



## EMOTIONAL ASPECTS OF SELF-ATTITUDE OF ADOLESCENTS WITH *PECTUS EXCAVATUM* (PE) BEFORE AND AFTER SURGERY (PILOT STUDY)

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The present study deals with preliminary assessment of adolescents' with *Pectus excavatus* (PE) personal emotional characters of self-attitude prior to and after surgical treatment. PE is a congenital defect manifesting in retraction of sternum and cartilaginous portions of the ribs into the rib-cage. It constitutes about 90% of the entire number of cases of congenital pathology of the chest, its rate as high as 1-8 per 1000 neonates. The only method of treatment for this pathology is surgical operation for conservative measures can't stop progressive deformation of the chest. The peak of this pathology coincides with adolescent period which is particularly sensitive for forming of personality. The goal of the present study is the assessment of emotional and personality features of adolescents with PE that are manifesting in peculiarities of cognitive, affective and behavioral reactivity. 26 adolescent patients aged 13 to 17 years with PE hospitalized at surgical clinic of St. Petersburg State Pediatric Medical University for subsequent primary operative elimination of this defect or recurring operation – ablation of the implant (1-4 years after the primary surgery) took part in the present study. High level of anxiety and depression associated with negative perception of their bodies prior to surgery was revealed. Urgent need for psychological assistance of these adolescents is evident as well as extension of further studies associated with peculiarities of emotional self-perception and its correlation with children-parents relationship character.

**Keywords:** adolescents; anxiety-depressive disorders; self-attitude; pectus excavatum; reconstructive surgery.

## ЭМОЦИОНАЛЬНО-ЛИЧНОСТНЫЕ АСПЕКТЫ САМООТНОШЕНИЯ ПОДРОСТКОВ С ВОРОНКООБРАЗНОЙ ДЕФОРМАЦИЕЙ ГРУДНОЙ КЛЕТКИ ДО И ПОСЛЕ ХИРУРГИЧЕСКОГО ЛЕЧЕНИЯ (ПИЛОТНОЕ ИССЛЕДОВАНИЕ)

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Исследование посвящено анализу результатов пилотной оценки эмоционально-личностных характеристик самоотношения подростков с воронкообразной деформацией грудной клетки (ВДГК) до и после хирургического лечения. ВДГК – порок развития, проявляющийся западением грудины и хрящевых отделов ребер внутрь грудной клетки, он составляет 90 % от общего числа врожденной патологии грудной клетки и встречается в 1–8 случаях на 1000 новорожденных. Лечение данной патологии только хирургическое, так как невозможно консервативно остановить процесс прогрессирования

ния деформации. Пик развития данного заболевания приходится на подростковый возраст, сензитивный для формирования личности. Цель исследования – изучение эмоционально-личностных характеристик подростков с ВДГК, которые проявляются в особенностях когнитивного, аффективного и поведенческого реагирования. В исследовании приняли участие подростки с ВДГК, находящиеся в хирургическом отделении № 2 клиники ФГБОУ ВО СПбГПМУ в связи с предстоящим оперативным лечением. Всего было обследовано 26 подростков в возрасте от 13 до 17 лет. I группа – 14 подростков (10 мальчиков, 4 девочки), которые поступили на первичную операцию по устранению деформации грудной клетки, II группа – 12 подростков (10 мальчиков, 2 девочки), поступившие повторно (спустя 1–4 года после первичной операции) в связи с необходимостью удаления импланта. Выявлен высокий уровень тревожности и депрессивности в связи с негативным восприятием собственного тела до операции. Обозначена необходимость психологического сопровождения этих подростков, а также дальнейших исследований, связанных с особенностями эмоционального восприятия собственного тела и их связи с характером детско-родительских отношений.

**Ключевые слова:** подростки; тревожно-депрессивные расстройства; самоотношение; воронкообразная деформация грудной клетки; реконструктивная операция.

The hollowed chest (HC), or pectus excavatum (PE) comprises 90% of the total number of congenital abnormalities of the chest and occurs in 1–8 individuals per 1000 newborns. HC is a developmental defect that manifests as a depression in the sternum and the cartilaginous rib divisions of the chest. To date, the etiopathogenesis of this disease remains unknown [5]. This pathology can only be surgically treated because it is impossible to conservatively halt the progression of this deformity. Major development of this disease occurs in adolescence, which is a period sensitive to the formation of personality. During this period, along with the growth spurt, a previously minimal cosmetic defect can become gross and disfiguring within a few months [2], and this can greatly affect subsequent quality of life. Hence, current indications for surgical treatment include not only functional changes in the cardiovascular and respiratory systems but also gross cosmetic defects that significantly affect the quality of life of the patient [1, 13, 14, 16, 17].

According to other researchers, adolescents with a chest deformity occasionally develop a negative body image, which leads to reduction in self-esteem, increase in anxiety, and disturbances in social interaction [3, 4, 9, 15].

This study aimed to investigate the emotional and personal characteristics of adolescents with HC, including the characteristics of cognitive, affective, and behavioral responses.

International studies focused on the psychological state of adolescents with this disease [10–12] mostly utilized questionnaires that assessed particular signs through scores and provided an extensive knowledge base on this issue. In this study, we qualitatively evaluated the indicators that reflect the degree of psychological well-being in adolescents with HC as well as their self-esteem and anxiety levels.

The relevance of studying the psychological components of this problem is that modern medical technologies are primarily directed at eliminating anatomici-

cal and physiological defects, and it undoubtedly plays a major role in the treatment of adolescents with HC. Moreover, it is important to consider various aspects of the emotional state of these patients during the surgical preparation and recovery periods.

## MATERIALS AND METHODS

In this study, adolescents with HC were enrolled; they stayed in the surgical department No. 2 of the Federal State Budgetary Educational Institution of Higher Education, Saint Petersburg State Pediatric Medical University of the Russian Ministry of Health, for surgical treatment. A total of 26 adolescents aged 13–17 years were examined. Group I included 14 adolescents aged 13–17 years (10 boys and 4 girls) who were admitted for primary surgery to eliminate the chest deformity; group II included 12 adolescents aged 14–17 years (10 boys and 2 girls) who had been re-admitted (at 1–4 years after the initial surgery) for removing the implant.

The objectives of this study were the identification of the emotional and personal characteristics of self-attitude of the adolescents with HC before and after surgical treatment. The methods used were clinical interview-questioning, analysis of data from medical records, and application of the Stolin self-attitude questionnaire [8], E.E. Malkova method of multivariable estimation of children's anxiety [6], Depriscope by P. Heimas and A.I. Podolsky [7], and the original projective method-color image of the body (CIB) developed by A.O. Teplyakova under the guidance of Prof. E.E. Malkova [9], in which special attention was paid to the analysis of the color relationship to the thoracic part of the silhouette.

## RESULTS OF THE STUDY

According to the clinical interview conducted, 78.6% of the adolescents in group I denied that a physical defect had an effect on their emotional state and relationships with their peers and did not associate their failures with the presence of the disease. However,

64.2% of the subjects noted that HC seriously limited their physical activity (due to the deterioration in their physical condition, they were forced to restrict or stop their participation in various sports). Most adolescents (85.7%) complained of frequent exhaustion and rapid fatigue. In 71.4% of subjects, the recovery of physical activity was the only reason for which they consented for the reconstructive surgery. Not more than a third (28.6%) of the respondents reported dissatisfaction with the condition of their body, complaining that due to the deformity, they felt constrained around their peers while changing clothes on the beach and in the pool. All the adolescents expecting surgery unequivocally answered "No" to the question "Would you like your chest to remain in the state that it is now?"

Adolescents in the group II were generally more confident and willingly described their feelings. Absence of pain and a marked improvement in physical condition after surgery was noted in 83.3% of respondents, which according to the adolescents, significantly improved the quality of their lives. Psychological assessment revealed that 41.7% of the respondents noted a subjective decrease in their anxiety level ("Somehow, I immediately stopped worrying; it left me"), and 58.3% had an active desire to communicate with their peers. In addition, 16.7% of children retrospectively admitted that before the surgery, there were moments when they did not want to live, which is an extremely alarming fact. Nevertheless, at the time of implant removal, all of them noted a significant improvement in their psychomotional state ("Now life has changed very much for the better"); 58.3% of adolescents retrospectively admitted that many of their previous problems were due to the presence of HC and that this was something that they had not previously realized. Furthermore, 75% of adolescents believed that the psychological support of their parents played an important role before the surgical treatment and especially in the postoperative recovery period.

Meanwhile, after the reconstructive surgery, 41.7% of adolescents experienced some difficulties in integrat-

ing into ordinary life. According to them, "It was scary to run at first" and "I was afraid that I would lose consciousness while swimming." However, 16.7% of the children expressed regret that doctors do not allow full-fledged participation in sports.

To identify the attitude of adolescents toward their body, the projective method CIB was applied. The results did not reveal significant differences between the colors chosen by the groups or the level of detail and harmony, but they did subjectively reflect higher level of acceptance of one's body as a whole (Figure 1) and the chest in particular (Figure 2) in the adolescents of group II compared with the adolescents of group I.

An analysis of the self-attitude assessment data revealed differences between the two groups of adolescents in terms of self-confidence and expectation of a positive attitude from others (Figure 3). Furthermore, the level of these indicators among adolescents in group I was not only lower than the indices of adolescents in group II but also lower than the normative values. Regarding other scales of the questionnaire, the results for the adolescents of both groups did not significantly differ.

The results of multivariable estimation of anxiety levels revealed a predominantly higher level of this index in the adolescents of group I (Table 1). The most significant levels of anxiety (including values above the normative values) were observed in the "anxiety in relations with peers", "anxiety associated with the assessment of others", "anxiety in situations of self-expression", and "increased autonomic responsiveness" scales, which may indicate a higher level of anxiety and emotional tension in group I adolescents before surgical treatment than in group II adolescents.

Table 2 shows the manifestations of depressive tendencies. In adolescents of group I, these tendencies were manifested as sleep disorders (78.6%), fatigue (85.7%) accompanied with a lack of energy (85.7%), and difficulty in concentrating (92.9%). The most significant was the indicator of the degree of intervention of depressive manifestations in the sphere of teenage experi-

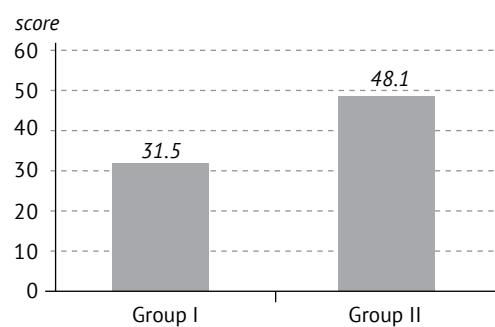


Fig. 1. Level of acceptance of one's body in the adolescents

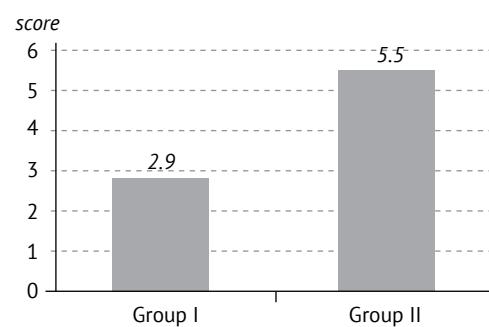


Fig. 2. Level of acceptance of the whole chest in the adolescents

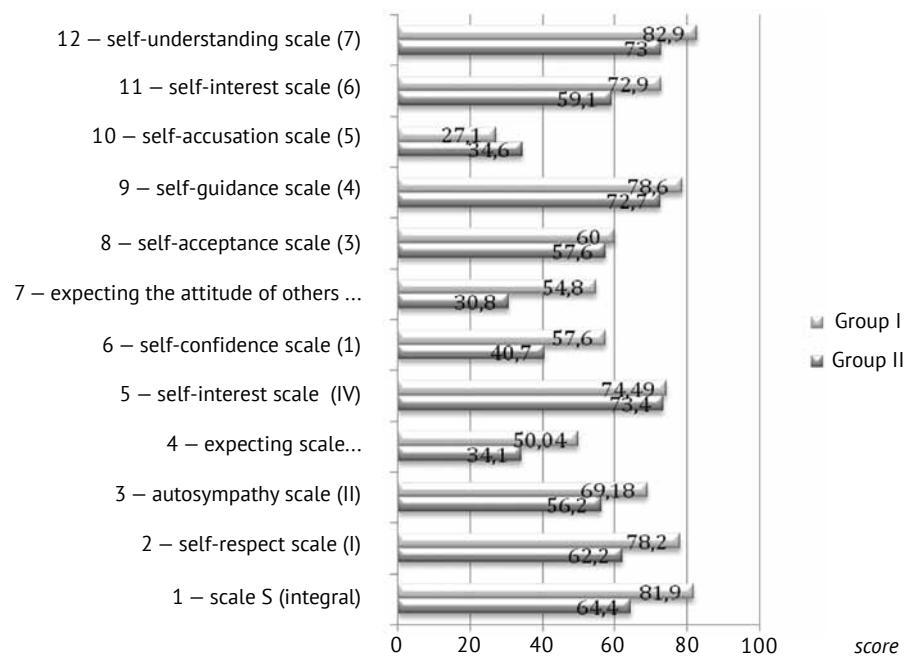


Рис. 3. Special aspects of self-attitude in the studied adolescents

Table 1

Multivariable estimation of anxiety in the studied adolescents

Anxiety parameter	Group I		Group II	
	<i>M</i>	<i>m</i>	<i>M</i>	<i>m</i>
General anxiety	3.43	0.18	1.5	0.16
Anxiety in relations with peers	4.07	0.17	2.42	0.16
Anxiety associated with the assessment of others	4.29	0.17	2.58	0.16
Anxiety in relations with teachers	2.27	0.16	1.92	0.16
Anxiety in relations with parents	4.51	0.18	2.50	0.16
Anxiety associated with success in training	3.14	0.15	2.25	0.19
Anxiety in situations of self-expression	4.14	0.18	2.58	0.16
Anxiety arising in the situation of testing knowledge	2.50	0.18	2.17	0.17
Reduced mental activity due to anxiety	3.93	0.17	2.92	0.16
Increased autonomic responsiveness caused by anxiety	2.64	0.18	1.00	0.18

ences (DINTRUS). According to the recommendation of the authors of the questionnaire "Depriscope", if the value of this indicator reaches or exceeds 21 points, it can be assumed that the adolescent has a risk of depression [7]. In this group of adolescents, the DINTRUS indicator had an average of  $19.8 \pm 3.0$  points.

In addition, the adolescents of group II experienced a general surge of energy, an absence of loneliness, a fear of going to school, along with the fear of communication, touchiness, and disbelief in the future. In general, these adolescents exhibited significantly fewer signs of depression, and their DINTRUS score averaged  $5.6 \pm 2.0$  points.

Table 2

Manifestation of depressive tendencies in the studied adolescents

Statement	Group I	Group II
I felt fear	57.1%	33.3%
I was irritated	64.3%	58.3%

Continuation of table 2

Statement	Group I	Group II
I did not believe in the future	21.4%	0
I was worried for nothing	42.9%	33.3%
I felt lonely	28.6%	0
I found it difficult to fall asleep	78.6%	44.3%
When I woke up, I felt tired	85.7%	41.7%
Usually, I felt tired and exhausted	57.1%	0
I was afraid to go to school	35.7%	0
I easily got tired	64.3%	0
I lost my appetite	42.9%	0
I was disappointed in love	28.6%	0
I could not forgive myself for my mistakes	50%	0
I tried to avoid communication with other people	50%	0
I did not want to live	14.3%	0
It was difficult for me to concentrate on one thing	92.9%	25%
I did everything slower than usual	64.3%	41.7%
I felt a lack of energy	85.7%	41.7%
I could sleep day and night	50%	25%
I really did not like myself	42.9%	0
I was touchy	50%	0

## DISCUSSION

The results of the study revealed that the psychological state of the majority of adolescents in group I differed from that of group II adolescents (after surgical treatment).

Importantly, the results of experimental psychological research methods confirmed the findings obtained through clinical interviews and observation by doctors and medical psychologists. However, some of the facts revealed in the interview, as a result of research using the projective method CIB and the self-attitude questionnaire, were unexpected.

For example, in a conversation, the adolescents of group I tried to deny the negative effect of a physical defect on their psychological state, but the data of experimental psychological research testified to the contrary.

The use of the CIB method enabled the analysis and comparison of the degree of acceptance of the one's body and the thoracic part of the skeleton in the adolescents of both groups. Using the data obtained at a relatively equal level of harmony and detail in the adolescents of group I, the subjectively experienced dissatisfaction with the body was revealed. The adolescents of group II, who had undergone the first stage of surgical treatment, expressed great satisfaction with their bodies, and they liked themselves, which was reflected

both in the results of the experimental study and in the clinical interview.

Notably, the survey results of some adolescents from both groups were not included in the study because their psychological state was largely unrelated to HC. For example, in one of the adolescents from group I, HC suddenly appeared at the age of 14 years, and he participated in the study at 3 months after establishing the diagnosis. Thus, the external defect did not have a significant influence on his psychological state. Another adolescent (from group II) experienced internal anxiety, mostly because of the stay in the institution, which was reflected in the results of his survey as well as in the experimental study of the levels of anxiety and depression.

During the study, we did not detect a significant correlation between the severity of chest deformity and the dissatisfaction with one's own appearance. Even a small deformity caused dissatisfaction with one's own appearance. In addition, regardless of the severity of the external defect, the adolescents of group I experienced a negative effect on their psychoemotional state to a different degree, which was established both during the interview and through the results of the experimental study.

This study identified the need for psychological support for adolescents at all stages of treatment as well as

the need for further research, possibly involving data on intrafamily and parental relationships to search for psychological resources for overcoming the anxiety and depression that occurs at various stages of treatment.

Thus, based on the data obtained from the pilot study, the following preliminary conclusions can be drawn.

1. In adolescents with HC who are under the influence of an external defect, a negative perception of one's own body image is formed, which leads to a decrease in self-esteem, an increase in anxiety, and actualization of depressive manifestations in the structure of the psychoemotional state.

2. After surgical treatment in adolescents with HC, we noted qualitative changes in the formation of body image, a decrease in the level of anxiety, and the disappearance of depressive signs.

Adolescents with HC need psychological support at all stages of inpatient treatment.

## REFERENCES

1. Апросимова С.И., Киргизов И.В., Дударев В.А. Оценка качества жизни у детей с воронкообразной грудной клеткой до и после оперативного лечения // Кремлевская медицина. Клинический вестник. – 2016. – № 3. – С. 44–48. [Aprosimova SI, Kirgizov IV, Dudarev VA. Assessment of the quality of life in children with a funnel-shaped chest deformation before and after surgical treatment. *Kremlevskaya medicina. Klinicheskij vestnik*. 2016;(3):44-48. (In Russ.)]
2. Баиров Г.А., Маршев И.А. Врожденные деформации грудной клетки // Хирургия пороков развития у детей. – Л.: Медицина, 1968. – С. 116–135. [Bairov GA, Marshev IA. Congenital deformities of the chest. In: Surgery of developmental malformations in children. Leningrad: Medicina; 1968. P. 116-135. (In Russ.)]
3. Виноградов А.В. Психологический статус детей и подростков с деформацией грудной клетки: Автореф. дис. ... канд. мед. наук. – М., 2004. [Vinogradov AV. The psychological status of children and adolescents with deformity of the thorax. [dissertation] Moscow; 2004. (In Russ.)]
4. Гаврикова Е.В. Психосоциальные проблемы при воронкообразной деформации грудной клетки // Амбулаторная и больничная психотерапия и медицинская психология. – 2013. – № 11. – С. 40–43. [Gavrikova EV. Psycho-social problems with funnel-like deformation of the chest. *Ambulatornaya i bol'nichnaya psihoterapiya i medicinskaya psihologiya*. 2013;(11):40-43. (In Russ.)]
5. Комиссаров И.А., Комолкин И.А., Афанасьев А.П. Деформации грудной клетки у детей // Педиатр. – 2010. – Т. 1. – № 1. – С. 63–66. [Komissarov IA, Komolkin IA, Afanas'ev AP. Deformations of the chest in children. *Pediatr*. 2010;1(1):63-66. (In Russ.)]
6. Малкова Е.Е. Психодиагностическая методика для многомерной оценки детской тревожности: Пособие для врачей и психологов. – СПб.: НИПНИ им. Бехтерева, 2007. [Malkova EE. Psychodiagnostic method for multidimensional assessment of children's anxiety. Manual for doctors and psychologists. Saint Petersburg: NIPNI im. Bekhtereva; 2007. (In Russ.)]
7. Подольский А.И., Идобаева О.А., Хейманс П. Диагностика подростковой депрессивности. Теория и практика. – СПб.: Питер, 2004. [Podol'skij AI, Ido-baeva OA, Hejmans P. Diagnosis of teenage depression. Theory and practice. Saint Petersburg: Piter; 2004. (In Russ.)]
8. Столин В.В., Пантилев С.Р. Опросник самоотношения // Практикум по психодиагностике: Психодиагностические материалы. – М., 1988. – С. 123–130. [Stolin VV, Pantileev SR. Self-relationship questionnaire. Practical work on psychodiagnostics: Psychodiagnostic materials. Moscow; 1988. P. 123-130. (In Russ.)]
9. Теплякова А.О. Особенности образа тела у подростков с нарушениями двигательных функций: Магистерская диссертация. – СПб.: РГПУ им. А.И. Герцена, 2016. [Teplyakova AO. Features of an image of a body at teenagers with disturbances of impellent functions. Master's dissertation. Saint Petersburg: RGPU im. A.I. Gercena; 2016. (In Russ.)]
10. Bahadir A, Bektaşoğlu PK, Ese PC, et al. Psychosocial Functioning in Pediatric Patients With Pectus Excavatum and Pectus Carinatum. *Turk J Med Sci*. 2017;47(3):771-777.
11. Habelt S, Korn St, Berger A, Bielek J. Psychological Distress in Patients with Pectus Excavatum as an Indication for Therapy. *International Journal of Clinical Medicine*. 2011;2:295-300. doi: 10.4236/ijcm.2011.23050.
12. Ji Y, Liu W, Chen S, et al. Assessment of psychosocial functioning and its risk factors in children with pectus excavatum. *Health Qual Life Outcomes*. 2011;9:28. doi: 10.1186/1477-7525-9-28.
13. Lawson ML, Cash TF, Akers R, et al. A pilot study of the impact of surgical repair on disease-specific quality of life among patients with pectus excavatum. *J Pediatr Surg*. 2003;38(6):916-918. doi: 10.1016/S0022-3468(03)00123-4.
14. Lomholt JJ, Jacobsen EB, Thastum M, Pilegaard H. A prospective study on quality of life in youths after pectus excavatum correction. *Ann Cardiothorac Surg*. 2016;5(5):456-465. doi: 10.21037/acs.2016.08.02.
15. Robert E. Kelly, Jr. Michele L. Lombardo. Psychologic Effects, Body Image, and Pectus Excavatum and Carinatum. In: Saxena Amulya K. Chest Wall Deformities,

Department of Pediatric Surgical University Medical Centre, Münster, Germany, 2017. P. 169-175.

16. Roberts J, Hayashi A, Anderson JO, et al. Quality of life of patients who have undergone the Nuss procedure for pectus excavatum: Preliminary findings. *J Pediatr Surg.* 2003;38(5):779-83. doi: 10.1016/j.jpsu.2003.50166.

17. Steinmann C, Krille St, Mueller A, et al. Pectus excavatum and pectus carinatum patients suffer from lower quality of life and impaired body image: a control group comparison of psychological characteristics prior to surgical correction. *Eur J Cardiothorac Surg.* 2011;40(5):1138-1145. doi: 10.1016/j.ejcts.2011.02.019.

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