PhD THESIS

(ABSTRACT)

ANALYSIS OF THE IMPACT OF SOME PERIOPERATIVE FACTORS UPON THE STRESS REACTION IN MAJOR ORTHOPEDIC SURGERIES

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INTRODUCTION. THEME APOLOGY

The head note of this PhD thesis was represented in a study in 2005 (“Optimization of Stress Control through Epidural Anaesthesy in the Context of Postoperative Acute Pain Management in Major Orthopedic Surgery” (Craiova Medicală, vol 7, no 3, 2005)), being one of the authors, where we had the purpose of examining subjective pain, endocrine stress response, in a homogenous population of patients, subjected to total articular arthroplasty. Starting from the period of my Residency I have been attracted by anaesthesy in orthopedic and traumatology surgeries. For approximately 9 years, I have developed my clinical activity within this domain, working in the Clinic of Orthopedy and Traumatology of the Universitary Emergency Hospital of Craiova. This is a regional hospital serving a geographical area comprising five counties. This fact makes this type of major surgeries to represent an almost daily casuistry within this activity field.

Reading the literature within this field leads to two conclusions. Worldwide literature is represented by a series of recent studies, performed upon certain major surgeries, with high anxiogenic impact: thorax surgery, heart surgery or larynx surgery. National literature is almost absent within the study of the anxiety of the individual faced with surgery, in general, and with orthopedical surgeries, in particular.

Approaching the psychological side of the patient may represent, at first sight, an obsolete subject within the crowded clinical activity in an emergency hospital, being considered as unimportant, tiring and raising additional costs. Medical psychology is a branch of psychology that is not to be found, unfortunately, in the landscape of clinical activity of the majority of Romanian hospitals, except for research area.

KNOWLEDGE LEVEL

I. PAIN-PRESENT NOTIONS

1. PAIN DEFINITION, TERMS AND TOXONOMY

Pain, the most frequent symptom in medical practice, is purely subjective, difficult to define and, sometimes, hard to explain. Pain is a complex correlation of unpleasant sensorial, emotional, mental experiences and certain autonomous (involuntary) answers and psychological and behavior reactions caused by tissue deterioration. Tissue lesions, if induced by a disease, an inflammation or as a result of an accident (or provoked by a surgery or other therapeutical measures) constitute a detrimental stimulus and produces cellular destruction with the release of biochemical substances (1).

2. PHYSIOPATHOLOGICAL ASPECTS IN POSTOPERATIVE PAIN

Various chemical mediators and transmitters are involved in pain, both at lesion and CNS level, the final sensation depending upon the interaction between these. In acute pain, the internal or external aggressive stimuli excite the nociceptors that centrally transmit nervous influxes, thus triggering the alarm system (at high frequencies) and activating the excitatory and inhibitory mechanism of pain (2). There are reviewed notions about:

*Cutaneous Nociceptors*
*Deep Somatic Tissues.* Description of receptros from: the skeletal muscle and tendone, articulations and bone.
*Modulatory Mechanisms of Pain*
3. MEDICAL AND INSTRUMENTAL EVALUATION OF PAIN

3.1. MEDICAL EVALUATION

Pain Evaluation. Parameters.

Pain localization and distribution, pain quality is a very important distinctive characteristic, because it indicates the shallowness or depth of the causative factor, its gravity or intensity. This is probably the most difficult aspect in pain evaluation, as this cannot be accurately appreciated; duration and frequency. The duration and other temporal characteristics of pain suggest its mechanism, thus helping in establishing the diagnosis; pain history. Previous pain history is extremely important within the evaluation of chronic pain patient concerning the elaboration of therapeutical strategy and prediction of results. Family history is a major factor in the development of chronic pain behavior (3); Psychological and psychosocial history; Drug intake history.

INSTRUMENTAL EVALUATION

For the instrumental evaluation of pain, although nowadays there are used various scales that include the patient’s clinical factors, usually in medical practice there are used he following: Numeric Rating Scale, Visual Analog Scale, Category Scale, Pain Relief Scale.

4. POSTOPERATIVE PAIN

Surgery generates tissular lesions thus releasing algogenic substances (prostaglandins, histamines, serotonin, bradikinins, P substance) that produce nociceptive influxes after their reception by the nociceptors, which then transmit the information through the nervous fibers A-δ and C to the nervous system.

4.1. PROGRESS FROM POSTOPERATIVE ACUTE PAIN TO POSTOPERATIVE CHRONIC PAIN

4.2. MECHANISMS AND PREVENTION OF POSTOPERATIVE CHRONIC PAIN

5. PROCEEDINGS OF PERIOPERATIVE ANALGESIA

5.1. PAIN CARE IN THE ELDERLY

5.2. ANALGESIA TECHNIQUES AND USED DRUGS

II. REGIONAL ANAESTHESIA AND PERIOPERATIVE SEDATION

1. REGIONAL ANAESTHESIA

1.2. REGIONAL ANAESTHESIA WITH INTRASPINAL OPIOIDS

2. TECHNICAL AND PHARMACOLOGICAL OPTIONS FOR SEDATION

Sedation Techniques

Non-pharmacological techniques

Pharmacological options for sedation: Benzodiazepines, Ketamine, Propofol.
Sedation adjuvants. Opioids, Agonists α2, Dexametomidine, Neuroleptics
Antagonist drugs: Flumazenil

Balanced sedation technique

Monitored Patient Controlled Sedation (MPCS)

Technical problems and sedation developments
III. CLINICAL PSYCHOLOGY ASPECTS

1. PAIN PSYCHOLOGY. There are reviewed the following aspects: Cartesian Thinking and Mind, Attention, Imagery, Waiting, Charts, Multiple drafts, Meaning

2. PSYCHIC NORMALITY NOTION

Psychological aspects according to age

PSYCHOLOGICAL EVALUATION AND PSYCHODIAGNOSIS

Psychic trauma

ANXIETY PREDISPOSITION

Anxiety evaluation algorithm

Spielberger's State-Trait Anxiety Inventory (STAI). The scale comprises 40 items that are evaluated on a Likert scale with four points. It has two subscales, one for “State” with 20 statements that evaluate how the subject feels “now, at this moment”, and the subscale “Trait” comprising 20 statements about how the individual feels “in general”. The scale provides a score for each of the two subscales.

IV. ORGANISM ADAPTATION TO STRESS (CERTAIN PHYSIOPATHOLOGICAL ASPECTS)

The main part of the stress response is to maintain homeostasis. The endocrine and metabolic reaction induced by surgery is not a specific one. After Hans Selye introduced the “stress” notion, it is well-known that the organism reacts to different types of physical/psychic acute or chronic aggressions, thus trigerring its own defensive mechanisms; these are more or less adjusted, involving bad consequences as well (4).

Cortisol

Insulin. Insulin and immunitary response, Effects upon organs

Cytokines

REACTION CONTROL TO SURGICAL PERFORMANCE

Local-regional anesthesia. Peridural anesthesia (PA),

Analgesic anesthesia

Postoperative analgesia

Specific blocking agents

Nutritional support

Normothermia

Effects of anaesthetics upon the postaggressive response

PARTICULARITIES OF MAJOR ORTHOPEDIC SURGERIES

To whom is arthroplasty of inferior limb is addressed to?

Total hip arthroplasty (THR)

Surgical approaches and techniques in hip arthroplasty

Surgical approaches in knee arthroplasty (TKA)

Total arthroplasty specific problems
PERSONAL CONTRIBUTIONS

GENERAL OBJECTIVES OF THE PERSONAL RESEARCH

Total articular arthroplasty is a major surgery, which is performed to patients with chronic suffering over long periods of time, generally the elderly, most of them having a surgical history. As a consequence, taking care of this type of patient involves a multidisciplinary collaboration: the Orthopedist, the Anaesthetist and the Kinetotherapist.

The known principles of the multimodal, multidisciplinary approach involve:

- selection of patients and preoperative preparation
- anaesthetic protocol
- minimum tissular trauma
- analgesic protocol, and
- early physical therapy protocol.

This personal research is made up of 3 studies, each of them proposing to approach as objectively as possible the first three points of the above enumerated principles. In this sense, I studied the impact of some possible preoperative stressors (patient’s anxiety) that may play a determining part in the immediate postoperative reaction, as well as some possible intraoperative interventions (sedation, surgical technique) that may modulate the neuroendocrine and inflammatory response.

Selection of patients and preoperative preparation. The first study proposes, on a group of 154 patients proposed for total arthroplasty at the inferior limb level, the identification of individual psychological patterns by quantifying the level of anxiety, according to the patient’s demographic parameters (age, sex, living environment, educational level, marital status) and clinical parameters (chronic pain, preoperative articular pain). These parameters will be correlated and studied in dynamics during the perioperative period (preoperative, immediately postoperative and after 24 hours). This study will identify the patients with a high anxiogenous risk and who, as a consequence, will need an additional intraanaesthetical sedation, in order to reduce surgical stress and to improve the level of the patient’s content.

Anaesthetic protocol. In the second study, out of the group of patients anteriorly identified with high anxiogenic risk there will be made up two groups, one that will benefit from additional sedation RA, an another free of this sedation. In the two groups there will be appreciated the endocrine and immune response, by analyzing the dynamics and correlations between: glycemia, cortisol and insulinemia, lymphocytes, leucocytes, as well as their correlation with the level of perioperative anxiety.

Rahianaeesthesia has proven its efficiency in major orthopedic surgery of the inferior limb. Its associated intraoperative sedation is not usually used, out of economical reasons or because of cardiorespiratory risks in the elderly. I parted from the hypothesis that the impact of sedation is reflected upon the neuroendocrine answer both directly, but also indirectly by anxiety modulation. This might justify the use of sedation on a large scale in the patients with total articular arthroplasty, the individual variability being an important factor for target sedation.

Tissular trauma. The third study will propose the analysis of surgical stress quantified by markers of inflammation, in two technical variations of total knee arthroplasty (I chose TKA because this surgery is considered by some orthopedic surgeons more “aggressive” for the patient).
STUDY 1
OBJECTIVE: The evaluation of anxiety of the patients subjected to total articular arthroplasty is useful for improving the perioperative management.

Secondary Objectives

A. Evaluation of perioperative anxiety and establishing its correlations with the patient’s demographic and clinical data, in order to identify the patients with a high anxiogenic risk.
B. Evaluation of the intraoperative sedation impact upon the patients with rahianaesthesia, according to their anxiety level.
C. Determining the impact of anxiety within the patients’ subjective evaluation of the postoperative pain in the first 24 hours.

MATERIAL AND METHOD

The study is a prospectively randomized one, developed between October 2008 and May 2011 in the Clinic of Orthopedic and Traumatology of the Universitary Emergency Hospital of Craiova, having the assent of the Ethics Board and the patient’s informed consent.

After the preanaesthetic consult, a number of 182 patients were approached in order to be included in the study. After applying the exclusion criteria and obtaining the data regarding the parameters monitored, the final number of patients whose data were statistically elaborated was of 154:

- 101 patients with total hip arthroplasty (THR)
- 53 patients with knee total arthroplasty (TKA)
  o In all the patients there were monitored:
- Evaluation of perioperative anxiety, as trait (X2) and situation (X1)
- Establishing the correlations of preoperative anxiety with other preoperative variables (demographic data, pain)
  o Postoperatively, there were monitored:
- Anxiety evaluation
- Subjective evaluation of pain and the patient’s content with pain management in the first 24 hours; establishing their connections with the level of anxiety.

SYNTHESIS OF THE MAIN RESULTS

A. EVALUATION OF PREOPERATIVE ANXIETY AND ESTABLISHING ITS CORRELATIONS WITH OTHER PREOPERATIVE FACTORS

PREOPERATIVE ARTICULAR PAIN (PAIN 0)

- average intensity: 5.7±1.41
->4 (NRS): 77.9% of the patients

Pain 0 distribution, according to: sex: 83.50% of women: pain 0 >4, 68.42% of men: pain 0 >4; age: <70 years old: 5.42±1.28 NRS; 70.75% of them: pain 0 >4; ≥70 years old: 6.18±1.50 NRS; 81.8% of them: pain 0 >4; time length of articular pain (having an impact on social life): 2.6±1.13 years; diagnosis: gonarthrosis patients (79.24% women) complain of a more intense preoperative pain (p<0.0001);
PREOPERATIVE ANXIETY

Preoperative anxiety as trait X2-average value: 42.29±10.54. –Preoperative anxiety of situation X1- average value: 47.74±11.19. There is a highly significant correlation: anxiety faced with surgery X1-anxiety trait.

Anxiety distribution according to other preoperative factors:

- sex—women indicate a higher anxiety value, compared to men, unsignificant as anxiety trait X2, but significant faced with surgery X1 (p<0.005); age: >75 years old: (X2) significantly increases (p=0.001) compared with patients <60 years old; faced with surgery: (X1) increases with age (but uneven groups distributed on age groups); social environment –patients from the countryside present an anxious state X2 significantly high and maintain this state X1 faced with surgery (p=0.002); education leve: patients who have graduated only Primary and Secondary Schools: significantly high values of anxiety; family support—patients lacking an adequate family support (17.53%): significantly high anxiety; diagnosis—patients with gonarthrosis indicate high values of anxiety vs. those with coxarthrosis, but equally distributed groups; there is an important correlation both in patients with coxarthrosis and in those with gonarthrosis: anxiety-preoperative pain intensity, time length of articular pain; arthroplasty history—faced with surgery the patients with arthroplasty history: unsignificantly lower anxiety.

B. EVALUATION OF INTRAOPERATIVE SEDATION IMPACT IN PATIENTS WITH HIGH ANXIETY COMPARED TO THOSE WITH LOW ANXIETY.

IMPACT OF INTRAOPERATIVE SEDATION UPON THE ANXIETY OF PATIENTS FACED WITH SURGERY

Anxiety as trait X2: considered stable
-in patients with high anxiety when faced with surgery (As and B), postoperative anxiety X1’ significantly decreases (p<0.0001) in group As vs. group B
-in patients with low anxiety when faced with surgery (Cs and D), the impact of sedation is not as obvious (p=0.1)
All in all, in the patients with articular prostheses at the level of the inferior limb:
- average value (X1’) 42.4±8.82
- (X1’) high and very high (>50): 15.58%
- only 18.87% of the patients with high perioperative anxiety, intraoperatively sedated, also maintain a high anxiety after surgery, compared to 60% of the patients with high X1, not sedated during surgery.

IMPACT OF INTRAOPERATIVE SEDATION UPON THE POSTOPERATIVE PAIN

-in the patients with high anxiety when faced with surgery (As and B), immediate postoperative pain (pain 1) is appreciated by the patients (NRS) as being significantly low (p<0.0001) in the patients sedated during surgery As vs B, according to anxiety dynamics

Next day after surgery (pain 2)

-In the patients with high anxiety when faced with surgery: there are no significant differences (p=0.25) in appreciating the next day pain by the patients in the 2 groups (As vs B).
In the patients with low anxiety when faced with surgery: there are no significant differences (p=0.66) in appreciating the next day pain by the patients in the 2 groups (Cs vs D).

C. DETERMINATION OF ANXIETY IMPACT IN THE SUBJECTIVE EVALUATION OF POSTOPERATIVE PAIN BY THE PATIENT AND THE PATIENT’S CONTENT REGARDING THE MANAGEMENT OF PAIN THE NEXT DAY AFTER SURGERY

EVALUATION OF IMMEDIATE POSTOPERATIVE PAIN (PAIN 1)

Average value pain 1=4.07±1.39

Impact factors upon pain 1: preoperative pain and its time length: there is an important correlation (p<0.0001); surgery: patients with TKA appreciate pain 1 more intensely; intraoperative sedation (see B); history of total arthroplasty: -patients with total arthroplasty history: lower pain 1 (p=0.008); patients with the same surgery on the contralateral limb: lower pain 1.

EVALUATION OF LATE POSTOPERATIVE PAIN, MINIMUM AND MAXIMUM PAIN IN THE FIRST 24 HOURS (QUESTIONNAIRE A):

Impact factors on pain 2, min pain, max pain:
- pain 1 –there is a good correlation (0.5-0.6): pain 1-pain 2-max pain-min pain
- surgery: patients with TKA appreciate pain 2-max pain - min pain as significantly more intense vs. THR;
- total arthroplasty history: these patients appreciate pain 2 as significantly lower (p<0.01).

Anxiety impact upon pain 2- max pain – min pain

-there is a very good correlation (0.7-0.8): the patient’s anxiety faced with surgery – pain 2- max pain- min pain, both in THR and TKA patients; there is a good – average correlation (0.6-0.7): postoperative anxiety – pain 2- max pain – min pain; -patients with high situation anxiety appreciate more intense pains even after 24 hours: pain 2- max pain – min pain;

Anxiety and pain impact upon sleep

-pain was the cause of sleep disturbing in 52.59% of the patients: approx. 70%-TKA, 40%-THR; anxiety as trait X2 and postoperative anxiety X1’ are significantly high (p<0.0001) in the patients appreciating that sleep was affected, especially those with TKA (p=0.018).

Patient’s content about the pain management in the first 24 hours after surgery

Average value =3.13±1.13 (≥3-considered as acceptable)
- approx. 27 % of the patients consider pain management under expectations
- there is a very good indirect correlation (0.7): (X2)-content value (r=-0.71)
  (X1’)- content value (r=-0.69)
- there is an average indirect correlation (0.5-0.6): content value -pain (pain 1, pain 2, max pain, min pain).
CONCLUSIONS

1. The patients scheduled for total articular prosthesis in the inferior limb present a high level of anxiety, in accordance with the patient’s clinical and demographic factors.
2. Identification of clinical-demographic factors helps to create an anxiogenic profile of the patient scheduled for a major surgery.
3. Patients with gonarthrosis indicate a high preoperative anxiety, in correlation with: frequent presence of women with this diagnosis, intensity and time length of preoperative articular pain.
4. The level of anxiety and pain intensity are lower in the patients with an arthroplasty history.
5. There is an important correlation between the patients’ anxiety as trait and situation anxiety (faced with surgery).
6. The impact of intraoperative sedation in the patients with rahianesthesia is obvious upon anxiety and immediate pain. This impact is superior in the patients with high preoperative anxiety.
7. The patients with high anxiety when faced with surgery and whose anxiety maintains high are patients with a high risk of more intense postoperative pain; the impact of anxiety is seen especially in the case of appreciating maximum pain within the period end of surgery – next day.
8. The patients appreciating that their sleep the first night after surgery was affected by pain are those with a high anxiety level.
9. The patients’ content with pain management the first day after surgery is correlated with the appreciated pain intensity, but especially with the anxiety level of these patients.

STUDY 2
IMPACT OF SEDATION UPON PERIOPERATIVE ENDOCRINE STRESS IN THE PATIENTS WITH HIGH ANXIETY UNDERTAKING TOTAL ARTHROPLASTY IN THE INFERIOR LIMB

Objective:
The decrease of anxiety level through intraoperative sedation and postoperative anxiolysis may modulate the neuroendocrine response to perioperative stress.

MATERIAL AND METHOD
This randomized prospective clinical study includes 48 patients out of a number of 154 patients subjected to total articular endoprosthesis at hip and knee level, respectively. The patients included in the study were equally divided into 2 groups: A and B, each group comprising 24 patients: 12 patients with knee prosthesis (TKA) and 12 patients with hip prosthesis (THR). In all patients there was performed total cemented arthroplasty, using the same surgical technique, according to prosthesis type (THR and TKA, respectively). Endocrine stress variables: glycemia, seric cortisol, insulin were measured before surgery, in the morning of the surgery, immediately after surgery and the next day after surgery.

RESULTS
DETERMINING THE MINIMUM LEVEL OF ANXIETY HAVING A MAJOR BIOUMORAL CORRESPONDENT (ROC CURVE)
There were determined:
- The main correlations between pre and postoperative anxiety with indicators of hormonal stress: cortisolemia, glycemia and insulinemia.
- Dynamics of situation anxiety
- Cortisolemia dynamics
- Glycemia dynamics
- Insulinemia dynamics
- Lymphocytes and leukocytes dynamics according to the surgery

CONCLUSIONS

1. Immediately before surgery, there is a significant correlation: situation anxiety – cortisolemia – glycemia. The average preoperative values of glycemia and cortisolemia exceed the laboratory superior reference threshold (5).

2. Determining an anxiety threshold as a prediction for the level of glycemia and cortisolemia and extrapolating to general population may be extremely useful in preventing an „adaptive” response to stress and determining the necessity for anxiolysis and preoperative sedation.

3. Intraoperative sedation and postoperative anxiolysis in the patients with high anxiety may modulate, indirectly, the postoperative neuroendocrine response by modulating the anxiety (5).

4. The Propofol- Midazolam combination is very good, adverse effects being minimum in an elderly population with comorbidities.

5. Patients with high anxiety maintain a high anxiety level after surgery, although the event considered as major stressor has passed; other postoperative factors (for ex., mobilization) should not be neglected, postoperative anxiolysis proving its utility in these patients.

6. TKA patients present a significantly high postoperative hyperglycemia compared to THR patients.

7. Cortisol and catecolamines play an important part in adjusting the immunitary response but there should still be demonstrated the anxiety impact upon it (5).

STUDY 3

DETERMINING NEUROENDOCRINE AND INFLAMMATORY STRESS IN TWO TYPES OF APPROACHES OF TOTAL KNEE ARTHROPLASTY (6)

OBJECTIVE

Altering a “classical” surgical technique may lead to the diminishing of perioperative stress in the first 24 hours.

MATERIAL AND METHOD

The study was performed between November 2009 – February 2010 in the Clinic of Orthopedy and Traumatology within the Universitary Emergency Hospital of Craiova.

Together with the Orthopedist there were selected fo this study 24 patients having the diagnosis of primary osteoarthrotis (gonarthrosis) proposed for total primary articular endoprothesis at knee level. After obtaining the informed consent and exclusion criteria were applied, there finally remained 18 patients to be included in this study, divided into 2 groups according to the used surgical technique. From the peripheral blood there were determined the following, before surgery, immediately after and 24 hours after surgery: Interleukin-6 (IL-6), C-reactive Protein (CRP), Seric Cortisol.
From the peripheral blood there were determined the following, before surgery after and 24 hours after surgery:

- Haemoglobin (Hb), total leukocytes (L), lymphocytes

RESULTS

Dynamically, in both groups the values of IL-6 measured systemically show highly significant statistical increases ($p<0.0001$), both immediately and 24 hours after surgery.

C-reactive protein presents significant increases 24 hours after surgery in both studied groups, with a slight advantage for PIA. Immediately after surgery there could not be seen any significant changes compared to preoperative measures.

Seric cortisol, measured immediately after surgery, presents a descendant curve (in patients still under anaesthesia effect), followed by significantly high values 24 hours after surgery, especially in PIA.

CONCLUSIONS

The postaggressive inflammatory and neuriendocrine response in TKA is influenced by the used surgical technique, thus being reduced in the medial subvastus approach compared to the internal parapatellar approach. Even though the size of incision is similar, preserving some deep tissues (muscles, tendons) and lower transfusional intake may be possible explanations (6).

Iv spine anaesthesia influences the modulation of endocrine response (cortisolemia decrease immediately after surgery)(6).

FINAl CONCLUSIONS

1. In the patients scheduled for total arthroplasty, the evaluation of preoperative anxiety is useful due to the fact that the level of anxiety plays an important part in subjective evaluation of postoperative reactions (pain, for example).

1.1 The patients scheduled for total articular prosthesis in the inferior limb present a high state anxiety. This fact is due to a long suffering having an impact upon social life (mobility disorders because of articular pains), failure of certain conservatory treatments/ late presence of the specialist doctor, old age and simultaneous comorbidities.

1.2 Identification of the patient’s clinical and demographic factors correlations with the level of perioperative anxiety helps to identify the patient with anxiogenic risk, in the absence of a specialized psychological evaluation.

1.3 The patient’s anxiety when faced with surgery increases in a direct correlation with the anxiety trait level.

1.4 Patients with high preoperative anxiety are patients presenting a risk in appreciating a more intense postoperative pain, if their anxiety level maintains high after surgery. Decrease of pain threshold (appreciating minimum and
maximum pain), presence of night pain with sleep deprivation and patients’ poor content with pain management are correlated with the patient’s perioperative anxiety.

1.5 TKA patients appreciate postoperative pain as being more intense, especially night pain, and their content about pain management is lower, compared to THR patients. These variables correlate with a higher level of preoperative anxiety in the patients with gonarthrosis, in the presence of a more intense and longer preoperative articular pain.

1.6 There is no certainty in supporting that the presence of total arthroplasty history is associated with the decrease of anxiety level and postoperative pain (insignificant differences).

1.7 In patients with rhianesthesia for TKA/THR (elder patients, in general), intraoperative sedation is justified in those with high and very high preoperative anxiety, and less in the patients with low preoperative anxiety, the patients’ interindividual variability being an important factor.

2. The high preoperative anxiety of patients with total articular endoprosthesis is predictive for the perioperative neuroendocrine answer.

2.1 In the patients with high immediate preoperative anxiety, the neuroendocrine answer is high when faced with surgery. There is an important direct correlation: situation anxiety – cortisolemia – glycemia, both in coxarthrosis patients and in gonarthrosis ones.

2.2 Establishing an anxiety threshold as a prediction for a high level of glycemia and cortisolemia immediately after surgery would be useful in the “adaptive to stress” response and also for establishing the need for additional measures of the therapeutical protocol (sedation, anxiolysis, analgesy).

2.3 Intraoperative sedation and postoperative anxiolysis in high anxiety patients are obviously reflected in the perioperative neuroendocrine answer, correlated with the patient’s level of anxiety (the cortisolemia level preserves a similar dynamics to the perioperative anxiety level, both in TKA patients and in THR ones).

2.4 Patients with high anxiety maintain a high situation anxiety after surgery, although the surgery itself ended. In this situation, postoperative anxiolysis is required, proving its utility by the impact upon the possibly direct endocrine answer, but also by modulating the anxiety.

3. There cannot be drawn any definite conclusion regarding the impact of anxiety upon the immune answer, even though there is a backwards correlation: situation anxiety – lymphocytes decrease and cortisolemia -- lymphocytes decrease, especially in the TKA case. There are, thus, required further studies of research.

In order to reduce the clinical and biochemical impact of surgical stress, together with the precise evaluation of the patient and the intervention upon the anaesthetical component and potoperatory protocol, the use of a minimally invasive surgical technique, especially for TKA patients (subvastus medialis approach) is associated
with the decrease of inflammatory response. Preserving certain deep tissues and lower transfusional requirements may be possible explanations.

**The personal research allows the improvement of perioperative management in the patients scheduled for total articular prosthesis in the inferior limb.** This research study brings benefits to:

1. The patient. Such a multidisciplinary approach comes to meet the patient’s expectations overcome a surgery more easily, to have lesser or more reduced subjective complaints; the need for a rapid and quality postoperative recovery; the need for social reintegration, free of psychological traumas.

2. The Anaesthetists. Including the patient into a psychological pattern that imposes/not an additional standard protocol (preanaesthesia, often neglected; AR associated sedation; postoperative anxiolysis, additional analgesy measures, including regional analgesy techniques), helps the Anaesthetist to establish a therapeutical protocol.

3. The Orthopedist: a good selection of patients, intraoperative confort, as well as a simple postoperative progress, together with a well-deserved content of the patient.

4. The system: In our country, in a healthcare system still dreaming to a healthcare level similar to that in Western Europe countries, hospitals start to also guide their activity after economical, including marketing, princiles. Therefore, the patients’ care with even shorter hospitalization periods, with even lower costs and with high content will probably become managerial challenges.

I consider that, together with the orthopedist, Anaesthetist, Kinetotherapist, in these orthopedic surgeries (total arthroplasty), the presence of the *Psychologist is absolute necessary*, not only for identifying patients with an anxiety risk, but also a psychological counseling, where necessary. I consider the **Individual Card personnally elaborated** for this research study extremely useful in collecting the data necessary for establishing the perioperative management in these patients. In the future, the *early ambulatory intervention upon the anxiety of the patient proposed for TKA/THR*, by training the patient (adequate information for the psychological profile, psychotherapy – where accepted) regarding the surgery itself and the patient’s expectations, would prove its utility.

For a further development of this research and for improving the relationship between patients and medical staff, and implicitly the improvement of perioperative management and the patient’s content, I elaborated a personal patient’s content questionnaire, which had already been used within the clinic I work in. The results of using this questionnaire will represent the theme of a further consequent research studies.

REFERENCES

