154 - ANALYSIS OF MAXIMUM RESPIRATORY PRESSURE BEFORE AND AFTER INTERVENTION ACQUATIC PHYSIOTERAPY IN MORBIDLY OBESE BEFORE BARIATRIC SURGERY

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INTRODUCTION

According to the report of World Health Organization (2003), the obesity is one of the most neglected diseases, with projected global epidemic of severe obesity. The obesity isn't a singular desorder but a heterogeneous group of conditions with multiple causes that ultimately result in phenotype of obesity (FRANCISCHI et al., 2000).

An intervention is currently is reaching the obese population is the attempt of reducing body weight through stomach reduction surgery, known as bariatric surgery.

The physioterapist have an important role, working with the multidisciplinary team in after and before these surgery, due to high incidence of pulmonary complications after surgery, responsible for increased morbity and mortality in this period (SARMENTO, 2007).

Also according to Sarmento (2007), the pre-operative morbidly obese always have some degree of respiratory failure, which leads of increased risk os atelectasis, bronchopneumonia, pneumonia and pulmonary embolism after surgery, the care before and after period are the most important than the surgery to ensure good result for the patient, must identify the risk factors for the occurrence of complications, you should prepare and guide the patient to attempt to prevent pulmonary and cardiovascular complications, surgical procedures, mechanical ventilation, local of incision, presence of drains, breathing exercises, cough, walking, smoking cessation, aerobic and respiratory muscle training, physical exercise, orientation of the surgical team.

Another intervention popularly known in the preparation of pre-operative is the practice of aerobic activities that aim to decrease the body weight, improves cardiovascular capacity, improve breathing capacity, improve quality of life and that has this physiological effects: elimination of excess fat reserves, in addition facilitating the distribution of body fat that will encourage a healthier pattern, improves the performance of the heart to produce myocardial energy requirements by reducing heart rate and blood pressure, increase pulmonar ventilation by gain in volume minute and reduction in respiratory rate and improves the structure and function of ligaments, tendons and joints. (BLAIR et alii,1994 ; BOUCHARD et alli,1994 ; YAZBEK & BATTISTELLA,1994 ; citado por GUEDES,1995).

According to Francishi et al. (2001) the regular aerobic training intensifies the loss of fat, but at the same time doesn't guarantee success in the maintenance of MCM. There are several types of training available, wich vary in intensity, duration and frequency are necessary to produce and maintain the desired effect from that chosen training.

An example of aerobic activity that has been used and has brought plenty of positive results is hydrotherapy, that is a form of therapy in the water, being a very different means of land. When inserted in this new environment the body is subjected to different physical forces and consequently performs a series of physiological adaptations (CAROMANO et al., 2003).

In hydrotherapy the aerobic activity has intensity graded according to several variables, being the most used and their respective values: Maximal oxygen consumption: 40/50% to 85% found by effort testing; training using variation of maximum heart rate: 55/65% to 90%; training using a percentage of resting heart rate: 40/50% to 85%, training using subjective effort of Borg: exercise that involve moderate and intense activity; training within the injunction blood lactate of 4mM/L; training that consume lower energy inferior to MET's (CAPUTO, 2009).

The weekly frequency of aerobic activities are set 3 to 5 times per week, with an estimated time of 20 to 60 minutes (involving continuous or discontinuos exercise). The monitoring of this activity should be done with the systematic monitoring of the following data: vital signs (blood pressure, heart rate, respiratory rate, oxygen saturation) table of subjective effort of Borg and dyspnea. (CAPUTO, 2009)

The physical forces of water play a central role in the organism during the exercise, causing changes in cardiorespiratory system, improving cardiac efficiency and consequently resulting in smaller changes in heart rate (HR), in response to peripheral vasoconstriction and diversion of blood to active tissues. (KRUEL, 2000; CAROMANO et al., 2003).

Immediately after immersing the body suffers the action of hydrostatic pressure, increasing blood flow, centralizing the bulk of lower limbs for large parts of the thorax, indicating improved efficiency in the mechanisms responsible for the improvement of venous return. (FILKENSTEIN et al., 2005).

The hydrostatic pressure is a fundamental element for the physiological responses during the practice of hydro gymnastics. It helps to correct posture, in respiratory rehabilitation, the knowledge body, in balance and also in venous return. Another important element is the resistance of water, which provides important influence about improvement of physical conditioning, energy expenditure and reducing the impact suffered by the joints. (KRUEL, 2000; CAROMANO et al., 2003).

It is known that obesity causes restrictions in lung function due decreased of diaphragmatic incursion by increased abdominal fat and increased the weight on the chest wall, leading to a reduction in lung volume and capacity, this results in a reduced tolerance to effort. The objective of this study was assessed the effect of acquatic physioterapy treatment in maximal respiratory pressures before bariatric surgery.

MATERIALS AND METHODS

The treatment was performed at the Rehabilitation Centre of Assis Gurgacz college - FAG, in the sector of cardiopulmonary physioterapy and in swimming pool. The sample was composed by 3 women aged 18 to 50 years, previously assessed by the gastroenterologist and sent to FAG for physioterapy treatment and released for physical activity in therapeutic pool. Everybody are on the queue to perform bariatric surgery. The program of training were 15 session at frequency of three times per week, for about 50 minutes each. The intensity calculated for the energy expenditure was 50% of maximal HR, perceived exertion scale moderate and control the signs and symptoms. Everybody were previously adapted to the water. Every 5 minutes were monitored: heart rate, oxygen saturation, perceived exertion scale and signs and symptoms. The schedule of treatment was: 5 minutes to warming with global stretching and walking in water, 15 minutes to aerobic training using upper limbs,

15 minutes to aerobic training using lower limbs and 5 minutes to slowdown with global stretching.

For hydrotherapy session will be used the follow protocol, developed by research collaborators. The first 5 minutes of warming will consist of: Hiking inn both directions with the water resistance acting directly and global stretching; race with alternating elevation knee and closed fists; Running with alternating elevation knees, hands open; jumping moving forward, with water until shoulders; jumping in place, approaching and departing his legs.

The exercise for upper limbs are composed by: Pull and push - labour muscle: biceps, triceps, flexors and extensors of the forearms. When pulling, palm facing downwards; while pushing with the palm facing upward. Using the physical principles of water as resistance; arms forward with palms facing one to the other, driving them away, pushing the water with the backs of hands back (inspired). Attach them to front, the water resistance onn the palms (expiry); hands resting on the boards, running in place, moving them forward and backward. The board in this moment used as a material to resist; skip supporting hands lightly on the boards, extending their arms; push- put the board into the water close to the chest. Extend your arms into the water and bring the board close to the chest, restarting the movement; running in place, moving the arms under water, moving forward and backward. Muscular work: arms and legs. The dumbbells are used as resistance for greater energy expenditure and increase muscle strength.

The exercises of lower limbs: cycle - working muscle: quadriceps, posterior thigh. Pull the knee up, extend you leg, touching the toes the ground, restarting the movement; abduction-adduction - working muscle: lateral and inner thigh. Holding the edge, lift one leg extended to lateral and back (right the left); kicking the legs the front crawl - working muscle: thigh muscles anterior and posterior; Plie - hold in gutter, flex and extend the legs; skip uniting and away the legs - working muscle: internal and external muscles of the thigh and quadriceps. Small games: pass the ball over the head and between his legs. The last (walking, jumping, swimming, running) is placed at the front, when the first get ahead, the team wins; Pass the ball laterally, the latter should (running, jumping, swimming, etc.), go to the basket, go back and putting themselves forward; game of dodgeball.

Slowdown: Global stretches with the Water Pilates technique. This program creatively adapts Pilates exercise for the pool. Stretches the entire body with exercises and original conditioning, building a stronger core (abdominal and posterior region), moving from the inside out. The postures used are as follows: Standing with help to bat and one upper limb, open the arm to the side and keep; the torso rotates to the same side and the outher arm touches the bat. Held at the expiration together the movement and the inspiration in the back of it; Standing, without floats help, held to kick forward and backward. Alternating the legs. In the same previous posture associated the upper limbs.

The first and last sessions were used to conduct the assessment and reassessment of patients using manovacuometer with the measurement of maximal respiratory pressure: Inspiratory (MIP) and expiratory (MEP) in soil, before and after acquatic physioterapy intervention, according to the criteria of Brazilian Society of pulmonology and phthisiology, totaling 17 sessions.

RESULTS AND DISCUSSION

Before the acquatic physioterapy program, the average MIP by the patients was 80±12 cm/H2O and after was 120±10 cm/H2O with p=0.058 was no significant difference. While MEP has average 86.6± 12.3 cm/H2O and after was 106.6±5.3 cm/H2O with p= 0.18 was no significant difference.

With respect to the values obtained in the MIP can be observed that the initial average was below the expected parameters for a young adult, then, still following what it says Regenga (2000), the expected values are between - 90cm H2O to - 120cm H2O.

The function of respiratory muscles and diaphragmatic movement are affected by obesity. This is by restricting the expansion of chest cavity and lungs. Paisani (2005) found great variability in the pre-operative between MIP and MEP observing patients with low values of muscle strength and others with normal values or even above the expected value. This small effect on the values of MIP and MEP can be explained by the fact that the obese have a large overhead inspiratory, thereby promoting a training effect in the respiratory muscles, which could result in lower reduction in MIP and MEP.

The location of the deposit of fat also influences a ventilatory function and the more central (or android) the greater the prejudice. The function of respiratory muscles and diaphragmatic movement are also changed due to restrictions in chest wall caused by adipose tissue. (PAISANI, CHIAVEGATO e FARESIN, 2005 e PEREIRA, FRANCISCHI e LANCHA-JR, 2003).

It was expected that individuals with severe obesity present pulmonary restriction due to excess fat, which would reduce diaphragmatic excursion and reduced lung volume, when compared with provided values for non-obese people. (NAIMARK e CHERNIACK, 1960; LUCE, 1980; SURATT et al, 1984; COLLINS et al, 1995; JUNG, 1997; BARRETO, 2002; EICHENBERGER et al, 2002; LAGHI e TOBIN, 2003; EMMERICH, 2004; CANOY et al, 2004; PAISANI, CHIAVEGATO e FARESIN, 2005).

Hautmman in his study considering the normal values for MIP < 70 cmh2O and MEP > 80 cmh2O, noted wide variability in comparison with the measures of volume and capacity respiratory muscle strenght. Of the 19 patients in the experimental group, 13 patients (68,42%) had inspiratory muscle weakness and 14 patients (73,68%) had expiratory muscle weakness. In the control group of 15 patients, 4 (26,66%) had inspiratory muscle weakness and 2 patients (13,33%) had expiratory muscle weakness. Applied the inspiratory muscle training to patients in the experimental group that obtained statistically significant improvement of (p< 0, 001).

The study is in agreement wit SARAGIOTTO (2003) that after respiratory physioterapy the patients had a very small development, of only -7,09 cmH2O. This resusts aren't statistically significant at the 5% level with p= 0.85. The smallest variation in the MIP can be justified by the fact that the carrying out of inspiration, that is active fully process, ie, it requires of muscle strength especially the diaphragm its greatest representative, for it is necessary a respiratory mechanics without changes, in obese patient this doesn't happen often. The values of MEP were also measured and similarly dont showed significant changes.

Regarding the protocols used for training evolution also occur. Pardy and Rochester cited by Machado- Rodrigues demonstrate the existence of a strong relationship between the intensity, training and percentage of improvement of MIP. Wankes e cols re ject this relationship, since pressures imposed from 70% and 100% MIP increase this variable in only 40%. The training of low intensity, ie, with load of 30% result in increases of 34%.

In this study the load training was 50% MIP. Observed an improvement in 50% of MIP. This probably occurred due to the continuous training and the 10 physioterapy session supervised by physioterapist. This monitoring enable the reassessment constant, which justify this improvement.

The smallest variation in the MIP can be justified by the fact that for achievement inspiration, that is a active fully process, ie, requires inspiratory muscle strength especially the diaphragm its greatest representative, for this it is necessary a mechanical respiratory unamended, in obese patient this doesn't happen often.

CONCLUSION

This study responded to the objective of research, showing to be beneficial when used as a means of preparing before obesity surgery, with increase in maximal respiratory pressure after acquatic physioterapy intervention. It is suggested to repeat the study with a larger sample of individuals.

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ANALYSIS OF MAXIMUM RESPIRATORY PRESSURE BEFORE AND AFTER INTERVENTION ACQUATIC PHYSIOTERAPY IN MORBIDLY OBESE BEFORE BARIATRIC SURGERY

ABSTRACT

Introduction: It is known that obesity causes restrictions in lung function due to decreased of diaphragmatic excursion by increased abdominal fat and increase the weigh on the chest wall, leading to a reduction in volume and capacity of lung, this results in a reduced tolerance to effort. Objective: Assess the effects of acquatic physioterapy on maximal respiratory pressures before bariatric surgery. Methodology: The treatment was performed at the Rehabilitation Centre of Assis Gurgacz college - FAG, in the sector of cardiopulmonary physioterapy and in swimming pool. The sample was composed by 3 women aged 18 to 50 years, previously assessed by the gastroenterologist and sent to FAG for physioterapy treatment and released for physical activity in therapeutic pool. Everybody are on the queue to perform bariatric surgery. Results: Before the acquatic treatment, the average MIP by the patients was 80 ± 12 cm/H20 and after was 120 ± 0 cm/H20 with p=0, 058 no significant difference. The MEP has averaged 86,66 ± 12,33 cm/H2O and after was 106,66 ± 5,33 cm/H2O with p=0, 183 no significant difference. Conclusion: This study responded to the research objectives, showing beneficial when used as a means of preparing for the obesity surgery, with increase in maximal respiratory pressures after acquatic physioterapy. It is suggested to repeat the study with a larger sample of individuals.

KEYWORDS: Acquatic Physioterapy, Manovacuometry, Bariatric Surgery.

ANALYSE DES PRESSIONS RESPIRATOIRES MAXIMALES AVANT ET APRÈS INTERVENTION PHYSIOTHÉRAPIQUE AQUATIQUE EN OBÈSES MORBIDES PRÉ CHIRURGICAUX BARIATRIQUES

RÉSUMÉ

Introduction : Il est connu que l'obésité engendre restrictions dans la fonction pulmonaire à cause de la diminution de l'incursion diaphragmatique par l'augmentation de l'adiposité abdominale et par l'augmentation du poids à la paroi thoracique, conduisant à une réduction des volumes et des capacités pulmonaires, cela résulte à une tolérance réduite à l'effort. Objective : Évaluer la répercussion du traitement physiothérapeutique aquatique dans des pressions respiratoires maximales pré-opératoire de chirurgie bariatrique. Méthodologie : Le traitement a été réalisé dans le Centro de Réhabilitation de la Faculté Assis Gurgacz – FAG, dans les gymnases de Physiothérapie Cardio-pulmonaire et pscine thérapeutique. L'échantillon a été composé de 3 femmes de 18 à 50 ans, évaluées préalablement par le médecin gastroentérologue, dûment envoyées à FAG pour traitement physiothérapeutique et libérées pour la pratique d'activité physique en piscine thérapeutique. Toutes se trouvent dans file pour réalisation de chirurgie bariatrique. Résultats : Avant le programme physiothérapeutique aquatique, la moyenne du Pimáx par les patientes ont été de 80 ± 12 cm/H20 et après il a été de 120 ± 0 cm/H20 en étant p=0, 058 n'ayant pas de différence

significative. Déjà Pemáx a eu moyenne 86,66 ± 12,33 cm/H20 et après a été de 106,66±5,33 cm/H20 en étant p=0,183 n'ayant pas de différence significative. Conclusion : Cette étude à répondu aux objectifs de la recherche, en se montrant bénéfique à l'être utilisé comme moyen de préparation pour la pré-opératoire de chirurgie de l'obésité, en ayant augmentation dans les pressions maximales après intervention physiothérapeutique aquatique. Se suggère la répétition de l'étude avec un échantillon plus grand de personnes.

MOTS-CLÉS : Physiothérapie Aquatique, Manovacuometria, Chirurgie Bariatrique

ANÁLISIS DE PRESIONES RESPIRATORIAS MÁXIMAS PRE Y POS INTERVENCIÓN DE FISIOTERAPIA ACUÁTICA EN OBESOS MÓRBIDOS PRECIRUGÍA BARIÁTRICA

RESUMEN

Introducción: Se sabe que la obesidad causa restricciones en la función pulmonar debido a la disminución de la excursión diafragmática por aumento de la adiposidad abdominal y aumentar el peso en la pared torácica, lo que lleva a una reducción de volumen y la capacidad pulmonar, esto resulta en una tolerancia menor al esfuerzo. Objetivo: Evaluar la repercusión del tratamiento fisioterapéutico acuático en las presiones respiratorias máximas en el preoperatorio de cirugía bariátrica. Metodología: El tratamiento se llevó a cabo en el Centro de Reabilitação da Faculdade Assis Gurgacz - FAG, en los gimnasios de Fisioterapia Cardiopulmonar y piscina terapéutica. La muestra está formada por tres mujeres de 18 y 50 años, previamente evaluadas por el médico gastroenterólogo, debidamente encaminadas a FAG para el tratamiento fisioterapéutico y liberadas para la práctica de actividad física en una piscina terapéutica. Todas están en la cola para realizar la cirugía bariátrica. Resultados: Antes del programa fisioterapéutico acuático, la media de la Pimáx por las pacientes fue de 80 ± 12 cm/H20 y después fue de 120 ± 0 cm/H20 siendo p=0, 058 no habiendo diferencia significativa. Ya la Pemáx tuvo alrededor de 86,66 ± 12,33 cm/H20 y después fue de 106,66±5,33 cm/H20 siendo p=0, 183 no habiendo diferencia significativa. Conclusión: Este estudio respondió a los objetivos de la investigación, ha mostrado ser benéfico cuando se utiliza como medio de preparación para el preoperatorio de la cirugía de la obesidad, habiendo aumento en las presiones respiratorias máximas pos intervención fisioterapéutica acuática. Se sugiere repetir el estudio con una muestra mayor de individuos.

PALABRAS-CLAVE: Fisioterapia Acuática, Manovacuometria, Cirugía Bariátrica

ANALISE DAS PRESSÕES RESPIRATÓRIAS MÁXIMAS PRÉ E PÓS INTERVENCÃO FISIOTERAPICA AQUÁTICA EM OBESOS MORBIDOS PRÉ CIRURGICOS BARIÁTRICOS

RESUMO

Introdução Sabe-se que a obesidade gera restrições na função pulmonar devido à diminuição da incursão diafragmática pelo aumento da adiposidade abdominal e pelo aumento do peso na parede torácica, levando a uma redução dos volumes e capacidades pulmonares, isso resulta em uma tolerância reduzida ao esforço. Objetivo: Avaliar a repercussão do tratamento fisioterapêutico aquático nas pressões respiratórias máximas no pré-operatório de cirurgia bariátrica. Metodologia O tratamento foi realizado no Centro de Reabilitação da Faculdade Assis Gurgacz - FAG, nos ginásios de Fisioterapia Cardiopulmonar e piscina terapêutica. A amostra foi composta por 3 mulheres de 18 a 50 anos, avaliadas previamente pelo médico gastroenterologista, devidamente encaminhadas a FAG para tratamento fisioterapêutico e liberadas para a prática de atividade física em piscina terapêutica. Todas encontram-se na fila para realização de cirurgia bariátrica. Resultados: Antes do programa fisioterapêutico aquático, a média da Pimáx pelas pacientes foi de 80 ± 12 cm/H20 e após foi de 120 ± 0 cm/H20 sendo p=0, 058 não havendo diferença significativa. Já a Pemáx teve média 86,66 ± 12,33 cm/H20 e após foi de 106,66±5,33 cm/H20 sendo p=0, 183 não havendo diferença significativa. Conclusão: Este estudo respondeu aos objetivos da pesquisa, mostrando-se benéfico ao ser utilizado como meio de preparação para o pré-operatório da cirurgia da obesidade, havendo aumento nas pressões respiratórias máximas pós intervenção fisioterapêutica aquática. Sugere-se a repetição do estudo com uma amostra maior de indivíduos.

PALAVRAS-CHAVE: Fisioterapia Aquática, Manovacuometria, Cirurgia Bariátrica