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SCIENTIFIC ARTICLE

Influence of different body positions in vital capacity in patients on postoperative upper abdominal

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KEYWORDS
Positioning the patient;
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Abstract
Rationale: The changes in body position can cause changes in lung function, and it is necessary to understand them, especially in the postoperative upper abdominal surgery, since these patients are susceptible to postoperative pulmonary complications.
Objective: To assess the vital capacity in the supine position (head at 0° and 45°), sitting and standing positions in patients in the postoperative upper abdominal surgery.
Methods: A cross-sectional study conducted between August 2008 and January 2009 in a hospital in Salvador/BA. The instrument used to measure vital capacity was analogic spirometer, the choice of the sequence of positions followed a random order obtained from the draw of the four positions. Secondary data were collected from the medical records of each patient.
Results: The sample consisted of 30 subjects with a mean age of 45.2 ± 11.2 years, BMI 20.2 ± 1.0 kg/m^2. The position on orthostasis showed higher values of vital capacity regarding standing (mean change: 0.15 ± 0.03 L; $p = 0.001$), the supine to 45 (average difference: 0.32 ± 0.04 L; $p = 0.001$) and 0° (0.50 ± 0.05 L; $p = 0.001$). There was a positive trend between the values of forced vital capacity supine to upright posture (1.68 ± 0.47; 1.86 ± 0.48; 2.02 ± 0.48 and 2.18 ± 0.52 L; respectively).
Conclusion: Body position affects the values of vital capacity in patients in the postoperative upper abdominal surgery, increasing in postures where the chest is vertical.

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PALAVRAS-CHAVE
Posicionamento do paciente;
Capacidade vital forçada;
Complicações pós-operatórias;
Cirurgia abdominal

Influência de diferentes posições corporais na capacidade vital em pacientes no pós-operatório abdominal superior

Resumo
Justificativa: As alterações no posicionamento corporal podem ocasionar mudanças na função respiratória e é necessário compreendê-las, principalmente no pós-operatório abdominal superior, já que os pacientes estão suscetíveis a complicações pulmonares pós-operatórias.
Objetivo: Verificar a capacidade vital nas posições de decúbito dorsal (cabeceira a 0° e 45°), sentado e em ortostase em pacientes no pós-operatório de cirurgia abdominal superior.
Métodos: Estudo transversal, feito entre agosto de 2008 e janeiro de 2009, em um hospital na cidade de Salvador (BA). O instrumento usado para mensuração da capacidade vital (CV) foi o ventilômetro analógico e a escolha da sequência das posições seguiu uma ordem aleatória obtida a partir de sorteio das quatro posições. Os dados secundários foram colhidos nos prontuários de cada paciente.
Resultados: A amostra foi composta por 30 indivíduos com idade média de 45,2 ± 11,2 anos e IMC 20,2 ± 1,0 kg/m^2. A posição em ortostase apresentou valores maiores da CV em relação à sedestração (média das diferenças: 0,15 ± 0,03 litros; p = 0,001), ao decúbito dorsal a 45° (média das diferenças: 0,32 ± 0,04 litros; p = 0,001) e 0° (0,50 ± 0,05 litros; p = 0,001). Houve um aumento positivo entre os valores de CVF do decúbito dorsal para a postura ortostática (1,68 ± 0,47; 1,86 ± 0,48; 2,02 ± 0,48 e 2,18 ± 0,52 litros; respectivamente).
Conclusão: A posição do corpo afeta os valores da CV em pacientes no pós-operatório de cirurgia abdominal superior, com aumento nas posturas em que o tórax encontra-se verticalizado.

Introduction

Upper abdominal surgical procedures account for a large number of postoperative pulmonary complications (PPC) because these procedures directly interfere with lung mechanics and tend to induce restrictive ventilatory disorders, as well as reflex inhibition of phrenic nerve and consequent diaphragmatic dysfunction.[1–3] During early postoperative period, patients may present hypoventilation related to the anesthetic process, as well as limiting ventilatory changes due to pain in surgical site.[4]

The prevalence rate of PPC in upper abdominal surgery varies between 17% and 88%.[5] These changes are more marked in laparotomy procedures, but are also seen in laparoscopic surgeries.[1]

Pulmonary function tests play an important role in the assessment, diagnosis, quantification of the ventilatory disorders intensity, and treatment course.[6] The forced vital capacity (FVC) is a pulmonary function measure often used for this purpose and is defined as the maximum volume of air exhaled from after maximum inspiration.[6,7] Decreased FVC is a fairly obvious abnormality in patients with respiratory muscle weakness or changes in lung mechanics that overload these muscles.[7,8] These decreases after upper abdominal surgery range from 20% to 30% of the preoperative value and may achieve more significant values up to 50%.[7,9–11]

Change in body positioning and the consequent change of gravity effect, among other factors, cause change in respiratory function at different intensities.[12] Thus, knowledge of the physiological effects of different body positions on pulmonary function is essential to guide the physical therapy procedures, including spirometry in clinical practice, so that its values are comparable between different periods and patients.[13] Therefore, the objective of this study was to investigate the functional vital capacity in the supine (head at 0° and 45°), sitting on the bed with hanging down legs, and upright positions in patients after upper abdominal surgery.

Method

Cross-sectional study conducted in the wards of Hospital Santo Antônio – Obras Sociais Irmã Dulce, Salvador, Bahia State, a city reference in abdominal surgery.

Patients aged over 18 years, on the second postoperative day of upper abdominal surgery, with history of previous functional independence and medical release and stand-up were included. Exclusion criteria were patients with irreversible pain with painkillers, neurological and/or cognitive impairment that prevented the FVC measurement and a decrease in blood pressure greater than 20% from baseline during position change.

The study was approved by the Research Ethics Committee of the hospital, protocol number 40/06. All patients signed an informed consent form (ICF).

Data collection was conducted from August 2008 to January 2009. Forced vital capacity (FVC) measurement was defined according to the 2002 guidelines for pulmonary function tests.[6] The toll used for this measurement was the analog spirometer (Ferraris – Mark 8 Respirometer Wright, Louisville, CO, USA) coupled to a silicon face mask. The sequence of positions was randomized by blocks of envelopes. Subsequently, subjects were placed in selected positions and asked to perform a maximal inspiration to total