



RESPIRATORY ASSESSMENT OF SMOKING PATIENTS SUBMITTED TO THORACOABDOMINAL SURGICAL PROCEDURES

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ABSTRACT

The aim of this study was to identify the main clinical changes related to respiratory function in smokers submitted to thoracoabdominal surgical procedures. It is a descriptive study with a cross-sectional design and quantitative approach performed with 185 patients. The results obtained showed a predominance of males (87.0%) with a mean age of 34.97 years, brown skin (59.2%), single individuals (49.7%), and incomplete primary education (57.8%). The most frequent surgery was exploratory laparotomy (65.5%) followed by chest drainage (32.7%) and the most prevalent type of anesthesia was the local one (59.3%). Among the most frequent clinical manifestations were: tachypnea (45.3%), accessory muscle use (43.0%), hypoxemia (35.5%) and dyspnea (28.2%). It was also verified that approximately 43.2% of the sample evaluated presented cough, which was associated with the presence of pain (59.8%) and 28.3% of the patients had signs of secretion in the airways. As for pulmonary auscultation, adventitious noise was identified in 41.5% of the sample, with the most frequent type being wheezing sounds (33.5%); 53.0% of the patients presented decreased respiratory sounds. The results led to the conclusion that the main respiratory complications found in smokers after surgery were tachypnea, hypoxemia, dyspnea, accessory muscle use, adventitious sounds and diminished respiratory sounds.

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INTRODUCTION

Surgical procedures, regardless of level of complexity, lead to a range of dysfunctions in the mechanics of the body, particularly respiratory muscle dysfunction, which may occur to some degree even when the lungs are not directly involved in the procedure

(Tomasi et al., 2017). Avila and Fenini (2017) explain that pulmonary affections are the second most common type of complications that occur in the postoperative period, and they compromise the respiratory system and influence the clinical picture of the patient. These authors also point out that among the various types of surgeries, thoracic and upper abdominal

surgeries have been associated with a high incidence of pulmonary complications during the postoperative period and are important causes of morbidity and mortality. The complications resulting from thoracoabdominal surgical procedures occur due to the proximity of the surgical incision site to the diaphragm muscle and the thorax, which may interfere with lung capacity and volume, compromising the respiratory system (Almeida *et al.*, 2017; Silva and Filho, 2018). Thus, factors such as advanced age, presence of previous lung disease or other clinical diseases, presence and intensity of smoking, obesity, malnutrition, type of anesthesia, time of surgery, and surgical technique employed are closely linked with the occurrence of pulmonary complications in the post-operative period (Sheeren and Gonçalves, 2016). Among the main respiratory complications are the development of atelectasis, hypoxemia and pneumonia, affecting about 80% of the patients who undergo the surgical procedure (Silva and Filho, 2018; Ozgunay, 2018). The incidence of these complications is significantly higher in smokers when compared to nonsmokers, because they may present a more complex health condition when submitted to thoracoabdominal surgical procedures (Cavichio *et al.*, 2014; Steyer *et al.*, 2016). Smoking is considered a major public health problem. It is the main preventable cause of morbidity and mortality and is a risk factor for chronic non-communicable diseases in the postoperative period. Smoking is responsible for increased indices of impairment in the circulatory and respiratory systems, as well as for the chronicity of these disorders (Hanci *et al.*, 2015). One of the main alterations in the respiratory function that happens in smokers is damage of cilia in the tracheobronchial mucosa and increased production of mucus with thicker consistency, leading to a greater probability of airway infections (Ávila and Fenini, 2017). Chronic exposure to cigarette smoke causes physiological changes that may modify the responses to interventions and contribute to increased morbidity during the postoperative period of surgeries, increasing the risk for the development of respiratory, cardiovascular, and cicatrization complications (Cavichio *et al.*, 2014). When there is chronic exposure to cigarettes, morphological changes occur in the epithelium of the respiratory system, including loss of cilia, hyperplasia and metaplasia with keratinization (Tamashiro *et al.*, 2009). Therefore, the participation of nurses in the postoperative period is important to promote good patient care and prevent possible postoperative complications that may be potentiated by the use of tobacco. Therefore, the present study aimed to identify the main clinical alterations related to respiratory function present in smokers submitted to thoracoabdominal surgical procedures.

MATERIALS AND METHODS

This is a cross-sectional, descriptive study with a quantitative approach developed with 185 smokers who were in the postoperative period of thoracic and upper abdominal surgeries and were hospitalized in the postoperative sector of a reference public hospital located in Northeast Brazil. In order to select the sample, the following inclusion criteria were established: to be an active smoker until the time of admission, male or female, with age greater than or equal to 18 years, and to be in the first 48 postoperative hours of surgeries performed in the thoracic and/or upper abdominal area. As exclusion criteria, the following were established: to present a diminished level of consciousness; use nasogastric, nasoenteral and/or tracheostomy tubes; have a surgical incision below the

umbilical scar; or present some type of severe cognitive impairment that would make it impossible for the patient to actively participate in the interview. Data collection was carried out from August 2017 to August 2018 by undergraduate nursing, medicine and physiotherapy students that are part of a research project about the respiratory system. The team members were trained in theoretical-practical classes on the evaluation of propaedeutic methods, types of surgical procedures and complications in the postoperative period of thoracoabdominal surgeries, as well as filling in the questionnaire and handling of the instruments used in the physical examination. The information was collected with the aid of a structured questionnaire adapted by Pascoal (2011). The questionnaire used was divided into three parts. The first one addressed data related to personal aspects: socio-demographic, history of the current disease, and family history, and habits of life. The second part was focused on information about the surgical procedure performed, and the third contained information about the patient's respiratory function and general characteristics. The information collected was organized and structured in a spreadsheet of the Microsoft Excel® software and analyzed with the support of the Statistical Package for Social Sciences (SPSS) version 24.0. The descriptive analysis of the data included the calculation of absolute frequencies, percentages, and measures of central tendency and dispersion, which were later exposed in tables. The research respected the ethical aspects presented in resolution 466/12. This study was approved by the Committee of Ethics in Research with Human Beings of UFMA under Opinion number 1,318,579. The patients authorized the realization of this study through the signing of the Informed Consent Term.

RESULTS

A total of 185 smoker patients who underwent thoracic and/or upper abdominal surgeries participated in the study. The results obtained revealed a predominance of male patients (87.0%) with a mean age of 34.97 years, who self-reported to be brown skinned (59.2%), single (49.7%), with a level of education equivalent to incomplete primary education (57.8%) and who reported being drinkers (49.7%), drinking alcoholic beverages three times a week. Table 1 shows the data on the types of surgical procedures and anesthesia used in the sample evaluated.

Table 1. Prevalence of types of surgical procedures and anesthetics used in smokers submitted to thoracic/upper abdominal surgeries. Imperatriz, MA, Brazil, 2017-2018 (N = 185)

Variables	N	%
Exploratory laparotomy	110	65.5
Chest Drainage	55	32.7
Colorrhaphy	11	6.5
Appendectomy	10	6.0
Enterectomy	7	4.2
Cholecystectomy	6	3.6
Thoracotomy	6	3.6
Phrenorrhaphy	6	3.6
Hepatorrhaphy	6	3.6
Mesorrhaphy	4	2.4
Gastrorrhaphy	4	2.4
Abdominal Cavity Drain	4	2.4
Pulmonary Decortication	2	1.2
Others	27	16.3
Anesthesia type		
Local	96	59.3
General	66	40.7

The data in Table 2 indicate the surgical reasons that led the patients to perform thoracic/upper abdominal surgeries. The clinical profile related to the respiratory function of the evaluated patients is presented in Table 3.

Table 2. Prevalence of reasons that led to thoracic/upper abdominal surgeries. Imperatriz, MA, Brazil, 2017-2018 (N = 185)

Variables	N	%
Perforation due to melee weapon wound	71	41.5
Perforation due to firearm wound	38	22.0
Acute abdomen	16	9.8
Perforated Gastric Ulcer	9	5.2
Automotive trauma	8	4.7
Appendicitis	6	3.5
Cholelithiasis	5	2.9
Supra-umbilical hernia	2	1.2
Pneumothorax	5	2.9
Closed abdominal trauma	5	2.9
Hemothorax	3	1.8
Thoracic trauma	1	0.6
Evisceration	1	0.6
Abdominal tumor	1	0.6
Others	12	7.0

Table 3. Clinical profile of patients submitted to thoracic/upper abdominal surgeries in relation to respiratory function Imperatriz, MA, Brazil, 2017-2018 (N = 505)

Variables	N	%
Tachypnea	82	45.3
Accessory muscle use to breathe	77	43.0
Hipoxemia	65	35.5
Dyspnea	51	28.2
Irregular respiratory rhythm	25	13.8
Tachycardia	19	10.4
Seizure	12	8.6
Wide eyes	8	5.8
Diaphoresis	9	4.9
Pursed lips breathing	5	3.6
Nose wing beat	3	2.2
Cyanosis	3	2.2
Presence of cough	80	43.2
Cough severity		
Causes pain	61	59.8
Leads to dyspnea	21	20.6
Does not change functional patterns	13	12.7
Interrupts sleep	13	12.7
Others	2	2.0
Elimination of respiratory secretion		
No secretion	86	51.8
Expectoration is absent, but presents signs of secretion	47	28.3
Spontaneously moves secretions	31	18.7
Moves and expels secretions with aid	2	1.2
Symmetry of thoracic expansion		
Symmetrical	160	90.9
Asymmetry, delayed movement	16	9.1
Presents adventitious noises	76	41.5
Adventitious noise type		
Gasping	62	33.5
Snoring	10	5.4
Crackling	4	2.2
Wheezing	3	1.6
Pulmonary auscultation		
Decreased breathing sounds	97	53.0
Increased respiratory sounds	86	47.0
Suppressed respiratory sounds	5	2.7

Source: primary data.

N = number; % - percentage

DISCUSSION

The occurrence of complications related to the respiratory function is common in patients submitted to surgical procedures, especially in the case of smokers (Cavichio *et al.* 2014; Simsek *et al.* 2016). Although it is common to identify complications such as laryngospasm, bronchospasm, cough,

desaturation, hypersecretion and apnea, there is a shortage of studies aimed at smokers in the postoperative phase, especially if the surgical procedure is performed in the thoracoabdominal region. Regarding the data obtained in the respiratory assessment of patients in this study, the most frequent clinical manifestation was tachypnea. This result is in line with the study of Santos *et al.* (2017), who evaluated patients in the immediate postoperative period of exploratory laparotomy and cholecystectomy, in which tachypnea was also a frequent clinical alteration (75.0%) and the mean respiratory rate found was 21 incursions per minute. Factors such as pain, depth and extent of operative wound, diaphragmatic alteration, duration of surgery and type of anesthesia may hinder and compromise the respiratory rate of patients undergoing surgical procedures, especially laparotomies, thus becoming a limiting factor for ventilation and potentially contributing to the occurrence of respiratory complications.

The use of the accessory musculature is a clinical alteration that may be present in patients submitted to surgeries in the thorax and abdomen. This fact was observed in the present investigation. However, we did not find studies in the literature reporting this clinical manifestation in adult smokers who had undergone thoracic or upper abdominal surgeries. Hypoxemia was identified in 35.5% of the patients in this study. This alteration was also found in the study by Silva and Filho (2018), but in a greater proportion, since about 80% of the patients who underwent surgery had a low level of oxygen saturation. Such a high prevalence can be explained by complications resulting from the surgery, because the procedure can interfere in the respiratory dynamics and, consequently, lung ventilation (PASCOAL *et al.* 2016). Another clinical change that can be observed in patients submitted to surgical procedures was dyspnea. In the present investigation, 28.2% of the sample presented it. This finding is in line with that found by Pascoal *et al.* (2016), in which dyspnea was identified in 28.6% of the patients submitted to thoracoabdominal surgery. This alteration can be related to the respiratory discomfort manifested by the patient, because the body tries to compensate for this disorder by promoting an increase in respiratory rate and change the rhythm and depth of respiration (CAVICHIO *et al.*, 2014). Cough is a common clinical manifestation in postoperative patients, and it was present in 43.2% of the sample of this study. According to Santos *et al.* (2017), some factors compromise the patient's ability to perform an effective cough to eliminate secretions. Among them are surgery time, anesthetic drugs and postoperative pain. Such situations contribute to retention of secretions and consequent bacterial proliferation that may lead to respiratory complications. This information confirms the finding in the present study; 59.8% of the evaluated patients reported the presence of pain associated with the occurrence of cough. Therefore, this fact associated to the particularities of typical respiratory impairment of smokers leaves them even more susceptible. Another point to be highlighted is that 51.8% of the smokers evaluated in this study did not have secretions in the respiratory tract. However, during the physical examination, it was observed that 28.3% of the patients in the sample had signs of secretion in the airways, but they were not able to expectorate. This finding may be related to impaired mobility and ineffective coughing of patients, traits that are commonly associated with the perioperative period and lead to the risk of accumulation of pulmonary secretion (Hinkley *et al.*, 2016). Regarding the variables related to pulmonary auscultation, adventitious sounds were

present in 41.5% of the patients, and the most frequent was of the gasping type (33.5%). It was also seen that respiratory sounds were decreased in 53.0% of the patients. This finding corroborates those of Sousa *et al.* (2013), where 34.7% of the patients also presented decreased respiratory sounds. According to Sasaki *et al.* (2013), the accumulation of secretion in the airways leads to the occurrence of pneumonia and atelectasis, and consequently, to a drop in oxygen concentration, causing the alveoli to collapse, ultimately contributing to the occurrence of adventitious respiratory sounds. Although the literature explains this relationship, no studies were found to correlate the adventitious murmur of the gasping type with smoking patients in the postoperative period of thoracic and upper abdominal surgeries. The limitations of this study include the fact that the data were collected by different people and, despite the training conducted to standardize the data collection, there may have been differences in the clinical evaluation. Furthermore, the fact that inclusion was restricted to patients within the first 48 hours after surgery may be interpreted as a limitation because some patients were unable to answer some questions or to undergo the complete physical examination because of their health state.

Conclusion

The main clinical changes related to the respiratory function in smoking patients who underwent surgical procedures in this study were tachypnea, hypoxemia, dyspnea, accessory muscle use, adventitious sounds and decreased respiratory sounds.

It is believed that the results obtained in this study can contribute to the action of nurses before these clinical manifestations, so that nurses may have a greater confidence at the moment of preparing the care plan, as well as in the perception of the respiratory state of patients, especially when chronic habits such as smoking are present, thus minimizing the occurrence of complications and providing an effective respiratory state.

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REFERENCES

Almeida AGA., Pascoal LM., Santos FDRP., Neto PML., Nunes SFL., Sousa VEC. 2017. Respiratory status of adult patients in the postoperative period of thoracic or upper abdominal surgeries. *Rev Lat Am Enfermagem*, 25, p.111-222.

Ávila AC., Fenilli R. 2017. Incidência e fatores de complicações pulmonares pós-operatórias em pacientes submetidos à cirurgias de tórax e abdome. *Rev Col Bras Cir.*, 44, p. 284-292.

Cavichio BV., Pompeo DA., Oller GASAO., Rossi LA. 2014. Tempos de cessação do tabagismo a prevenção de complicações na cicatrização de feridas cirúrgicas. *Rev Esc Enferm, USP*. 48, p.174-180.

Hanci V., Kiraz HA., Ömür D., Ekin S., Uyan B., Yurtlu DA., *et al.* 2015. Efeitos do tabagismo sobre a dor durante o cateterismo venoso: um estudo prospectivo e randomizado. *Rev Bras Anesthesiol.*, 65, p. 47-50.

Hinkle JL., Cheever KH. 2016. Brunner&Suddarth: Tratado de Enfermagem Médico-Cirúrgica, VOLL, Guanabara Koogan, Rio de Janeiro.

Ozgunay SE., Karasu D., Dulger S., Yilmaz C., Tabur Z. 2018. Relationship between cigarette smoking and the carbon monoxide concentration in the exhaled breath with perioperative respiratory complications. *Rev Bras Anesthesiol.*, 68, p. 462-471.

Pascoal LM. 2011. Diagnósticos de Enfermagem respiratórios em crianças com infecção respiratória aguda: estudo longitudinal. Mestrado em Enfermagem. Universidade Federal do Ceará, Fortaleza (CE) Brasil.

Pascoal LM., Carvalho JPA., Sousa VEC., Santos FDRP., Neto PML., Nunes SFL., *et al.* 2016. Ineffective airway clearance in adult patients after thoracic and upper abdominal surgery. *Applied Nursing Research*, 31, p. 24-28.

Pascoal LM., Lopes MVO., Chaves DBR., Beltrão BA., Silva BM., Monteiro FPM. 2015. Troca de gases prejudicada: acurácia das características definidoras em crianças com infecção respiratória aguda. *Rev Lat Am Enfermagem.*, 23, p. 491-499.

Santos FDRP., Moraes HDL., Nunes SFL., Neto PML., Pascoal LM. 2017. Laparotomia exploratória e colecistectomia: análise da frequência respiratória e saturação de oxigênio de pacientes no pós-operatório imediato. *Revista Eletrônica Trimestral De Enfermagem*, 48: 266-74.

Santos FDRP., Nascimento JN., Nunes SFL., Pascoal LM., Almeida AGA., Neto PML. 2017. Medo da tosse em pacientes no pós-operatório de cirurgia torácica e abdominal. *Revista Ciência em Extensão*, 13(2): 83-88.

Sasaki N., Meyer MJ., Eikermann M. 2013. Postoperative respiratory muscle dysfunction: pathophysiology and preventive strategies. *Anesthesiology*, 118(4): 961-78

Scheeren CC., Gonçalves JJS. 2016. Avaliação comparativa da função ventilatória através do pico de fluxo expiratório no pré e pós-operatório imediato de pacientes submetidos a procedimentos cirúrgicos eletivos de andar superior de abdome. *Revista do Colégio Brasileiro de Cirurgiões*, 43(3):165-70.

Silva DCB., & da Silva Filho LS. 2018. Fisioterapia Respiratória no Pós-operatório de Cirurgia Abdominal Alta: Uma Revisão de Literatura. Ver Atenção à Saúde. 16(55), 115-123.

Simsek E., Karaman Y., Gonullu M., Tekgul Z., Cakmak M. 2016. O efeito da exposição passiva à fumaça de tabaco em complicações respiratórias no perioperatório e a duração da recuperação. *Revista Brasileira de Anestesiologia*, 66(5): 492-98.

Sousa VEC., Lopes MVO., Araujo TL., Rolim IL., Nascimento RV., Oliveira TF. 2013. Clinical indicators of in effective airway clearance for patients in the cardiac postoperative period. *European Journal of Cardiovascular Nursing*, 12 (2): 193-200.

Steyer NH., Oliveira MC., Gouvêa MR., Echer IC., Lucena AF. 2016. Clinical profile, nursing diagnoses and nursing care for postoperative bariatric surgery patients. *Revista Gaúcha de Enfermagem*, 37(1): e5017.

Tamashiro E., Cohen NA., Palmer JN., Lima WTA. 2009. Efeitos do cigarro sobre o epitélio respiratório e sua participação na rinossinusite crônica. *Brazilian Journal of Otorhinolaryngology*, 75(6), 903-907.

Tomasi AVR, Pires FRO., Durand MK., Danczuk RFT., Heidemann ITSB. 2017. Prevalence of surgery in elderly. *Revista de enfermagem da UFPE online*. 11(9):3395-401.