141 - EFFECTS OF AQUATIC PHYSIOTHERAPY ON LUNG FUNCTION AND QUALITY OF LIFE IN PATIENTS WITH BREAST CANCER

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INTRODUCTION

Cancer (CA) is a huge public health problem, accounting for more than six million deaths each year. In Brazil, breast CA is the leading cause of death among women (INCA, 2010). The physical deconditioning in patients with CA causes systemic manifestations, which is resulted from the disease or side effects of treatments and/or associated comorbidities. Physical therapy can alleviate these issues and improve the quality of life (QL) of these patients (CRANNELL; STONE, 2008; EVANS; LAMBERT, 2007).

A rehabilitation program through exercises implemented before, during and after the treatment of CA can mitigate the side effects of the disease and afford physical and psychological benefits (PEETERS et al., 2009; COURNEYA et al., 2007). The aquatic physiotherapy (AP) can reduce the lymphedema, promote muscle relaxation, increase the exercise tolerance and physical strength (SHIMONY; TIDHAR, 2008; GUERREIRO GODOY et al., 2010; RIZZI et al., 2010). However, the AP is not yet widely studied, which led to the evaluation of the behavior of physiological variables, lung volumes, respiratory muscle strength (RMS) and QL before and after a program of AP in women with breast CA.

METHODOLOGY

It is a pre-experimental study with eleven breast CA patients after the chemotherapy and radiotherapy cycle. It was included patients with medical clearance to perform the AP and it was excluded those with lung disease, smokers and former smokers or metastases. From the total of twenty-nine patients it was selected eleven of them, four patients had performed a total mastectomy of the breast, two underwent quadrantectomy and five only removed the tumor. The project was approved by the Ethics Committee of the University of Santa Cruz do Sul (Unisc).

The AP program lasted 34 sessions (03 times/week), consisting of 15 minutes of aerobic exercise (warming up), 15 minutes of stretching, 10 minutes of resistance exercises and 10 minutes of relaxation. The average water temperature was 36ºC with immersion to the level of the xiphoid process. All patients practiced aquatic physiotherapy as the only physical activity during the week.

Anthropometric data were collected and then evaluated the physiological variables, lung volumes, RMS and QL before and after the AP program. Heart rate (HR), peripheral oxygen saturation (SpO2), respiratory rate (RR), systolic blood pressure (SBP) and diastolic blood pressure (DBP) were measured at rest. The lung volumes were measured using a portable spirometer (EasyOne ®, MODL 2001), following standards of the American Thoracic Society (AMERICAN THORACIC SOCIETY, 2005) with values predicted by Pereira et al. (1992).

The RMS was evaluated by manometer (MDI ®, MVD300 model), and obtained five maneuvers of maximal inspiratory pressure (MIP) and maximal expiratory pressure (MEP) obtained after peak expiratory and inspiratory effort. It was considered the greatest value of MIP and MEP that did not differ more than 10% the second highest in descending order (NEDER et al., 1999; AMERICAN THORACIC SOCIETY, 2002). The QL was evaluated using the Quality of Life Questionnaire, University of Washington - EORTIC 30, where the lower score meant the better QL of the patients evaluated (Rebelo et al., 2007). For statistical analysis it was used the Wilcoxon test to compare the period before and after the AP (via SPSS software (version 14.0)). For the purposes of statistical significance it was considered $p < 0.05$.

DISCUSSION AND RESULTS

The results of this study suggested that AP significantly improves the HR, RR, respiratory muscle strength and QL of women with breast CA. Studies showed that physical activity can be practiced safely during and after chemotherapy for breast CA and that women feel more active improvements in fitness, muscle strength and QL. Although more research is needed to define the role of exercise in these patients, many proven benefits led to the American Cancer Society and American College of Sports Medicine to encourage regular physical activity in a moderate intensity for patients with breast CA (LIGIBEL, 2011). Emaus et al. (2010), in a population study with 1364 breast CA patients, mentioned that metabolic components and physical activity affect the biological mechanisms and prognosis of breast CA, described a relationship between mortality and BMI, lipids, and physical activity in breast CA patients.

The evaluated patients were age of 52.82 ± 7.22 years old and BMI 24.99 ± 3.36 Kg/m2. The Table 1 shows the behavior of HR and RR before and after the AP program. Dimeo et al. (1998), investigated the effect of aerobic exercise in patients with CA who had demonstrated a fatigue, improvements in the physical performance and reduction in HR after training.

The studies that examined the cardiorespiratory capacity of patients with breast CA underwent a physical exercise program showed significant improvement in cardiorespiratory capacity (VAN WAART et al., 2010; McNEELY et al., 2006; CAMPBELL et al., 2005). In the present study there was significant reduction in RR after the AP program, indicating reduced breathing work.

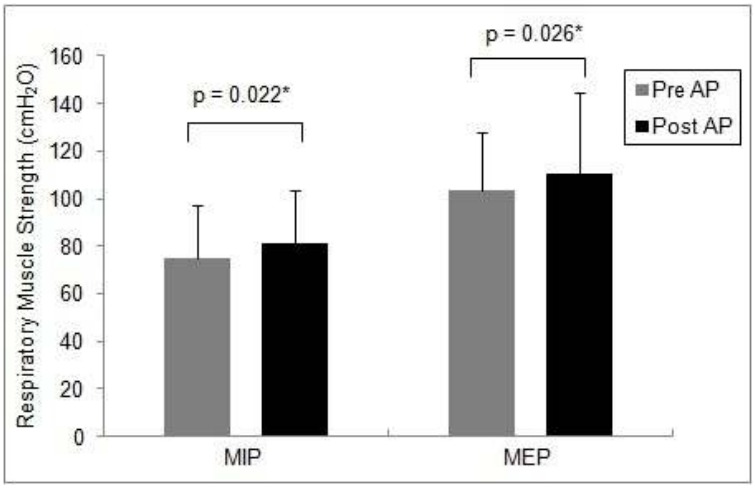
Table 1. Analysis of the physiologic variables before and after aquatic physiotherapy program.

	Pre-AP	Post-AP	p
SBP (mmHg)	127,2 ± 14,8	125,4 ±12,9	0,589
DBP (mmHg)	80,9 ± 11,3	75,4 ± 6,8	0,107
HR (bpm)	89,3 ± 10,4	81,8 ± 9,4	0,018*
SpO_2 (%)	97,9 ± 0,8	98,0 ± 0,9	0, 680
RR (irpm)	17,1 ± 3,2	13,9 ± 2,1	0,003*

SBP: Systolic blood pressure; DBP: Diastolic blood pressure; HR: Heart rate; SpO2: Peripheral oxygen saturation; RR: Respiratory rate; *p<0,05.

Moreover, comparing the period before and after the AP, there is a significant increase in both MIP and MEP (Figure 1). Herrero et al. (2006) evaluated the effects of physical training in patients with breast CA and revealed an increase in cardiorespiratory capacity, muscular strength and resistance. According to Klika et al. (2009), a training of 12 weeks, based on two weekly workouts of higher intensity, produces significant aerobic capacity changes in a group of breast CA survivors, with the increase of RMS alongside cardiorespiratory aptitude assessed by cardiopulmonary exercise test.

Figure 1. Analysis of the respiratory muscle strength before and after aquatic physiotherapy program.



MIP: maximal inspiratory pressure; MEP: maximal expiratory pressure; Pre AP: pre aquatic physiotherapy program; Post AP: post aquatic physiotherapy program; *p<0,05.

Pulmonary toxicity coming from chemotherapy and radiation can cause radiation pneumonitis, alveolar hemorrhage and acute changes in lung function (RYAN et al., 2007; ABOUD-JAWDE et al., 2005). However, the sample analyzed showed the lung volumes according to the predicted. Despite the improvement in lung function after the AP program, the results of this study were not significant (Table 2).

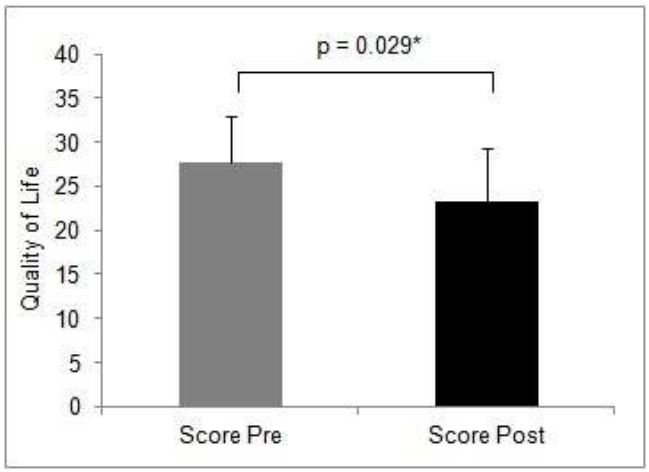
Table 2. Analysis of lung function before and after Aquatic Physioterapy.

	Pre-AP	Post-AP	P
VFE_1Pred (% predicted)	82.88±23.04	90.11±13.05	0.109
PEFPred (% predicted)	91.38±23.53	98.25±14.92	0.085
FVCPred (% predicted)	84.88±20.11	92.75±12.85	0.317
VEF_1/CVF (%predicted)	91.75±17.42	93.63±17.62	0.317

VFE1Pred: predicted value of forced expiratory volume in one second; PEFPred: predicted value of peak expiratory flow; FVCPred: predicted value of forced vital capacity; TiffeneauPred: predicted value of the Tiffeneau index. Predicted value according to Pereira et al. (1992).

By analyzing the QL, it is observed significant improvement in the presented scores of the questionnaire (Figure 2). There are several factors affecting the QL of women with breast CA, among them there is the pain (SO et al., 2009), depression and anxiety levels (KARAKOYUN-CELIK et al., 2010) and fatigue (HAAS, 2010). To reduce such complications, exercise has been suggested as adjunctive treatment to enable the improvement of QL (MARK et al., 2006). Valenti et al. (2008) found significant correlations between exercise and all QL indicators, intense exercise is strongly correlated with it.

Figure 2. Quality of life before and after aquatic physiotherapy program.



ScorePre: obtained score before the aquatic physiotherapy; ScorePost: obtained score after the aquatic physiotherapy; *p<0,05.

Duijts et al. (2011) in a meta-analysis, evaluated the QL and exercise in women with breast CA and it was observed that after the practice of exercise there was a significant improvement in QL, in the levels of fatigue, depression and body image. These data corroborate with the present study, where QL improved significantly after the practice of the AP, expressed by decrease of the score obtained.

Among the study limitations, it can cite the reduced number of patients analyzed and the lack of a control group. Moreover, the scarcity of studies that use the AP as a form of training limited the discussion of results, however it can demonstrate the need for studies that may improve the evaluation and the treatment of patients with breast CA.

In this study, the AP promoted a significant reduction in HR, RR, RMS and the QL of women with breast CA. Such evidence is of great importance because it can lead to improved performance of daily activities of these patients, improving their functional performance and quality of life.

REFERÊNCIAS BIBLIOGRÁFICAS

ABOUD-JAWDE, R. M. et al. Impact of induction concurrent chemoradiotherapy on pulmonary function and postoperative acute respiratory complications in esophageal cancer. Chest. v. 128, n. 1, p. 250-255, 2005.

AMERICAN THORACIC SOCIETY. ATS/ERS Statement on Respiratory Muscle Testing. American Journal of Respiratory and Critical Care Medicine, v. 166, p. 518-624, 2002.

AMERICAN THORACIC SOCIETY. ATS/ERS. MILLER, M. et al. Standardisation of spirometry. European Respiratory Journal. v. 26, n. 2, p. 319-338, 2005.

CAMPBELL, A. et al. A pilot study of a supervised group exercise program as a rehabilitation treatment for women with breast cancer receiving adjuvant treatment. European Journal of Oncology Nursing. v. 9, p. 56-63, 2005.

COURNEYA, K. S. et al. Effects of aerobic and resistance exercise in breast cancer patients receiving adjuvant chemotherapy: a multicenter randomized controlled trial. y. v. 25, p. 4396-4404, 2007.

CRANNELL, C. E.; STONE, E. Bedside physical therapy project to prevent desconditioning in hospitalized patients with cancer. Oncology Nursing Forum. v. 35, n. 3, p. 343-345, 2008.

DIMEO, F. et al. Aerobic exercise as therapy for cancer fatigue. v. 30, n. 4, p. 475-478, 1998.

DUIJTS, S. F. et al. Effectiveness of behavioral techniques and physical exercise on psychosocial functioning and health-related quality of life in breast cancer patients and survivors--a meta-analysis. v. 20, n.2, p. 115-126, 2011.

EMAUS, A. et al. Metabolic profile, physical activity, and mortality in breast cancer patients. v. 121, n. 3, p. 651-660, 2010.

EVANS, W. J.; LAMBERT, C. P. Physiologic basis of fatigue. American Journal of Physical Medicine Rehabilitation. v. 86, n. 1, p. S29-S46, 2007.

GUERREIRO GODOY, M. de F. et al. Active exercises utilizing a facilitating device in the treatment of lymphedema resulting from breast cancer therapy. ence. v. 8, p. 1-4, 2010.

HAAS, B. K. Fatigue, self-efficacy, physical activity, and quality of life in women with breast cancer. v. 34, n. 4, p. 322-334, 2011.

HERRERO, F. et al. Combined aerobic and resistance training in breast cancer survivors: A randomized, controlled pilot trial. icine. v. 27, n. 7, p. 573-580, 2006.

INCA – Instituto Nacional do Câncer. Mama. Rio de Janeiro, 2010. Disponível em: <www2.inca.gov.br/wps/wcm/connect/tiposdecancer/site/ home/mama/cancer_mama> Acesso em: 25 jun 2011.

KARAKOYUN-CELIK, O. et al. Depression and anxiety levels in woman under follow-up for breast cancer: relationship to coping with cancer and quality of life. v. 27, n.1, p. 108-113, 2010.

KLIKA, R.J. et al. Individualized 12-week exercise training programs enhance aerobic capacity of cancer survivors. icine. v. 37, n. 3, p. 68-77, 2009.

LIGIBEL, J. A. Role of adjuvant and posttreatment exercise programs in breast health. The v. 9, n. 2, p. 251-256, 2011.

MARKES, M. et al. Exercise for women receiving adjuvant therapy for breast cancer. v. 18, n. 4, CD005001, 2006.

McNEELY, M.L. et al. Effects of exercise on breast cancer patients and survivors: a systematic review and meta-analysis. v. 175, n. 1, p. 34-41, 2006.

NEDER, J. A. et al. Reference values for lung functions tests. II. Maximal respiratory pressures and voluntary ventilation. Brazilian Journal of Medical and Biological Research, v. 32, n. 6, p. 719-727, 1999.

PEETERS, C. et al. Evaluation of a cancer exercise program: patient and physician beliefs. . v. 18, n. 8, p. 898-902, 2009.

PEREIRA, C. A. C. et al. Valores de referência para espirometria em uma amostra da população brasileira adulta. Jornal Brasileiro de Pneumologia. v. 18, n. 1, p. 10-22, 1992.

REBELO, V. et al. Avaliação da qualidade de vida em mulheres com cancro de mama: um estudo exploratório com 60 mulheres portuguesas. Psicologia, Saúde & Doenças. v. 8, n. 1, p. 13-32, 2007.

RIZZI, P. R. dos S. et al. Efeito da hidrocinesioterapia na força muscular e na flexibilidade em idosas sedentárias. Revista Fisioterapia em Movimento. v. 23, n. 4, p. 535-543, 2010.

RYAN, J. L. et al. Mechanisms of cancer-related fadigue. The Oncologist. v. 2, n. 1, p. 22-34, 2007.

SHIMONY, A.; TIDHAR, D. Aqua lymphatic therapy for managing lower extremity lymphedema. ogy. v. 59, n. 6, p. 1092, 2008.

SO, W. K. et al. The symptom cluster of fatigue, pain, anxiety, and depression and the effect on the quality of life of women receiving treatment for breast cancer: a multicenter study. v. 36, n. 4, p. E205-E214, 2009.

VALENTI, M. et al. Physical exercise and quality of life in breast cancer survivors. v. 5, n. 1, p. 24-28, 2008.

VAN WAART, H. et al. Design of the Physical exercise during Adjuvant Chemotherapy Effectiveness Study (PACES): a randomized controlled trial to evaluate effectiveness and cost-effectiveness of physical exercise in improving physical fitness and reducing fatigue. v. 10, n. 673, p. 1-10, 2010.

World Health Organization. World Cancer Report, 2008. Disponível em: <http://www.iarc.fr/en/publications/pdfs-online/wcr/2008/wcr_2008.pdf> Acesso em: 15 jul 2011.

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EFFECTS OF AQUATIC PHYSIOTHERAPY ON LUNG FUNCTION AND LIFE QUALITY IN PATIENTS WITH BREAST CANCER

ABSTRACT

The cancer (CA) of the breast can result in physical changes that cause loss of life quality (QL). The aquatic physiotherapy (AP) improves the cardiorespiratory capacity, which can reduce problems stemming from the disease. Thus, this study aimed to evaluate lung volumes, respiratory muscle strength (RMS) and QL before and after AP program in women with breast CA. It is a pre-experimental study, which included 11 patients with breast CA after chemotherapy. The AP program included 34 sessions (03 a week), comprising 15 minutes of aerobic exercise (warming up), 15 minutes of stretching, 10 minutes of resistance exercises and 10 minutes of relaxation. Physiological variables (blood pressure, heart rate [HR], oxygen saturation and respiratory rate [RR]), lung volumes, maximal inspiratory pressure (MIP), maximal expiratory pressure (MEP) and QL were measured before and after the AP program. The average age and BMI were 52.82 ± 7.22 years old and 24.99 ± 3.36 kg/m2, respectively. After the AP program, a reduction in HR (p = 0.018) and RR (p = 0.003) as well as increased MIP (p = 0.022) and MEP (p = 0.026). The lung volumes did not change, however, the QL significantly improved (p = 0.029). It is concluded that AP reduced the breathing and cardiac function as well as improved quality of life and RMS, demonstrating the positive impact of the aquatic physiotherapy program in patients with breast cancer.

KEYWORDS: breast cancer, physiotherapy, muscle strength, quality of life

EFFETS DE LA PHYSIOTHÉRAPIE AQUATIQUE SUR LA FOCTION PULMONAIRE ET QUALITÉ DE VIE CHEZ LES PATIENTS ATTEINTS DU CANCER DU SEIN

RÉSUMÉ

Le cancer (CA) du sein peut entraîner des changements physiques qui causent la perte de qualité de vie (QV). La Physio thérapie aquatique (PA) améliore la capacité cardiorespiratoire, ce qui peut réduire les problèmes découlant de la maladie. Ainsi, cette étude a visé évaluer les volumes pulmonaires, la force des muscles respiratoires (FMR) et la QV avant et après le programme PA chez les femmes atteints du CA du sein. C'est un pré-étude expérimentale qui comprenait 11 patients atteints du CA de sein après la chimiothérapie. Le programme PA comprenait 34 sessions de PA (03 fois par semaine), comprenant 15 minutes d'exercices aérobics (échauffement), 15 minutes d'étirements, 10 minutes d'exercices de résistance et 10 minutes de relaxation. Les variables physiologiques (pression artérielle, fréquence cardiaque [FC], saturation périphérique d' oxygène et la fréquence respiratoire [FR]), les volumes pulmonaires, la pression inspiratoire maximale (PIM) et la pression expiratoire maximale (PEM) et la qualité de vie ont été mesurés avant et après le programme PA. La moyenne d'âge et l'IMC ont été 52.82 ± 7.22 ans et de 24.99 ± 3.36 kg/m2, respectivement. Après le programme PA, a eu une réduction des FC (p = 0.018) et FR (p = 0.003) et une augmentation PIM (p = 0,022) et le PEM (p = 0.026) Les volumes pulmonaires ne sont pas modifiées, mais la qualité de vie a significativement améliorée (p = 0.029). Nous concluons que la PA a réduit le travail de la respiration et du cœur ainsi qu'a amélioré la qualité de la FMR et la qualité de vie, ce qui démontre l'impact positif du programme de thérapie physique aquatique chez les patients avec cancer du sein.

MOTS-CLÉS: cancer du sein, la physiotérapie, la force musculaire, la qualité de vie

EFECTOS DE LA FISIOTERAPIA ACUÁTICA SOBRE LA FUNCIÓN PULMONAR Y LA CALIDAD DE VIDA EN PORTADORAS DE CÁNCER DE MAMA

RESUMEN

El cáncer (CA) de mama puede resultar en alteraciones físicas que generan la pérdida de la calidad de vida (CV). La fisioterapia acuática (FA) mejora la capacidad cardiorrespiratoria, pudiendo reducir problemas advenidos de la enfermedad. De esa forma, el presente estudio visó evaluar los volúmenes pulmonares, fuerza muscular respiratoria (FMR) y CV antes y tras el programa de FA en portadoras de CA de mama. Se trata de un estudio pre experimental, que incluye 11 portadoras de CA de mama tras tratamiento quimioterápico. El programa de FA abarcó 34 secciones (3 veces a la semana), compuestas por 15 minutos de ejercicios aeróbicos (calentamiento), 15 minutos de alargamientos, 10 minutos de ejercicios resistidos y 10 minutos de relajación. Las variables fisiológicas (presión arterial, frecuencia cardíaca [FC], saturación periférica de oxígeno y frecuencia respiratoria [FR], los volúmenes pulmonares, la presión inspiratoria máxima (PImax) y presión espiratoria máxima (PEmax) bien como la CV, fueron verificadas antes y después el programa de FA. Las medias de edad y del IMC fueron de 52.82 ± 7.22 años y 24.99 ± 3.36 Kg/m2, respectivamente. Tras el programa de FA, hubo reducción de la FC (p=0.018) e da FR (p=0.003), así como el aumento de la PImax (p=0.022) y PEmax (p=0.026). Los volúmenes pulmonares no alteraron, sin embargo la CV ha mejorado significativamente (p=0.029). Se ha concluido que la FA redujo el trabajo respiratorio y cardíaco y también mejoró la FMR y la calidad de vida, evidenciando el impacto positivo del programa de fisioterapia acuática en portadores de cáncer de mama.

PALABRAS CLAVE: cáncer de mama, fisioterapia, fuerza muscular, calidad de vida

EFEITOS DA FISIOTE RAPIA AQUÁTICA SOBRE A FUNÇÃO PULMONAR E A QUALIDADE DE VIDA EM PORTADORAS DE CÂNCER DE MAMA

RESUMO

O câncer (CA) de mama pode resultar em alterações físicas que geram perda da qualidade vida (QV). A fisioterapia aquática (FA) melhora a capacidade cardiorrespiratória, podendo reduzir problemas advindos da doença. Dessa forma, o presente estudo visou avaliar os volumes pulmonares, força muscular respiratória (FMR) e QV antes e após programa de FA em portadoras de CA de mama. Trata-se de estudo pré-experimental, que incluiu 11 portadoras de CA de mama após tratamento quimioterápico. O programa de FA abrangeu 34 sessões (03 vez por semana), compostas por 15 minutos de exercícios aeróbicos (aquecimento), 15 minutos de alongamentos, 10 minutos de exercícios resistidos e 10 minutos de relaxamento. As variáveis fisiológicas (pressão arterial, freqüência cardíaca [FC], saturação periférica de oxigênio e freqüência respiratória [FR]), os volumes pulmonares, a pressão inspiratória máxima (PImax) e pressão expiratória máxima (PEmax) bem como a QV, foram aferidas antes e após o programa de FA. As médias da idade e do IMC foram de 52,82 ± 7,22 anos e 24,99 ± 3,36 Kg/m2, respectivamente. Após o programa de FA, houve redução da FC (p=0,018) e da FR (p=0,003) bem como aumento da PImax (p=0,022) e PEmax (p=0,026). Os volumes pulmonares não alteraram, entretanto a QV melhorou significativamente (p=0,029). Conclui-se que a FA reduziu o trabalho respiratório e cardíaco bem como melhorou a FMR e a qualidade de vida, evidenciando o impacto positivo do programa de fisioterapia aquática em portadores de câncer de mama.

PALAVRAS-CHAVES: câncer de mama, fisioterapia, força muscular, qualidade de vida