

A REVIEW OF THE PSYCHOEMOTIONAL FACTORS IN FUNCTIONAL DYSPEPSIA

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ABSTRACT

Functional dyspepsia (FD) is a gastric disorder pertaining to the large spectrum of functional gastro-intestinal disorders (FGID). Its common manifestations are abdominal pain, eructation, and early satiety. Differential diagnosis with other medical conditions like gastritis and peptic ulcer is obligatory. The disease may be precipitated by and/or associated with various psychological disorders, mainly anxiety and depression, therefore it is considered a somatoform disorder. Nevertheless primary FD also occurs and it may trigger a depression-like emotional response, as do other chronic diseases, not necessarily functional. A holistic approach must be adopted in the management of FD, because the disease has deep connections with environmental and psychological factors. The coping styles used by the patients when dealing with their dyspeptic symptoms have a major influence on the disease outcome. The propensity to seek medical attention divides FD patients into consulters (the ones who demand professional help in the hope of curing their symptoms) and nonconsulters (those who don't). A frequent characteristic of the consulters is their complaints amplifying tendency. Although the disease is considered, according to its name, a functional disturbance, there is evidence for associated anomalies localized in the central and peripheral nervous system.

Key words: depression, anxiety, coping, somatization

Abbreviations

ACTH = adrenocorticotrophic hormone; CCK = cholecystokinin; CNS = central nervous system; CRF = corticotropin-releasing hormone; DU = duodenal ulcer; FD = functional dyspepsia; FGID = functional GI disorders; GI = gastro-intestinal; HPA = hypothalamic-pituitary-adrenal; IBS = irritable bowel syndrome; NMDA = N-methyl-D-aspartic acid; STAI = state-trait anxiety index

INTRODUCTION

FGID represent a class of GI tract diseases for which no underlying structural or biochemical anomaly (identifiable by the available routine diagnostic tests) has been defined. The spectrum of FGID encompasses conditions affecting the various anatomical segments of the GI tract such as: functional esophageal disorders, functional gastroduodenal disorders, functional bowel disorders, biliary dyskinesia, and functional anorectal disorders. The differential diagnosis must be made between these conditions and GI tract diseases characterized by organic lesions that may be discovered using proper diagnostic procedures.

Functional dyspepsia (FD), also called nonulcer dyspepsia manifests as recurrent epigastric pain (not necessarily meal-related), early satiety, eructation, bloating, and a sensation of fullness in the abdomen. If these symptoms are accompanied by gastroesophageal reflux and pyrosis, the diagnosis must be changed from FD to gastroesophageal reflux disease. No visible injury can be seen during endoscopy in patients with FD and no association with *Helicobacter pylori* infection has been established, but disturbances of the sensory and motor GI function have been identified and most patients with FD are more anxious and/or depressed than normal individuals.

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The distinction between FD and IBS could be inaccurate as they might represent the same disease characterized by irritability of the whole GI tract. The two entities seem to differ by the apparent localization of the symptoms, but they may actually be two variants of a single pathological entity (1). Up to half of the patients with FD suffer from IBS too (2).

There are several factors that influence the nature and intensity of symptoms in those who suffer from FD: social environment (psychosocial stressors), behavioral particularities, cognitive competences, coping style, associated psychological disorders (3). There is a large heterogeneity in the manifestations of FD (4), the symptoms varying widely from patient to patient and, not infrequently, in the same patient, one possible explanation being the inter- and intraindividual diversity of the emotional states and/or psychological features. Unlike IBS, the link between FD and female gender is not so strong (2).

MANAGING FD SYMPTOMS

Individuals with similar symptoms describe differently their sensations and this is mostly a matter of perception based upon the particular pain tolerance of a given person (4). It has been demonstrated that the discomfort threshold in FGID patients is lower than in normal people, the former experiencing pain even at mild GI segment distention.

FD patients may be divided in those who ask for medical consultation and those who do not (4). The physicians' offices attending ones tend to have a higher level of attention, are very concerned about their situation, and frequently have a negative way of thinking (5). They closely and worriedly monitor their symptoms' evolution and the more they do so, the more is the perception of their complaints magnified and the more aggressive their medical care demanding attitude becomes (4).

In every routine situation, one encounters at least one stressful event that alerts one's defensive behavior system. The way one manages to face threats defines one's way of coping. Different coping styles have been described and represent the manner a person deals with problems that appear on a daily bases without even realizing it (it is a sort of subconscious behavior). On the other hand, coping with a new and persistent challenge represents the "conscious" type of coping, the one the individual believes to be the best way to overcome the discomfort. The latter type of coping is the

mechanism that mediates one's attitude towards a chronic illness. Since FD and the others FGID are considered chronic diseases, it is important to study the way patients bearing these diagnostics deal with their symptoms in order to overcome them.

The symptom FD patients most frequently complain about is probably pain, therefore the way they manage it highly influences the outcome of the disease. Basically there are two ways of coping with pain: by concentrating on abolishing it or by ignoring it. The first type of coping mechanism is centered on the problem, namely on the pain the patients experience (4). Considering it as a stressful event, they try their best to stop it, but in so acting, they may not only actually amplify the subjective perception of their symptoms, but they may also neglect other meaningful activities, which may result in a deterioration of their emotional status, afflicted with anxiety and depression feelings. Nonetheless, an attitude of ignorance and optimism can diminish and even stop the pain perception – persons who adopt this way of coping have lower levels of anxiety and depression. The flexibility of coping mechanisms is the basis of controlling the ability to tolerate the symptoms. One of the important factors modulating this flexibility is social support, which thereby influences the perceived intensity of the symptoms. Coping is not all about handling alone your problems, but also about receiving help or mere advice and acting in conformity with the advice you are given. It has not been concluded yet whether the influence of psychosocial factors affects more the patients' decision to seek medical support or the perception of their symptoms (6).

FD, ANXIETY AND DEPRESSION

Since the FGID were first described, several studies have proved their association with anxiety and depressive disorders (7,8). There is a consensus about the link between psychological disturbances and FD. A further argument thereto is the triggering of gastrointestinal symptoms by induced anxiety in normal individuals (2).

Anxiety is more frequent than depression among FGID patients (9), but further studies are required in order to establish this as a fact. Attempts have been made to identify a temporal pattern for the link between emotional issues and the dyspeptic pain. A great proportion of patients suffering from painful disorders (included here are the patients with dyspeptic symptoms) declare that depression has affected their life after the pain had appeared

and began to be uncomfortable, exceeding the tolerable threshold (10). The quest for a temporal relationship between pain and anxiety produced inconclusive results, as the onset of pain seems to predate anxiety in roughly half of the patients, and postdate it in the other half (10). But the above observations are valid only for the patients in which the somatic sensations were the first complaints of FD – this is sometimes called primary FD. There is yet another form of FD which appears on the background of a psychiatric disorder, most commonly depression and anxiety (10). In this setting, the latter is deemed primary, while FD is considered secondary. Moreover, an emotional disorder predicts the advent of dyspeptic symptoms and, at least in this context, FD should be regarded as a somatoform disorder. Although we are keen about pointing out the tight relation of FD to psychological disorders such as anxiety and depression, we have to acknowledge that there are patients with dyspeptic symptoms without any significant mood alterations (although most of them do experience emotional issues).

Anxiety and depression influence patient's decision to seek professional medical help. It seems that almost any long lasting disease may be associated with anxiety or depression, and neither of these appears to be more prevalent as a comorbidity of chronic illnesses. Nonetheless, this does not hold for FD, where anxiety is a more frequent concomitant. Depending on how the discomfort interferes with everyday life activities, the depression level is higher or lower, but once installed, it remains relatively constant without dramatical changes (11). Pain induces psychological alterations, but the reciprocal is also true. In many patients, there is a typical chicken/egg situation, as it is hard to tell which one was the first to appear and, consequently, to decide which should be granted more attention from a therapeutic perspective: the dyspeptic symptoms or the psychological ones. The treatment with antidepressant and anxiolytic agents has shown some benefits in FD patients (12), demonstrating the importance of somatization in the pathophysiology of this disease. It has been suggested that, whenever dyspeptic patients come to medical attention, they should fill in a questionnaire (13) in order to assess their possibility to benefit from psychotherapy (14). Nowadays there is an increasing tendency to treat both the digestive symptoms, and the psychological disorders in FD patients (15), a strategy that may lower the management costs (16). However not all the patients admit their psychological disturbances or the correlation between them

and the somatic discomfort (17). Recognizing and acknowledging the emotional problems can be very hard even for a normal person and the level of understanding the emotional side of the disease depends among others on the patient's educational status. It is a difficult task for medical personnel to explain to dyspeptic patients that a solution for them is a psychiatric treatment. The simple fact that they experience pain induces the denial of a treatment for anxiety or depression (18). Nevertheless many patients respond well to a therapy based on dietary changes and avoidance of symptom aggravating factors (19).

DIAGNOSING FD

A major role in the evolution of FD is the way physicians treat the patients. FD patients complain not only about their somatic symptoms, but also about their frustration and altered emotional status. If the physician has poor communication skills, the patients' pessimistic attitude may be amplified and the result may be disappointing for both patient and physician (20).

When the patients do not directly speak about their emotional problems (whether they are reserved or simply do not admit them), a thorough medical history may reveal signs of the patient's psychological comorbidities. Obviously, the patient's body language has to be analyzed by the doctor throughout the conversation (21). Often, these important clues may be missed by the physician who is not paying enough attention, possibly because of the frustration generated by the lack of a logical explanation for the patient's medical symptoms (20). There are two identified approaches that a physician embraces when dealing with a patient with FD: the first is characterized by the physician's refusal to admit that the patient really experiences the symptoms because of their ambiguity; by contrast, the second one, called "patient-centered-communication", involves understanding what the patient feels. This second type of medical behavior puts the physician on a closer path to deciphering the patient's emotions (20), trying to individualize the person and not the illness, struggling to incorporate the current illness in the patient's way of living without affecting his/her everyday routine.

A FD patient may require more time for a consult than patients with organic diseases. Consequently, physicians may tend to get away from the case as soon as possible (20). The ambiguity and complexity of the symptoms, the emotional factors involved, and the time issue can cause great discomfort and

even anxiety to the clinician, jeopardizing the harmony of the patient-physician relationship.

The current diagnostic procedure for FD remains endoscopy. This maneuver is not used for identifying some gastric lesion pathognomonic for FD (as no such lesion exists), but for excluding other diseases like peptic ulcer or gastroesophageal reflux (19). It is nowadays generally accepted that FGID should be managed according to a biopsychosocial model (in which psychosocial characteristics of the individual should be given a prominent role) and not only from a strictly pathological point of view (22,23) – one could wonder whether not all the illnesses should be managed likewise. Nonetheless, the diagnostic workup should be thorough and the clinician ought to keep in mind that a non-negligible proportion of the FD patients will develop peptic ulcer (2).

FD is a highly complex disease. The efforts to find the best therapy for it are still running. Treatment options are broad: psychological approach, antidepressants, anxiolytics, antacids, antisecretory drugs, prokinetics, sucralfate and life style changing. The psychological therapies are mostly based upon changing patients' coping style. Hypnosis and cognitive-behavioral psychotherapy are also used (2).

Herbal therapy with capsaicin and artichoke leaf extract was tried for a short period of time to several patients. The results were satisfactory for the artichoke extract, but controversial for capsaicin (2).

The effort to design new therapies for FD is in progress, its main targets being pain perception and gastric reflex activity (2). Fedotozine and asimadoline, agonists of opioid receptors, seem to have beneficial action on dyspeptic symptoms. Other therapeutical targets would be the NMDA receptors, vanilloid receptors, protease-activated receptors, somatostatin receptors and sodium channel receptors, CCK receptors, tachykinin and CRF receptors (2).

FD AND COPING STYLES

The relationship between emotional state and gastric symptoms has long been a matter of interest. An observational study dating back in the 1940s described the case of a patient with a gastric fistula that was experiencing lower gastric motor function when he was frightened, yet higher gastric motor function when he was choleric (24). Patients with dyspeptic symptoms are generally more depressed, anxious, and tensed, and they have lower levels of energy (they feel weaker) than non-dyspeptic controls (25).

There seems to be a connection between anxiety and gastric function (both the sensory, and motor one) in FD patients. In a study where FD subjects were divided into a normosensitive and a hypersensitive group (defined according to barostat test results), the level of anxiety (as established by means of the STAI questionnaire) was proven to be greater in those with gastric hypersensitivity. It appears that patients with higher pain thresholds and lower compliance have a higher level of anxiety but only in the hypersensitive group (6). Some features of anxiety identified in the hypersensitive persons were hyperarousal and hypervigilance (6), thought to have not only a psychological, but also a biological substrate that has not been totally revealed yet. They make the patients adopt a coping mode centered on their symptoms, generate frustration and discomfort, and pushes them to obsessively monitor their symptoms and to overestimate their significance.

In a study aimed at unraveling a supposed deeper meaning in the relationship between gastric function and mood, electrogastrograms were recorded (cutaneous electrodes were used to register gastric electrical activity). In this manner, the objective somatic reaction of the stomach to stimuli was analyzed. In parallel, patients were asked to rate their emotional status (the subjective reactions) every time after a stimulus was applied. The stimuli were of two categories: exciting and nonexciting. The measurements revealed that when the exciting stimulus was acting, gastric motility decreased and the patients declared an arousing state (the reactions were attributed to activation of the sympathetic nervous system). But during the nonexciting stimulus, gastric motility increased and the emotional arousal state came to a lower level, suggesting that the parasympathetic nervous system mediated the reactions (24).

There are certain differences that distinguish patients with FD who look for medical support from those who do not. The behavior of the consultants (the ones who go to the doctor) show that they tend to confront more with their problems and they don't resign when encounter a stressful event (26). These traits match their state of hyperarousal and hypervigilance. This continuous monitoring of health makes the patients more vulnerable to other environmental and social stressors. They insist to focus on negative feelings and they think that what happens inside their body is very dangerous (5). The handiest attitude adopted by the consultants in their coping strategy is to complain to a medical service. They are often disappointed with their functional diagnostic, refusing it and trying to prove

there is something more serious than FD, they ask for other medical opinions (5).

Comparing the consulters and the nonconsulters, a series of data emerged concerning their reasons for seeking or not medical support. The consulters have great interest to obtain more information about their disease, look for professional advice and ask for explications to understand their affection. The consulters are not only interested to be told they have a functional gastric disorder; they also need to be reassured they do not have some serious illnesses like cancer or heart disease (27). On the other hand, the nonconsulters, being asked why they didn't come to see a doctor, replied that they didn't have enough time and didn't consider their symptoms important enough. (26,14). Problem-centered coping is not a bad approaching, but exaggerating the meaning of the problem can cause distress. The greater the tendency to use problem-centered coping, the greater the level of anxiety (26,28), this correlation being mostly valid for the consulters' group. Continuing the idea, the greater the level of anxiety, the more the patients amplify their dyspeptic symptoms and the more they feel the need to see a doctor. The pessimistic way of approaching the dyspeptic symptoms may result in an unsatisfactory outcome of the illness. This can be amplified by unhappy events from the past like abuse (especially in women) that negatively influence the life of patients (29,30).

The feeling-centered coping adopted by the nonconsulters may be more appropriate for managing a chronic illness. Persons that coped in this way with the dyspeptic symptoms have proven to be more optimistic, to accept their discomfort more easily and to have more rational thinking (26). These individuals can also ignore their pain by not concentrating on it and by occupying their time with distracting activities – in so doing, they can abolish their symptoms and therefore they do not contact a physician (26,31). Summing these things up, it is demonstrated that the anxiety and depression levels in people who use emotion-centered coping are much lower than in those who exaggeratedly focus on their dyspeptic discomfort by using problem-centered coping. A study performed on women showed that the main factors that influence the bad outcome of FD are a negative attitude towards the dyspeptic symptoms, adopting a wrong type of coping, and a history of unfortunate events (29).

FD – A SOMATOFORM DISORDER

The attitude towards the discomfort manifested by the patients with FD is influenced by social,

environmental and psychical factors. Various circumstances and occurrences happening during an individual's life may alter his/her behavior, especially so the uncontrollable events, which have been proven to be a risk factor for future psychological disturbances. An angry attitude for increased amounts of time can influence gastric emptying. Unhappy, stressed or angry persons are more predisposed to gastric stasis with the subsequent symptoms (32).

Some studies describe FD as a somatization phenomenon. Somatization may be viewed as emotions translated into physical perceptions. The term may be equivalent with hypochondria and in ancient times was described in women and was called hysteria (33). Many definitions of the term were trying to satisfy its meaning, but none of them could cover all the significances: some declare that somatization is strongly associated with some psychiatric disturbance like alexithymia which is considered to be an explanation for somatization (34); others believe that the term mostly expresses one's tendency to complain about symptoms which can not be explained in a medical manner (35). In this view, FD is not really considered a disease, but more of a somatoform disorder in which the main concern is the psychological affliction that induces the physical symptoms (36). In the same study a connection was found between age, female sex, and symptom amplification in FD (36). It may be speculated that patients with FD are having anxious and depressive emotional states that are being amplified when the dyspeptic symptoms appear (28). The idea underlines that even before dyspeptic symptoms appeared, these people had experienced some emotional disturbances. In these patients FD should be regarded as a secondary disorder triggered by the psychiatric condition (depression or anxiety). Patients having somatoform disorders are known to seek medical support very often (21), this is why, for financial reasons, the relevance of their symptoms must be well established and their treatment rigorously weighed.

Alexithymia was proposed in several studies to be a predisposing factor for functional somatic illnesses. Alexithymia represents the ineptitude to recognize and verbally express one's emotions, which is often coupled with an inability to understand that some physical sensations may be attributed to emotional feelings. Persons with this condition are thought to be incapable of experiencing complex feelings (34). Because they fail to associate their feelings with their bodily sensations, alexithymic patients are more likely to seek medical

support for unexplained symptoms (35). These patients are unable to understand the psychosomatic nature of their disease.

Living a chronic stressful life alone can lead to dyspeptic symptoms with a psychological component (37), but it is also known the fact that prolonged life stress is a risk factor for organic GI lesions such as peptic ulcer (38). Stressors acting for long periods of time may induce a state of FD in an individual and along with this, emotional disturbances like depression, anxiety and even insomnia (39). The sleep disturbances seem to correlate with the severity of the symptoms and with high anxiety levels (40). The number of somatic symptoms has been correlated with psychological disorders. The presence of unexplained symptoms or of a large number of unrelated symptoms in a patient could indicate a mood disorder like anxiety (41).

A significant amount of studies concentrated to find the differences and similarities between patients with FD and those with duodenal ulcer. The symptomatology of both illnesses is almost identical and because of this the differential diagnostic should be thoroughly made. The relevant data obtained were supposed to distinguish between the intensity and number of symptoms in each category and the psychological states both patient groups manifested.

No significant difference in the levels of anxiety was identified when comparing FD patients with those diagnosed with duodenal ulcer (DU). However trait anxiety seems to be much higher in FD individuals when compared to those suffering from DU (42). Patients with FD had more complaints than those with DU and also had a greater number of symptoms from other organs and systems than the GI tract (43). The disease history was longer in those with FD and the symptoms they complaint were more frequent and persistent (43), also the patients with FD had more previous medical consults (44).

Somatic amplification of symptoms often occurs in FD patients. The process implies perceiving some symptoms as more intense and more bothersome than they really are. These patients are hypervigilant and prone to worry disproportionately about any new symptom, which is regarded as extremely alarming, pushing them to seek medical advice. The individual concentrates more on his/her body sensations in a negative way, giving them greater importance than normal. Specialists believe that somatic amplification is the basis for explaining functional organ diseases and evidence demonstrated that the phenomenon correlates well with psychiatric

disturbances. Somatic amplification can be the key for explaining the variability of symptoms in persons with the same chronic functional disease (but it must be taken into account the association of other factors that influence symptom variability such as ethnicity – the Asians complaint more of their symptoms than the Caucasian do (45) – and patients management by the health care systems (46)). The somatic amplification can be a transient psychological process associated with some somatic discomfort or can be a behavior trait that manifests itself throughout one's life (47). The variability of dyspeptic symptoms is a matter of "abnormal illness behavior" (21). The illness behavior is a way of coping with the disease. The association with illness severity is only moderate and this is interesting to know for understanding the emotional component of the illness. A hypochondriac patient almost certainly amplifies his/her symptoms and the doctor can be misled by his/her convincing manner of showing in what bad situation he is.

Cognition, context, attention, mood – these are the parameters that influence perception of symptoms (47). When a symptom is attributed to a more serious disease, it tends to amplify its intensity (a good example for this is a worried patient with undiagnosed FD that imputes his/her dyspeptic symptoms to a gastric tumor and the more he/she believes this, the stronger his/her symptoms become). The quality of symptoms also depends on what a person expects to happen. If a patient newly diagnosed with FD who previously experienced dyspeptic symptoms is being informed by his/her doctor about what other manifestation he/she may encounter, the patient starts feeling what he/she should feel according to the doctor's information. (nu mai are sens continuarea, poate fi eliminate. Voiam sa spun ca incepe sa aiba simptomele pe care se asteapta sa le aiba dup ace I s-a explicat ce inseamna boala lui, iar vechile simptome se pot modifica) Offering more attention to a somatic sensation amplifies that sensation (29). Most of the people with FD and especially the ones who often seek medical aid demonstrate hyperattentive behavior (6, 29).

PATHOPHYSIOLOGY OF FD

Some physiopathologic considerations about FD reveal that most of the patients with this illness have abnormal gastric motility and hypersensitivity (48, 49, 50). A high number of dyspeptic patients have problems with the relaxation of the gastric fornix. This poor relaxation induces the sensation

of early satiety (48) and the sensation of fullness after a meal is correlated with anxiety (51). A lower vagal tone was identified in these patients comparing with healthy people and also an increase in CCK level was recorded associated to decreased gastric motility (52). The low vagal tone may explain the personality traits found in patients with FD: anxiety, neuroticism, depression (53). Because of this, FD can be correlated with sleep disorders that affect more women than men (53). Symptoms cannot distinguish between organic and FD, but apparently, in FD there is a hypersensitivity of the afferent gastric nerve fibers (54). This hypothesis does not explain the comorbid psychological disorders. The gastric hypersensitivity to distention was accompanied by belching, postprandial pain and weight loss (55). Another feature of FD hypersensitivity to distention of the stomach is the diminished gastric reflex reactivity (56).

The connection between the brain and the GI system is very interesting. The main center of gut control from the CNS is the limbic system. But that region is involved in personality and emotionality too and even more, the limbic system modulates visceral pain transmission and perception (57). So there is an anatomic closeness than can explain some of the mysteries concerning the relationship between emotional status and FGID.

The functional dyspeptic disease and also the irritable bowel syndrome have shown to be connected with some disturbances of the hypothalamic-pituitary-adrenal (HPA) axis (58, 59). The importance of cortisol in stress reaction is thoroughly understood and also the association of stress and GI system illness is well known. Recently it has been discovered that corticotropin-releasing factor (CRF) plays a major role in regulating central mechanisms by which stress induces impaired gastric emptying and stimulates colonic peristalsis (58). Both mechanisms occur because of the action of CRF on the hypothalamic paraventricular nucleus (which is known to be involved in regulating stressful events), but by acting on the locus coeruleus, CRF only induces high motility of the colon, without inhibiting the emptying of the stomach (58). One study that verified the integrity of the HPA axis in patients with FGID reached the conclusion that in all patients the activity of the axis was lower than in normal persons (59). Besides, low levels of adrenocorticotrophic hormone (ACTH) and cortisol were registered (59). These observations lead to the conclusion that in such functional GI tract disorders, a down-regulation of CRF receptors at the level of the pituitary has occurred. The

scientific literature describes low responsiveness of the pituitary gland upon stimulation with CRF in eating disorders, anxiety and depression (59). Mal-functioning CCK pathway mechanism is speculated to contribute to FD development. CCK inhibits gastric emptying indirectly, by the afferent fibers of the vagus nerve. In FD, the way CCK acts interferes with the serotonin pathway, the mechanism is not well understood but has been proposed to play a part in FD pathological process (2).

Duodenal hypersensitivity to gastric acid and lipid-rich meals is associated with FD (2).

About one fifth of patients with FD had a medical past of enteric infection. Although an inflammatory etiology will contradict the definition of functional dyspepsia, authors take into consideration this pathophysiologic mechanism too (2).

CONCLUSIONS

FD is an illness of the modern world. The way of dealing with it should be based on a biopsychosocial model. In both primary and secondary FD the associated psychological disorders should be evaluated carefully. FD is divided into primary and secondary according to whether the dyspeptic symptoms precede or follow the psychological disturbances. Secondary FD, deemed to be induced by a psychiatric disorder, is considered a somatoform disease. In most cases, the outcome is determined by the way patients cope with their symptoms. An emotion-based coping style has definitely better results than a confrontational attitude towards the problem. Patients that are constantly worried about their somatic sensations are at a greater risk to aggravate their symptoms; therefore they are seeking medical support more often. In this group of “excessively-worried” patients, higher levels of anxiety were found compared to the individuals who ignored the discomforts. Hyperarousal and hypervigilance are common among patients with FGID. Both of these combine with the dyspeptic symptoms into a potentially self-amplifying loop. Hyperattention increases pain perception. The variability of symptoms makes the diagnosis a difficult task. Because there are no associated organic lesions, the diagnosis of FD is based only on the patient’s complaints. The physician has to pay attention to the dialog with the patient and has to observe clues that may reveal his/her mental state. Therapy options are plenty: from drugs acting to alleviate the pain to psychological support. The latter is extremely important and the clinician should not forget about it. In many cases, the

symptoms disappear after the patients change their lifestyle and way of thinkings. Patients with FD or other FGID often have negative thinking. A more optimistic mindset results in a decrease of their physical discomfort. FD is a somatization process and alexithymic patients are prone to dyspeptic symptoms, which are a reflection of their unrecognized emotions. As this is only a matter of perception, their brain can be educated to no longer

translate their mental state into physical sensations. In such patients, psychotherapy is almost mandatory. By altering the activity of the neuroendocrine system, chronic stress determines the malfunctioning of the GI tract. In patients with FD the activity of the HPA axis is depressed, with abnormally high levels of CRF impairing gastric emptying. CCK-mediated mechanisms may also be involved in the pathophysiology of FD.

REFERENCE

- Agréus L., Svärdsudd K., Nyrén O., Tibblin G. – Irritable bowel syndrome and dyspepsia in the general population: overlap and lack of stability over time. *Gastroenterology*. 1995; 109: 671-80.
- Saad R.J., Chey W.D. – Current and Emerging Therapies for Functional Dyspepsia. *Alimentary Pharmacology & Therapeutics*. 2006; 24: 475-92.
- Budavari A.I., Olden K.W. – Psychosocial aspects of functional gastrointestinal disorders. *Gastroenterol Clin North Am*. 2003; 32: 477-506.
- Cheng C., Hui W.M., Lam S.K. – Psychosocial factors and perceived Severity of functional dyspeptic symptoms: a psychosocial interactionist model. *Psychosom Med*. 2004; 66: 85-91.
- Hiller W., Cuntz U., Rief W., Fichter M.M. – Searching for a gastrointestinal subgroup within the somatoform disorders. *Psychosomatics*. 2001; 42: 14-20.
- Van Oudenhove L., Vandenberghe J., Geeraerts B., Vos R., Persoons P., Demyttenaere K., Fischler B., Tack J. – Relationship between anxiety and gastric sensorimotor function in functional dyspepsia. *Psychosom Med*. 2007; 69: 455-63.
- Whitehead W.E. – Psychosocial aspects of functional gastrointestinal disorders. *Gastroenterology*. 2006; 130: 1447-58.
- Haug T.T., Mykletun A., Dahl A.A. – The association between anxiety, depression, and somatic symptoms in a large population: the HUNT-II study. *Psychosom Med*. 2004; 66: 845-51.
- Kane F.J. Jr, Strohlein J., Harper R.G. – Nonulcer dyspepsia associated with psychiatric disorder. *South Med J*. 1993; 86: 641-6.
- Lieb R., Meinlschmidt G., Araya R. – Epidemiology of the association between somatoform disorders and anxiety and depressive disorders: an update. *Psychosom Med*. 2007; 69: 860-3.
- Von Korff M., Simon G. – The relationship between pain and depression. *Br J Psychiatry Suppl*. 1996; 30: 101-8.
- Radziewicz-Winnicki I., Więcek S., Woś H., Janowska M. – (Psychosomatic aspects of functional dyspepsia: the influence of neuroticism on symptoms occurrence and response to the treatment) (the original paper is in Polish). *Pediatr. Współcz. Gastroenterol. Hepatol Żywnienie Dziecka*. 2007; 9: 115-21 Ł.
- Tse A.W., Lai L.H., Lee C.C., Tsoi K.K., Wong V.W., Chan Y., Sung J.J., Chan F.K., Wu J.C. – Validation of Self-administrated Questionnaire for Psychiatric Disorders in Patients with Functional Dyspepsia. *J Neurogastroenterol Motil*. 2010; 16: 52-60.
- Herschbach P., Henrich G., Von Rad M. – Psychological factors in functional gastrointestinal disorders: characteristics of the disorder or of the illness behavior?. *Psychosom Med*. 1999; 61: 148-53.
- Mine K., Kanazawa F., Matsumoto K., Tsuchida O., Hosoi M., Kubo C. – A depressive disorder in patients with irritable bowel syndrome and non-ulcer dyspepsia. *Nihon Rinsho*. 1994; 52: 1329-33.
- Arnou B.A., Blasey C.M., Lee J., Fireman B., Hunkeler E.M., Dea R., Robinson R., Hayward C. – Relationships among depression, chronic pain, chronic disabling pain, and medical costs. *Psychiatr Serv*. 2009; 60: 344-50.
- Burton C., Weller D., Sharpe M. – Functional somatic symptoms and psychological states: an electronic diary study. *Psychosom Med*. 2009; 71: 77-83.
- Bair M.J., Robinson R.L., Katon W., Kroenke K. – Depression and pain comorbidity: a literature review. *Arch Intern Med*. 2003; 163: 2433-45.
- Talley N.J. – Nonulcer dyspepsia: current approaches to diagnosis and management. *Am Fam Physician*. 1993; 47: 1407-16.
- Epstein R.M., Shields C.G., Meldrum S.C., Fiscella K., Carroll J., Carney P.A., Duberstein P.R. – Physicians' responses to patients' medically unexplained symptoms. *Psychosom Med*. 2006; 68: 269-76.
- Rief W., Martin A., Klaiberg A., Brähler E. – Specific effects of depression, panic, and somatic symptoms on illness behavior. *Psychosom Med*. 2005; 67: 596-601.
- Drossman D.A. – Presidential address: Gastrointestinal illness and the biopsychosocial model. *Psychosom Med*. 1998; 60: 258-67.
- Drossman D.A., Creed F.H., Olden K.W., Svedlund J., Tonere B.B., Whitehead W.E. – Psychosocial aspects of the functional gastrointestinal disorders. *Gut*. 1999; 45: 25-30.
- Muth E.R., Koch K.L., Stern R.M., Thayer F. – Effect of autonomic nervous system manipulations on gastric myoelectrical activity and emotional responses in healthy human subjects. *Psychosom Med*. 1999; 61: 297-303.
- Kanbara K., Fukunaga M., Mutsuura H., Takeuchi H., Kitamura K., Nakai Y. – An exploratory study of subgrouping of patients with functional somatic syndrome based on the psychophysiological stress response: its Relationship with moods and subjective variables. *Psychosom Med*. 2007; 69: 158-65.
- Cheng C. – Seeking medical consultation: perceptual and behavioral characteristics distinguishing consulters and nonconsulters with functional dyspepsia. *Psychosom Med*. 2000; 62: 844-52.
- Lydeard S., Jones R. – Factors affecting the decision to consult with dyspepsia: comparison of consulters and non-consulters. *J R Coll Gen Pract*. 1989; 39: 495-8.
- Henningsen P., Zimmermann T., Sattel H. – Medically unexplained physical symptoms, anxiety, and depression: a meta-analytic review. *Psychosom Med*. 2003; 65: 528-33.
- Drossman D.A., Leserman J., Li Z., Keefe F., Hu Y.J.B., Toomey T.C. – Effects of coping on health outcome among women with gastrointestinal disorders. *Psychosom Med*. 2000; 62: 309-17.
- Leserman J., Li Z., Hu Y.H., Drossman D.A. – How multiple types of stressors impact on health. *Psychosom Med*. 1998; 60: 175-81.
- Cheng C., Hui W.M., Lam S.K. – Coping style of individuals with functional dyspepsia. *Psychosom Med*. 1999; 61: 789-95.
- Bennett E.J., Kellow J.E., Cowan H., Scott A.M., Shuter B., Langeluddecke P.M., Hoschl R., Jones M.P., Tennant C.C. – Suppression of anger and gastric emptying in patients with functional dyspepsia. *Scand J Gastroenterol*. 1992; 27: 869-74.
- Pridmore S. – Download Of Psychiatry – Chapter_22__Somatization. University of Tasmania. 2006.
- Mattila A.K., Kronholm E., Jula A., Salminen J.K., Koivisto A.M., Mielonen R.L., Joukamaa M. – Alexithymia and somatization in general population. *Psychosom Med*. 2008; 70: 716-22.

35. **Kooiman C.G., Bolk J.H., Rooijmans H.G.M., Trijsburg R.W.** – Alexithymia does not predict the persistence of medically unexplained physical symptoms. *Psychosom Med.* 2004; 66: 224-32.
36. **Jones M.P., Schettler A., Olden R.N.K., Crowell M.D.** – Alexithymia and Somatosensory Amplification in Functional Dyspepsia. *Psychosomatics.* 2004; 45: 508-16.
37. **Talley N.J., Piper D.W.** – Major life event stress and dyspepsia of unknown cause: a case control study. *Gut.* 1986; 27: 127-34.
38. **Craig T.K., Brown G.W.** – Goal frustration and life events in the aetiology of painful gastrointestinal disorder. *J Psychosom Res.* 1984; 28: 411-21.
39. **Bennett E., Beaurepaire J., Langeluddecke P., Kellow J., Tennant C.** – Life stress and non-ulcer dyspepsia: a case-control study. *J Psychosom Res.* 1991; 35: 579-90.
40. **Lacy B.E., Everhart K., Crowell M.D.** – Functional dyspepsia is associated with sleep disorders. *Clin Gastroenterol Hepatol.* 2011; 9: 410-4.
41. **Kroenke K., Spitzer R.L., Williams J.B.W., Linzer M., Hahn S.R., DeGruy III F.V., Brody D.** – Physical symptoms in primary care: predictors of psychiatric disorders and functional impairment. *Arch Fam Med.* 1994; 3: 774-9.
42. **Alexander P.J., Tantry B.V.** – Role of anxiety and personality in non-ulcer dyspepsia: a comparative study with duodenal ulcer. *Indian J Gastroenterol.* 1993; 12: 86-8.
43. **Haug T.T., Svebak S., Wilhelmsen I., Berstad A., Ursin H.** – Psychological factors and somatic symptoms in functional dyspepsia, A comparison with duodenal ulcer and healthy controls. *J Psychosom Res.* 1994; 38: 281-91.
44. **Morris C., Chapman R., Mayou R.** – The outcome of unexplained dyspepsia; A questionnaire follow-up study of patients after endoscopy. *J Psychosom Res.* 1992; 36: 751-7.
45. **Farooq S., Gahir M.S., Okyere E., Sheikh A.J., Oyebode F.** – Somatization: a transcultural study. *J Psychosom Res.* 1995; 39: 883-8.
46. **Simon G.E., VonKorff M., Piccinelli M., Fullerton C., Ormel J.** – An international study of the relation between somatic symptoms and depression. *N Engl J Med.* 1999; 341: 1329-35.
47. **Barsky A.J.** Amplification, somatization, and the somatoform disorders. *Psychosomatics.* 1992; 33: 28-34.
48. **Tack J., Piessevaux H., Coulie B., Caenepeel P., Janssens J.** – Role of impaired gastric accommodation to a meal in functional dyspepsia. *Gastroenterology.* 1998; 115: 1346-52.
49. **Lémann M., Dederding J.P., Flourié B., Franchisseur C., Rambaud J.C., Jian R.** – Abnormal perception of visceral pain in response to gastric distension in chronic idiopathic dyspepsia; The irritable stomach syndrome. *Dig Dis Sci.* 1991; 36: 1249-54.
50. **Mearin F., Cucala M., Azpiroz F., Malagelada J.R.** – The origin of symptoms on the brain-gut axis in functional dyspepsia. *Gastroenterology.* 1991; 101: 999-1006.
51. **Schurman J.V., Singh M., Singh V., Neilan N., Friesen C.A.** – Symptoms and subtypes in pediatric functional dyspepsia: relation to mucosal inflammation and psychological functioning. *J Pediatr Gastroenterol Nutr.* 2010; 51: 298-303.
52. **Jonsson B.H., Uvnas-Moberg K., Theorell T., Gotthard R.** – Gastrin, cholecystokinin, and somatostatin in a laboratory experiment of patients with functional dyspepsia. *Psychosom Med.* 1998; 60: 331-7.
53. **Haug T.T., Syebak S., Hausken T., Wilhelmsen I., Berstad A., Ursin H.** – Low vagal activity as mediating mechanism for the relationship between personality factors and gastric symptoms in functional dyspepsia. *Psychosom Med.* 1994; 56: 181-6.
54. **Mertz H., Fullerton S., Naliboffa B., Mayera E.A.** – Symptoms and visceral perception in severe functional and organic dyspepsia. *Gut.* 1998; 42: 814-22.
55. **Tack J., Caenepeel P., Fischler B., Piessevaux H., Janssens J.** – Symptoms associated with hypersensitivity to gastric distention in functional dyspepsia. *Gastroenterology.* 2001; 121: 526-35.
56. **Coffin B., Azpiroz F., Guarner F., Malagelada J.R.** – Selective gastric hypersensitivity and reflex hyporeactivity in functional dyspepsia. *Gastroenterology.* 1994; 107: 1345-51.
57. **Jones M.P., Dilley J.B., Drossman D., Crowell M.D.** – Brain-gut connections in functional GI disorders: anatomic and physiologic relationships. *Neurogastroenterol Motil.* 2006; 18: 91-103.
58. **Taché Y., Mönnikes H., Bonaz B., Rivier J.** – Role of CRF in stress-related alterations of gastric and colonic motor function. *Ann N Y Acad Sci.* 1993; 697: 233-43.
59. **Böhmelt A.H., Nater U.M., Franke S., Hellhammer D.H., Ehlert U.** – Basal and stimulated hypothalamic-pituitary-adrenal axis activity in patients with functional gastrointestinal disorders and healthy controls. *Psychosom Med.* 2005; 67: 288-94.
60. **Cheng C., Hui W.M., Lam S.K.** – Coping with first-time endoscopy for a select sample of chinese patients with functional dyspepsia and duodenal ulcer: an observational study. *Psychosom Med.* 2002; 64: 867-73.
61. **Jonsson B.H., Theorell T., Gotthard R.** – Symptoms and personality in patients with chronic functional dyspepsia. *J Psychosom Res.* 1995; 39: 93-102.