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PECULIARITIES OF PSYCHOLOGICAL STATUS IN PATIENTS WITH FUNCTIONAL DYSPEPSIA: POSTPRANDIAL DISTRESS SYNDROME

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ABSTRACT

Introduction: Among all causes of epigastric pain or burning, early satiety, bothersome fullness, the most common one is functional dyspepsia (FD). Analysis of psychological peculiarities of patients with FD becomes one of the key problems.

The aim: To compare the level of anxiety, depression, and social functioning of patients with postprandial distress syndrome (PDS), patients with epigastric pain syndrome (EPS), and healthy volunteers.

Materials and methods: This cross-sectional study was conducted in adult patients with FD (58 patients with PDS and 37 patients with EPS) and healthy volunteers (30 persons). Patients' social functioning was assessed with the 36-Item Short Form Health Survey (SF-36). Anxiety and depression levels were measured with the Hospital Anxiety and Depression Scale (HADS).

Results: Patients with PDS showed significantly lower rates of physical functioning ($p=0.0002$), role physical ($p=0.003$), bodily pain ($p=0.0001$), general health ($p=0.0001$), vitality ($p=0.0001$), and social functioning ($p=0.0003$), in comparison with healthy volunteers. This group also showed significantly lower rates of general health ($p=0.041$), and social functioning ($p=0.048$), as compared to patients with EPS. FD led to an increase in anxiety levels regardless of the type of disease as compared with healthy volunteers ($p=0.024$). Patients with PDS had elevated depression levels compared to patients with EPS ($p=0.023$) and healthy volunteers ($p=0.001$).

Conclusions: Each type of FD has a certain impact on the social functioning, anxiety and depression levels. Patients with PDS manifested significant differences in the psychological state as compared to patients with EPS, and healthy volunteers.

KEY WORDS: functional dyspepsia, postprandial distress syndrome, social functioning, anxiety, depression

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INTRODUCTION

Epigastric pain or burning, early satiety, bothersome fullness are the most common causes of gastroenterological consultations [1]. Among all causes of dyspepsia, the most common one is functional dyspepsia (FD) [2, 3]. A lot of studies demonstrated that FD affects nearly 10-30% of the population in the countries with advanced living standards. Most of those patients are from working age group [4]. Ford A. et al. analyzed results of esophagogastroduodenoscopy in 5389 patients with dyspepsia and showed that in 82.0% of cases there were no organic pathology of gastroduodenal area and the symptoms were caused by FD [2].

Functional dyspepsia is not associated with increased mortality, therefore psychological assessment is an important indicator of what impact the disease has on patients [5, 6]. Patients with FD have reduced quality of life. The reasons include constant emotional distress because of chronic symptoms of FD, financial aspects, and reduced serviceability. FD has two recognized subtypes, which are not mutually exclusive: postprandial distress syndrome (PDS) and epigastric pain syndrome (EPS). PDS is defined by bothersome postprandial fullness or bothersome early satiation. EPS is defined by bothersome epigastric pain or

bothersome epigastric burning [7]. PDS is the most common subtype of FD: nearly 50% of patients with FD have a PDS type of the disease. EPS is diagnosed in 25% of all other cases, and there is an overlap of these two conditions in 25% of the total number of patients with FD [8].

The symptoms of postprandial distress syndrome (PDS) include bothersome postprandial fullness or early satiety severe enough to affect daily life or ability to finish a regular-size meal for three or more days per week in the past 3 months, with at least a 6-month history. The symptoms of epigastric pain syndrome (EPS) include bothersome epigastric pain or epigastric burning one or more days per week in the past 3 months, with at least a 6-month history. Both types of FD were discovered to have multiple pathophysiological factors, as was reflected in Rome IV definition. They are gastric emptying, impaired gastric accommodation, gastric and duodenal hypersensitivity to distention, acidity, and the other intraluminal stimuli, duodenal low-grade inflammation, mucosal permeability, food antigens, environmental exposures, *Helicobacter pylori* infection, and psychological factors (disorders of gut-brain interaction) [9, 10].

Therefore, further analysis of psychological peculiarities of patients with FD becomes one of the key problems.

THE AIM

To compare the level of anxiety, depression, and social functioning of patients with PDS, patients with EBS, and healthy volunteers.

MATERIALS AND METHODS

This study was conducted as a cross-sectional study in adult patients with FD and healthy volunteers. The 3 study groups were formed:

- Group 1 included 58 patients with PDS.
- Group 2 included 37 patients with EBS.
- Group 3 included 30 healthy volunteers.

The study was conducted from 01 January 2018 till 01 June 2019 at the Gastroenterological Center of the “Oberig” Clinic in Kyiv, Ukraine. The study was performed in accordance with the Helsinki Declaration.

To be eligible for this study, subjects had to meet all the inclusion criteria and none of the exclusion criteria.

INCLUSION CRITERIA

1. Men or women ≥ 18 years of age with a clinical diagnosis of FD, based on Rome IV criteria either for PDS to be included into Group 1, or for EPS to be included into Group 2. Participants had to be free of any diseases or complaints to be included in Group 3.
2. Participant can understand the nature of the study and has provided written informed consent to participate in the study.

Exclusion criteria:

1. Evidence of organic, systemic, or metabolic disease that is likely to explain the symptoms on routine checkups (including an upper endoscopy).
2. Any of the following red flag symptoms: age of onset >45 years, persistent vomiting, signs of bleeding, iron deficiency anemia, family history of upper gastrointestinal cancer, progressive dysphagia and/or odynophagia.
3. Known or possible drug and/or alcohol addiction.
4. Relevant abnormalities on physical examination.

There were no differences in age, sex, body mass index, comorbidities among all study groups, and the duration of

symptoms was equal in Group 1 and Group 2. The details are provided in Table 1.

The investigators collected the medical history data for all the participants of the study, diagnosis of FD was set according to Rome IV criteria. All the participants underwent a complete blood count, glucose level test, thyroid-stimulating hormone test, stool test, and abdominal ultrasound. *Helicobacter pylori* infection was diagnosed via rapid one-step immunochromatographic assay for detection of monoclonal *Helicobacter pylori* antigen in stool samples or in PCR for *Helicobacter pylori* DNA or using histological methods. Biopsies from the duodenum and stomach were obtained from subjects older than 45, and additionally they had esophagogastroduodenoscopy with proximal jejunoscopy and chromoscopy. Magnetic resonance imaging and/or computed tomography scan of abdominal cavity were also performed when necessary to exclude any organic pathology.

Patients’ social functioning was assessed with the 36-Item Short Form Health Survey (SF-36). The SF-36 consists of eight scaled scores, which are the weighted sum of the questions in their section. Each scale is directly transformed into a 0-100 scale on the assumption that each question carries equal weight. The lower the score, the more disabled subjects are, and the higher the score, the less disabled they are, i.e., a score of zero is equivalent to maximum disability and a score of 100 is equivalent to no disability. The SF-36 measures eight domains: physical functioning (PF), role physical (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role emotional (RE), and mental health (MH).

Anxiety and depression levels were measured with the Hospital Anxiety and Depression Scale (HADS). The questionnaire comprises seven questions for anxiety and seven questions for depression. Scores equal to or greater than 11 on either scale indicate a definitive case, the results of 8-10 are qualified as a masked condition, lower than 7 mean that symptom is absent.

Both questionnaires were filled by the participants themselves. Group 1 and Group 2 completed the questionnaires before any treatment started.

Table 1. Clinical characteristics of study participants

| Characteristics | Study groups | | | p | |
|---|----------------|----------------|----------------|------------------|------------------|
| | Group 1 (n=58) | Group 2 (n=37) | Group 3 (n=30) | P ₁₋₂ | P ₁₋₃ |
| Age, years (M±SD) | 35.5±6.7 | 33.2±5.1 | 32.0±4.1 | 0.061* | 0.006* |
| Women/men, n | 38/20 | 24/13 | 18/12 | 0.948# | 0.682# |
| Body mass index, kg/m ² (M±SD) | 21.1±1.8 | 20.8±1.7 | 21.0±1.7 | 0.506* | 0.669* |
| Duration of symptoms, months (M±SD) | 92.5±11.7 | 91.6±10.9 | – | 0.704* | – |
| Gastroesophageal reflux disease, n (%) | 12 (20.7%) | 10 (27.0%) | 11 (29.7%) | 0.475# | 0.316# |
| Irritable bowel syndrome, n (%) | 6 (10.3%) | 5 (13.5%) | 4 (10.8%) | 0.638# | 0.942# |
| Hypertension, n (%) | 2 (3.4%) | 1 (2.7%) | 1 (2.7%) | 0.839# | 0.839# |
| Non-alcoholic fatty liver disease, n (%) | 3 (5.2%) | 2 (5.4%) | 2 (5.4%) | 0.960# | 0.960# |

* – t-test; # – χ²-test; no statistical significance of differences, p>0.05.

Table 2. Analysis of separate SF-36 domains in the study groups

| Study groups | Results (M, 95% CI) | | | | | | | |
|--------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | PF | RP | BP | GH | VT | SF | RE | MH |
| Group 1 (n=58) | 74.7 (70.1 – 79.3) | 67.1 (60.0 – 74.1) | 58.8 (54.3 – 63.4) | 53.4 (49.2 – 55.6) | 56.8 (52.6 – 61.0) | 78.1 (72.8 – 80.2) | 74.7 (68.5 – 77.2) | 76.2 (74.9 – 79.4) |
| Group 2 (n=37) | 77.4 (69.6 – 85.3) | 72.0 (60.9 – 83.1) | 58.5 (51.0 – 66.0) | 63.2 (56.4 – 69.9) | 59.7 (52.6 – 66.5) | 86.5 (80.3 – 92.7) | 84.3 (77.3 – 92.3) | 80.6 (75.9 – 85.3) |
| Group 3 (n=30) | 84.1 (82.7 – 85.5) | 78.3 (75.8 – 80.8) | 73.9 (72.1 – 75.7) | 69.7 (68.3 – 71.2) | 70.4 (68.9 – 71.9) | 89.3 (88.0 – 90.6) | 81.9 (79.7 – 84.2) | 82.8 (80.8 – 84.9) |
| p ₁₋₂ * | 0.556 | 0.457 | 0.946 | 0.041 | 0.470 | 0.048 | 0.370 | 0.125 |
| p ₁₋₃ * | 0.0002 | 0.003 | 0.0001 | 0.0001 | 0.0001 | 0.0003 | 0.119 | 0.236 |

* – t-test

STATISTICAL ANALYSIS

In this study we used descriptive statistics of the endpoints and comparisons among groups were applied. We used Fisher's exact test and χ^2 test for categorical variables, and t-tests for continuous variables for comparative analysis between groups of patients with FD (Group 1 and Group 2) and in comparison with the Group 3. Statistical significance was considered at $p < 0.05$.

RESULTS AND DISCUSSION

Detailed results of SF-36 domains are provided in Table 2.

PF is a subscale which indicates the impact of the physical condition on the physical activity. According to the analysis, PF score in Group 1 was the lowest (74.7 vs 77.4 and 84.1). There were no statistically significant differences in PF score in comparison with Group 2. However the score was significantly lower, as compared with Group 3 ($p=0.0002$). Consequently, FD leads to the decrease of PF score regardless of its type.

The subscale RP allows to evaluate the influence of physical condition on daily role activity. The results in Group 1 were the lowest, although there was no statistically significant difference as compared to Group 2 (67.1 vs 72.0). RP score was significantly lower in Group 1 as opposed to Group 3 (67.1 vs 78.3; $p=0.003$). According to the results, FD causes the decrease of RP score regardless of its type.

BP is an indicator of the impact of pain on the ability to perform normal daily work, including household duties. There were no differences in BP rate shown for Group 1 and Group 2 (58.8 vs 58.5). BP score was significantly lower in Group 1 in comparison with Group 3 (58.8 vs 73.9; $p=0.0001$). Consequently, FD leads to the decrease of BP score regardless of the disease type.

The subscale GH is self-assessment of a person's current state of health and the prospects for treatment if/when necessary. The statistical analysis demonstrated that the lowest GH score was in the Group 1. The difference was significant in comparison with Group 2 score (53.4 vs 63.2; $p=0.041$) and with Group 3 score (53.4 vs 69.7; $p=0.0001$). Consequently, patients with PDS have a significantly lower GH score in comparison to patients with another type of FD – EBS, and with healthy people.

VT is an indicator of a degree of strength and energy, or vice versa, of weakness. The VT score was lower in Group 1 as compared with Group 2 (56.8 vs 59.7), although there was no evidence of any statistically significant differences ($p=0.470$). The VT score was significantly lower in the Group 1 than in Group 3 (56.8 vs 70.4; $p=0.0001$). These results demonstrate that FD leads to the decrease of VT score regardless of the disease type.

The subscale SF determines the extent to which the physical or emotional state limits social activity (communication). Group 1 score was significantly lower in contrast to Group 2 (78.1 vs 86.5; $p=0.048$), and Group 3 (78.1 vs 89.3; $p=0.0003$). Consequently, patients with PDS have a significantly lower SF score in relation to patients with EBS, and healthy people.

RE is an indicator of influence of the emotional condition on the ability to perform the work, including everyday activities. No statistically significant differences in RE scores were detected for all study groups.

MH subscale characterizes mood, the presence of depression, anxiety. There was no evidence of statistically significant differences in MH scores for the study groups.

Consequently, the presence of FD leads to decrease in social functioning according to SF-36. The significantly lower rates for Groups 1 and 3 were shown for PF, RP, BP, GH, VT, and SF. Patients with PDS were demonstrated to have lower scores in GH and SF subscales in comparison with patients with EPS (Fig. 1).

Detailed results of anxiety and depression scores for each group are provided in Table 3.

The highest mean value of the anxiety was in Group 1 (7.9). 28.8% of the patients from this group did not have anxiety, 71.2% did (28.8% – masked anxiety, 42.4% – definite anxiety). Although the anxiety score was lower for Group 2 (7.5), no statistically significant differences for Group 1 and Group 2 were revealed ($p=0.637$). The comparison of Group 1 and Group 3 demonstrated a significant increase of anxiety level in patients from Group 1 ($p=0.024$). Consequently, FD leads to the increase of anxiety level regardless of the type of disease (Fig. 2).

The highest mean value of depression was discovered in Group 1 (8.2). 39.6% of the subjects from this group did not have depression, 60.4% of them showed signs of depression

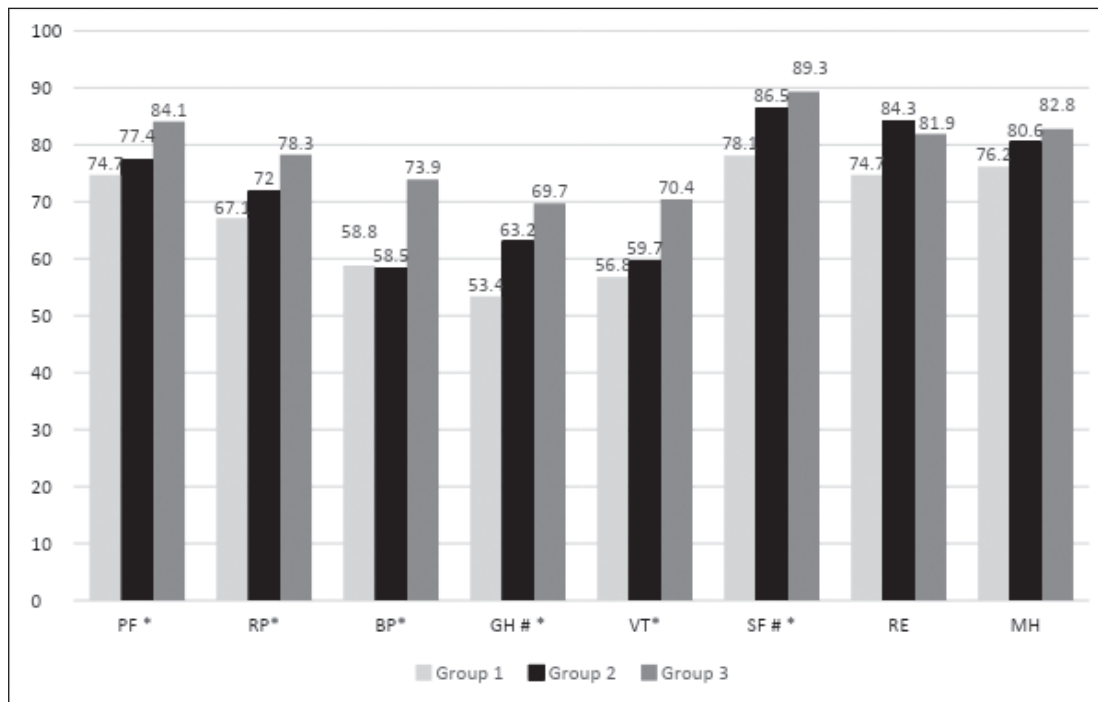


Fig. 1. Results of SF-36 questionnaire analysis for the study groups
 # - statistical significance of differences for Group 1 and Group 2
 * - statistical significance of differences for Group 1 and Group 3

Table 3. The results of HADS subscales for the study groups

| Characteristics | Study groups | | | p* | |
|---------------------|--------------------------------------|----------------|----------------|------------------|------------------|
| | Group 1 (n=58) | Group 2 (n=37) | Group 3 (n=30) | P ₁₋₂ | P ₁₋₃ |
| Anxiety (HADS-A) | No anxiety (for the score 0-7), % | 28.8 | 32.4 | 90 | |
| | Masked anxiety (8-10), % | 28.8 | 32.4 | 10 | |
| | Definite anxiety (11-21), % | 42.4 | 35.2 | 0 | |
| | Total score (M ± SD) | 7.9 ± 4.7 | 7.5 ± 3.5 | 3.9 ± 2.3 | 0.637 |
| Depression (HADS-D) | No depression (for the score 0-7), % | 39.6 | 67.5 | 96.6 | |
| | Masked depression (8-10), % | 22.4 | 21 | 3.4 | |
| | Definite depression (11-21), % | 38 | 11.5 | 0 | |
| | Total score (M ± SD) | 8.2 ± 5.3 | 5.0 ± 3.9 | 4.0 ± 3.0 | 0.023 |

* – t-test

(22.4% – masked depression, 38% – definite depression). Further analysis demonstrated statistically significant differences for Group 1 compared with Group 2 (p=0.023), and for Group 1 compared with Group 3 (p=0.001). Consequently, patients with PDS have an elevated level of depression as compared to patients with EBS and to healthy volunteers (Fig. 3).

We also compared received data with results of another studies. P. Aro et al. published the results that demonstrated the SF-36 domain scores in the Kalixanda endoscopic study population differ from Swedish mean values only for RP and GH, and their mean values were very near the respective values found in the Finnish general population. All SF-36 domain scores in PDS, except for RE, were both clinically and statistically significantly lower compared with nondyspeptic individuals. The authors also compared

the received data with previous trials that took place in the Western European countries and concluded there were only minor differences in the results [11]. O.I. Sergiienko and O.V. Bezsonova also received the data that confirmed the decreased social functioning levels in patients with FD in Ukrainian population [12].

B.F. Filipović et al. concluded that depression and anxiety level is the highest in patients with FD, if to compare with patients with chronic gastritis and healthy volunteers [13]. Similar results were received by P. Aro et al. They performed a prospective cohort study in Sweden, in which 1000 persons participated for 10 years. They demonstrated that in Swedish population anxiety at baseline, but not depression, increased the risk for development of FD [14]. Similar opinion demonstrated F. De Giorgi et al. who con-

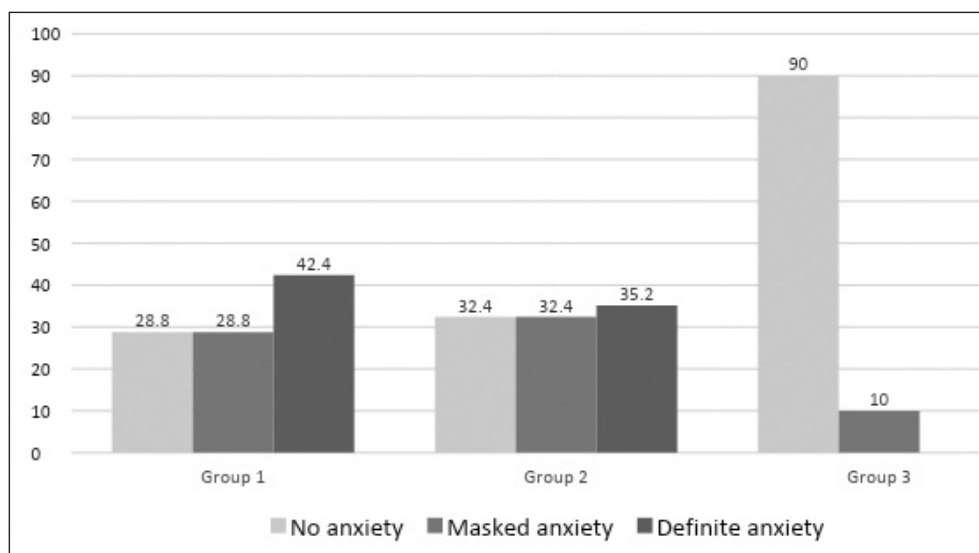


Fig. 2. Anxiety levels according to HADS-A analysis in the study groups

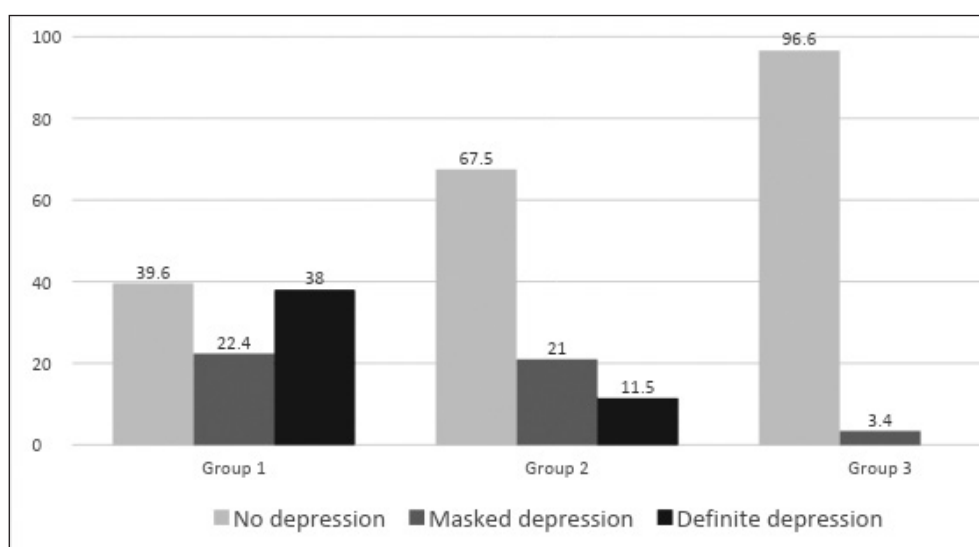


Fig. 3. Depression levels according to HADS-D analysis in the study groups

cluded that FD is related to increased anxiety level [15]. In Ukraine D. Janelidze discovered the relation between depression level and FD symptoms severity [16].

Our findings are consistent with the published literature. However in previous researches no differential statistical analysis was performed for different types of FD – PDS and EBS. The data that was collected in those studies also was based on Rome III criteria to set the diagnosis of FD. As a result currently the lack of updated data is present.

CONCLUSIONS

Each type of functional dyspepsia – postprandial distress syndrome and epigastric pain syndrome – has a certain impact on the social functioning, anxiety and depression levels. Patients with postprandial distress syndrome manifested significant differences in the psychological state as compared to patients with epigastric pain syndrome, and healthy volunteers:

- Patients with postprandial distress syndrome showed significantly lower rates of physical functioning, role physical, bodily pain, general health, vitality, and social functioning, in comparison with healthy volunteers.
- Patients with postprandial distress syndrome showed significantly lower rates of general health, and social functioning, as compared to patients with epigastric pain syndrome.
- Functional dyspepsia led to an increase in anxiety levels regardless of the type of disease as compared with healthy volunteers.
- Patients with postprandial distress syndrome had elevated depression levels compared to patients with epigastric pain syndrome and healthy volunteers.

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Conflict of interest:

The authors declare no conflict of interest.

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