lazaro JR, Correa J et al. – Phrenic nerve block caused by interscalene brachial plexus block: effects of digital pressure and a low volume of local anesthetic. *Reg Anesth Pain Med*. 1999;24:231-235.
14. Urmey WF, Gloeggler PJ – Pulmonary function changes during interscalene brachial plexus block: effects of decreasing local anesthetic injection volume. *Reg Anesth*, 1993;18:244-249.
15. Dagli G, Guzeldemir ME, Volkan Acar H – The effects and side effects of interscalene brachial plexus block by posterior approach. *Reg Anesth Pain Med*, 1998;23:87-91.
16. Eroglu A, Uzunlar H, Sener M et al. – A clinical comparison of equal concentration and volume of ropivacaine and bupivacaine for interscalene brachial plexus anesthesia and analgesia in shoulder surgery. *Reg Anesth Pain Med*, 2004;29:539-543.
17. Liisanantti O, Luukkonen J, Rosenberg PH – High-dose bupivacaine, levobupivacaine and ropivacaine in axillary brachial plexus block. *Acta Anaesthesiol Scand*. 2004;48:601-606.
18. Vainionpaa VA, Haavisto ET, Huha TM et al. – A clinical and pharmacokinetic comparison of ropivacaine and bupivacaine in axillary plexus block. *Anesth Analg*, 1995;81:534-538.
19. Pereira MC, Mussi RF, Massucio RA et al. – Paresia diafragmática bilateral idiopática. *J Bras Pneumol*, 2006;32:481-485.
20. Tetzlaff JE – Bloqueios de Nervos Periféricos, em: Morgan GE, Mikhail MS – *Anestesiologia Clínica*. 2<sup>nd</sup> Ed. Rio de Janeiro, Revinter, 2003;238.
21. Reiz S, Haggmark S, Johansson G et al. – Cardiotoxicity of ropivacaine—a new amide local anaesthetic agent. *Acta Anaesthesiol Scand*, 1989;33:93-98.
22. Heavner JE – Cardiac toxicity of local anesthetics in the intact isolated heart model: a review. *Reg Anesth Pain Med*, 2002;27:545-555.
23. Altintas F, Gumus F, Kaya G et al. – Interscalene brachial plexus block with bupivacaine and ropivacaine in patients with chronic renal failure: diaphragmatic excursion and pulmonary function changes. *Anesth Analg*, 2005;100:1166-1171.
24. Carneiro AF, Oliva Filho AL, Hamaji A – Anestésicos Locais, em: Turazzi JC, Cunha LB, Yamashita AM et al. – *Curso de Educação à Distância em Anestesiologia*. São Paulo, Office; 2002;104-105.

**RESUMEN**

Hortense A, Perez MV, Amaral JLG, Oshiro ACMV, Rossetti HB – Bloqueo del Plexo Braquial por Vía Interescalenica. Efectos sobre la Función Pulmonar.

**JUSTIFICATIVA Y OBJETIVOS:** *La vía interescalenica es uno de los accesos más a menudo utilizados en el bloqueo del plexo braquial. Sin embargo, se ha demostrado una asociación de esa técnica con el bloqueo del nervio frénico ipsilateral. La disfunción diafragmática de resultados de esa asociación, provoca alteraciones en la mecánica pulmonar, potencialmente perjudiciales en pacientes con una limitación de la reserva ventilatoria. El objetivo del estudio fue evaluar la repercusión del bloqueo interescalenico sobre la función pulmonar por medio de la medida de la capacidad vital forzada (CVF).*

**MÉTODO:** *Estudio doble ciego, con 30 pacientes, estado físico I o II (ASA), distribuidos aleatoriamente en dos grupos de 15. Se administró solución a 0,5% de ropivacaína (Grupo Ropi) o bupivacaína a 0,5% con epinefrina (Grupo Bupi). El bloqueo fue realizado utilizando estimulador de nervio periférico e inyectando 30 mL de anestésico local. Cuatro espirometrías se hicieron en cada paciente: antes del bloqueo, 30 minutos, 4 y 6 horas después. Los pacientes no recibieron sedación.*

**RESULTADOS:** *Un paciente del Grupo Ropi y tres pacientes del Grupo Bupi, quedaron excluidos del estudio por fallos de bloqueo. La reducción de la CVF en el Grupo Ropi se hizo máxima a los 30 minutos (25,1%) y a partir de entonces, hubo una tendencia progresiva a la recuperación. Ya con la bupivacaína, la reducción de la CVF pareció ser menos acentuada en los diversos momentos estudiados; se observó una reducción adicional entre 30 minutos (15,8%) y 4 horas (17,3%), siendo esa sin diferencia estadística. A partir de 4 horas, se notó una tendencia a la recuperación. En los dos grupos, después de 6 horas de bloqueo, la CVF todavía estaba por debajo de los valores previos.*

**CONCLUSIONES:** *El bloqueo interescalenico reduce la CVF en la mayoría de los casos; las alteraciones fueron más acentuadas en el Grupo Ropivacaína.*