

# Does a previous surgical experience interfere on psychic stress in patients submitted to major surgery?

## *A experiência cirúrgica prévia interfere no estresse psíquico em pacientes submetidos à operações de grande porte?*

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### A B S T R A C T

**Objective:** to evaluate the impact of stress in patients undergoing major surgeries under general anesthesia, relating their physical and psychic reactions to the different stages of stress. **Methods:** we studied 100 adult patients of both genders, who were divided into two groups: Group 1 – 22 patients without experience with surgery; Group 2 – 78 patients previously submitted to medium and major surgery. To investigate the stress, we used the Inventory of Stress Symptoms for Adults, developed by Lipp, the day before the procedure and two days and seven days after the operation. The comparison of groups with respect to gender, pain, and percentage of stress were performed using the Chi-square test, and for the age variable the Student's t test was used. Differences were considered significant at  $p < 0.05$ . **Results:** the groups were not homogeneous as for the overall percentage of stress on the three measurements. G1 had decreased postoperative stress, whilst in G2 it increased. Psychological symptoms of stress prevailed in both groups. **Conclusion:** previous surgery reduced preoperative stress but did not affect postoperative emotional disorders.

**Key words:** Stress, psychological. General surgery. Anesthesia, general. Psychic symptoms. Perioperative period.

### INTRODUCTION

Stress is the body's reaction that involves biopsychosocial aspects and develops in stages. To Lipp<sup>1</sup> all individuals are subject to stress, depending on the circumstances, which may exceed their ability to cope with a given situation. Stress occurs from breakdown of homeostasis and designates a complex psychophysiological condition, which has its genesis in the need to confront a disturbance that threatens their balance. According to Straub<sup>2</sup>, it is a process by which one perceives and responds to events that are judged to be threatening. The concept of stress describes both the stimuli that generate breaks in the balance of the organism and a behavioral response, including coping strategies. For that author, the research on stress intensified after the Second World War, with the study of posttraumatic stress disorder in veterans.

Selye<sup>3</sup>, in 1936, was a pioneer in identifying stress as triphasic: alarm, resistance and exhaustion. Years later, Lipp<sup>4</sup> described a fourth phase, almost near-exhaustion situated between the phases of resistance and exhaustion. Lazarus<sup>5</sup> introduced the concept of the interpretation of an event as a stressor in 1966, and in the 1970s, took an

important step in the study of stress, suggesting that the reaction depends on how the individual interprets the stressor stimulus. The core of his work contributed to the expansion of Psychosomatic Medicine by provide hypotheses about personality characteristics as internal sources of stress, determining individual reactions to life events<sup>1,6</sup>.

One of the authors who have most influenced the work of Selye was Bernard, who claimed that one of the most characteristic made of all life is the ability of the organism to maintain the constancy of the internal environment<sup>7</sup>. Cannon called this ability homeostasis, meaning the effort of physiological processes to maintain a state of internal balance in the body<sup>8</sup>.

According to Lazarus and Folkman<sup>7</sup>, cognitive activities used by the individual to interpret environmental events are fundamental in the stress process. Environmental conditions help explain differences in cognitive assessments.

Lipp<sup>4</sup> extended the study of stress in 2004, suggesting the notion of "life themes", indicating a tendency of certain people to repeat their stress creating experiences in different moments of life.

There are several circumstances that can cause stress, such as emotional impacts, social confrontation and

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biological conditions, including treatment of diseases and operations. Surveys have shown that the biochemical process of stress does not depend on the cause of tension, but on the need to adapt to any event or to the change that triggered it<sup>4</sup>.

Several authors consider surgical stress as the impact exerted on the human body for surgical procedures involving the patient, family, surgeon and also teams of anesthesia and surgery<sup>9-13</sup>. A major operation is seen as a major stressor.

Despite extensive literature review, there is a gap with respect to the adversities caused by stress in hospitalized surgical patients. Accordingly, it was decided to conduct this research, to better understand the emotional disorders of such patients.

The aim of this study was to evaluate the impact of stress in patients undergoing medium and major operations under general anesthesia, relating their physical and psychological reactions to the different phases of stress and to assess whether previous experience interferes with stress levels.

## METHODS

We conducted a comparative, descriptive, quantitative-approach field study in surgical patients of the Belo Horizonte Holy Home and the Institute for Security Servers of Minas Gerais. It was approved by the Ethics Committees of both institutions. Data collection occurred between April and November 2008. The decision on the application of the test at three times of the perioperative period emerged due to the changes that may occur to the patient during this period and due to determinations contained in the test manual, which promotes stress measurements the day before, a week and one month later. There was an adaptation to the research model suggested by Lipp<sup>4</sup>.

We investigated 120 patients of both genders undergoing major surgeries under general anesthesia and operative time exceeding two hours. Of this total, 20 patients were excluded, three due to death and the others to not fulfilling the prerequisites defined in the methods.

We excluded patients with severe physical weakness, neurological or psychiatric disorders, those who have left doubts as to their answers, those who refused to participate, and those who did not respond adequately to the test. Some patients were eliminated for not having the records with complete information.

Patients were divided into two groups: Group 1 – 22 patients (8 women and 14 men) aged between 19 and 69 years ( $47.9 \pm 3.35$ ), who had not undergone previous surgery; and Group 2 – 78 patients (50 women and 28 men), aged between 20 and 81 years ( $55.6 \pm 1.46$ ), who had undergone one or more medium or major operations.

There was an interview with a psychologist to evaluate patients' mental health. There was no restriction as to gender, race, education level and socioeconomic status. Patients operated on by a general surgeon, urologist, otolaryngologist, gynecologist, orthopedic surgeon and breast cancer specialist were included.

The research consisted of three interviews freely consented to by each patient, one on the 24 hours preceding the operative act and two on the second and seventh postoperative days (POD). The Informed Consent Form was presented to participants before the first application of the test. Tests of preoperative and second postoperative day were administered during hospitalization. The second postoperative test was always applied on the seventh POD for inpatients, still in bed, on the return of the patient to outpatient visit, or by response letter sent by the patient by mail. Those who were admitted to the Intensive Care – ICU – were interviewed after discharge of that unit, provided it happened before the seventh postoperative day. When patients showed discomfort after the operation, we awaited their improvement and spontaneous acceptance to be interviewed. All these patients were included in the interview just prior to the surgery and on the seventh POD. The heart rate data, pain, blood pressure, type of anesthesia, duration of operation and hospital stay were obtained from patient charts.

To stress assessment, we used the Lipp Inventory of Stress Symptoms for Adults - ISSL validated by Lipp and Guevara in 1994<sup>13</sup>, and standardized by Lipp in 2003<sup>14</sup>. It was deemed valid for this type of patient, since it is not invasive or painful and it quantifies stress by phases and symptoms, which correspond to the most frequent manifestations. This test consists of three groups of questions, referring to the four stages of stress, dividing symptoms in the last 24 hours, last week and last month.

Not of all patients were able to participate in the three periods in which the test was applied. In the first interview we obtained the participation of all patients in both groups (22 in G1 and 78 in G2). In the second stage only 51 patients participated, 13 in G1 (9 M and 4 F), 50 (4) years, and 38 in G2 (15 M and 23 F), 53 (2) years,  $p = 0.33$ . In the third step, the ISSL was applied to 29 patients. In G1, there were nine patients (6 M and 3 F), 54 (4) years, and in G2, 20 (6 M and 14 F), 57 (2) years,  $p = 0.52$ . At the end, the perioperative stress levels between groups were compared and the prevalence of stress symptoms verified.

To calculate the stress, a conversion table (Table 1) was created. We converted the percentage value of stress in numbers from 1 to 13, one being no stress. From the value of 2, each number corresponded to progressively higher stages.

Depending on the intensity of the stress, the alert phase was divided into four sub-phases: the number 2 corresponded to patients with stress from 1% to 25%, the number 3, from 26% to 50%, the number 4, 51% 75% and the number 5, 76% to 100%.

The resistance phase was divided into two sub-phases. The number 6 corresponded to patients with stress of 1% to 25% and the number 7, from 26% to 50%.

The near-exhaustion phase was further divided into two sub-phases, represented by the number 8, from 51% to 75% and the number 9 of 76% to 100%.

The exhaustion phase was divided into four sub-phases: the number 10 represented patients with stress 1% to 25%, the number 11 from 26% to 50%, the number 12, 51% to 75%, and the number 13, 76-100%.

The diagnosis was closed based on the sum of symptoms of each of the three parts of the ISSL. When the limit number of points for a given stage was reached, the stress level of the patient was determined. With the test analysis, we identified mild stress (alarm phase), moderate stress (resistance), moderately severe stress (near-exhaustion) or very severe stress (exhaustion).

Data were analyzed considering the stress level and the main symptoms. The chi-square test was used to check the equivalence between groups 1 and 2, for the categorical variables gender, pain and stress level. For the age variable, it being continuous, we used the Student t test. Differences were considered significant when their averages differed for values corresponding to  $p < 0.05$ .

## RESULTS

The length of hospitalization ranged between two and 35 ( $12 \pm 11$ ) days in G1 and between one and 55 ( $9 \pm 11$ ) days in G2, with no difference between groups ( $p = 0.09$ ). Report of pain before surgery occurred in 45% of G1 patients and in only 13% of G2 ( $p=0.0007$ ).

Some physical symptoms correlated with stress, such as hypertension and rapid heart rate. There was no difference observed between patients with and without prior surgical experience regarding these variables. The heart rate at G1 ranged between 58 and 100 ( $77.3 \pm 2.2$ ) beats per minute, and in G2, between 56 and 100 ( $77.2 \pm 0.9$ ) beats per minute, with no difference between groups ( $p=0.97$ ). The blood pressure in G1 varied between 120/60 and 200/100 ( $127.5 \pm 16.7 / 82.2 \pm 12.6$ ), and in G2 mmHg

it varied between 100/60 and 180/100 ( $130.0 \pm 23.9 / 78.4 + 9.8$ ) mm Hg, with no difference between groups ( $p=0.22$ ).

The behavior of patients regarding stress in the perioperative period is described in Table 1. In the 24 hours before surgery, there was no difference between groups regarding the incidence of stress ( $p=0.75$ ). In the second POD, there was also no difference between groups with respect to stress ( $p=0.87$ ). The same lack of difference in the behavior towards stress was observed on the seventh postoperative day ( $p=0.56$ ).

From the data presented in Table 2, it is observed that in the 24 hours preceding surgery, in G1 there was a trend to proportionally more patients undergoing resistance than the in G2, though with no significant difference ( $p=0.15$ ). In both groups there was a considerable percentage of patients without stress, also without significant difference ( $p=0.13$ ).

On the second postoperative day, in G2 prevailed patients undergoing resistance, while in G1 there were less patients in this phase ( $p=0.00007$ ). On that day, the percentage of patients without stress did not differ between the two groups ( $p=0.87$ ). Also in the second POD, in G1 predominated patients undergoing exhaustion when compared with G2 ( $p=0.0002$ ) (Table 2).

On the seventh POD, more patients persisted undergoing resistance in G2 compared with G1, though with no significant difference ( $p=0.15$ ). In this period there was a trend to proportionally more patients in G1 without stress compared with G2, without statistical significance ( $p=0.57$ ) (Table 2).

Regarding the distribution of physical and psychological symptoms and signs of stress the day before the operation, psychological symptoms prevailed in both groups at all stages evaluated, with no difference between groups ( $p=0.16$ ). Postoperatively, the higher incidence of psychological symptoms continued, both on the second day, with no difference between groups ( $p=0.32$ ) and on the seventh day, the increased incidence of G1 being noteworthy ( $p=0.003$ ) (Table 3).

In G1, the main preoperative mental symptoms were excessive emotional sensitivity (very nervous) (7.7%), daily anxiety (8.7%), emotional hypersensitivity (7.7%) and

**Table 1** - Patients with and without stress according to the ISSL in the perioperative period.

Patients	1 <sup>st</sup> Test		2 <sup>nd</sup> Test		3 <sup>rd</sup> Test	
	With	Without	With	Without	With	Without
Group 1	73%	27%	69%	31%	56%	44%
Group 2	71%	29%	68%	32%	60%	40%

ISSL - Inventory of Stress Symptoms Lipp

Group 1 - patients without previous experience with surgery

Group 2 - Patients with prior experience with surgery

1<sup>st</sup> Test - one day before the operation

2<sup>nd</sup> Test - Two days after the operation

3<sup>rd</sup> Test - seven days after the operation

**Table 2 -** Distribution of patients by perioperative stress phase according to the Inventory of Stress Symptoms.

Emotional State	Group 1			Group 2		
	1 <sup>st</sup> test	2 <sup>nd</sup> test	3 <sup>rd</sup> test	1 <sup>st</sup> test	2 <sup>nd</sup> test	3 <sup>rd</sup> test
Without Stress	6 (27%)	4 (31%)	4 (44%)	29 (37%)	12 (32%)	8 (40%)
Alarm	1 (5%)	1 (8%)	0	3 (4%)	2 (5%)	0
Resistance	11 (50%)	3 (23%)	3 (33%)	26 (33%)	19 (50%)	10 (50%)
Near-exhaustion	1 (5%)	2 (15%)	0	10 (13%)	2 (5%)	0
exhaustion	3 (14%)	3 (23%)	2 (22%)	10 (13%)	2 (5%)	02 (10%)
Total	22 (100%)	13 (59%)	09 (41%)	78 (100%)	38 (49%)	20 (26%)

Group 1 - patients without previous experience with surgery

Group 2 - Patients with prior experience with surgery

1<sup>st</sup> Test - one day before the operation

2<sup>nd</sup> Test - Two days after the operation

3<sup>rd</sup> Test - seven days after the operation

sudden urge to start new projects (7.1%). In G2, prevailed daily anxiety (8.4%), emotional hypersensitivity (7.8%), inability to work (7.0%). On the second postoperative day, in G1 there were excessive emotional sensitivity (9.5%), sudden urge to start new projects (8.4%), daily anxiety (7.4%), whilst in G2 there were excessive emotional sensitivity (7.6%), daily anxiety (7.6%) and sudden urge to start new projects (7.3%). On the seventh postoperative day, inability to work was the prevalent psychological manifestation in both groups (9.7% in G1 and 11.7% in G2), followed by sudden urge to start new projects (8.3%) in G1 and decreased libido (7.4%) in G2.

## DISCUSSION

The groups were not homogeneous in terms of number of participants. There was a difference in the percentage of patients in each group, because of the difficulty of finding those who had never been operated to participate. In the group with prior surgical experience there was a higher percentage of women, C-section being considered as previous surgical experience.

Patients without surgical experience complained of pain more frequently than the ones with previous surgical experience. One can associate this physical symptom with the stress that can trigger heightened sensitivity to physical stimuli<sup>15-17</sup>. Experienced patients probably developed coping mechanisms and resilience to physical stimuli.

Preoperatively, most patients without surgical experience manifested stress in the form of resistance to the operation, without developing coping tactics, this situation leading to preoperative stress. On the other hand, previous experience with surgery facilitated facing the situation, which affected them less severely.

Postoperatively, patients without surgical experience began to react appropriately to stress, in the same way patients who had previously undergone surgery. Even so, their emotions persisted, albeit at a lower intensity. The excessive physical and mental demand, characterized by stress, caused a transient exhaustion, of which all recovered quickly. This situation has not been found in patients who did not have stress, regardless of previous surgical experience. Even so, there were less success in coping with stress.

**Table 3 -** Distribution of physical and psychological symptoms and signs of stress in the perioperative period, according to the Inventory of Stress Symptoms.

Signs and symptoms of stress	Group 1			Group 2		
	1 <sup>st</sup> test	2 <sup>nd</sup> test	3 <sup>rd</sup> test	1 <sup>st</sup> test	2 <sup>nd</sup> test	3 <sup>rd</sup> test
Without Stress	6 (27%)	4 (31%)	4 (44%)	29 (37%)	12 (32%)	8 (40%)
Physical symptoms	3 (13%*)	3 (23%)	1 (11%)	14 (18%**)	6 (16%)	5 (25%***)
Psychological symptoms	13 (59%*)	6 (46%)	5 (56%)	38 (49%**)	20 (53%)	7 (35%***)
Total	22 (100%)	13 (59%)	09 (41%)	78 (100%)	38 (49%)	20 (26%)

Group 1 - patients without previous experience with surgery

Group 2 - Patients with one or more previous operations

\* 1 patient had the same physical and psychological symptoms and signs of preoperative of stress

\*\* 5 patients had the same physical and psychological symptoms and signs of preoperative of stress

\*\*\* 3 patients had the same physical and psychological symptoms and signs of stress on the seventh postoperative day.

It is noteworthy that patients with surgical experience were less successful in coping with postoperative stress, when present, having been more affected by anxiety and emotional hypersensitivity, without being able to properly use strategies to cope with stress. In this study, there was a greater percentage of psychological demonstrations throughout the perioperative period, regardless of their previous experience with surgery. Unlike the results found by Santos *et al.*<sup>12</sup>, who reported a higher percentage of preoperative physical symptoms, in this study there was a prevalence of psychological symptoms, especially before surgery.

All patients arrived at the hospital emotionally mobilized by the prospect of the operation, with feelings of distress and anxiety caused by excessive emotional demand facing the imminent prospect of their being operated. We found higher emotional lability in those who were to undergo surgery for the first time, caused by the imminent confront with an unknown event. This situation may have been responsible for the lower tolerance to physical discomforts. The previously patients operated, although emotionally primed with surgery, had lower prior stress. The previous surgical experience may have minimized the stress, but the stress level rose postoperatively.

There was no significant difference between the groups with and without prior surgical experience as for biological parameters of blood pressure and heart rate, which, associated with stress, could indicate a greater manifestation of physical symptoms. There was also no difference of average length of stay of one group over the other.

When analyzing the percentage of patients distributed by level of stress, we found significant differences in the behavior of patients with and without prior surgical experience. The lack of previous surgical experience is accompanied by severe pain and preoperative stress, with physical and psychological perioperative repercussions. This situation is partially relieved in patients previously submitted to other surgical procedures facing this new intervention, without evidence of preoperative stress.

Postoperatively, surgical stress decreased more in patients without prior surgical experience, through greater mobilization of coping and resilience mechanisms. Patients with previous surgical experience proved to be more stressed during this period, remaining with stress in the resistance level in the two periods measured postoperatively.

As for symptoms of stress, psychological manifestations predominated throughout the perioperative period in most patients in both groups studied, indicating that surgical intervention is a stressor that highly affects the emotional status of patients.

This research aims to contribute to medical personnel being aware that they need pay attention and treat the behavioral and emotional demands of patients, whenever they demonstrate not to have personal and social resources to deal with stress from surgery.

It was not possible to compare the present results with the literature, since we did not find other works conducted in the same manner. The articles found were all on theoretical grounds.

The fact that the patient had been previously operated reduced preoperative stress but did not affect postoperative emotional disorders.

## R E S U M O

**Objetivo:** avaliar o impacto do estresse em pacientes submetidos à operações de grande porte, sob anestesia geral, relacionando suas reações físicas e psíquicas com as diferentes fases do estresse. **Métodos:** foram estudados 100 pacientes adultos de ambos os sexos, distribuídos em dois grupos: Grupo 1- 22 pacientes sem experiência com cirurgia; Grupo 2- 78 pacientes submetidos previamente a outras operações de médio e grande porte. Para investigação do estresse, utilizou-se o Inventário de Sintomas de Stress para Adultos, desenvolvido por Lipp, um dia antes, dois dias, e sete dias após a operação. A comparação dos grupos quanto às variáveis sexo, dor, e percentual de estresse, foi realizada pelo teste qui-quadrado e para a variável idade foi utilizado o teste t Student. As diferenças foram consideradas significativas para  $p < 0,05$ . **Resultados:** os grupos não foram homogêneos quanto ao percentual geral de estresse nas três mensurações. O G1 diminuiu e o G2 aumentou o estresse no pós-operatório. Prevaleceram sintomas psíquicos do estresse em ambos os grupos. **Conclusão:** O fato de ter sido operado previamente reduziu a tensão pré-operatória, porém não interferiu nos distúrbios emocionais pós-operatórios.

**Descritores:** Estresse psicológico. Cirurgia geral. Anestesia geral. Sintomas psíquicos. Período perioperatório.

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