Ультразвуковое исследование коронарного кровотока в науке и практике

Загатина А.В.
Санкт-Петербургский государственный университет

Информация о потенциальном конфликте интересов

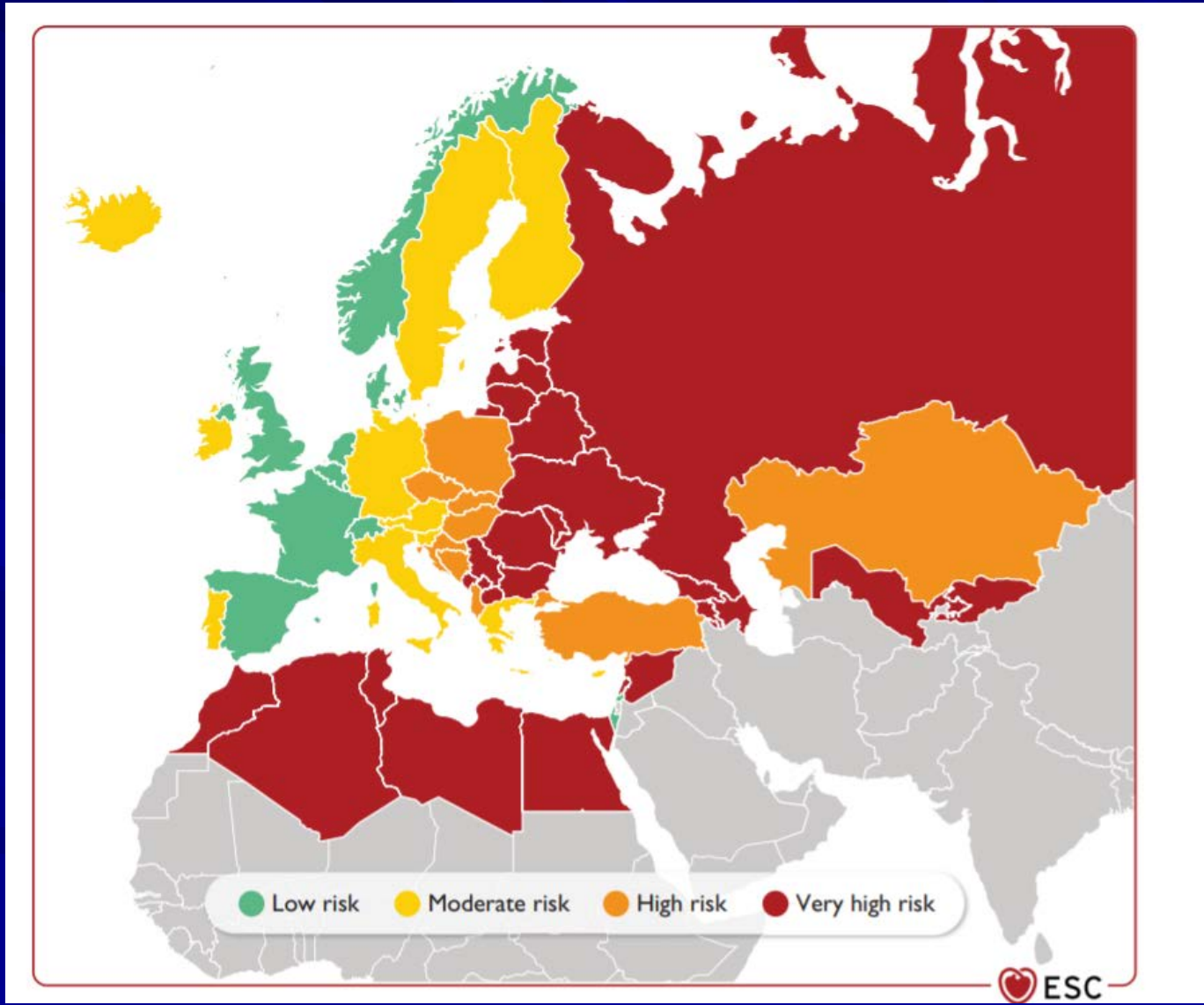
Автор заявляет об отсутствии конфликта интересов

Риск сердечно-сосудистой смерти

ESC
European Society of Cardiology
European Heart Journal (2021) **42**, 3227–3337
doi:10.1093/eurheartj/ehab484

ESC GUIDELINES

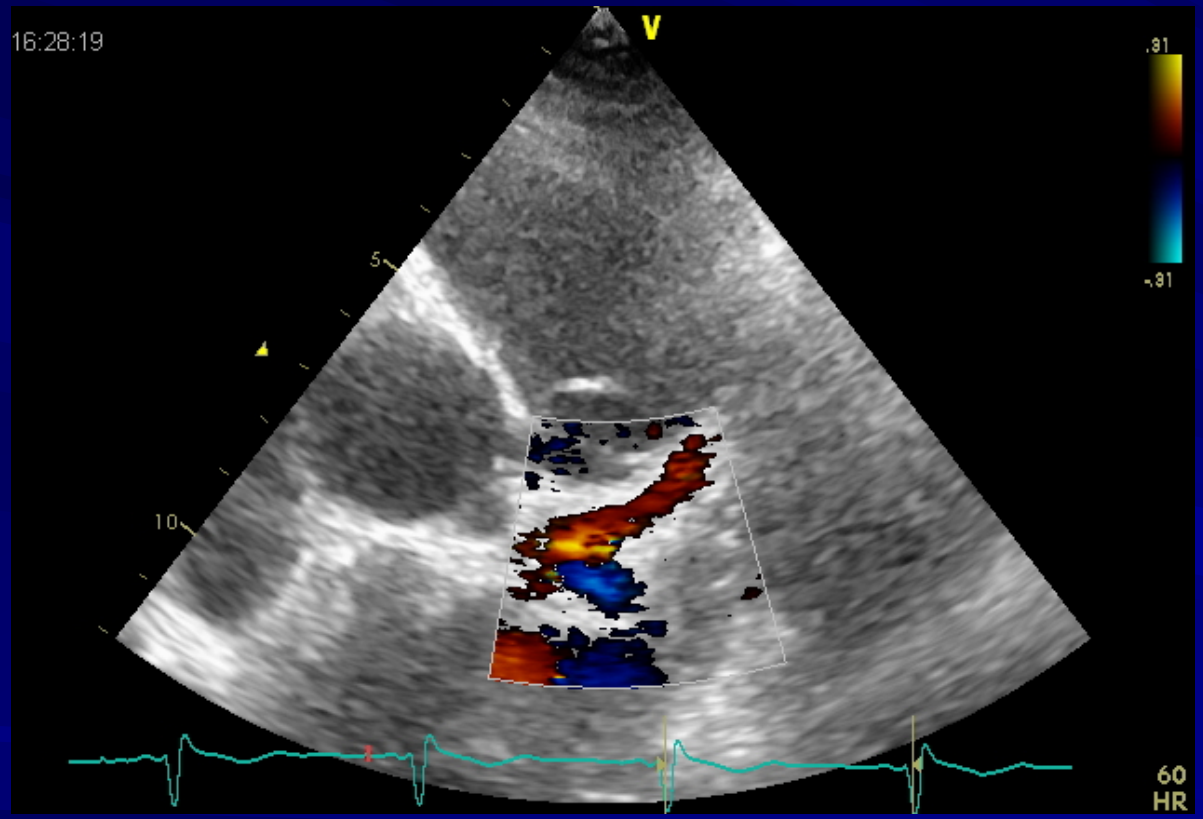
2021 ESC Guidelines on cardiovascular disease prevention in clinical practice

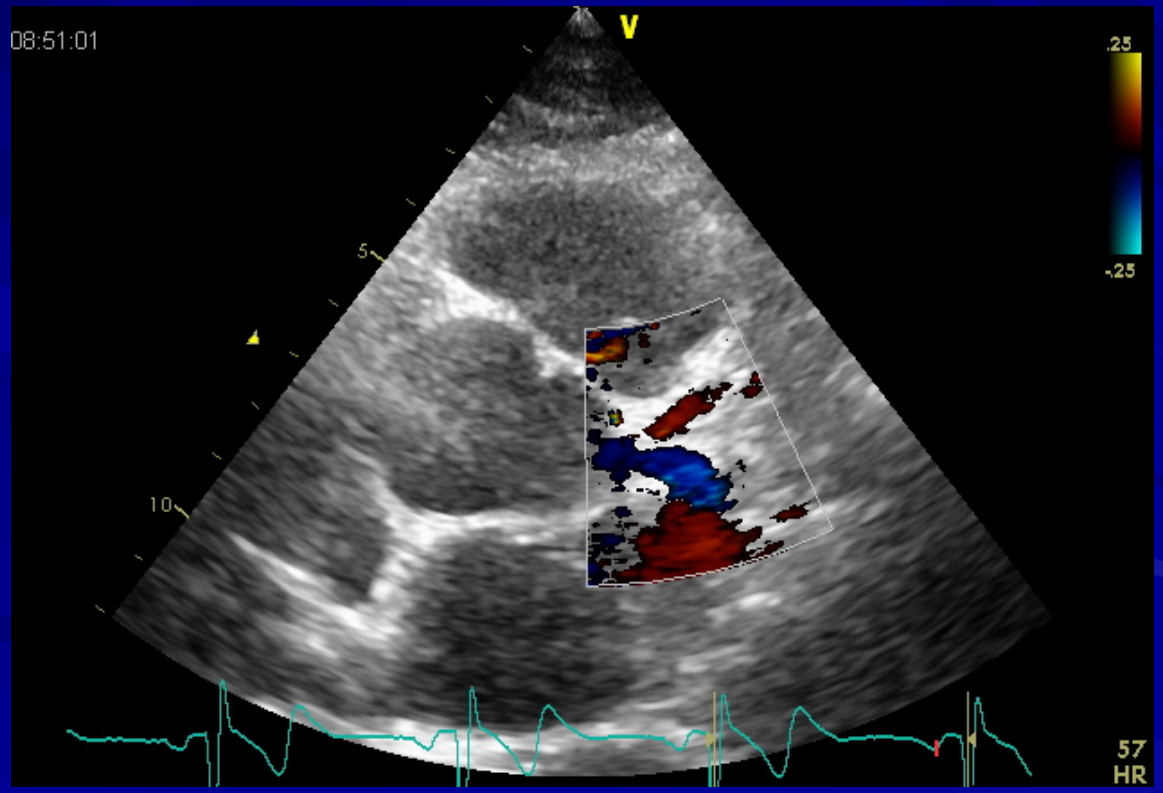


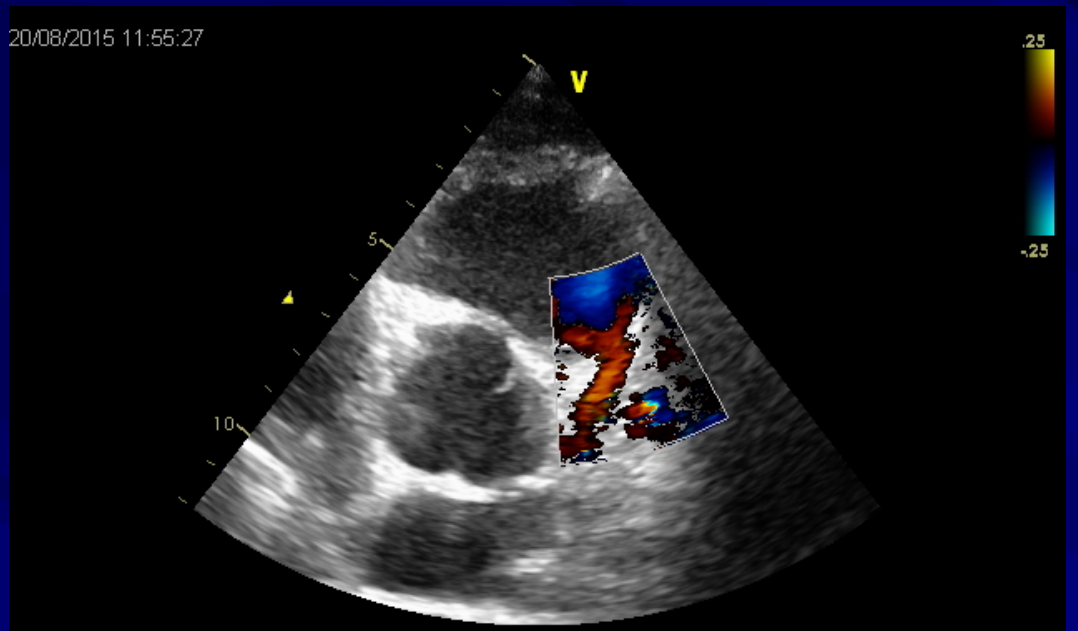
Этапы развития метода ультразвуковой визуализации коронарных артерий

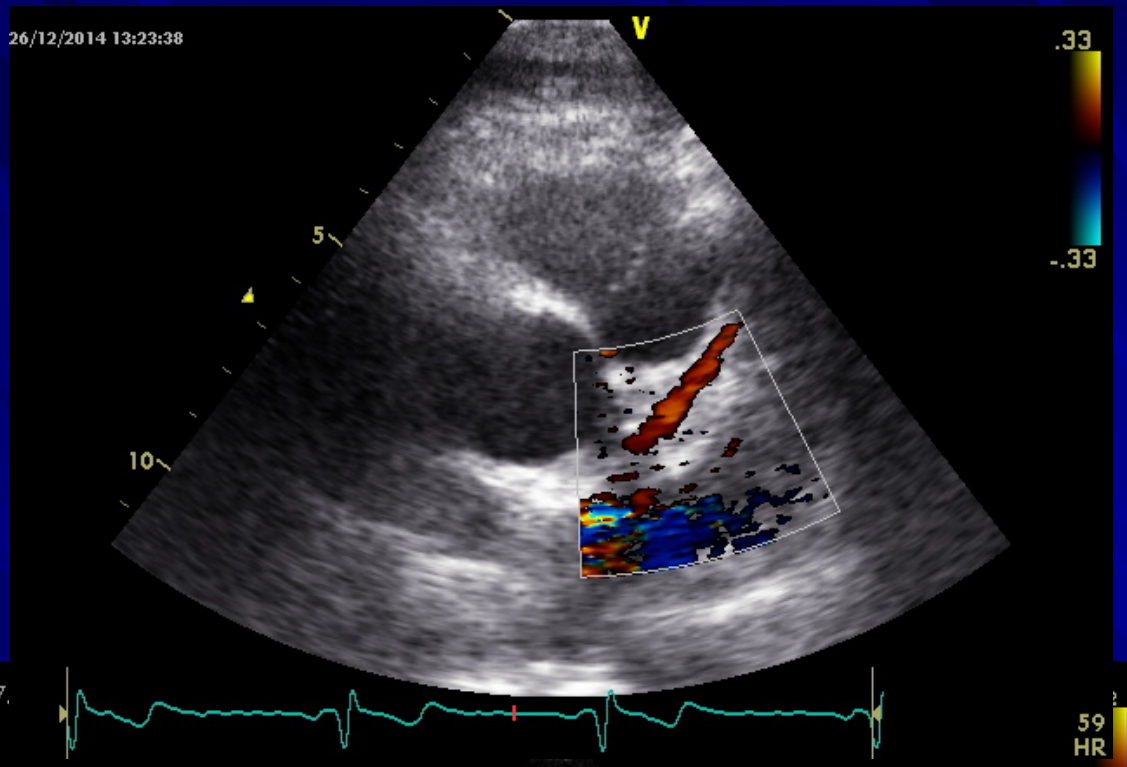
- До 90-х годов XX в. – первые попытки, визуализация возможна у малого процента пациентов, фрагментарно видны небольшие участки артерий
- 90-е годы XX в.– усовершенствование УЗИ аппаратов – появление «второй гармоники», высокочастотных датчиков – публикации в международной литературе данных о возможности визуализации 3 магистральных коронарных артерий, часто используется чреспищеводная визуализация
- 10-е годы XXI в. – внедрение в рутинную практику эхокардиографических центров Европы (Норвегия, Италия, Греция…), появление в рекомендациях для клинической практики Европейской Ассоциации по эхокардиографии

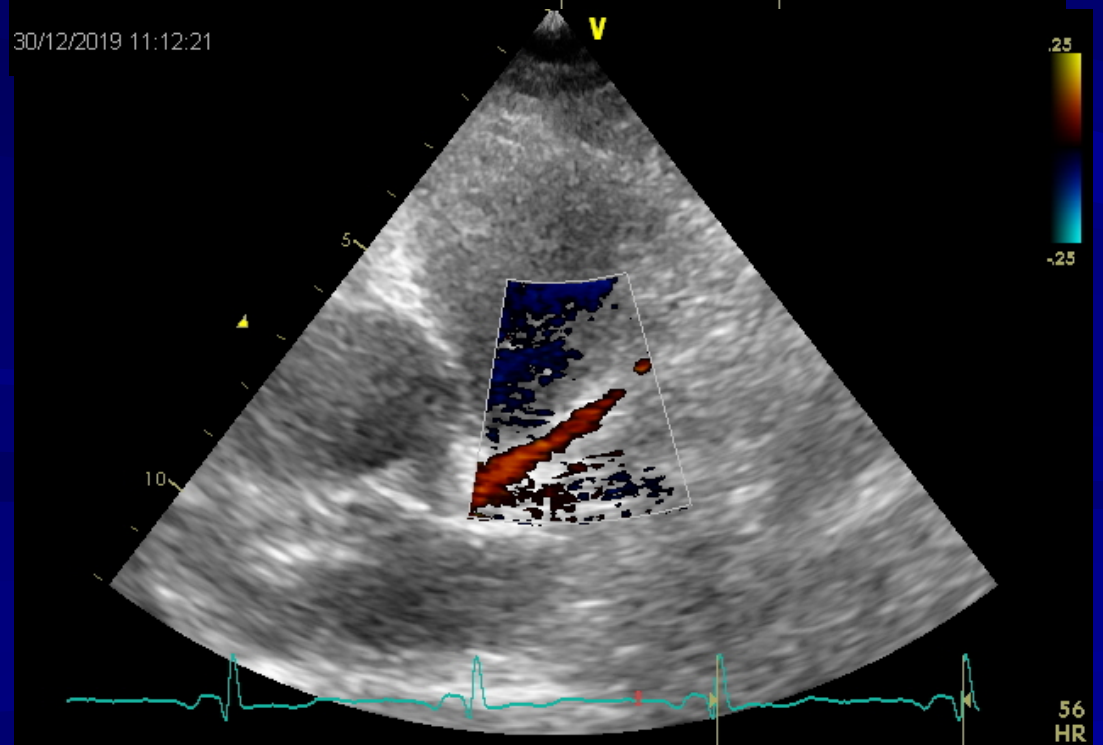
Визуализация ствола ЛКА, проксимальных отделов ПМЖВ и ОВ






20/08/2015 11:55:27
V
.25
-.25
5
10


26/12/2014 13:23:38
V
.33
-.33
5
10


30/12/2019 11:12:21
V
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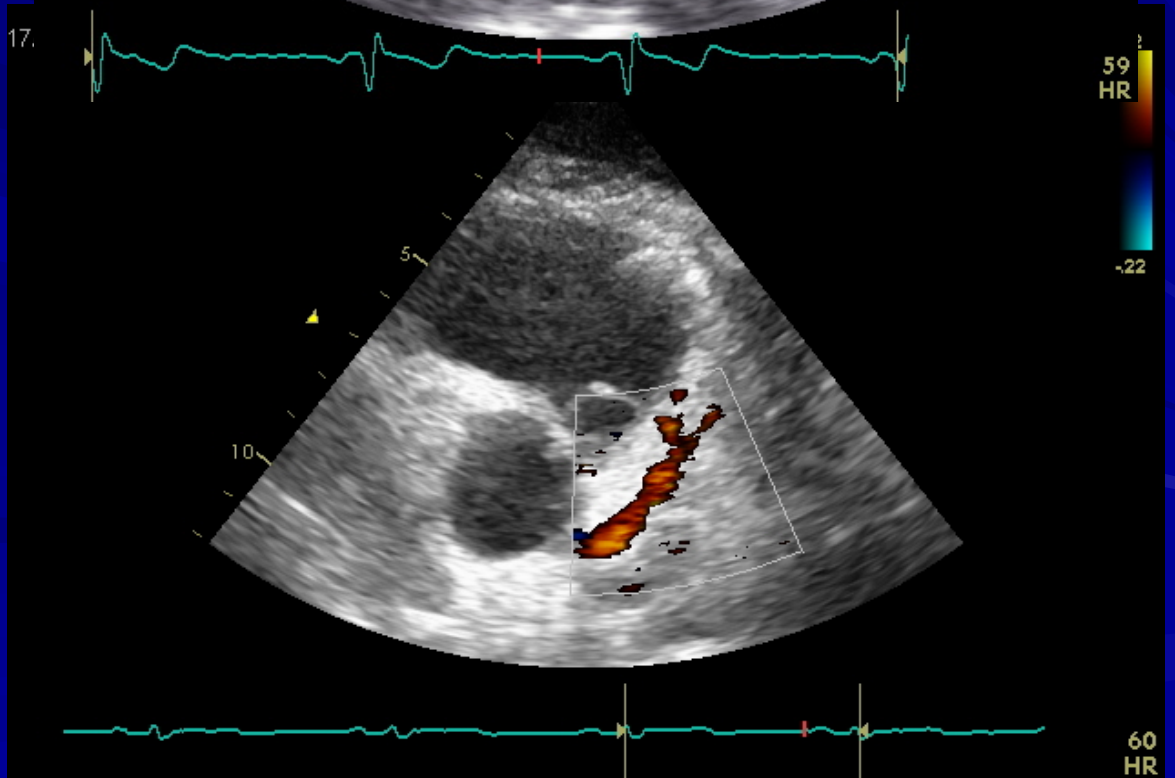
56
HR


17.
59
HR
-.22
5
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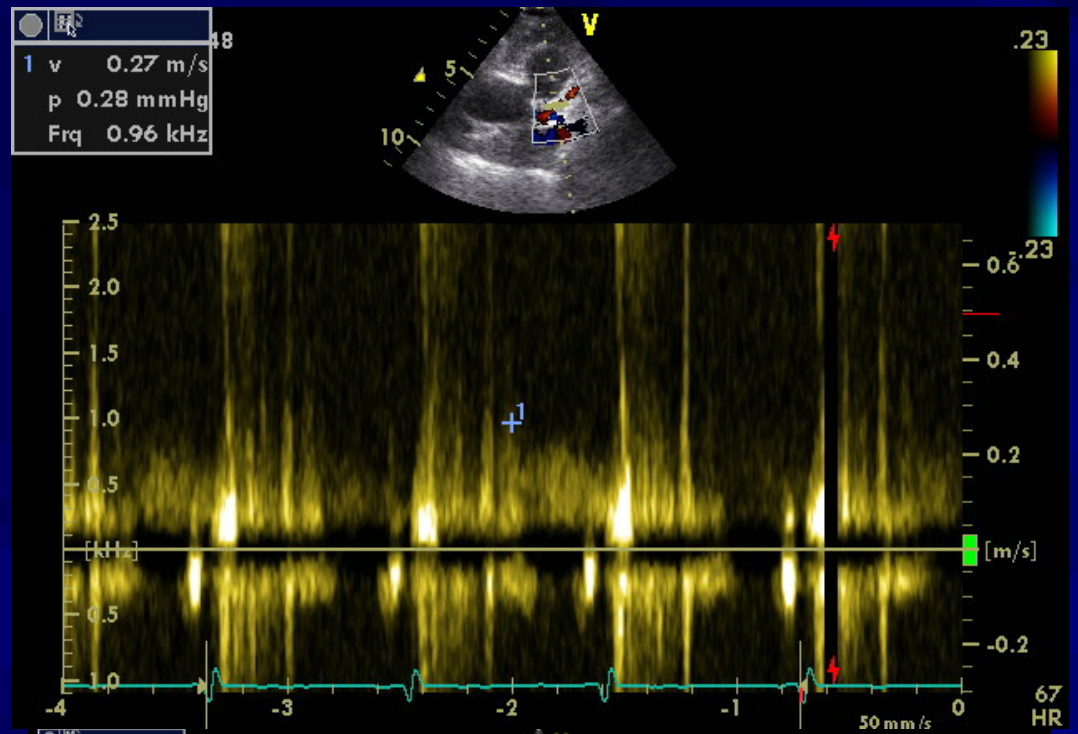
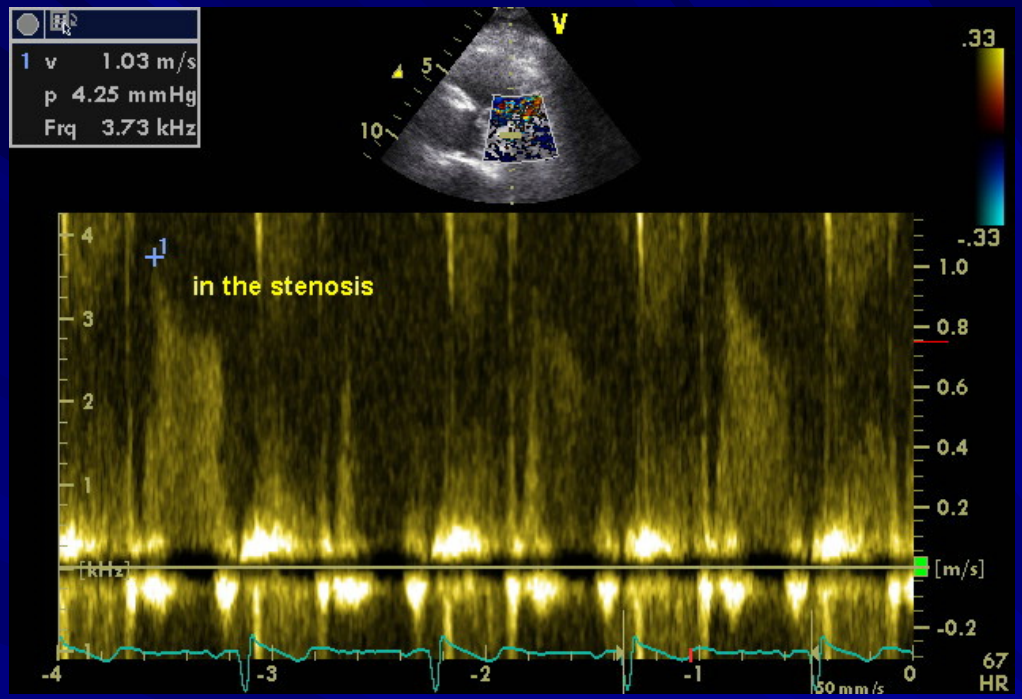
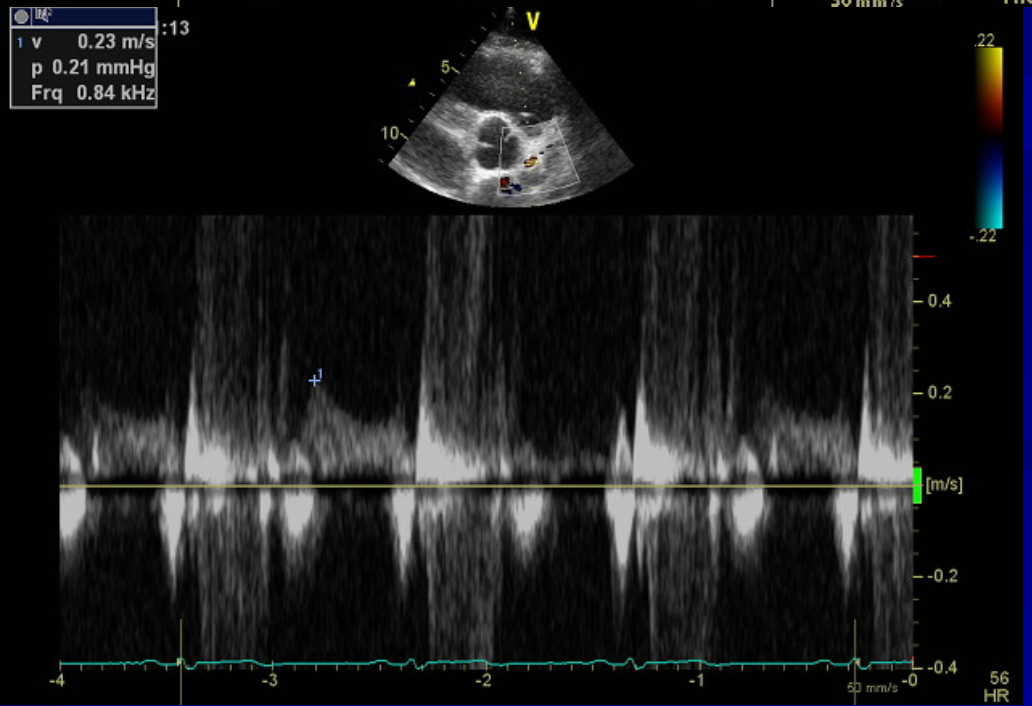
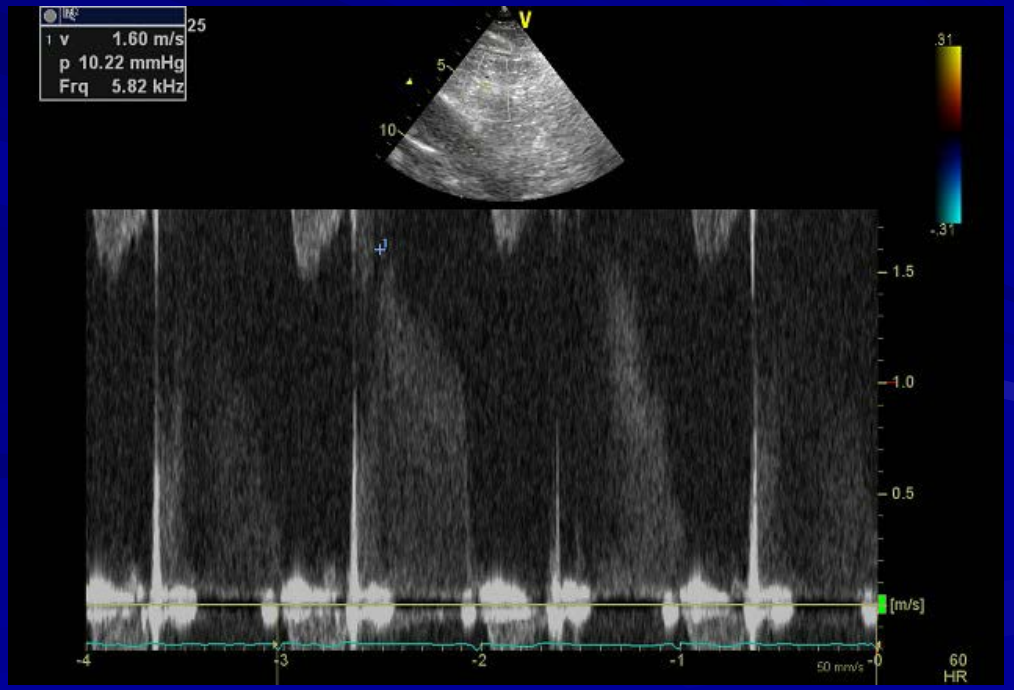
60
HR

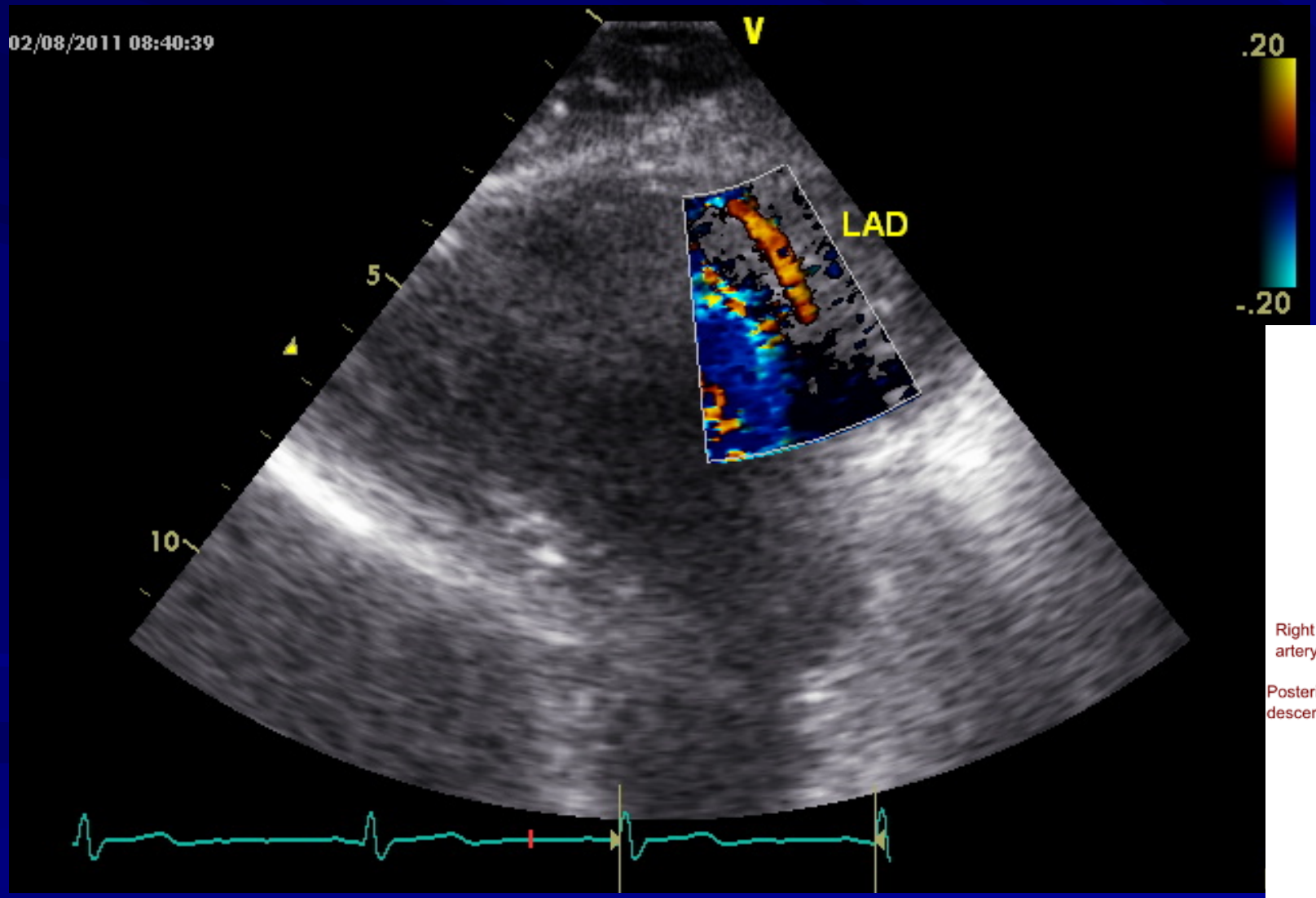

1 v 0.27 m/s
p 0.28 mmHg
Frq 0.96 kHz
[kHz]
[m/s]
50 mm/s
67
HR

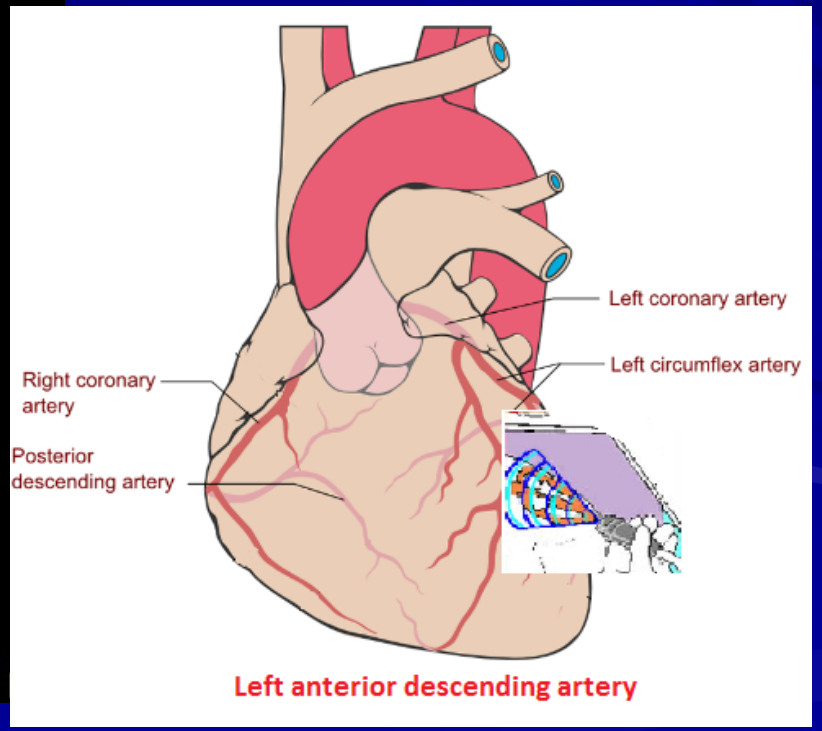

1 v 1.03 m/s
p 4.25 mmHg
Frq 3.73 kHz
in the stenosis
[kHz]
[m/s]
50 mm/s
67
HR


1 v 0.23 m/s
p 0.21 mmHg
Frq 0.84 kHz
[m/s]
50 mm/s
56
HR


1 v 1.60 m/s
p 10.22 mmHg
Frq 5.82 kHz
[m/s]
50 mm/s
60
HR

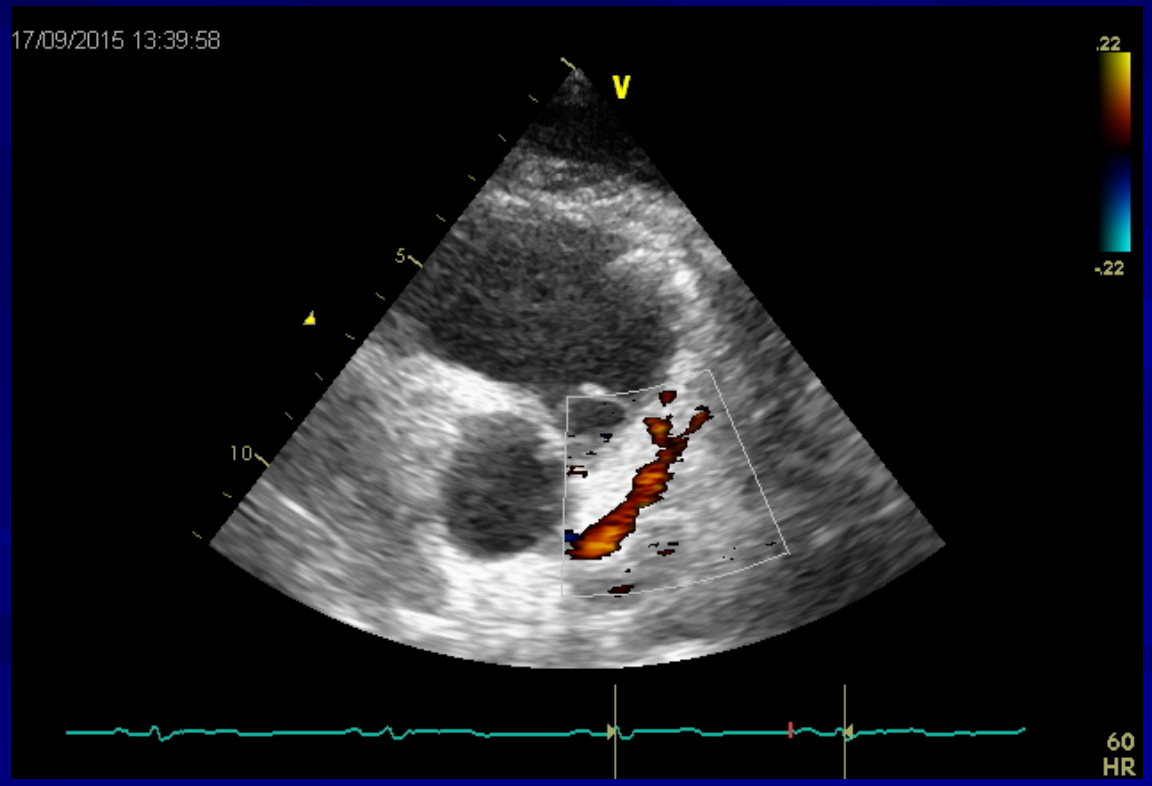
Визуализация срединного сегмента ПМЖВ



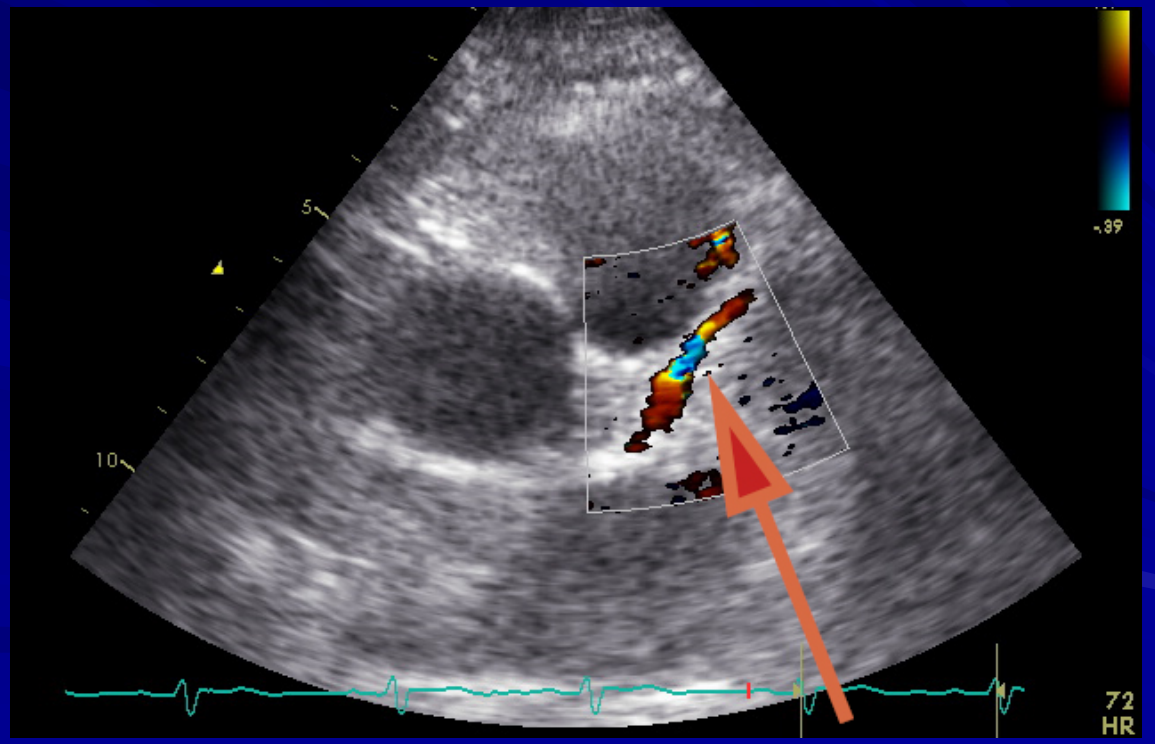


Сравнение нормы и стеноза

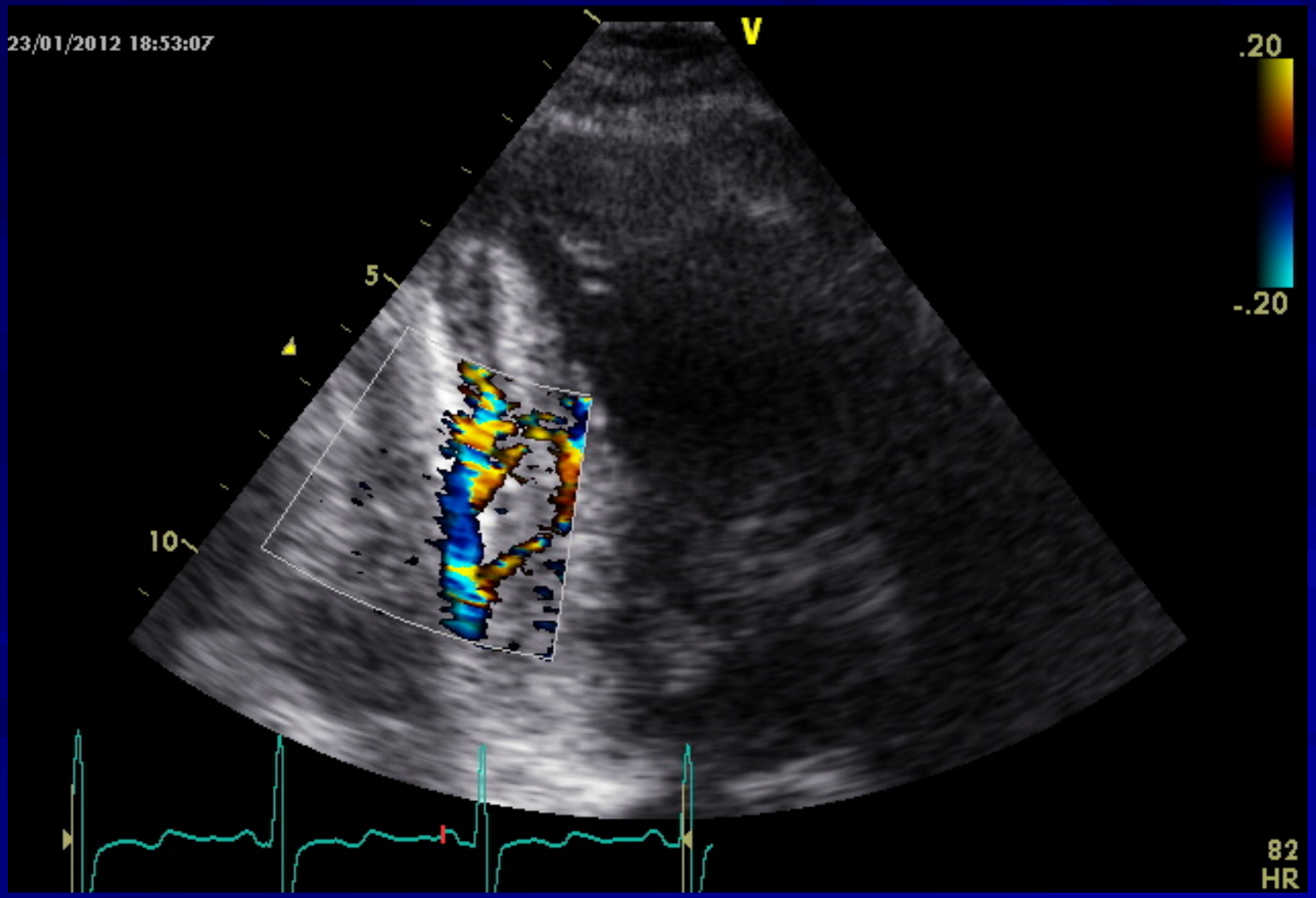
Норма

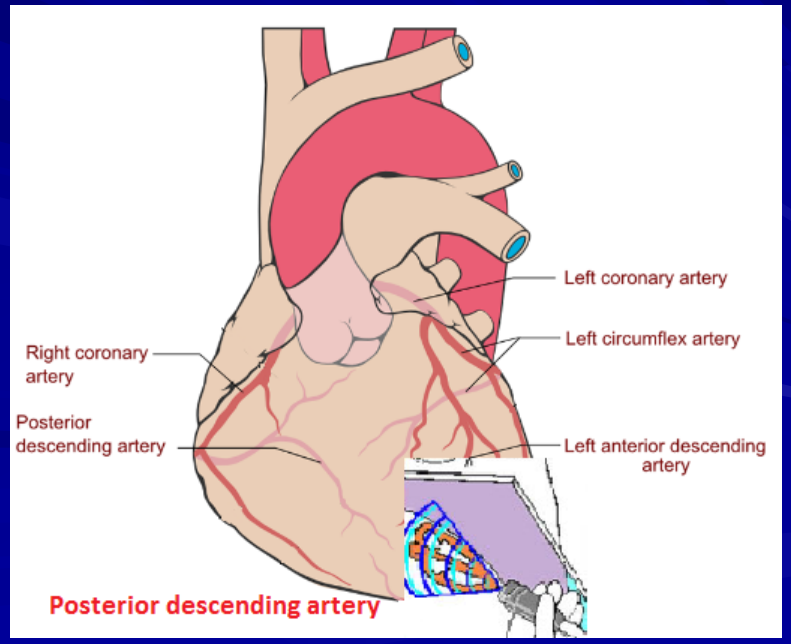


Стеноз проксимальной ПМЖВ



Визуализация ЗМЖВ





Cardiovascular Ultrasound

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Technical notes

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Imaging of all three coronary arteries by transthoracic echocardiography. an illustrated guide

Marek Krzanowski*[1], Wojciech Bodzoń[1] and Paweł Petkow Dimitrow[2]

Address: [1]The Department of Medicine, Jagiellonian University School of Medicine, 8 Skawińska Str., Kraków, Poland and [2]2nd Department of Cardiology, Jagiellonian University School of Medicine, 17 Kopernika Str., Kraków, Poland

Email: Marek Krzanowski* - mkrzano@mp.pl; Wojciech Bodzoń - wbodzon@mp.pl; Paweł Petkow Dimitrow - dimitrow@mp.pl

* Corresponding author

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Трансторакальное ультразвуковое исследование магистральных коронарных артерий: методические аспекты, возможности, ограничения

А.А. Бощенко, А.В. Врублевский, Р.С. Карпов

ГУ «НИИ кардиологии Томского научного центра СО РАМН»

На основании обследования 81 больного

агностики стенозов магистральных коро-

быть реко-

ия стенози-

ной артерии

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ораканальная

ия, магист-

гемодинами-

Cardiovascular Ultrasound

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Research

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Transthoracic echocardiography for imaging of the different coronary artery segments: a feasibility study

Johnny Vegsundvåg*[1], Espen Holte[1], Rune Wiseth[2,3], Knut Hegbom[3] and Torstein Hole[1,4]

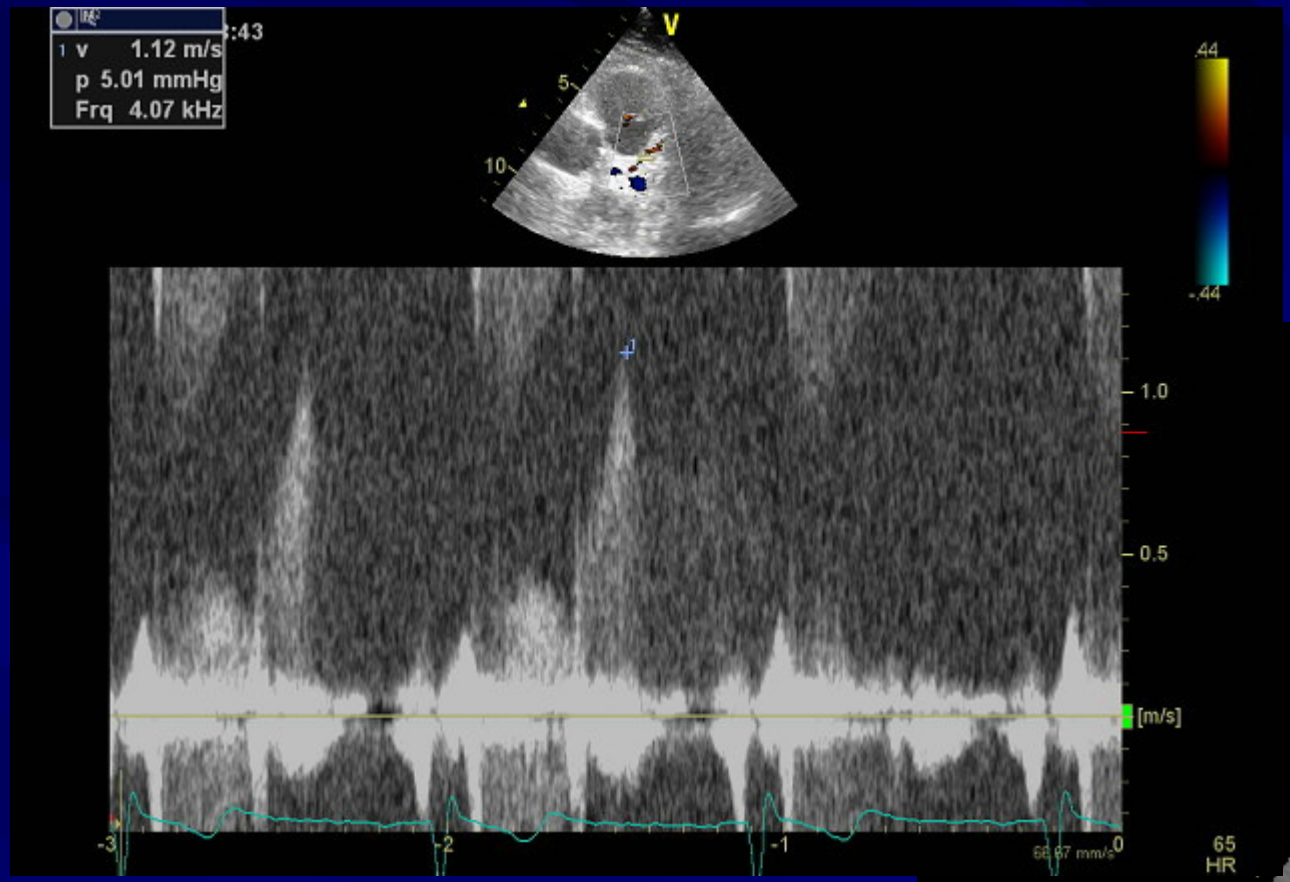
Address: [1]Department of Internal Medicine, Ålesund Hospital, Ålesund, Norway, [2]Department of Circulation and Medical Imaging, Norwegian University of Science and Technology (NTNU), Trondheim, Norway, [3]Department of Cardiology, Trondheim University Hospital, Trondheim, Norway and [4]Medical Faculty, Norwegian University of Science and Technology (NTNU), Trondheim, Norway

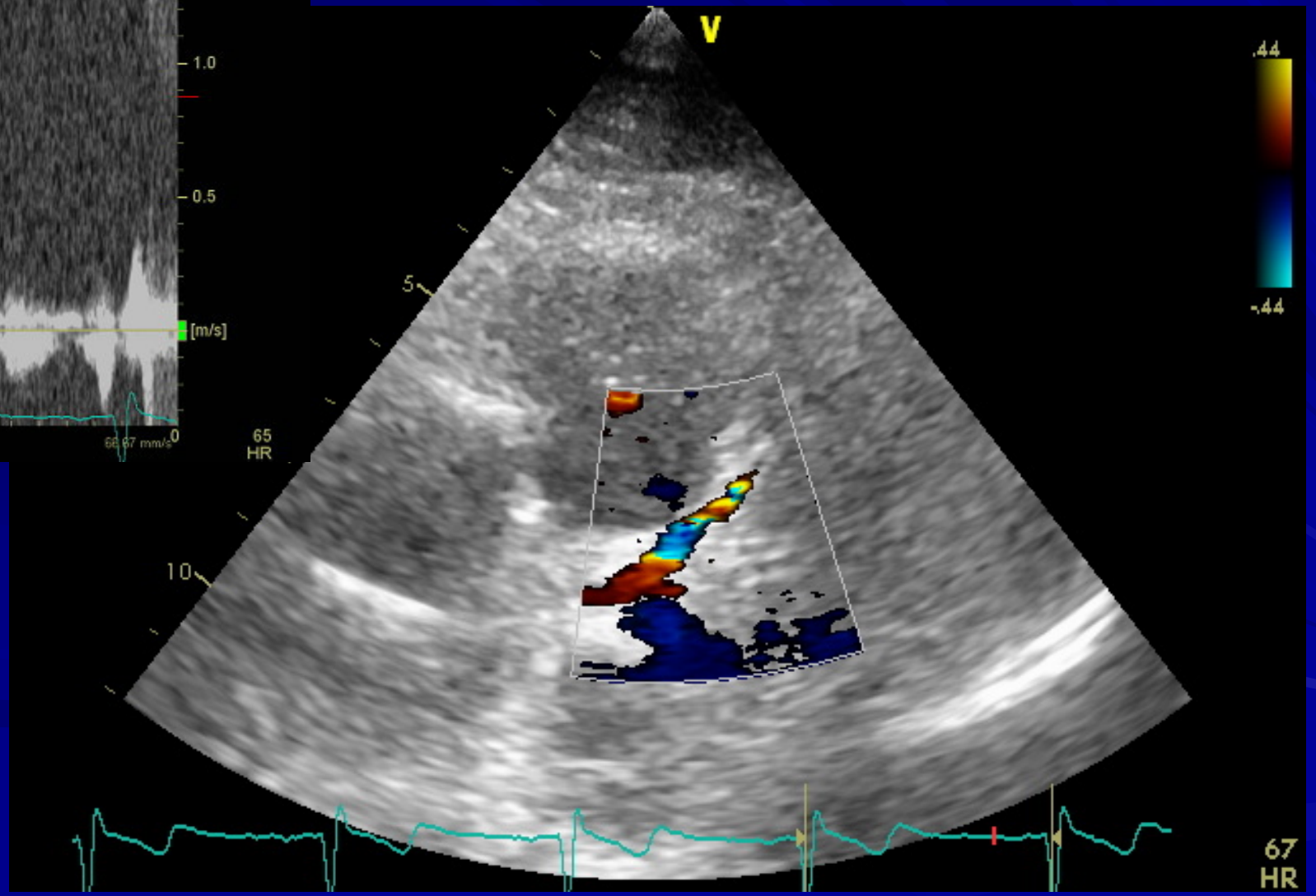
Email: Johnny Vegsundvåg* - johnnyvegsundvag@adsl.no; Espen Holte - es-holte@online.no; Rune Wiseth - rune.wiseth@stolav.no; Knut Hegbom - knut.hegbom@stolav.no; Torstein Hole - torstein.hole@helse-sunnmore.no

* Corresponding author

Клинический пример

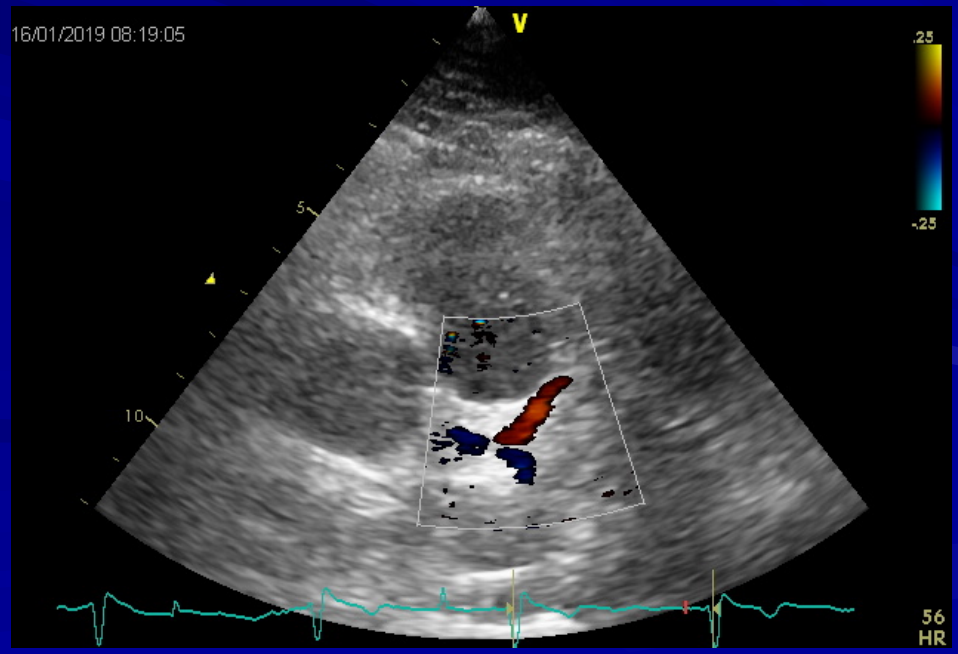
- Пациент, 37 лет, без одышки, болей в грудной клетке. Занимается спортом 4 раза в неделю. Появилось начальная артериальная гипертензия обратился к кардиологу
- Курящий, холестерин крови – 5,7, глюкоза – 5,3
- Стандарт обследования – ЭКГ, эхокардиография, УЗИ сосудов шеи
- ЭКГ – вариант нормы, ЭхоКГ – легкая начальная гипертрофия левого желудочка, УЗИ сосудов шеи – начальное утолщение стенки сонной артерии


v 1.12 m/s
p 5.01 mmHg
Frq 4.07 kHz
V
.44
-.44
1.0
0.5
[m/s]
-3
-2
-1
0


V
.44
-.44
5
10
65
HR
67
HR

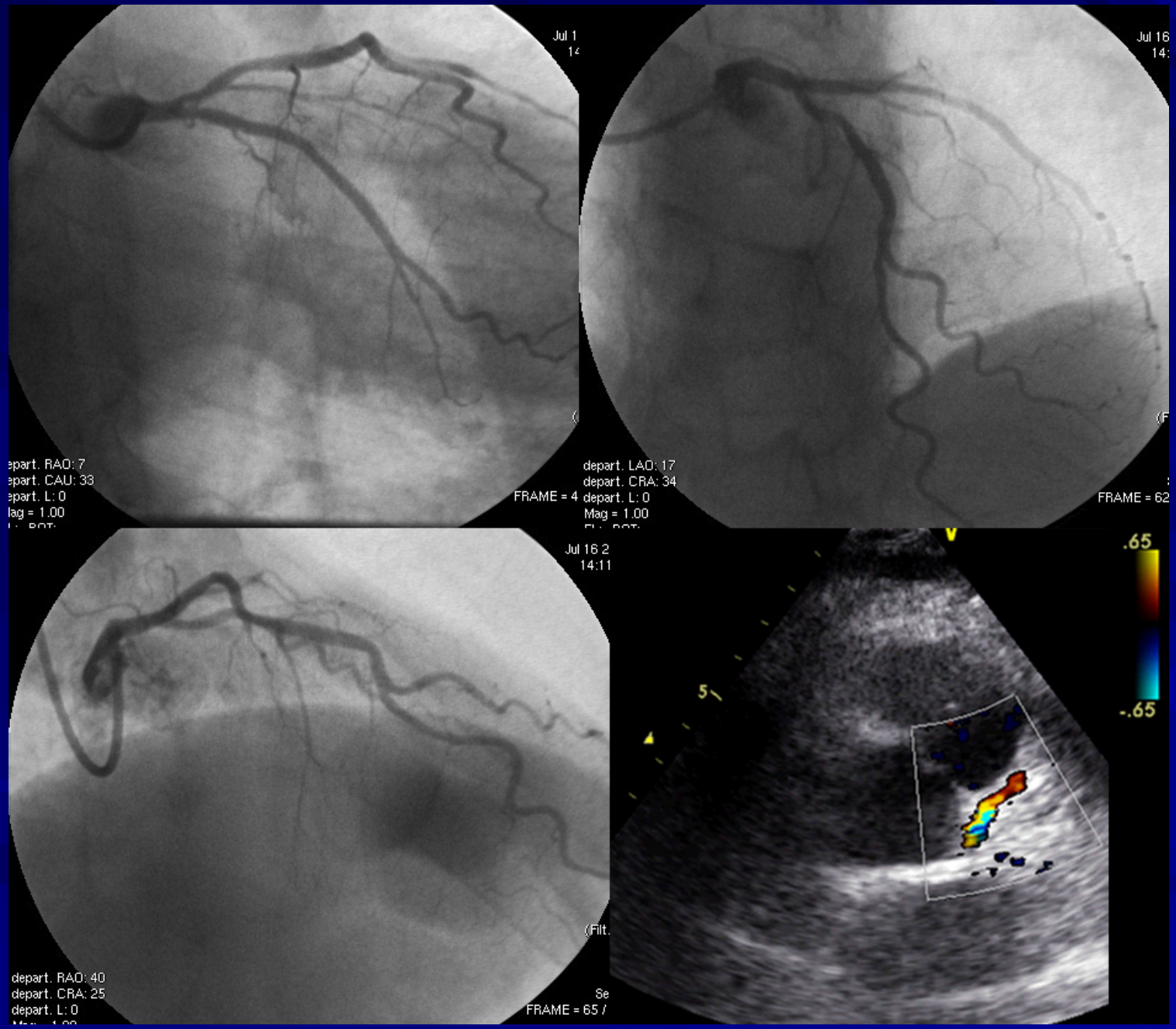
Около половины инфарктов и внезапных смертей происходят при отсутствии предшествующих болей и/или одышки, то есть у бессимптомных пациентов

- Проведен нагрузочный тест
- Выполнена коронарография – тандемные сужения 90% передней межжелудочковой артерии
- Проведено стентирование коронарной артерии



Клинический пример

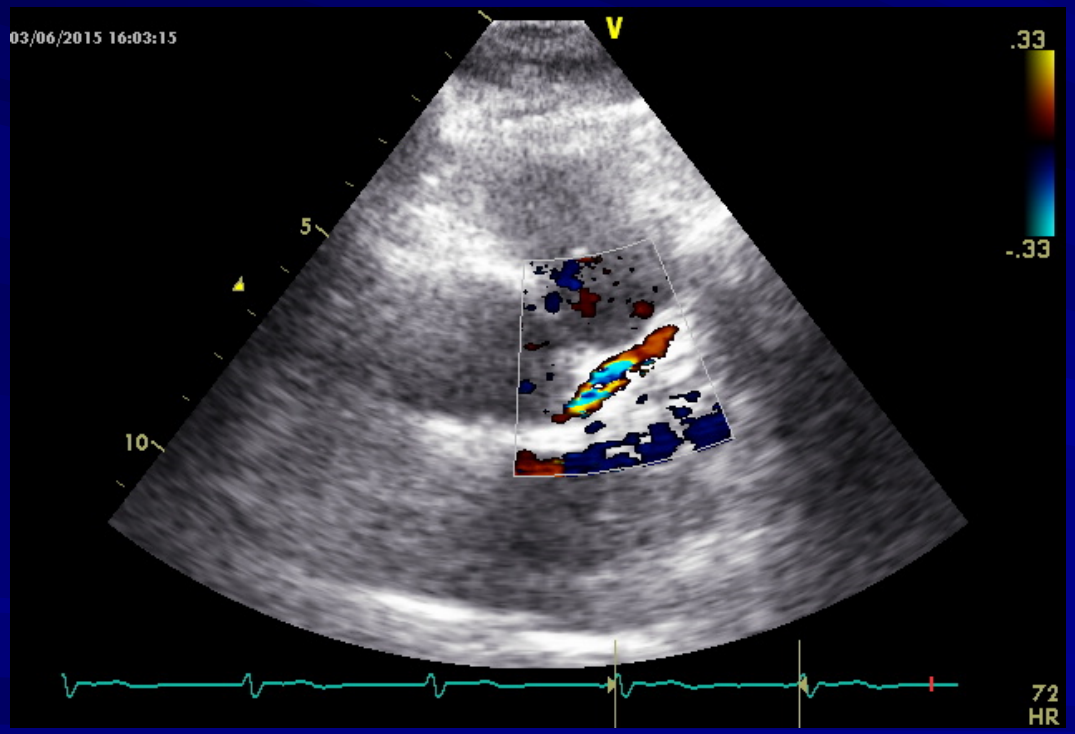
- Мужчина, 47 лет, некурящий, артериальная гипертензия, сахарный диабет
- Классическая стенокардия напряжения 2 функционального класса
- Эхокардиография
- Нагрузочный тест дважды – ишемический тест

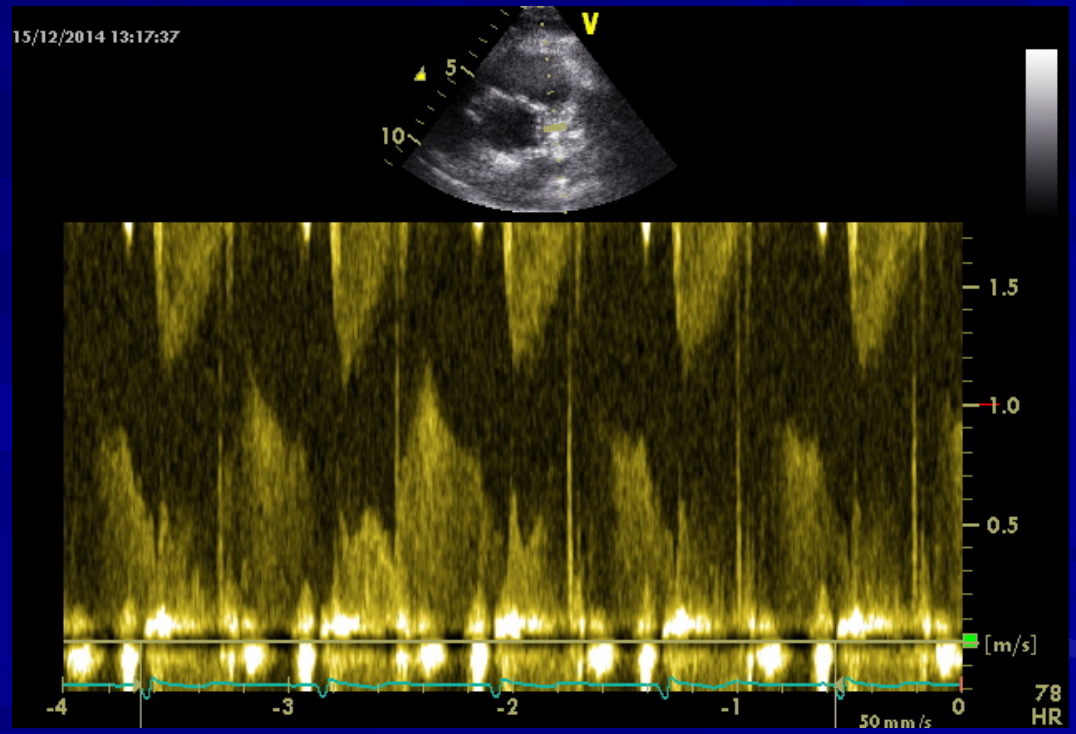


Клинический пример

3 специалиста интервенционной кардиологии разных центров – небольшое сужение устья ПМЖВ 10-30%

Стеноз устья ПМЖВ





Выявлено критическое сужение главной артерии сердца, проведено аорто-коронарное шунтирование

Главные научные направления

- Исследование коронарного кровотока в покое при обычной эхокардиографии
- Исследование коронарного кровотока при нагрузочных тестах

Главные научные направления

- Исследование коронарного кровотока в покое при обычной эхокардиографии
- Исследование коронарного кровотока при нагрузочных тестах

Научные исследования коронарного кровотока в КВМТ 2017-2021 год

- Прогностическое значение изменений коронарного кровотока при рутинной эхокардиографии более 1000 пациентов (работа закончена)
- Роль реваскуляризации миокарда для прогноза данных пациентов 546 пациентов (работа закончена) – планируется защита кандидатской диссертации
- Исследование коронарного кровотока и раннее выявление атеросклероза коронарных артерий у пациентов молодого возраста (группа мужчин 30-39 лет – 200 человек) (набор в завершающей стадии)
- Исследование коронарного кровотока у группы пожилых лиц для предсказания и предотвращения ближайших неблагоприятных событий (пациенты старше 75 лет, 146 человек). Набор завершен. Начало публикаций.

Научные исследования коронарного кровотока в КВМТ 2017-2021 год

- Контроль коронарного кровотока, изменение скоростных показателей во время операций аорто-коронарного шунтирования, связь с послеоперационным прогнозом. Основной этап закончен. Группа 155 человек
- Сравнение прогностической значимости скоростных показателей коронарного кровотока и других известных эхокардиографических и клинических факторов – набор закончен. 581 человек. Обработка данных.

- Прогностическое значение изменений коронарного кровотока при рутинной эхокардиографии у пациентов хронической почечной недостаточности 5 степени, получающих лечение гемодиализом. Работа начата в сентябре 2021 года. Уже проведен набор группы 30 человек. Вероятна остановка работы.

Список основных докладов и презентаций на Российских и международных конгрессах и конференциях

- Декабрь 2021 года – запланированы 2 презентации на конгрессе ЕвроЭхо2021, Берлин, Германия. Он-лайн формат
- Сентябрь 2021 года – доклад на Российской конференции конференции «Инновации в диагностике и лечении сердечно-сосудистых заболеваний», Санкт-Петербург, Россия
- Август 2021 – 3 презентации на Европейском конгрессе кардиологов, он-лайн международный формат
- Декабрь 2020 – 3 презентации ЕвроЭхо-2020, он-лайн международный формат
- Сентябрь 2020- 3 презентации, Европейский конгресс кардиологов, 2020, Амстердам, Нидерланды, (цифровой формат)
- Сентябрь 2020, - доклад, Российский национальный конгресс кардиологов, Казань, Россия.
- Февраль 2020, - 2 доклада на Российском конгрессе «Кардиостим»
- Декабрь 2019 – доклад + 5 презентаций на EuroEcho-Imaging 2019, Вена, Австрия.
- Октябрь 2019 – доклад на 22-м Конгрессе кардиологов Сербии, Златибор, Сербия.
- Сентябрь 2019 - доклад на 4-й российской конференции «Инновации в диагностике и лечении сердечно-сосудистых заболеваний», Санкт-Петербург, Россия
- Август 2019 – 5 постерных презентаций, доклад на конгрессе кардиологов ESC-2019, Париж, Франция.
- Апрель 2019 – доклад Международная конференция «Дни эхокардиографии в Софии», София, Болгария.
- Декабрь 2018 – 3 презентации на EuroEcho-Imaging 2018, Милан, Италия.
- Сентябрь 2018 – доклад на 3-й российской конференции «Инновации в диагностике и лечении сердечно-сосудистых заболеваний», Санкт-Петербург, Россия.
- Август 2018 – участие в 6 презентациях на конгрессе кардиологов ESC-2018, Мюнхен, Германия.
- Май 2018 – доклад в программе Семнадцатой Санкт-петербургской школы кардиологов, Санкт-Петербург, Россия.
- Декабрь 2017 – 3 презентации на EuroEcho-Imaging 2017, Лиссабон, Португалия.

Основные абстракты

1. Zagatina A, Kalinina E, Guseva O, Shmatov D. Assessment of coronary arteries during routine echocardiography, feasibility and prognostic value. A single-center prospective study European Heart Journal, Volume 42, Issue Supplement_1, October 2021, ehab724.1173, https://doi.org/10.1093/eurheartj/ehab724.1173
2. E Kalinina, A Zagatina, N Zhuravskaya, D Shmatov, Prognostic value of non-invasive coronary artery flow velocity assessment in elderly patients, European Heart Journal - Cardiovascular Imaging, Volume 22, Issue Supplement_1, January 2021, jeaa356.097, https://doi.org/10.1093/ehjci/jeaa356.097
3. M Kamenskikh, A Zagatina, N Zhuravskaya, D Shmatov, Diagnostic value of coronary artery assessment by transthoracic ecocardiography, European Heart Journal - Cardiovascular Imaging, Volume 22, Issue Supplement_1, January 2021, jeaa356.382, https://doi.org/10.1093/ehjci/jeaa356.382
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5. A Zagatina, M Novikov, N Zhuravskaya, V Balakhonov, D Shmatov. P1564 Changes in coronary flow velocity measuring during coronary bypass grafting can predict elevation of cardiac troponin. European Heart Journal - Cardiovascular Imaging, Volume 21, Issue Supplement_1, January 2020, jez319.985, https://doi.org/10.1093/ehjci/jez319.985
6. O Sukhanova, A Zagatina, N Zhuravskaya, A V Ivanov, D Shmatov. P1293 Coronary artery flow velocity alteration by transthoracic echo in a group of young adult males European Heart Journal - Cardiovascular Imaging, Volume 21, Issue Supplement_1, January 2020, jez319.738, https://doi.org/10.1093/ehjci/jez319.738
7. A Zagatina, N Zhuravskaya, O Guseva, E Kalinina, Y Drozdova, D Yurkin, D Shmatov. 1174 Coronary flow velocity assessment in routine echocardiography predicts adverse outcomes in three-year period in different subgroups. European Heart Journal - Cardiovascular Imaging, Volume 21, Issue Supplement_1, January 2020, jez319.673, https://doi.org/10.1093/ehjci/jez319.673

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Ultrasound in Medicine & Biology

Available online 26 April 2018

In Press, Corrected Proof

Original Contribution

Role of Coronary Flow Velocity in Predicting Adverse Outcome in Clinical Practice

Angela Zagatina* ✉, Nadezhda Zhuravskaya*, Maxim Kamenskikh †, Dmitry Shmatov †, Sergey Sayganov ‡, Fausto Rigo §

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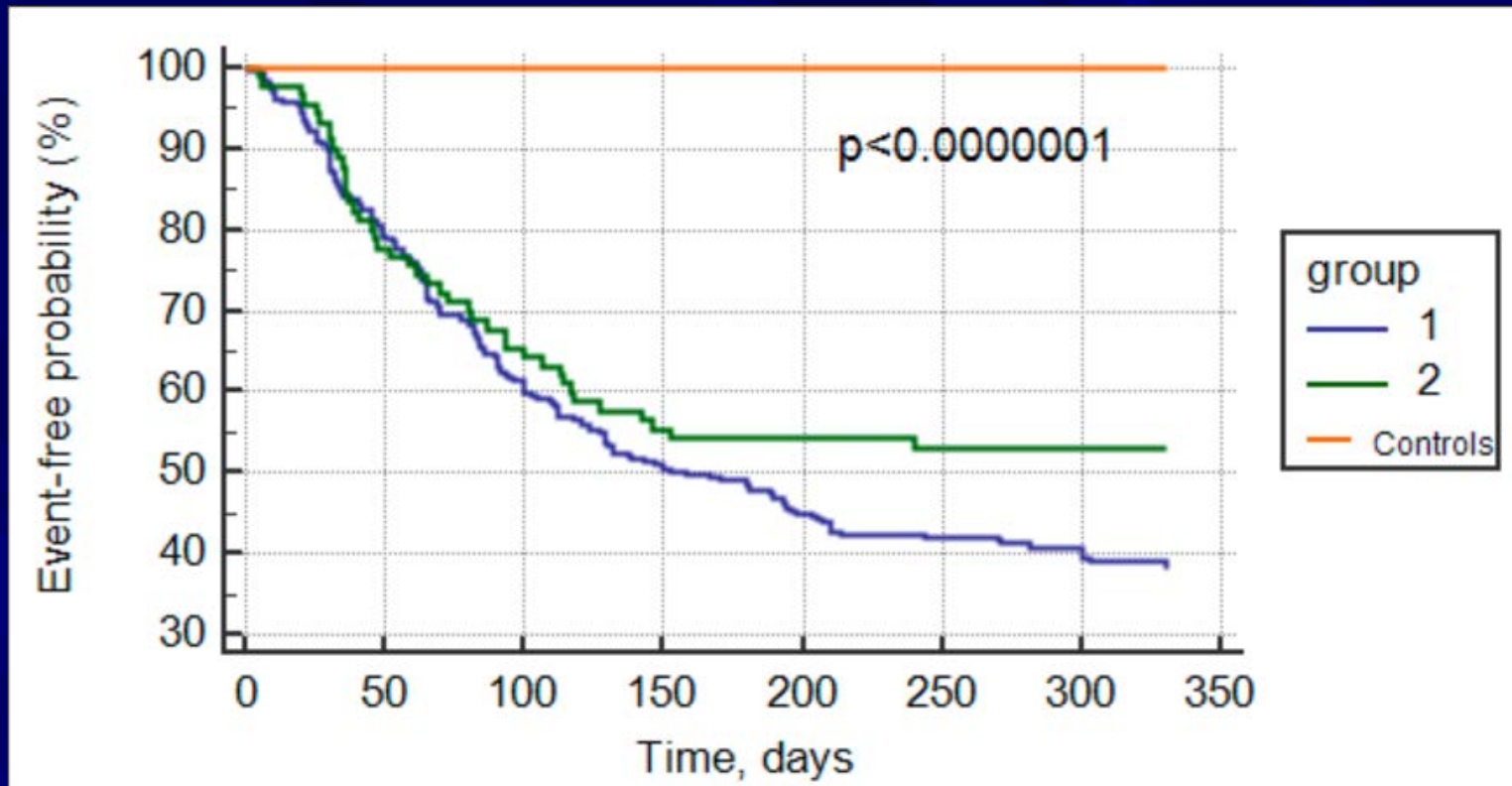
https://doi.org/10.1016/j.ultrasmedbio.2018.03.021

В проспективное исследование включено 412 пациентов. Наблюдение – 10 месяцев

- 361 человек, у которых при эхокардиографии определялись высокие скорости (более 70 см/с) в коронарных артериях. Подразделены на группу с высокими скоростями в проксимальных и непроксим. сегментах
- 51 – контрольная группа, у которых не было повышения скоростей кровотока



Number at risk

Group: 1	267	211	160	135	120	112	105
Group: 2	90	70	57	49	48	47	47
Controls	51	51	51	51	51	51	51

Основные результаты

- Смерть наблюдалась только в группе с высокими скоростями (6.4% vs. 0%, p<0.009)
- Смерть/ИМ/ОКС возникали в 10% vs. 0%, p<0.003
- Только максимальная скорость в проксимальных отделах была предиктором смерти (OR 1.02, 95% CI 1.01–1.03, P<0.02) или всех неблагоприятных исходов (OR 1.04, 95% CI 1.02–1.05, P<0.0001)

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Review Article

Should we routinely assess coronary artery Doppler in daily echocardiography practice?

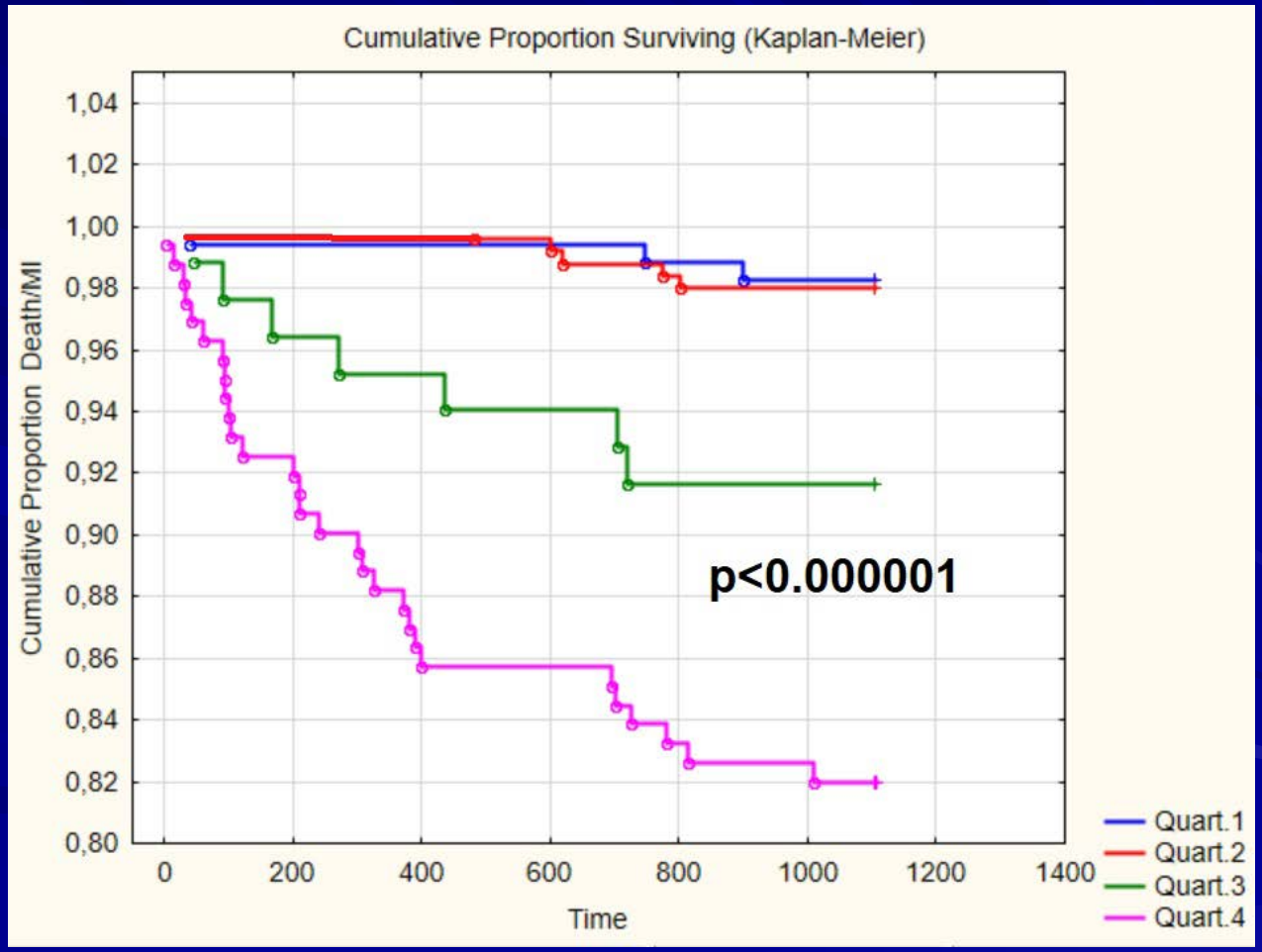
Angela Zagatina, Nadezhda Zhuravskaya, Martin Caprnda, Haaris A. Shiwani, Katarina Gazdikova, Luis Rodrigo,
...show all

Received 21 Apr 2021, Accepted 22 Aug 2021, Published online: 19 Sep 2021

Download citation https://doi.org/10.1080/00015385.2021.1973771 Check for updates

Основные результаты 3-х летнего наблюдения

Статья с результатами 3-летнего прогноза пациентов в зависимости от изменений коронарного кровотока в покое, выявленного во время рутинной эхокардиографии принят в журнал Acta Cardiologica



Главные научные направления

- Исследование коронарного кровотока в покое при обычной эхокардиографии
- Исследование коронарного кровотока при нагрузочных тестах

Дополнительное прогностическое значение оценки кровотока в ПМЖВ при СЭ с физической нагрузкой

European Heart Journal - Cardiovascular Imaging Advance Access published August 7, 2016

European Heart Journal – Cardiovascular Imaging
doi:10.1093/ehjci/jew164

The additive prognostic value of coronary flow velocity reserve during exercise echocardiography

Angela Zagatina* and Nadezhda Zhuravskaya

Medika Cardiology Clinic, 8-2, Dundicha St., Saint Petersburg 192283, Russia

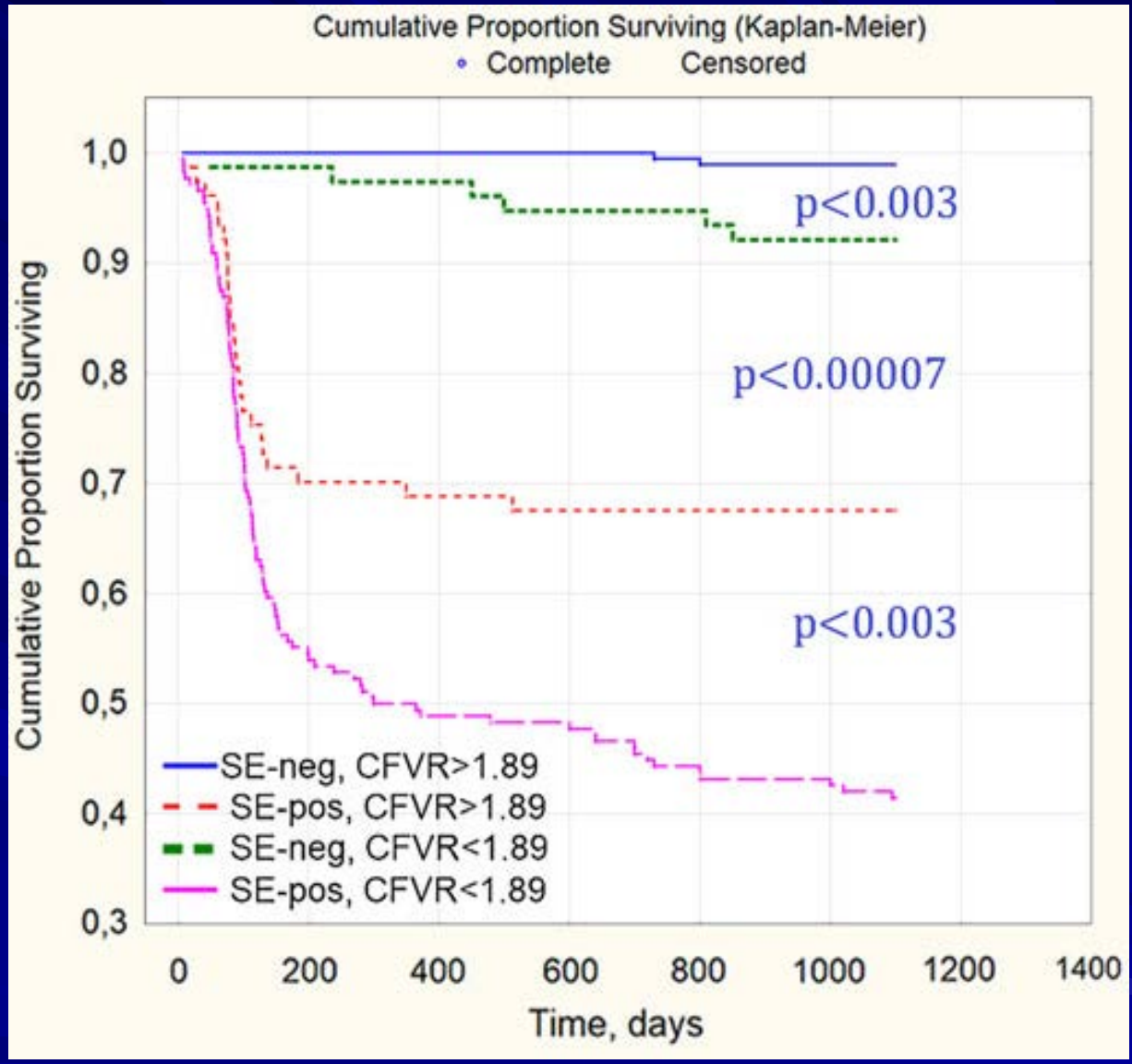
Received 8 June 2016; accepted after revision 13 July 2016

Aims The aim of the study was to assess the additive prognostic value of coronary flow velocity reserve (CFVR) alongside wall motion analysis during exercise echocardiography in patients with known or suspected coronary artery disease (CAD).

Methods and results In a prospective, single-centre, observational study, we evaluated 689 patients (449 males; 56 + 9 years) who underwent supine bicycle stress echo (ESE) with CFVR evaluation of the left anterior descending artery (LAD) by Doppler. ESE was positive for regional wall motion abnormalities in 359 (52%) patients. Mean CFVR was 1.9 ± 0.8. During a median follow-up of 36.6 months, there were 200 patients with major adverse cardiac events (MACE): 15 deaths, 17 non-fatal myocardial infarctions [11 of them also had percutaneous coronary intervention with stenting (PCI) or/and coronary artery bypass graft surgery (CABG)] and 179 patients underwent revascularization. The 37 months' event-free survival showed the best outcome for those patients with negative ESE by wall motion criteria and normal CFVR, and the worst outcome for patients with positive ESE by wall motion and abnormal CVFR (99 vs. 42%, $P < 0.0001$). At multivariable analysis, CFVR in LAD (OR 0.53, 95% CI 0.35–0.79, $P < 0.0001$), positivity for regional wall motion abnormalities during testing (OR 0.10, 95% CI 0.04–0.25, $P < 0.000$), previous PCI (OR 0.38, 95% CI 0.16–0.90, $P < 0.003$), male sex (OR 0.44, 95% CI 0.27–0.71, $P < 0.0009$), and heart rate reached during exercise (OR 0.98, 95% CI 0.96–0.99, $P < 0.02$) were independent prognostic predictors of MACE.

Дополнительное прогностическое значение оценки кровотока в ПМЖВ при СЭ с физической нагрузкой

Граница – КРпмжв=1.89



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Picano *et al. Cardiovascular Ultrasound* (2017) 15:3
DOI 10.1186/s12947-016-0092-1

Cardiovascular Ultrasound

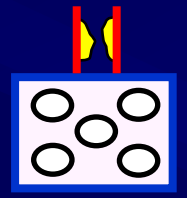
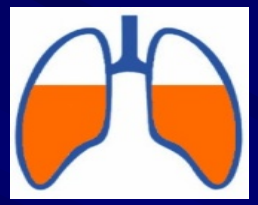
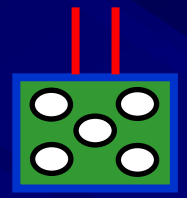
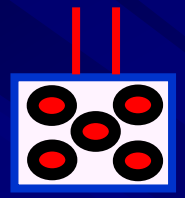
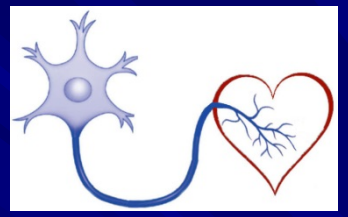
RESEARCH

Open Access

Stress echo 2020: the international stress echo study in ischemic and non-ischemic heart disease

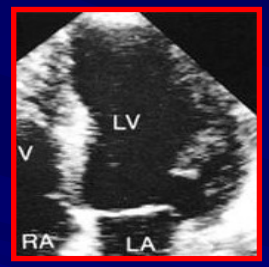
Eugenio Picano[1*], Quirino Ciampi[2], Rodolfo Citro[3], Antonello D'Andrea[4], Maria Chiara Scali[5], Lauro Cortigiani[6], Iacopo Olivotto[7], Fabio Mori[7], Maurizio Galderisi[8], Marco Fabio Costantino[9], Lorenza Pratali[1], Giovanni Di Salvo[10], Eduardo Bossone[3], Francesco Ferrara[3], Luna Gargani[1], Fausto Rigo[11], Nicola Gaibazzi[12], Giuseppe Limongelli[13], Giuseppe Pacileo[4], Maria Grazia Andreassi[1], Bruno Pinamonti[14], Laura Massa[14], Marco A. R. Torres[15], Marcelo H. Miglioranza[16], Clarissa Borguezan Daros[17], José Luis de Castro e Silva Pretto[18], Branko Beleslin[19], Ana Djordjevic-Dikic[19], Albert Varga[20], Attila Palinkas[21], Gergely Agoston[20], Dario Gregori[22], Paolo Trambaiolo[23], Sergio Severino[24], Ayana Arystan[25], Marco Paterni[1], Clara Carpeggiani[1] and Paolo Colonna[26]

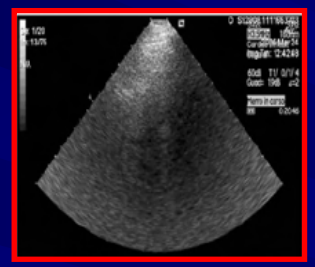
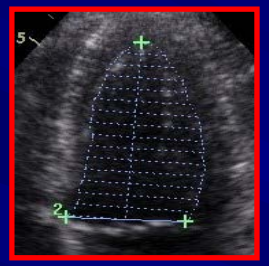
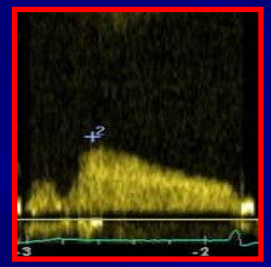
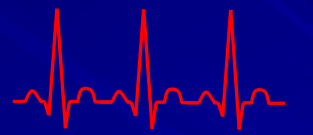
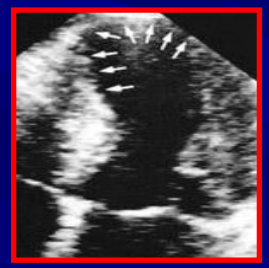
ABCDE протокол

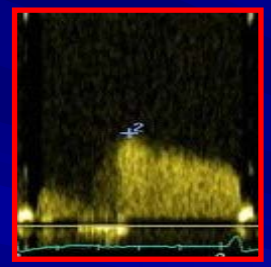
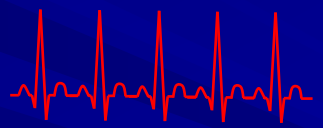






Rest

Stress



RWMA | **B-lines** | **LVCR** | **CFVR** | **HRR**

A = Асинергия | *B = B-линии* | *C = Контрактильный резерв* | *D = Допплер КА* | *E = ЭКГ-Резерв ЧСС*

(Updated from Picano E : Stress echo versatility for our imaging times, JACC img 2018; Ciampi Q, Zagatina A, Cortigiani L. et al, JACC 2020)

Основные результаты получены из 20 центров 8 стран

- Всего участвовало в тренинге, аккредитации 112 специалистов из 54 центров 17 стран

ClinicalTrials.gov PRS
Protocol Registration and Results System

ClinicalTrials.gov PRS DRAFT Receipt (Working Version)
Last Update: 02/08/2017 06:53

ClinicalTrials.gov ID: NCT03049995

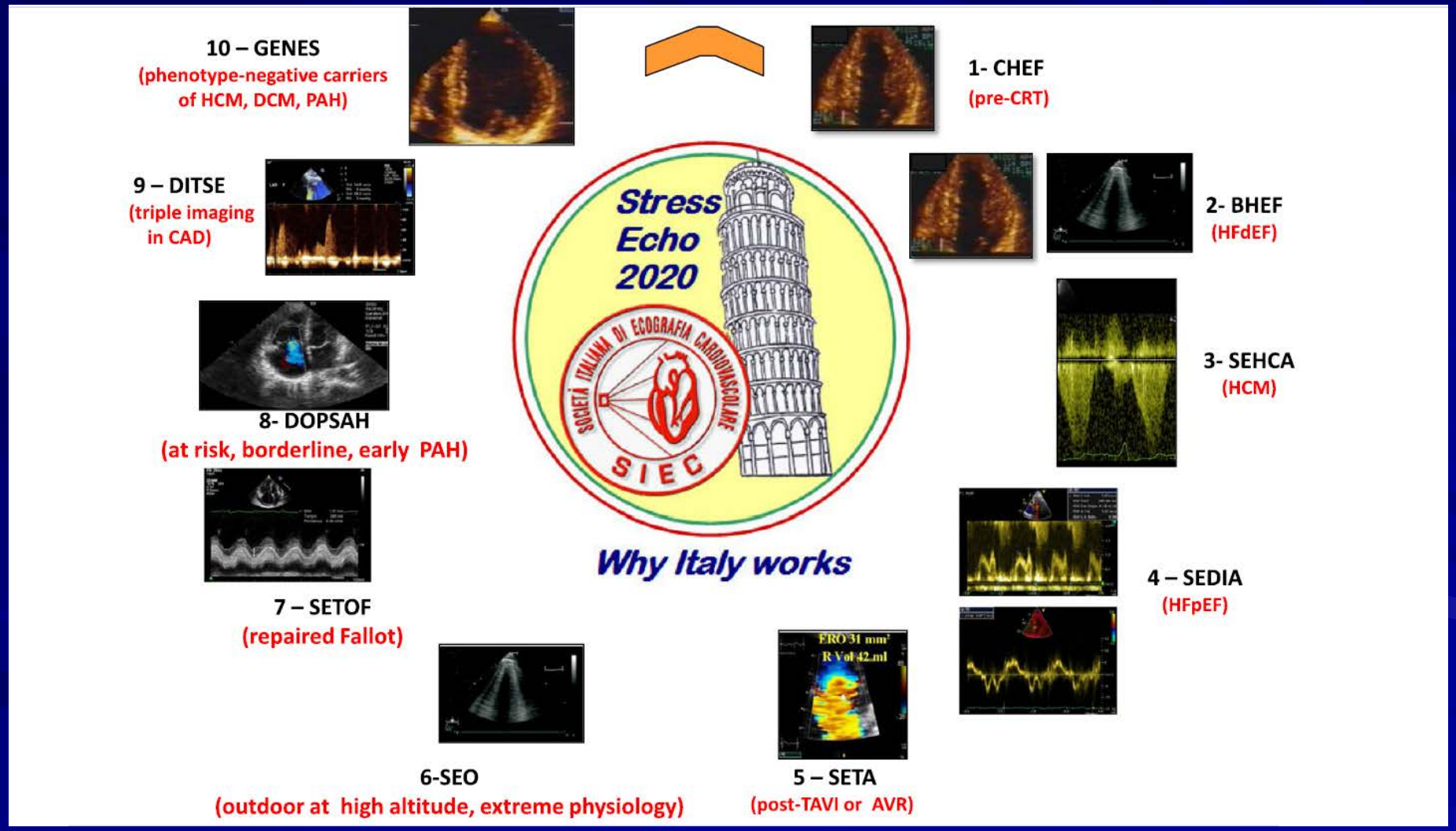
Study Identification

Unique Protocol ID:	FBF001
Brief Title:	Stress Echo 2020 - The International Stress Echo Study (SE2020)
Official Title:	The International Stress Echo Study in Ischemic and Non-ischemic Heart Disease
Secondary IDs:	

Study Status

Record Verification:	February 2017
Overall Status:	Recruiting
Study Start:	November 2016 [Actual]
Primary Completion:	December 2020 [Anticipated]
Study Completion:	December 2021 [Anticipated]

Стресс-эхо2020



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0301-5629/$ - see front matter

http://dx.doi.org/10.1016/j.ultrasmedbio.2017.07.007

● *Original Contribution*

B-LINES WITH LUNG ULTRASOUND: THE OPTIMAL SCAN TECHNIQUE AT REST AND DURING STRESS

MARIA CHIARA SCALI,*† ANGELA ZAGATINA,‡ IANA SIMOVA,§ NADEZHDA ZHURAVSKAYA,‡ QUIRINO CIAMPI,¶ MARCO PATERNI,‖ MARIO MARZILLI,† CLARA CARPEGGIANI,‖ and EUGENIO PICANO‖ ON BEHALF OF THE STRESS ECHO 2020 STUDY GROUP OF THE ITALIAN SOCIETY OF CARDIOVASCULAR ECHOGRAPHY (SIEC)

JACC
JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY

Journal of the American College of Cardiology
Volume 74, Issue 18, November 2019
DOI: 10.1016/j.jacc.2019.08.1046

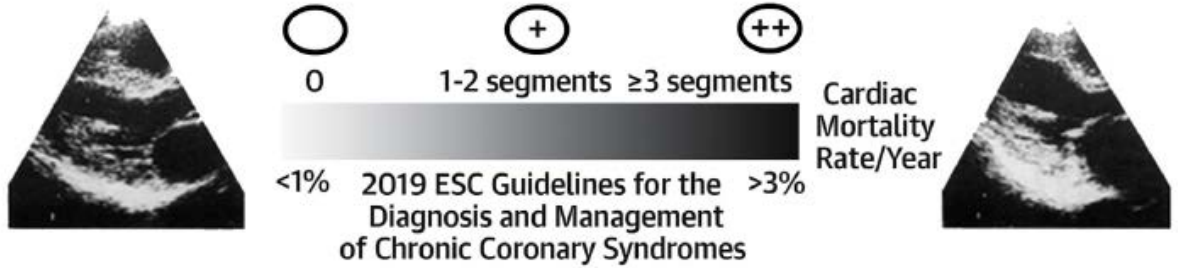
PDF Article

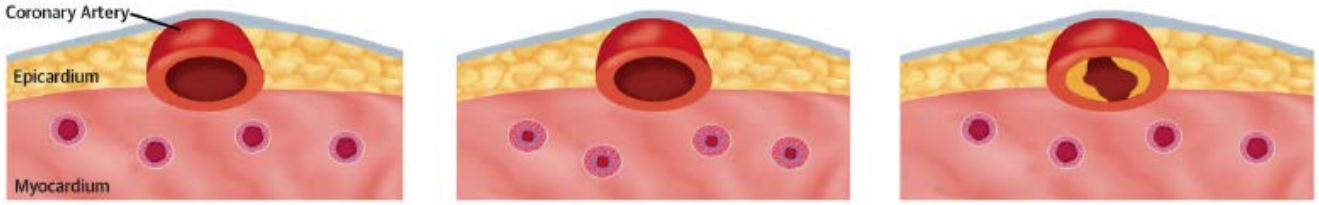
ORIGINAL INVESTIGATION

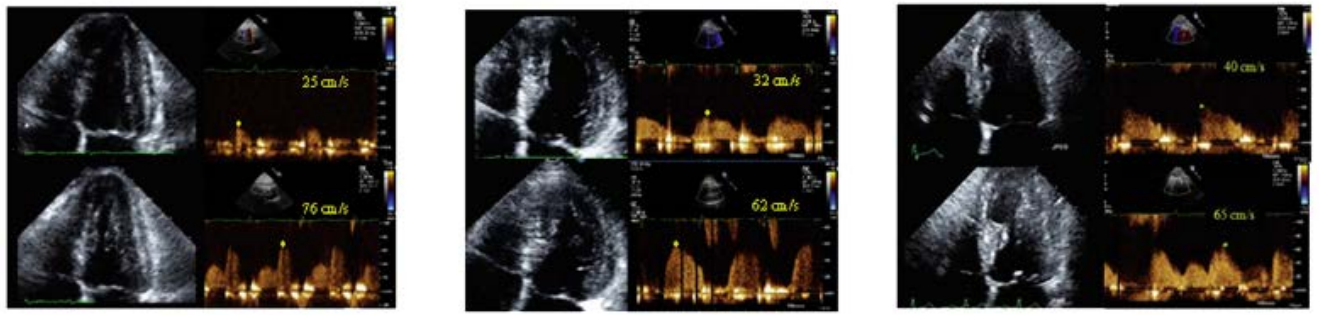
Functional, Anatomical, and Prognostic Correlates of Coronary Flow Velocity Reserve During Stress Echocardiography

Quirino Ciampi, Angela Zagatina, Lauro Cortigiani, Nicola Gaibazzi, Clarissa Borguezan Daros, Nadezhda Zhuravskaya, Karina Wierzbowska-Drabik, Jaroslaw D. Kasprzak, José Luis de Castro e Silva Pretto, Antonello D'Andrea, Ana

Risk Stratification Beyond Regional Wall Motion Abnormalities







No RWMA CFVR >2.0 | No RWMA CFVR ≤2.0 | RWMA CFVR ≤2.0

Nonischemic Warm Heart | Nonischemic Cold Heart | Ischemic Cold Heart

Ciampi, Q. et al. J Am Coll Cardiol. 2019;74(18):2278-91.

Journal of the American College of Cardiology
Volume 74, Issue 18, November 2019
DOI: 10.1016/j.jacc.2019.08.1046

ORIGINAL INVESTIGATION

Functional, Anatomical, and Prognostic Correlates of Coronary Flow Velocity Reserve During Stress Echocardiography

- Включено 3410 пациентов (63±11 лет; ФВ - 61±9%) с известной или предполагаемой ИБС и/или ХСН
- Всем пациентам проводилась стресс-эхокардиография (с ФН - 1288; вазодилататорами - 1860; добутамином -262)
- Исследование проводилось в 20 аккредитованных лабораториях 8 стран
- Возможность сканирования ПМЖВ во время стресс-теста было 3002 из 3410 (88%)
- Сниженный коронарный резерв (менее 2.0) был зарегистрирован у 896 из 3002 пациентов (30%).
- Многофакторный анализ показал, что нарушения сократимости во время СЭ и сниженный коронарный резерв являются независимыми предикторами неблагоприятных исходов (HR: 3.8; 95% CI: 2.3 -6.3; p < 0.001) и (HR: 1.5; 95% CI: 1.1-2.2; p < 0.009), соответственно.
- Появление ишемических нарушений сократимости (odds ratio [OR]: 6.5; 95% confidence interval [CI]: 4.9 to 8.5; p < 0.01), сниженный контрактильный резерв (OR: 3.4; 95% CI: 2.7 to 4.2; p < 0.01), и B-линии (OR: 1.5; 95% CI: 1.1 to 1.9; p ¼ 0.01) были ассоциированы с низким коронарным резервом в ПМЖВ.

Valentin Fuster's commentary

- "We could call this paper "**Going back to the future**", because the concept of CFVR (although not new) is coming back **with fullest speed in Europe and United States"**

- **"Knowing that the technology used is quite feasible, I can see a future by which the use of the quadruple protocol may provide a lot of information"**

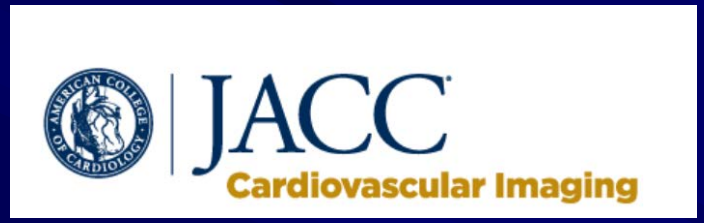
(Valentin Fuster, Editor-in-chief, JACC November 5, 2019 comment to stress echo2020 JACC paper by Ciampi Q et al)

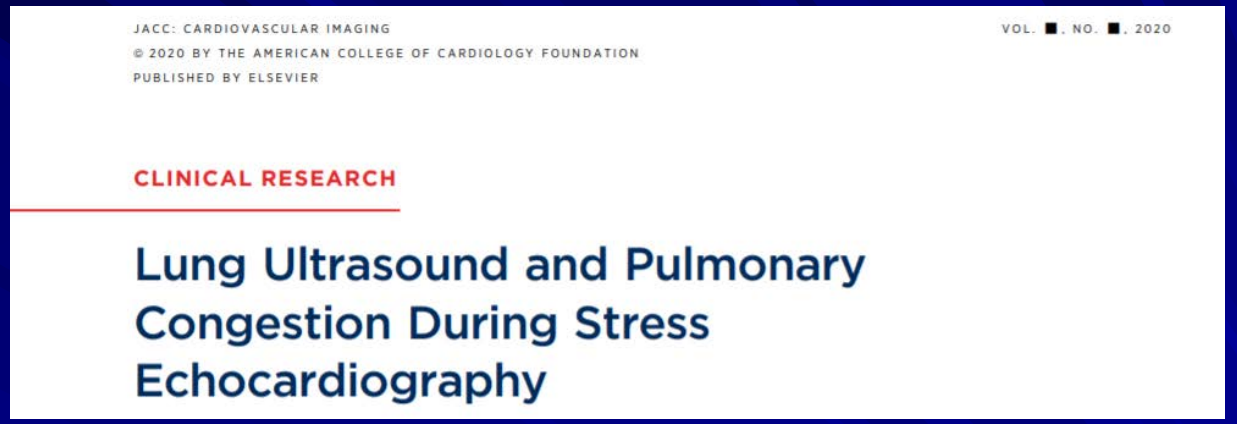
Minerva Cardioangiologica
EDIZIONI MINERVA MEDICA

Feasibility and Value of Two-dimensional Volumetric Stress Echocardiography

- Включено 4 735 пациентов (63.6 ± 11.3 лет)
- Возможность измерения КР была 100% без существенных временных затрат во время теста и + несколько минут после теста

T Bombardini, A Zagatina, Q Ciampi et al., 2020




JACC: CARDIOVASCULAR IMAGING
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CLINICAL RESEARCH

Lung Ultrasound and Pulmonary Congestion During Stress Echocardiography

- Всего 2,145 пациентов:
- Тест с физической нагрузкой - n = 1,012
- Тест с вазодилататорами - n = 1,054
- Тест добутамином - n = 79
- Согласно количеству B-линий на пике нагрузки пациенты были разделены на 4 группы: 1) B-линии 0-1; n = 1,389; 64.7; 2) B-линии 2 -4; n = 428; 20%); 3) B-линии 5-9; n = 209; 9.7%); 4) B-линии ≥10; n = 119; 5.4%

MC Scali, A Zagatina, Q Ciampi,...E Picano et al., 2020

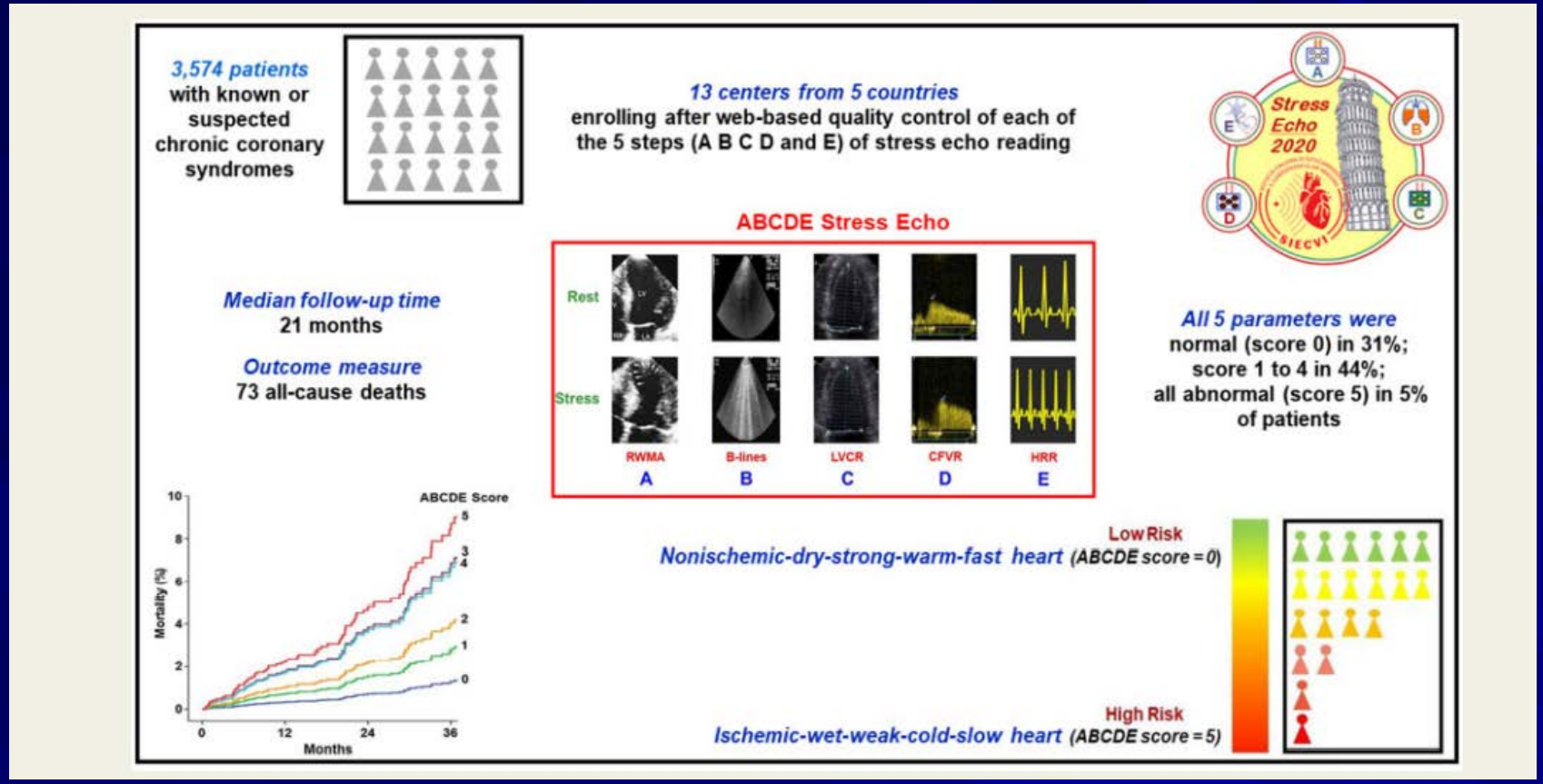
ESC European Society of Cardiology

European Heart Journal (2021) **00**, 1–11
doi:10.1093/eurheartj/ehab493

CLINICAL RESEARCH
Ischaemic Heart Disease

Prognostic value of stress echocardiography assessed by the ABCDE protocol

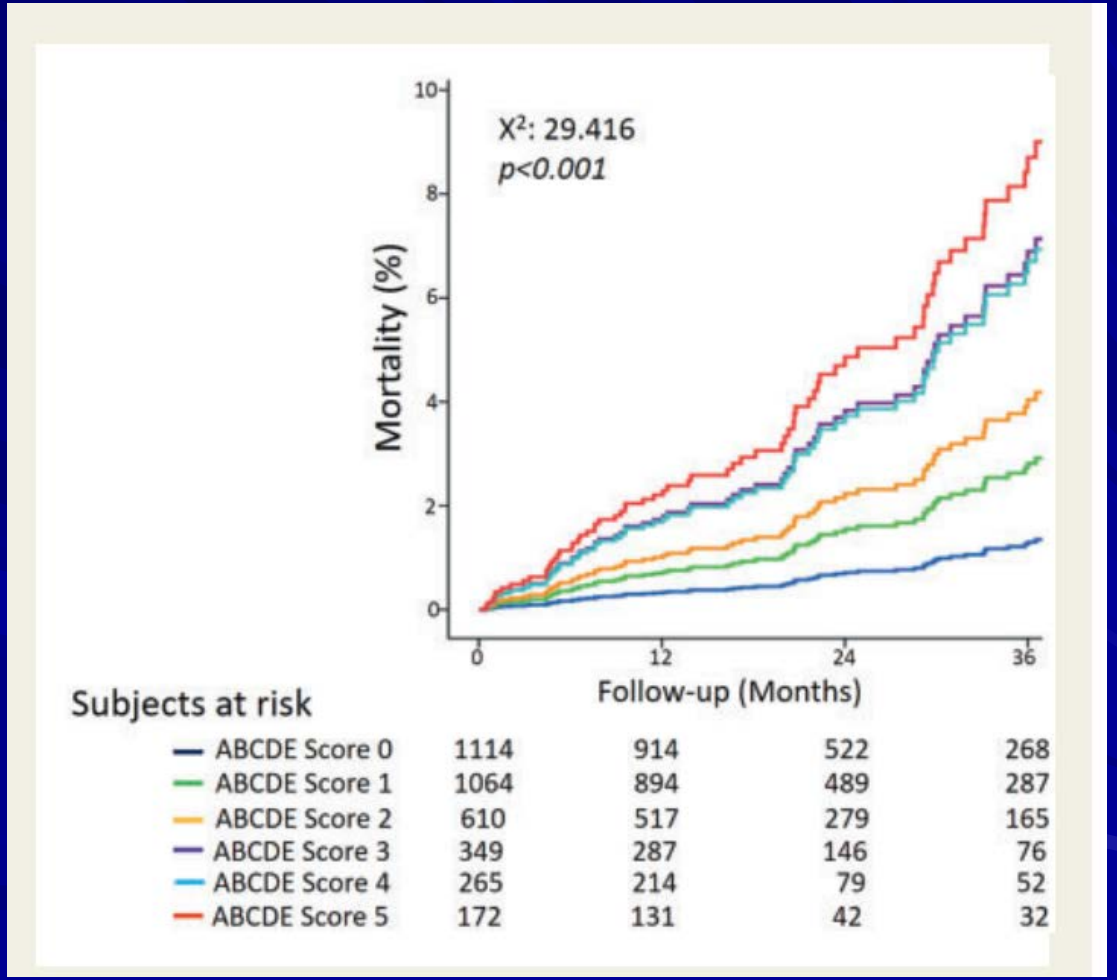
Quirino Ciampi[1†], Angela Zagatina [2], Lauro Cortigiani [3], Karina Wierzbowska-Drabik [4], Jaroslaw D. Kasprzak [4], Maciej Haberka[5], Ana Djordjevic-Dikic[6], Branko Beleslin[6], Alla Boshchenko[7], Tamara Ryabova [7], Nicola Gaibazzi [8], Fausto Rigo[9], Claudio Dodi[10], Iana Simova[11], Martina Samardjieva[11], Andrea Barbieri [12], Doralisa Morrone[13], Valentina Lorenzoni [14], Costantina Prota [15], Bruno Villari[1], Francesco Antonini-Canterin[16,17], Mauro Pepi [17,18], Clara Carpeggiani [19], Patricia A. Pellikka [20], and Eugenio Picano [19*†]; on behalf of the Stress Echo 2020 Study Group of the Italian Society of Echocardiography and Cardiovascular Imaging (SIECVI)



- Июль 2016 – ноябрь 2020, 3574 пациентов (65± 11, 2070 муж, 58%; 60± 10% ФВ) с известной или предполагаемой ИБС из 13 сертифицированных центров.
- ABCDE протокол стресс-эхокг.
- СЭ с ФН (n= 952) фармакологический тип СЭ (вазодилататоры n= 2151; добутамин n= 471).

Результаты

- Наблюдение 21 мес, 73 смерти.
- Предикторами летальности были шаг B [(HR) 2.621, P < 0.001], шаг D (HR 2.578, P < 0.001), и шаг E (HR 2.955, P< 0.001), но не A (HR 1.333, P = 0.349) and шаг C (HR 1.581, P= 0.051)



ESC European Society of Cardiology

European Heart Journal (2021) **00**, 1–3
doi:10.1093/eurheartj/ehab562

EDITORIAL

Stress echocardiography: the quest for risk stratification beyond myocardial ischaemia

Roxy Senior * and Rajdeep Khattar

Royal Brompton Hospital, London and Imperial College, London, UK

This editorial refers to 'Prognostic value of stress echocardiography assessed by the ABCDE protocol', by Q. Ciampi *et al.*, doi: 10.1093/eurheartj/ehab493.

"the ABCDE protocol in known CAD and absence of myocardial ischaemia may be very useful for risk stratification, providing reassurance for low risk patients and for taking an informed decision regarding the need for invasive investigation in high risk patients."

«СТРЕСС-ЭХОКАРДИОГРАФИЯ 2030 (SE2030)»

- В исследовании примут участие более 40 центров мира (Аргентина, Бельгия, Бразилия, Великобритания, Венгрия, Италия, Испания, Литва, Мексика, Польша, Португалия, Россия, Сербия, США, и т.д.)

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Article

Stress Echo 2030: The Novel ABCDE-(FGLPR) Protocol to Define the Future of Imaging

Eugenio Picano [1,*], Quirino Ciampi [2], Lauro Cortigiani [3], Adelaide M. Arruda-Olson [4], Clarissa Borguezan-Daros [5], José Luis de Castro e Silva Pretto [6,7], Rosangela Cocchia [8], Eduardo Bossone [8], Elisa Merli [9], Garvan C. Kane [4], Albert Varga [10], Gergely Agoston [10], Maria Chiara Scali [11], Doralisa Morrone [12], Iana Simova [13], Martina Samardjieva [13], Alla Boshchenko [14], Tamara Ryabova [14], Alexander Vrublevsky [14], Attila Palinkas [15], Eszter D. Palinkas [16], Robert Sepp [16], Marco A. R. Torres [17], Hector R. Villarraga [4], Tamara Kovačević Preradović [18], Rodolfo Citro [19], Miguel Amor [20], Hugo Mosto [20], Michael Salamè [20], Paul Leeson [21], Cristina Mangia [22], Nicola Gaibazzi [23], Domenico Tuttolomondo [23], Costantina Prota [24], Jesus Peteiro [25], Caroline M. Van De Heyning [26], Antonello D'Andrea [27], Fausto Rigo [28], Aleksandra Nikolic [29], Miodrag Ostojic [29], Jorge Lowenstein [30], Rosina Arbucci [30], Diego M. Lowenstein Haber [30], Pablo M. Merlo [30], Karina Wierzbowska-Drabik [31], Jaroslaw D. Kasprzak [31], Maciej Haberka [32], Ana Cristina Camarozano [33], Nithima Ratanasit [34], Fabio Mori [35], Maria Grazia D'Alfonso [35], Luigi Tassetti [35], Alessandra Milazzo [35], Iacopo Olivotto [35], Alberto Marchi [35], Hugo Rodriguez-Zanella [36], Angela Zagatina [37], Ratnasari Padang [4], Milica Dekleva [38], Ana Djordievic-Dikic [39], Nikola Boskovic [39], Milorad Tesic [39], Vojislav Giga [39], Branko Beleslin [39], Giovanni Di Salvo [40], Valentina Lorenzoni [41], Matteo Cameli [42], Giulia Elena Mandoli [42], Tonino Bombardini [18], Pio Caso [27], Jelena Celutkiene [43], Andrea Barbieri [44], Giovanni Benfari [45], Ylenia Bartolacelli [46], Alessandro Malagoli [47], Francesca Bursi [48], Francesca Mantovani [49], Bruno Villari [2], Antonello Russo [50], Michele De Nes [1], Clara Carpeggiani [1], Ines Monte [51], Federica Re [52], Carlos Cotrim [53], Giuseppe Bilardo [54], Ariel K. Saad [55], Arnas Karuzas [56], Dovydas Matuliauskas [56], Paolo Colonna [57,58], Francesco Antonini-Canterin [58,59], Mauro Pepi [58,60], Patricia A. Pellikka [4] and The Stress Echo 2030 Study Group of the Italian Society of Echocardiography and

Journal of
Clinical Medicine

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Article

Imaging Quality Control, Methodology Harmonization and Clinical Data Management in Stress Echo 2030

Ylenia Bartolacelli [1,*,†], Andrea Barbieri [2], Francesco Antonini-Canterin [3], Mauro Pepi [4], Ines Paola Monte [5], Giuseppe Trocino [6], Agata Barchitta [7], Alberto Cresti [8], Sofia Miceli [9], Licia Petrella [10], Frank Benedetto [11], Concetta Zito [12], Giovanni Benfari [13], Francesca Bursi [14], Alessandro Malagoli [15], Francesca Mantovani [16], Quirino Ciampi [17], Angela Zagatina [18], Eszter Dalma Palinkas [19], Attila Palinkas [20], Szilvia Rostasne Toth [20], Karina Wierzbowska-Drabik [21], Ana Djordievic-Dikic [22], Patricia A. Pellikka [23], Eugenio Picano [24] and on behalf of the Stress Echo 2030 Study Group of the Italian Society of Echocardiography and Cardiovascular Imaging [‡]

ESC Congress 2018. Saturday 25 - Wednesday 29 August 2018. Munich - Germany

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Загатина А.В