КЛИНИЧЕСКАЯ ГЕРОНТОЛОГИЯ

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CLINICAL CASE: SPECIAL GERIATRIC ASSESSMENT IN ROUTINE CARDIOLOGY

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Biological age is more important than chronological age in old patients. It is very important to access frailty in such cases. Frailty means increased physiologic vulnerability to stressors. It is associated with bad prognosis and really influences on the management of the patient. In our clinical case we observe some methods of frailty detection using methods of special geriatric assessment such as gait speed test, grip strength measuring and frailty index calculation. Our clinical case is just a look to a problem of frailty in old patients that are candidates to cardiac surgery. It reflects the use of conservative therapy in patients with need for cardiac surgery making the operation impossible because of very high operative risk.

Key words: weakness, grip strength; slowness; exhaustion, weight loss, mobility, gait speed test.

КЛИНИЧЕСКИЙ СЛУЧАЙ: СПЕЦИАЛИЗИРОВАННАЯ ГЕРИАТРИЧЕСКАЯ ДИАГНОСТИКА В ПОВСЕДНЕВНОЙ КАРДИОЛОГИИ

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Биологический возраст играет главенствующую роль при оценке рисков здоровью у пожилых пациентов. В этой связи особо важным представляется изучение такого феномена, как «frailty» - старческая астения. Старческая астения – состояние повышенной уязвимости к стрессорным агентам, приводящее к крайне неблагоприятному прогнозу у таких пациентов и часто влияющее на выбор тактики их ведения. В нашем клиническом случае мы анализируем возможности диагностики данного состояния с использованием различных специализированных методов гериатрической диагностики: тест ходьбой, измерение мышечной силы кисти и расчет индекса старческой астении. Предлагаемый клинический случай – это лишь взгляд на проблему старческой астении у пациентов старческого возраста, которые являются кандидатами для кардиохирургической операции. Случай показывает ситуацию крайне высокого риска хирургической операции, когда методом выбора является консервативная терапия у пациента с патологией, требующей кардиохирургического вмешательства.

Key words: слабость, сила мышц кисти, медлительность, усталость, потеря веса, подвижность, тест ходьбой, шаговый тест.

Introduction. Aging is one of the most important cardiovascular risk factors. Biological age as a result of aging process, morbidity and other factors is much more important than chronological age in old people. Frailty, defined as an increased physiologic vulnerability to stressors is a reflection of pathological aging [3, 5].

Frailty – is a relatively modern geriatric term, included 5 positions:

1. Weakness –little muscle strength;
2. Slowness – poor walking speed;
3. Exhaustion
4. Weight loss – unintentional weight loss greater than 5% or 3 kg in the preceding one year, according to the Cardiovascular Health Study
5. Low activity [2, 7].

It is known that frailty is associated with cardiovascular risk factors, hypertension, higher all-cause and cardiovascular mortality in old patients with cardiac disease. Moreover the principal point is that frailty is associated with a poor prognosis of cardiac surgery [1, 8, 9]. Our clinical case is just a look – how to use special geriatric assessment in routine practice, choosing patients in which cardiac surgery is much more harmful then necessary.

Patient V., 75 y. old has arrived to cardiac department of Belgorod regional hospital. He complained of a fatigue, dyspnoe during little exercise such as walking over the house, un unexplained falls, fear of falling. Also patient told about urinary inconsistency and rapid loss of body mass (more than 10 kg over last 6 month).

The disease began suddenly 2 years before. Patient felt while skiing in the forest. After this fall he felt much more fatigue during usual household activities, than before. He did not

felt a dyspnea during moderate physical activities. After a time (during 2 years) he became progressively more short of breath. At the time of presentation he was able to only walk 25 meters before he had to stop due to dyspnea. But also important point is that aid was needed to him for walking because of balance impairment. He could not make more then 5-10 steps (usually less) himself without falling.

Objective status: On examination patient appeared pale and thin. The weight was 44.0 kg, the height 176 cm, and the body-mass index - 14.2.

The respiratory rate – 16 breaths per minute. Pulmonary auscultation: poor breath in the lower lung fields. Blood pressure 160/90 mm Hg, the pulse 106 beats per minute. An intensive systolic murmur was heard in the apex. The abdomen was soft and nondistended, The temperature was normal.

Instrumental examination:

Anemia was found in blood count sample: Hemoglobin = 93 g/l, erythrocytes - $3{,}31x10^{12}$/l.

Serum creatinine , bilirubin, COT, GPT, total protein levels were at normal range.

Electrocardiography –Sinus rhythm. No special signs.

Echocardiography protocol:

Visualization condition – good.

RV dimension = 31.2 mm. LA = 53.2 (55.4*60.8 from A4), LA volume = 130 ml.
RA = 42.5*58.6.
LV = 52.2 mm, EDV(end-diastolic volume) = 121 ml ESV(end-systolic volume) = 52 ml
EF = 56.93%.
No local wall movement abnormalities detected.
LV wall thicknes: IVS = 14.5 mm. LVPW = 14.2 mm
Mitral valve: anterior mitral cusp prolapsed into the LA, signs of chordae rupture.
mitral regurgitation 3.5+ – wide high-speed jet, reaching pulmonary veins.
Max. velocity 0.96. Mean pressure – 2.18 mm hg, maximum pressure – 3.66 mm hg.
E/e' = 17.2.
Aortic valve – little calcinosis with aortic regurgitation+
Tricuspid valve: tricuspid regurgitation +++. Pulmonary systolic pressure = 42 mm hg.

So we came to conclusion that cardiac diagnosis looked like this one:
Mitral insufficiency IV caused by chord rupture.
HF NYHA III functional class. High pulmonary hypertension.
Anemia of chronic disease.

What should we do with this patient? How to explain other newly developed symptoms as urinary inconsistence and weight loss? How to estimate prognosis after sugery? We suppose that the only possible way is using special geriatric assessment.
Methods of geriatric assessment:

1. mobility was estimated by 5m-gait speed test. The result was – 12 seconds needed to move for 5 m distance (gait speed = 0.41 m/s <<0,8 m/s). Details of gait-speed measurement are described in appendix to the article.

2. muscle strength was assessed by simple dynamometer measurement of hip strength, according to Southampton protocol (see appendix) [4, 6], choosing the best effort from 3 attempts by each hand.

Right hand max. effort 8 kg
Left hand max. effort 6 kg
Weight loss and fatigue were 2 key causes why patient had came to the hospital.

Finally our patient has disturbance with simple life activities such as bathing, dressing e t.c., urinary inconsistency and memorial disorders.

So in this case we can see all frailty components. Using CCHS frailty index we have come to the result of 0.557 points (table 1). Results of the CCHS analyses suggest four frailty categories: non-frail (0 to 0.1), pre-frail (>0.1 to ≤0.21), morefrail(>0.30 to ≤0.35) (women only), and most-frail (0.45+). We came to conclusion that our patient is most frail with no doubts [4].

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Table 1.

Frailty deficits included in Canadian Community Health Survey-based frailty index (FI) in our patient

Concept/Variable	Description	FI value
Self-perceived health	Excellent/Very good	0.00
	Good	0.50
	*Fair/Poor	1.00
Change in health status (past year)	Much better/Somewhat better/About the same	0.00
	Somewhat worse	0.50
	*Much worse	1.00
Body mass index	Normal/Overweight	0.00
	Obese	0.50
	*Underweight	1.00
Participation and activity limitations	Never	0.00
	Sometimes	0.50
	*Often	1.00
Speech	*Understood by everyone or only those who know them	0.00
	Partially understood by everyone	0.50
	Not understood by anyone or partially understood by those who know them	1.00
Emotional health	Happy and interested in life	0.00
	Somewhat happy	0.25
	*Somewhat unhappy	0.50
	Very unhappy	0.75
	So unhappy that life is not worthwhile	1.00
Pain	None	0.00
	Pain does not prevent activity	0.25
	Pain prevents a few activities	0.50
	Pain prevents some activities	0.75

	Pain prevents most activities	1.00
Vision	*Sees with/without glasses	0.00
	Reads newsprint with/without glasses; cannot see person across street with glasses	0.25
	Sees person across street with/without glasses; cannot read newsprint with glasses	0.50
	Cannot read newsprint or see person across street with glasses	0.75
	Cannot see	1.00
Hearing	Hears in group without hearing aid (HA)	0.00
	*Hears one-on-one without HA; needs HA for group	0.20
	Can hear with HA	0.40
	Hears one-on-one without HA; cannot hear with HA in group	0.60
	Hears one-on-one with HA; cannot hear with HA in group	0.80
	Cannot hear	1.00
Mobility	Walks without difficulty and without aids	0.00
	*Walks outside with difficulty; no help/aids needed	0.20
	Walks outside with aids; no help of another person	0.40
	Walks short distances unaided; needs wheelchair for longer distances	0.60
	Walks short distances with help; needs wheelchair for longer distances	0.80
	Cannot walk	1.00
Cognition	Can remember most things, think clearly, solve problems	0.00
	Remembers most things; some difficulty to think, solve problems	0.20

	Somewhat forgetful, but thinks, solves problems	0.40
	Somewhat forgetful; some difficulty to think, solve problems	0.60
	*Very forgetful; great difficulty to think, solve problems	0.80
	Unable to remember anything, think, solve problems	1.00
Dexterity	*Full use of two hands and 10 fingers	0.00
	Limited use of hands, no help needed	0.20
	Limited use of hands, uses special tools	0.40
	Limited use of hands, needs help for some tasks	0.60
	Limited use of hands, needs help for most tasks	0.80
	Limited use of hands, needs help for all tasks	1.00
hronic conditions	Absence of a condition	0.00
	Arthritis or rheumatism; back problems other than arthritis; *high blood pressure; chronic bronchitis or emphysema; *heart disease; diabetes; cancer; effects of stroke; *urinary incontinence; Alzheimer's disease/dementia.	1.00 (=3*)
Limited in activities of daily living	Able to perform activities of daily living	0.00
	*Preparing meals; *getting to appointments and running errands; *doing everyday housework; *personal care such as washing, dressing; *moving inside the house; *looking after personal finances	1.00 (=6*)
Other	No fall-related injury (past 12 months) walked for exercise (past 3 months)	0.00
	*Fall-related injury (past 12 months),	1.00
	*no walking for exercise (past 3 months)	1.00

According to our findings our final diagnosis was:
Mitral insufficiency IV caused by chord rupture. Frailty.
HF NYHA III functional class. High pulmonary hypertension.
Anemia of chronic disease.

Using special geriatric assessment we proved frailty of our patient, choosing conservative therapy as only viable alternative in such case. Betta-blockers, digoxin, ACE-inhibitors and diuretics (torasemide and spironolactone) were given with a good symptomatic relief, improving physical intolerance during most simple activities, but reassessment was still unsuccessful, concluded that patient is frail (gait speed =0.6 m/s , max muscle strength still 8 kg). Conservative therapy was prescribed as a final result at admission.

Conclusions. Frailty must be validated in all patients $\geq$ 65 years old as an important prognostic factor. In this case we observed how special methods of geriatric assessment may be used in routine cardiology, determining prognosis and sometimes management positions in different clinical situations. Using simple methods as hand-grip test, 5m-gait speed test we can have a good look about patient's prognosis and management. It takes little time but can give us a huge amount of information.

Appendix: Southampton protocol for adult grip strength measurement [6].

(1) Sit the participant comfortably in a standard chair with legs, back support and fixed arms. Use the same chair for every measurement.
(2) Ask them to rest their forearms on the arms of the chair with their wrist just over the end of the arm of the chair—wrist in a neutral position, thumb facing upwards.
(3) Demonstrate how to use the Jamar handgrip dynamometer to show that gripping very tightly registers the best score.
(4) Start with the right hand.
(5) Position the hand so that the thumb is round one side of the handle and the four fingers are around the other side. The instrument should feel comfortable in the hand. Alter the position of the handle if necessary.
(6) The observer should rest the base of the dynamometer on the palm of their hand as the subject holds the dynamometer. The aim of this is to support the weight of the dynamometer (to negate the effect of gravity on peak strength), but care should be taken not to restrict its movement.

(7)Encourage the participant to squeeze as long and as tightly as possible or until the needle stops rising. Once the needle stops rising the participant can be instructed to stop squeezing.

(8) Read grip strength in kilograms from the outside dial and record the result to the nearest 1 kg on the data entry form.

(9) Repeat measurement in the left hand.

(10) Do two further measurements for each hand alternating sides to give three readings in total for each side. (11) The best of the six grip strength measurements is used in statistical analyses so as to encourage the subjects to get as high a score as possible.

(12) Also record hand dominance, i.e. right, left or ambidextrous (people who can genuinely write with both hands).

Equipment: Model J00105 JAMAR Hydraulic Hand Dynamometer*.

* We used Russian dynamometer «ДК-100-э».

5m-Gait Speed to Measure Frailty

STS National Database News, May 2011

The test can be performed with any patient able to walk five meters using the guidelines below.

1. Accompany the patient to the designated area, which should be well-lit, unobstructed, and contain clearly indicated markings at 0 and 5 meters.
2. Position the patient with his/her feet behind and just touching the 0-meter start line.
3. Instruct the patient to “Walk at your comfortable pace” until a few steps past the 5-meter mark (the patient should not start to slow down before the 5-meter mark).
4. Begin each trial on the word “Go.”
5. Start the timer with the first footfall after the 0-meter line.
6. Stop the timer with the first footfall after the 5-meter line.
7. Repeat three times, allowing sufficient time for recuperation between trials.
8. Record the times in seconds on the data collection form. The system will calculate the average speed when you enter the data.

Note: The patient may use a walking aid (cane, walker). If the patient is receiving an IV drip, he/she should perform the test without the IV only if it can be interrupted temporarily without any potential risk to the patient. If not, then the patient may perform the test pushing the IV pole.

References.

1. Afilalo J. Gait speed as an incremental predictor of mortality and major morbidity in elderly patients undergoing cardiac surgery / J. Afilalo, M.J. Eisenberg, J.F. Morin [et al.]. // J Am Coll Cardiol. – 2010. – Vol. 56, № 20. – P. 1668 - 1676.
2. Fried L.P. Nonlinear Multisystem Physiological Dysregulation Associated With Frailty in Older Women: Implications for Etiology and Treatment / L.P. Fried, Q.L. Xue, A.R. Cappola [et al.]. // J Gerontol A Biol Sci Med Sci. - 2009. – Vol. 64 A, № 10. – P. 1049 – 1057. doi:10.1093/gerona/glp076.
3. Hoover M. Validation of an index to estimate the prevalence of frailty among community-dwelling seniors / M. Hoover, M. Rotermann, C. Sanmartin [et al.] // Health Rep. – 2013. - Vol. 24, № 9. - P. 10 – 17.
4. Martone A.M. Anorexia of Aging: A Modifiable Risk Factor for Frailty / A.M. Martone, G. Onder, D.L. Vetrano [et al.]. // Nutrients. – 2013. - Vol. 5, № 10. - P. 4126 – 4133. doi:10.3390/nu5104126
5. Oliveira D.R. Prevalence of frailty syndrome in old people in a hospital institution / D.R. Oliveira, L.A. Bettinelli, A. Pasqualotti [et al.]. // Rev Lat Am Enfermagem. – 2013. – Vol. 21, № 4. – P. 891 – 898.
6. Roberts H.C. A review of the measurement of grip strength in clinical and epidemiological studies: towards a standardised approach / H.C. Roberts, H.J. Denison, H.J. Martin [et al.] // Age and Ageing. - 2011. – Vol. 40, № 4. – P. 423 – 429.
7. Rodríguez-Mañas L. Searching for an Operational Definition of Frailty: A Delphi Method Based Consensus Statement. The Frailty Operative Definition-Consensus Conference Project / L. Rodríguez-Mañas, C. Féart, G. Mann [et al.]. // J Gerontol A Biol Sci Med Sci. - 2013. – Vol. 68, № 1. – P. 62 – 67.
8. Rønning B. Frailty measures, inflammatory biomarkers and post-operative complications in older surgical patients / B. Rønning, T.B. Wyller, I. Seljeflot [et al.] // Age Ageing. - 2010. – Vol. 39, № 6. – P. 758 - 761. doi: 10.1093/ageing/afq123.
9. Singh M. Importance of frailty in patients with cardiovascular disease / M. Singh, Singh R. Singh, H. White [et al.] // Eur Heart J. - 2014. – Vol. 35, № 26. – P. 1726 - 1731.

References.

1. Afilalo J., Eisenberg M.J., Morin J.F., Bergman H., Monette J., Noiseux N., Perrault L.P., Alexander K.P., Langlois Y., Dendukuri N., Chamoun P., Kasparian G., Robichaud S., Gharacholou S.M., Boivin J.F. *J Am Coll Cardiol*. 2010, Vol. 56, no. 20, pp. 1668 - 1676.
2. Fried L.P., Xue Q.L., Cappola A.R., Ferrucci L., Chaves P., Varadhan R., Guralnik J.M., Leng S.X., Semba R.D., Walston J.D., Blaum C.S., Bandeen-Roche K. *J Gerontol A Biol Sci.* 2009, Vol. 64, no. 10, pp. 1049 – 1057. doi:10.1093/gerona/glp076.
3. Hoover M., Rotermann M., Sanmartin C., Bernier J. *Health Reports.* 2013, Vol. 24, no. 9, pp. 10 – 17.
4. Martone A.M. , Onder G., Vetrano D.L., Ortolani E., Tosato M., Marzetti E., Landi F. *Nutrients.* 2013, Vol. 5, no. 10, pp. 4126 – 4133. doi:10.3390/nu5104126
5. Oliveira D.R. Oliveira D.R., Bettinelli L.A., Pasqualotti A., Corso D., Brock F., Erdmann A.L..Rev *Lat Am Enfermagem* 2013, Vol. 21, no. 4, pp. 891 – 898.
6. Roberts H.C., Denison H.J., Martin H.J., Patel H.P., Syddall H., Cooper C., Sayer A.A. *Age and Ageing.* 2011, Vol. 40, no. 4, pp. 423 – 429.
7. Rodríguez-Mañas L., Féart C., Mann G., Viña J., Chatterji S., Chodzko-Zajko W., Gonzalez-Colaço Harmand M., Bergman H., Carcaillon L., Nicholson C., Scuteri A., Sinclair A., Pelaez M., Van der Cammen T., Beland F., Bickenbach J., Delamarche P., Ferrucci L., Fried L.P., Gutiérrez-Robledo L.M., Rockwood K., Rodríguez Artalejo F., Serviddio G., Vega E.; FOD-CC group (Appendix 1). *J Gerontol A Biol Sci Med Sci.* 2013, Vol. 68, no. 1, pp. 62 – 67.
8. Rønning B., Wyller T.B., Seljeflot I., Jordhøy M.S., Skovlund E., Nesbakken A., Kristjansson S.R. *.Age Ageing.* 2010, Vol. 39, no. 6, pp. 758 - 761. doi: 10.1093/ageing/afq123.
9. Singh M., Stewart R., White H. *Eur Heart J.* 2014, Vol. 35, no. 26, pp. 1726 - 1731.