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THE VALUE AND IMPORTANCE OF ANAMNESIS IN THE DIFFERENTIAL DIAGNOSIS OF TEMPOROMANDIBULAR DISORDERS

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Despite the fact that a significant amount of research has been devoted to the study of temporomandibular disorders, the etiology and pathogenesis still remain not fully determined. The aim of our study was to determine the factors of the anamnestic data of patients that may affect the onset and development of temporomandibular disorders. The subjects of the study were 178 people with suspected temporomandibular disorders, who underwent a set of examinations. According to the anamnestic data of patients, we performed an analysis of possible factors that could provoke the development of temporomandibular disorders. However, after a comparative analysis of the main group and the comparison group, we did not find statistically significant differences ($p > 0.05$) between the indicators of these groups, except for such a feature as "bruxism", which indicates the uncertainty of these factors in regards to having possible influence on the development of temporomandibular disorders in our research. Thus, it is possible to assume that certain diseases could cause disorders of the temporomandibular joint, yet it is impossible to rule out isolated disorders of the joints. Comprehensive study of the influence of anamnesis on the diagnosis and differential diagnosis of temporomandibular disorders remains open and requires further research.

Key words: risk factors of temporomandibular disorders, concomitant general somatic diseases, concomitant dental diseases, past illnesses.

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РОЛЬ ТА ЗНАЧЕННЯ АНАМНЕЗУ В ДИФЕРЕНЦІЙНІЙ ДІАГНОСТИЦІ СКРОНЕВО-НИЖНЬОЩЕЛЄПНИХ РОЗЛАДІВ

Незважаючи на те, що вивченню проблеми скронево-нижньощелепних розладів присвячена значна кількість досліджень, до цього часу питання етіології та патогенезу залишаються не до кінця з'ясованими. Метою нашого дослідження було визначити фактори з анамнестичних даних хворих, що можливо впливають на появу та розвиток скронево-нижньощелепних розладів. Матеріалом дослідження було 178 осіб з підозрою на скронево-нижньощелепні розлади, що пройшли комплекс обстежень. За анамнестичними даними хворих здійснений аналіз щодо можливих чинників, які могли б провокувати розвиток скронево-нижньощелепних розладів. Однак після здійснення порівняльного аналізу між основною групою і групою порівняння, у відсотковому відношенні не виявлено статистично значущих відмінностей ($p > 0.05$) між показниками означених груп, крім такої ознаки, як "бруксизм", що за нашими дослідженнями свідчить про недостовірність цих чинників відносно можливого впливу на появу скронево-нижньощелепних розладів. Отже, можливо припустити, що до порушень у скронево-нижньощелепному суглобі могли призвести певні хвороби, проте не можна відкидати ізольовані порушення в суглобах. Детальне вивчення впливу анамнезу на діагностику та диференційну діагностику скронево-нижньощелепних розладів залишається відкритим та потребує подальших досліджень.

Ключові слова: фактори ризику скронево-нижньощелепних розладів, супутні загальносоматичні захворювання, супутні стоматологічні захворювання, перенесені захворювання.

The study is a fragment of the research project "Improvement and development of new methods of diagnosis and treatment of patients with defects, deformities and functional disorders of the dento-maxillary system", state registration No. 0119U002102.

Temporomandibular joint disorder is a fairly common pathology of the maxillofacial area, which is the third most common after caries and periodontal disease. Thus, according to some authors there are some symptoms of dysfunction of the temporomandibular joint (TMJ) in 40–60 % of the population, and every year the number of such patients continuously increases [1].

Despite the fact that a significant amount of research has been devoted to the study of this problem, the issues of etiology and pathogenesis still remain unclear. Therefore, the onset of TMJ dysfunction syndrome has been long associated only with the anomalies and deformities of occlusion, violations of the integrity of dentition, changes in occlusal height. Meanwhile, one could often meet patients with dysfunction of TMJ without occlusal-articulatory pathology in clinical practice [1, 7].

It is also more difficult for practitioners to define the concepts of etiology and pathogenesis of temporomandibular disorders (TMDs) due to the contradictory information about the factors of development of these diseases, as there is no consensus on the results of researching this problem, and the data presented in various publications are usually ambiguous and even contradictory [2].

The pathology of temporomandibular joint holds a significant position among dental diseases due to the complexity of its treatment, as it involves cooperation with doctors of other specialties: otorhinolaryngologist, neurologist, psychotherapist, rheumatologist, etc. [8].

Presence of pain in the area of the face, jaws and tongue, the myriad of causes that trigger it and the large number of diagnostic errors create the need for a detailed discussion of the differential diagnosis of TMDs [4, 11].

It is possible to assume that certain diseases could cause TMJ disorders, but isolated disorders in the joints cannot be ruled out. Mutual strengthening of risk factors and TMD development factors is also possible. For example, bruxism can be both the cause of TMD development and its consequence [3, 5].

All the above emphasizes the topicality of this problem and the necessity for further research in this field.

The purpose of the study was to determine the factors of the anamnestic data of patients that may affect the onset of temporomandibular disorders and to assess their role in TMD development.

Materials and methods. The subjects of the study were 178 people with suspected temporomandibular disorders, who contacted the Center of Dentistry and the Department of Orthopedic Dentistry of Danylo Halytsky Lviv National Medical University.

All of these individuals got a set of examinations that included a thorough collection of complaints and medical history, a clinical examination using the Hamburg Protocol, the Helkimo Protocol [6], a study of TMJ function and occlusal tests. Additional methods included panoramic radiography and zonography, ultrasound diagnosis of the condition of TMJ and masticatory muscles, according to indications – spiral computed tomography and magnetic resonance imaging.

The findings were entered into a specially designed survey map with its translation into an electronic version.

The diagnosis was made according to the classification of temporomandibular disorders by B. W. Neville et al., which is updated with the section on “combined disorders”.

Moreover, due to the possible detection of pathologies that disguise or mimic temporomandibular disorders, a separate group of individuals were identified as “mimicked” or “unconfirmed”.

The distribution data of the examined individuals according to the types of TMDs and sex draws attention to the significant predominance of women with suspected TMD – 142 individuals (79.8 %) vs. 36 (20.2 %) males ($p < 0.01$), notably in all types of temporomandibular disorders.

The study revealed a significant predominance of arthrogenic TMDs, which were diagnosed in 108 individuals (60.7 %) – $p < 0.01$ compared to all other pathologies. A significant percentage was comprised of the so-called “mimicked” disorders, which were disguised as TMDs in 21 individuals (11.8 %).

Due to the fact that TMJ disorders such as “arthrogenic + myogenic”, “arthrogenic + hypermobility”, “arthrogenic + myogenic + hypermobility” have a combined nature, they are incorporated into the general group of “combined disorders”.

Therefore, all patients diagnosed with TMDs comprise one main group with a subdivision into “arthrogenic”, “myogenic” and “combined” disorders. Individuals with “mimicked” and “unconfirmed” disorders formed a comparison group.

The following data clearly indicate a significant predominance of women afflicted with all types of TMDs. Specifically, among the diagnosed “arthrogenic disorders” females account for 87 individuals (58.0 %) vs. 21 males (14.0 %): $p < 0.01$. And among the “combined disorders” there were 12 females (8.0 %) vs. 5 males (3.3 %); $p < 0.05$.

The study revealed a significant predominance of TMD patients among young and middle-aged people aged 15 to 39 – 122 individuals (81.3 %) against all other age groups – 28 individuals (18.7 %); $p < 0.01$.

Due to the lower amount of the examined individuals in this group, it is not possible to draw statistically significant conclusions, although certain tendencies can be noted. Similarly to the previous analysis, this group is majorly dominated by females both among the individuals with “mimicked” disorders (53.6 % females vs. 21.4 % males) and among individuals with unconfirmed TMDs (25.0 % females vs. 0.0 % males); $p < 0.001$.

In order to establish the factors that have a significant effect on the onset of each of the disorders when combined, we used a recursive method of logistic regression, which included gradual elimination of equivocal features according to the Wald test. The obtained coefficients of the model were analyzed using the criterion of Chi-square. In order to determine the proportion of variance for a dependent variable that can be explained by factors included in the regression model, we used Nagelkerke’s R-Square interpretation.

The calculations were made with the software RStudio v. 1.1.442 and R Commander v.2.4–4.

Results of the study and their discussion. According to the anamnestic data of patients, we performed an analysis of possible factors that could provoke the development of TMDs.

Among the most common possible factors of the development of TMDs the following should be noted as they exceed 10–15%: intubation anesthesia in the previous year – 11.3 %; traumatic removal of wisdom teeth – 10.7 %; orthodontic treatment with braces – 12.0 %; orthodontic treatment with a removable brace – 11.3 %; previous fixed prosthetics – 10.7 %; previous treatment of temporomandibular disorders – 10.7 %.

In total, among the specified group of patients, 104 factors were identified, 71 of which accounted for 108 patients with arthrogenous TMDs, which amounted to 0.66 possible factors per individual.

16 patients with myogenic TMDs are accounted for by 12 possible factors, which amounted to 0.75 factors per individual in this subgroup. 26 patients with combined TMDs are accounted for by 21 possible factors, which amounted to 0.8 possible factors per individual.

Comparative analysis of dental factors, which could contribute to the onset of TMDs, according to anamnestic data between the main group (2) and the comparison group (1).

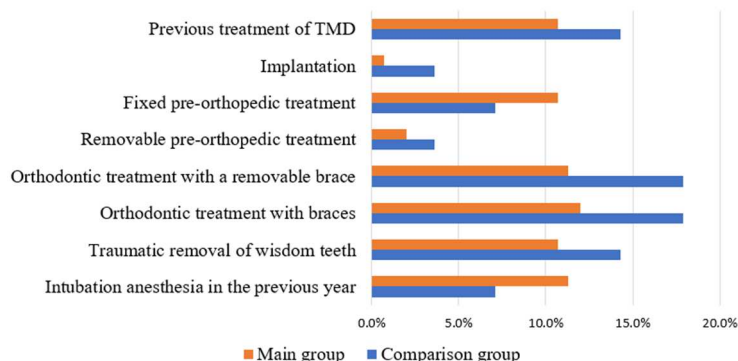


Fig. 1. Comparative analysis of dental factors, which could contribute to the onset of TMDs, according to anamnestic data between the main group (2) and the comparison group (1).

According to the data we have determined that despite the different number of individuals examined in the groups, we did not find statistically significant differences ($p > 0.05$) in percentage ratios between the indicators of these groups, which indicates the unreliability of these factors regarding the possible impact on TMD development according to our research.

The analysis of the general factors according to the anamnestic data, which could promote the development of TMDs in patients of the main examined group, is presented in table 1.

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Analysis of the general factors according to the anamnestic data, which could promote the development of TMDs in patients of the main group

The examined groups		Arthrogenic	Myogenic	Combined	Total
Sitting work	n	73	12	19	104
	%	48.7 (40.7–56.6)	8.0 (4.2–12.9)#	12.7 (7.8–18.4)#	69.3 (61.7–76.4)
Headache	n	37	8	11	56
	%	24.7 (18.1–31.9)	5.3 (2.3–9.5)#	7.3 (3.7–12)#	37.3 (29.8–45.2)
Mouth breathing	n	13	2	2	17
	%	8.7 (4.7–13.7)	1.3 (0.1–3.8)#	1.3 (0.1–3.8)#	11.3 (6.8–16.9)
Harmful habits	n	4	1	2	7
	%	2.7 (0.7–5.8)	0.7 (0–2.6)	1.3 (0.1–3.8)	4.7 (1.9–8.6)
Growth spurt	n	11	2	3	16
	%	7.3 (3.7–12)	1.3 (0.1–3.8)#	2.0 (0.4–4.8)#	10.7 (6.3–16.1)
Sports activities	n	28	1	1	30
	%	18.7 (12.9–25.3)	0.7 (0–2.6)	0.7 (0–2.6)	20 (14–26.8)
Bruxism	n	15	5	4	24
	%	10.0 (5.7–15.3)	3.3 (1.1–6.8)#	2.7 (0.7–5.8)#	16.0 (10.6–22.3)
Excessive abrasion of teeth	n	19	5	10	34
	%	12.7 (7.8–18.4)	3.3 (1.1–6.8)#	6.7 (3.2–11.2)	22.7 (16.3–29.7)
Psychosocial problems, stress	n	7	4	1	12
	%	4.7 (1.9–8.6)	2.7 (0.7–5.8)	0.7 (0–2.6)#	8 (4.2–12.9)

Note: * – presence of a significant difference ($p < 0.05$) compared to the comparison group; # – presence of a significant difference ($p < 0.05$) compared to the arthrogenous group; & – presence of a significant difference ($p < 0.05$) compared to the myogenic group.

Among the most common possible factors of TMD development, the following should be noted: sedentary work – 69.4 %; tension headaches – 37.3 %; sports activities – 20.1 %; bruxism – 16.0 %; excessive abrasion of teeth – 22.7 %.

We have determined that such factors as “sedentary work”, “headache”, “mouth breathing”, “growth spurt”, “bruxism”, “excessive tooth abrasion” are statistically significant for the group of patients with arthrogenic TMJ disorders ($p < 0.05$).

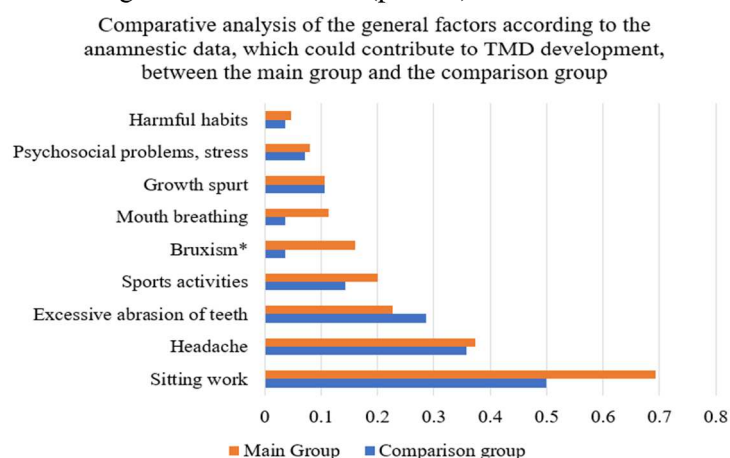


Fig. 2. Comparative analysis of the general factors according to the anamnestic data, which could contribute to TMD development, between the main group and the comparison group

Note: * – the presence of a significant difference ($p < 0.05$) compared to the comparison group

Furthermore, according to the anamnestic data of patients, we have analyzed the possible factors that affect the development of temporomandibular disorders. All factors determined by the anamnesis of patients are divided into three groups: past and concomitant pathologies associated with the maxillofacial area, past and concomitant general somatic pathologies and insignificant factors.

As a result of our research, we have determined that the most decisive factors were the following: traumatic brain injury (TBI) – 9.6 %, with a double predominance in females ($p < 0.05$); frequent treatment at the dentist's – 16.9 %, with a sevenfold predominance in females ($p < 0.05$); frequent sore throats – 19.1 %, with an almost sixfold predominance in females ($p < 0.05$) and the presence of herpes zoster in 17.4 % of individuals, also with an almost sevenfold predominance in females ($p < 0.05$).

Among the specified concomitant diseases it is worth singling out such pathologies as scoliosis (its various forms), which is defined in 19.7 % and cervical osteochondrosis in 21.3 % of patients, which together accounted for a high percentage – 41.0 %, with a predominance of scoliosis in 15.7 % of females vs. 3.9 % of males ($p < 0.05$) and the predominance of cervical osteochondrosis in 16.7 % of females vs. 4.5 % of males ($p < 0.05$).

Other general somatic pathologies include hypermobility of all joints, which was detected in 25.3 % of patients with a predominance in females – 19.1 % vs. 6.2 % of males ($p < 0.05$), thyroid disease – 13.5 %, with a predominance in females – 12.4 % vs. 1.1 % of males ($p < 0.05$) and allergies – 12.9 % also with a predominance in females 10.1 % vs. 2.8 % of men ($p < 0.05$). It is believed that these types of pathologies may affect the development of TMDs.

We also identified such concomitant pathologies as “rheumatism” and “polyarthritis”, although they were detected in a small proportion of patients – 5.1 % and 2.2 %, respectively. Among other somatic pathologies common among individuals with TMDs, the following were identified: hypotension in 21.9 %, gastritis in 17.4 %. All other somatic pathologies were detected in isolated cases.

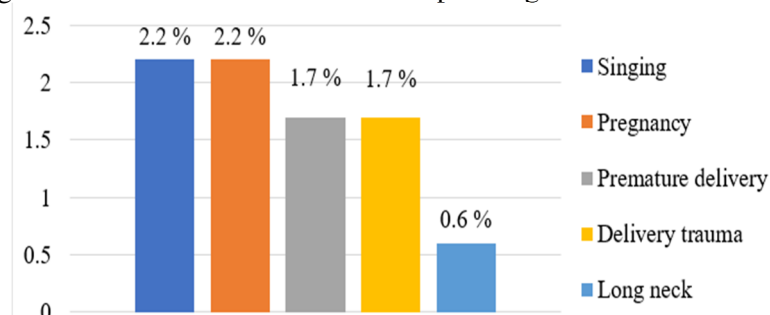


Fig. 3. Analysis of insignificant factors that could contribute to the development of TMDs

We performed a comparative analysis of the general factors according to the anamnestic data, which could contribute to TMD development, between the main group and the comparison group, the results of which are presented in fig. 2.

According to the data we have found that our study did not reveal statistically significant differences between the indicators of these groups ($p > 0.05$) in percentage ratios, except for such a feature as “bruxism”, where the ratio between the groups was – 3.6 % in the comparison group and 16.0 % in the main group ($p < 0.05$). Other possible factors of TMD development in our study were statistically insignificant.

We have also identified insignificant factors that could contribute to the development of TMDs, presented in fig. 3, which have been detected in separate patients, and which, however, may also affect the development of TMDs.

Such factors were “long neck”, “singing”, “premature delivery”, “delivery trauma”, “pregnancy”.

After statistical evaluation of the findings, our study did not reveal statistically significant differences between the indicators of the main group and the comparison group ($p>0.05$) in percentage ratios, except for such a feature as “bruxism”, where the ratio between groups was – 3.6 % in the comparison group and 16.0 % in the main group ($p<0.05$). Other general somatic and dental factors which could affect the onset of TMDs were statistically insignificant in our study.

As a result of our study, it was determined that the most important factors influencing the development of temporomandibular disorders are the following: traumatic brain injury (TBI) – 9.6 %; frequent treatment at the dentist’s – 16.9 %; frequent sore throats – 19.1 %, and the presence of herpes zoster in 17.4 % of individuals. Thus, while such factors as maxillofacial injury (MFI) and traumatic brain injury (TBI), which together account for 14.7 %, as well as frequent dental treatments – 16.9 % give some explanation regarding the possibility of developing TMDs, then such pathologies as “frequent sore throats” and “herpes zoster”, with fairly high percentages, may be explained by the close localization of the source of infection to the temporomandibular joints in the case of frequent sore throats. In the case of Herpes zoster, a possible explanation is a general viral infection of the body with a probable viral damage to the target joint. Other general somatic pathologies include hypermobility of all joints, which was found in 25.3 % of patients, thyroid disease – 13.5 % and allergies – 12.9 %, with predominance in females with 10.1 % vs. 2.8 % in males ($p<0.05$). It is believed that these types of pathologies may affect the development of TMDs.

The dental community of the study of temporo-mandibular disorders of Ukraine, Italy and the USA are known for their representatives like V. Kutsevlyak [2], D. Manfredini [9, 10], J. Okeson [11], who refuted a number of occlusive theory studies of the temporo-mandibular disorders theory. Then, it was created a new larger basis for research and exploration. In our study, we singly diagnosed and analysed the data of patients of our racial group and confirmed the fact of temporo-mandibular disorders polyetiology and the absence of racial affiliation to the development of such disorders. Therefore, we believe, that it is appropriate to extend the multifactorial approach to such patients, and occlusion is considered, as a factor that has an ability to influence.

Conclusions

The increase in the number of temporomandibular disorders in the population, especially at a young age, should draw the attention of dentists to perform a thorough examination at the primary screening.

As a result of the research, we have identified and analyzed general somatic and dental factors according to anamnestic data that could contribute to the development of TMDs. Moreover, the past and concomitant general somatic and maxillofacial diseases were determined and their possible influence on the onset and development of TMDs was assessed.

Quality diagnosis and treatment of TMDs requires a systematic interdisciplinary approach with the active involvement of the patient in order to detect and identify most of the current active negative endogenous and exogenous factors that can lead to temporomandibular disorders and support their development.

Referral for additional diagnostics and consultation of other specialists will help identify risk factors of TMDs, prevent TMDs, or detect them at an early stage. Treatment of these patients should be comprehensive, carried out with the involvement of doctors of related specialties, in case of the presence of a provoking or concomitant pathology in the TMD patient.

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PERSONIFICATION OF THE RISK OF HYPOXIC-ISCHEMIC BRAIN INJURY IN THE SYSTEM OF NEUROLOGICAL MONITORING OF CARDIAC SURGERY PATIENTS

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The study aimed to develop a screening algorithm for assessing the personalized risk of hypoxic-ischemic brain injuries in the preoperative period of cardiac surgery using artificial circulation. A comparative analysis of the frequency, prognostic value and diagnostic value of 26 clinical and anamnestic factors was performed in two groups of patients formed by the method of paired-comparison: 340 people with and 340 people without hypoxic-ischemic brain injuries. The most prognostically valuable factors were identified: the presence of manifestations of encephalopathy in the preoperative period – in 62.4 %, arterial hypertension – in 57.9 %, a history of closed traumatic brain injury – in 46.5 %, disorders of cerebral autoregulation – in 33.5 %, comorbid diabetes mellitus – in 34.2 %, a decrease in the left ventricular ejection fraction less than 30.0 % – in 23.7 %, and others. Prognostically unfavorable syndromes were identified and the screening tabular algorithm of risk personification of hypoxic-ischemic brain injuries based on risk assessments was substantiated.

Key words: neurological monitoring, cardiac surgery, risk assessment, cerebrovascular disorders.

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ПЕРСОНІФІКАЦІЯ РИЗИКУ ГІПОКСИЧНО-ІШЕМІЧНИХ УРАЖЕНЬ ГОЛОВНОГО МОЗКУ В СИСТЕМІ НЕВРОЛОГІЧНОГО СУПРОВОДУ КАРДІОХІРУРГІЧНИХ ПАЦІЄНТІВ

Автором статті було поставлено за мету розробку скринінгового алгоритму оцінювання персоніфікованого ризику гіпоксично-ішемічних уражень головного мозку в доопераційному періоді кардіохірургічних втручань з використанням штучного кровообігу. Виконано порівняльний аналіз частоти, прогностичної цінності та діагностичного значення 26 клініко-анамнестичних факторів в двох групах пацієнтів, сформованих за методом копії-пара: 340 осіб з та 340 осіб – без гіпоксично-ішемічних уражень головного мозку. Встановлено найбільш прогностично цінні фактори: наявність у доопераційному періоді проявів енцефалопатії – у 62,4 %, артеріальної гіпертензії – у 57,9 %, закритої черепно-мозкової травми в анамнезі – у 46,5 %, порушення церебральної ауторегуляції – у 33,5 %, коморбідний цукровий діабет – у 34,2 %, зниження фракції викиду лівого шлуночка серця менше 30,0 % – у 23,7 % та інші. Виділено прогностично несприятливі синдроми та, на основі ризикометричних оцінок, обґрунтовано скринінговий табличний алгоритм персоніфікації ризику гіпоксично-ішемічних уражень головного мозку.

Ключові слова: неврологічний супровід, хірургія серця, оцінка ризику, цереброваскулярні порушення.

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Modern technologies of cardiac surgery (CS) can significantly influence the structure of mortality, disability, and quality of life in patients with critical ischemic disease, valvular heart disease, cardiomyopathies [3, 4]. At the same time, neurological complications can significantly affect the course of the postoperative period and turn off the technically high-quality CS performance [10]. In recent years, the overall mortality after CS using artificial circulation (AC) is characterized by 20–25 % decrease, while the frequency of hypoxic-ischemic brain injuries (HIBI) is almost unchanged and even in older age groups increases [9, 11]. Cerebral stroke, postoperative encephalopathy and severe cognitive dysfunction, in some cases, remain a delayed problem of CS [12], which highlights the need to develop a system of intraoperative neurological monitoring. Recently, risk-solving approaches and risk-based personalization techniques have been used to address this problem, such as atherosclerosis of the aorta, arterial hypertension [5–7, 14] and