Papel da monitorização prolongada no diagnóstico da Fibrilação Arterial

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ALBERT EINSTEIN
HOSPITAL ISRAELITA

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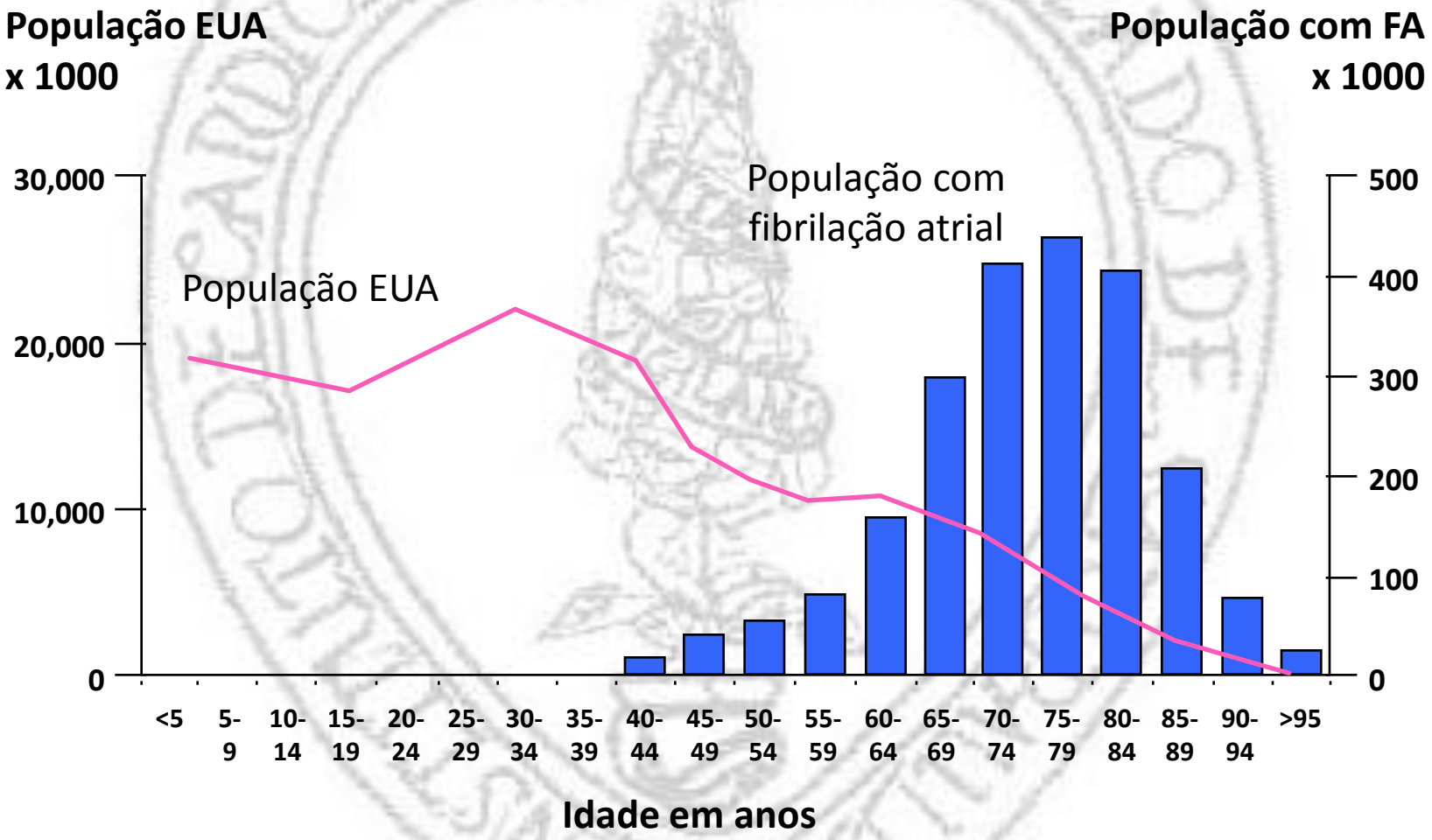
Instituto Dante Pazzanese de Cardiologia

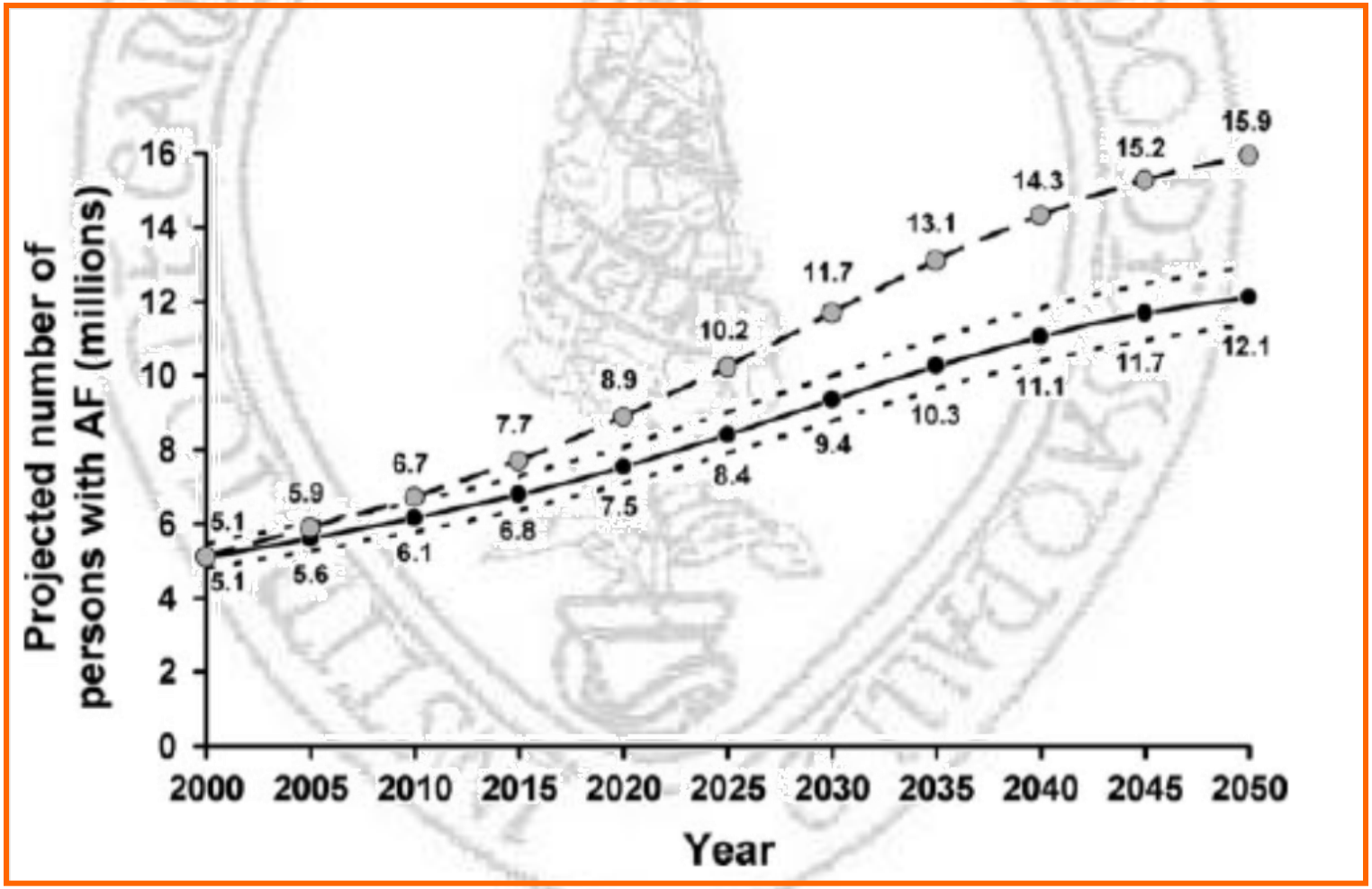
Distribuição da Demográfica da Fibrilação Atrial por Idade



Feinberg WM. Arch Intern Med. 1995;155:469-473.

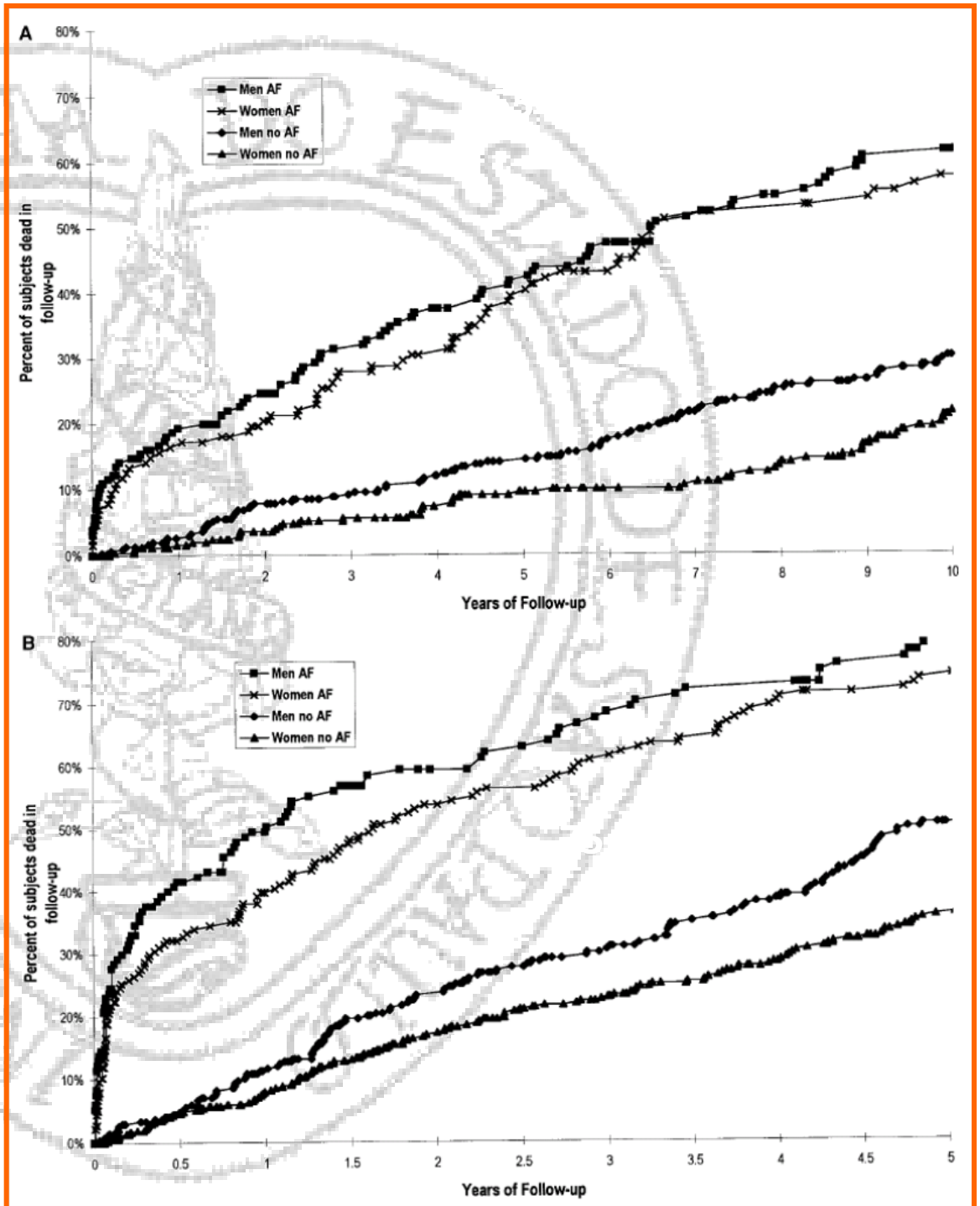
Secular Trends in Incidence of Atrial Fibrillation in Olmsted County, Minnesota, 1980 to 2000, and Implications on the Projections for Future Prevalence

Yoko Miyasaka, MD, PhD; Marion E. Barnes, MSc; Bernard J. Gersh, MB, ChB, DPhil; Stephen S. Cha, MS; Kent R. Bailey, PhD; Walter P. Abhayaratna, MBBS; James B. Seward, MD; Teresa S.M. Tsang, MD



Circulation 2006; 114:119-126

Mortalidade em Pacientes com FA



Benjamin JE et al. Circulation 1998; 98:946

Recomendações para Anticoagulação na Fibrilação Atrial

Critério CHADS2*	Escore de risco
História prévia de AVC	2
Idade > 75 anos	1
Hipertensão	1
Diabetes	1
Insuficiência cardíaca	1

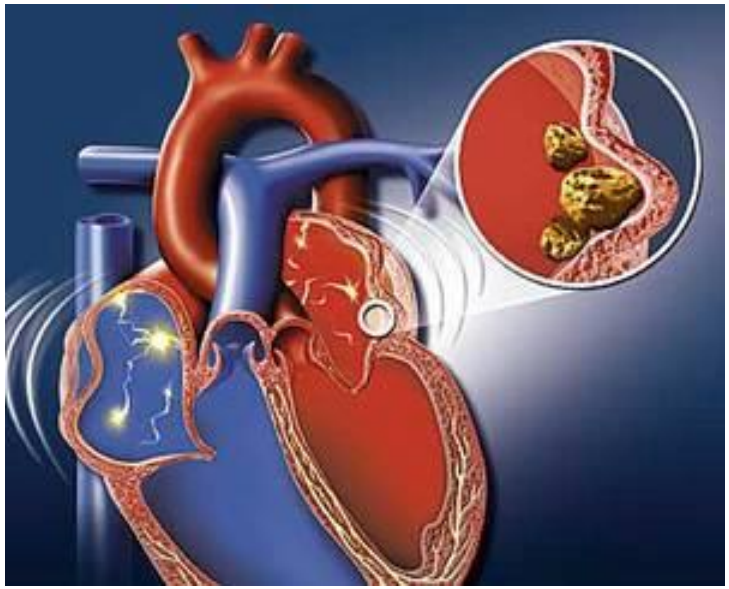
***Cardiac failure-Hypertension-Age-Diabetes-Stroke**
Pontuação acima de 2 → anticoagulação

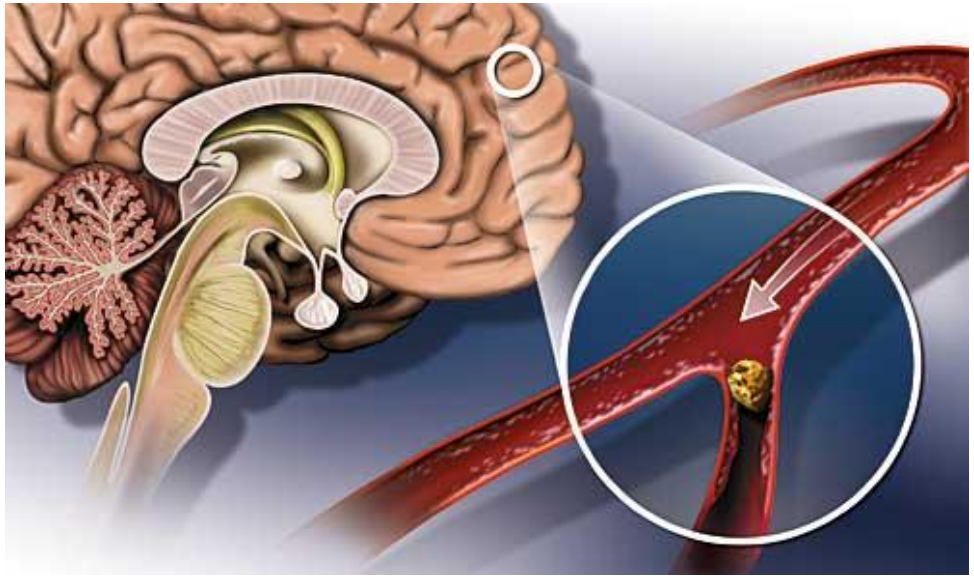
Van Walraven et al. Arch Intern Med 2003; 163:936-43

Decidindo sobre anticoagulação

CHA_2DS_2-VASc	Score	HAS-BLED	Score
Congestive heart failure/LV dysfunction	1	Hypertension (systolic blood pressure >160 mm Hg)	1
Hypertension	1	Abnormal renal or liver function	1 or 2
Age ≥75 y	2	Stroke	1
Diabetes mellitus	1	Bleeding tendency or predisposition	1
Stroke/TIA/TE	2	Labile INR (if on warfarin)	1
Vascular disease (prior MI, PAD, or aortic plaque)	1	Age (eg, >65 y, frail condition)	1
Age 65–74 y Sex category (ie, female gender)	1 1	Drugs (eg, concomitant antiplatelet or NSAIDs) or alcohol excess/abuse	1 or 2
Maximum score	9		9

Data from Lip GY, Nieuwlaat R, Pisters R, et al. Refining clinical risk stratification for predicting stroke and thromboembolism in atrial fibrillation using a novel risk factor-based approach: the Euro Heart Survey on atrial fibrillation. Chest 2010;137(2):263–72; and Pisters R, Lane DA, Nieuwlaat R, et al. A novel user-friendly score (HAS-BLED) to assess 1-year risk of major bleeding in patients with atrial fibrillation: the Euro Heart Survey. Chest 2010;138(5):1093–100.





Tromboembolismo cerebral na fibrilação atrial

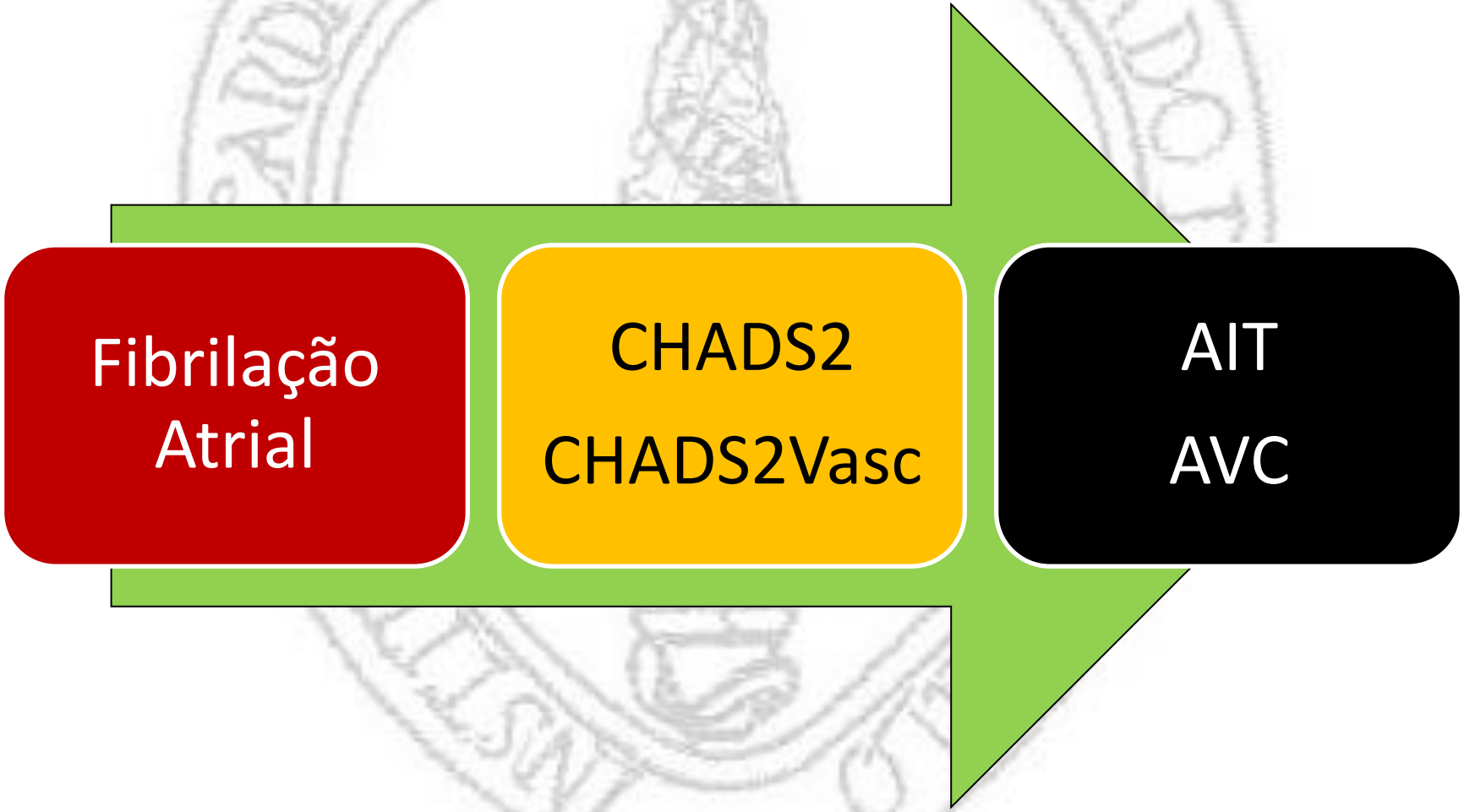
Restabelecimento do ritmo sinusal previne ?

DM

Locais mais comuns para tromboembolismo na fibrilação atrial

Autor	No.	Cerebral (%)	Membros (%)	Visceral (%)
Szekeley	89	70	25	4
Fleming	173	66	20	14
Wood		75	33	6
Casella	21	55	15	27
Daley	393	48	38	14
Gazenge	257	82	13	4
Hinton	34	65	20	15
Hinton	73	58	25	18
Aberg	79	33	25	42
Aberg	308	53	16	31

Os caminhos a serem percorridos



Os caminhos a serem percorridos

Fibrilação Atrial

CHADS2

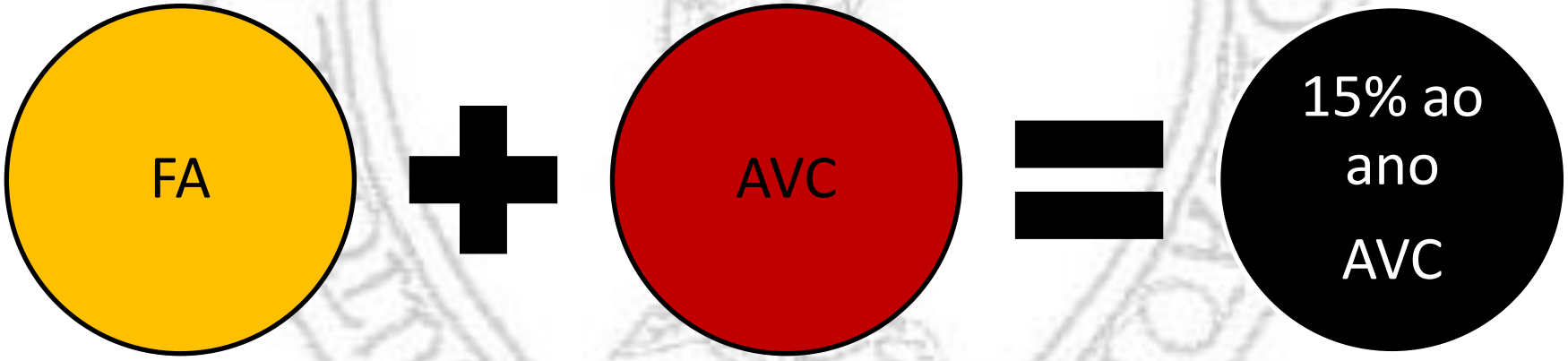
CHADS2Vasc

AIT

AVC

10% ??????

FA e Eventos isquemicos cerebrais



Cerebral Embolism Task Force. Cardiogenic brain embolism. The second report of the Cerebral Embolism Task Force. *Arch Neurol 1989;* ***46: 727–43.***
Stroke Risk in Atrial Fibrillation Working Group. Independent predictors of stroke in patients with atrial fi brillation: a systematic review. *Neurology 2007;* ***69: 546–54***

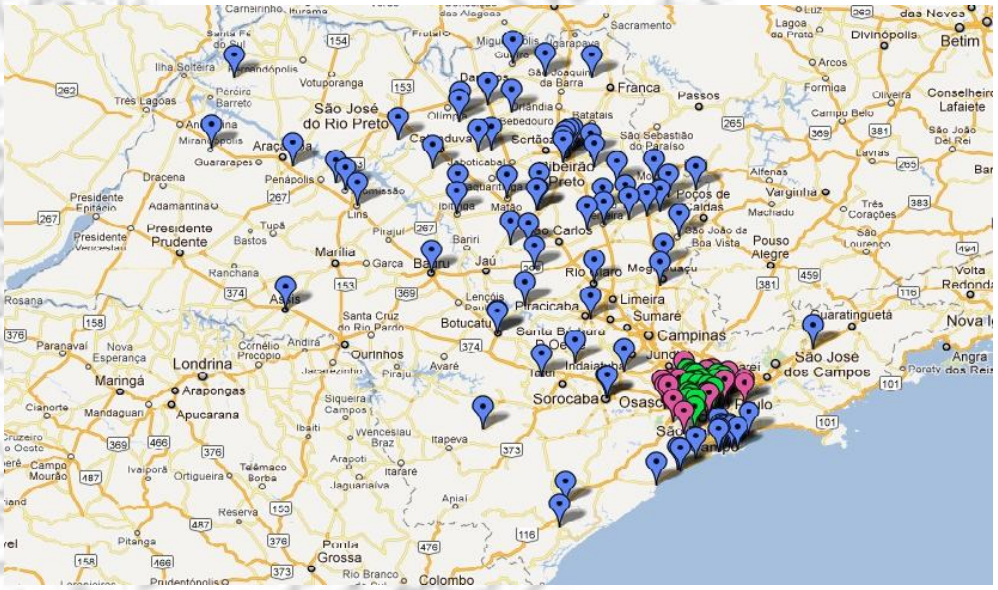
Avaliação do Ritmo Cardíaco
AVC isquêmico de causa não definida

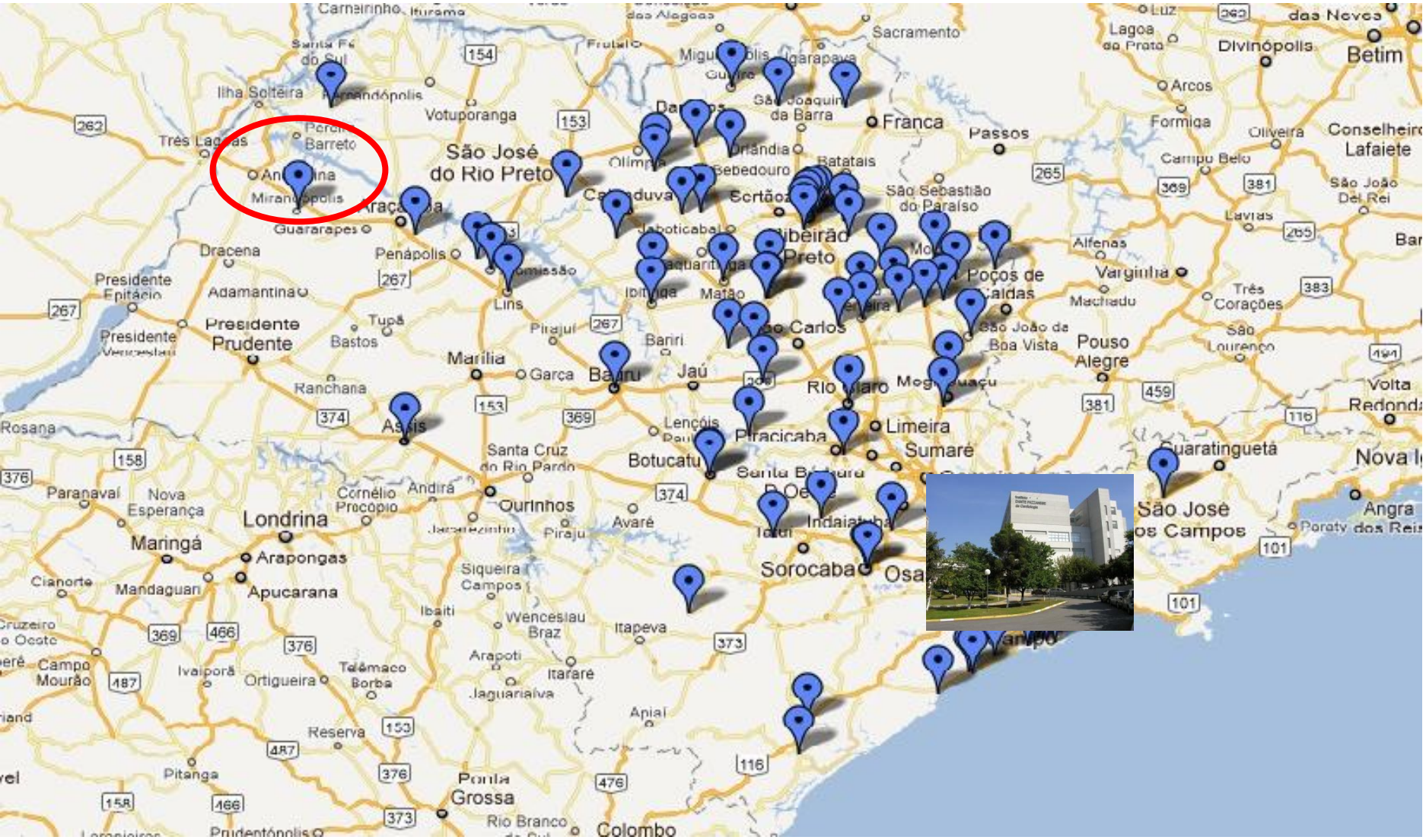
- Monitorização eletrocardiográfica seriada
- Monitorização com Holter
- Monitorização prolongada 30 dia (class IIa, evidência C)
- Monitor de eventos externos
- Monitor de eventos implantável
- Telemetria ambulatorial

SISTEMA TELE-ECG IDPC

Equipamento de Transmissão do Tele-ECG (com duas operadoras de celular)

Rede de unidades de saúde da SES atendida no Estado de São Paulo




Carnaíbinho
Santa Fé do Sul
Ilha Solteira
Fernandópolis
Votuporanga
Três Lagoas
Pereira Barreto
Andradina
Mirandópolis
Araçatuba
Guararapes
São José do Rio Preto
Dracena
Penápolis
Presidente Epitácio
Adamantina
Presidente Prudente
Tupã
Bastos
Lins
Marília
Garça
Bauru
Jaú
Ranchana
Assis
Rosana
Santa Cruz do Rio Pardo
Botucatu
Piracicaba
Rio Claro
Limeira
Sumaré
Sorocaba
Indaiatuba
Itu
Ourinhos
Avaré
Piraju
Paranavaí
Nova Esperança
Cornélio Procópio
Andirá
Londrina
Maringá
Arapongas
Apucarana
Cianorte
Mandaguari
Siqueira Campos
Ibaiti
Wenceslau Braz
Itapeva
Campo Mourão
Ivaiporã
Ortigueira
Telêmaco Borba
Arapoti
Itararé
Jaguariaíva
Apiaí
Reserva
Pitanga
Ponta Grossa
Rio Branco
Colombo
Franca
Passos
Batatais
Sacramento
Olímpia
Orlândia
Sebedouro
Sertãozinho
Ribeirão Preto
Jaboticabal
Matão
Ibitinga
Araraquara
São Carlos
Mogi Guaçu
Poços de Caldas
Alfenas
Varginha
Machado
Pouso Alegre
São João da Boa Vista
São Sebastião do Paraíso
Campo Belo
Formiga
Arcos
Divinópolis
Betim
Lagoa da Prata
Oliveira
Lavras
Conselheiro Lafaiete
São João Del Rei
Três Corações
São Lourenço
Guaratinguetá
São José dos Campos
Angra dos Reis
Paraty
Volta Redonda
Nova Iguaçu
Santa Bárbara d'Oeste
Lençóis Paulista
Barirí
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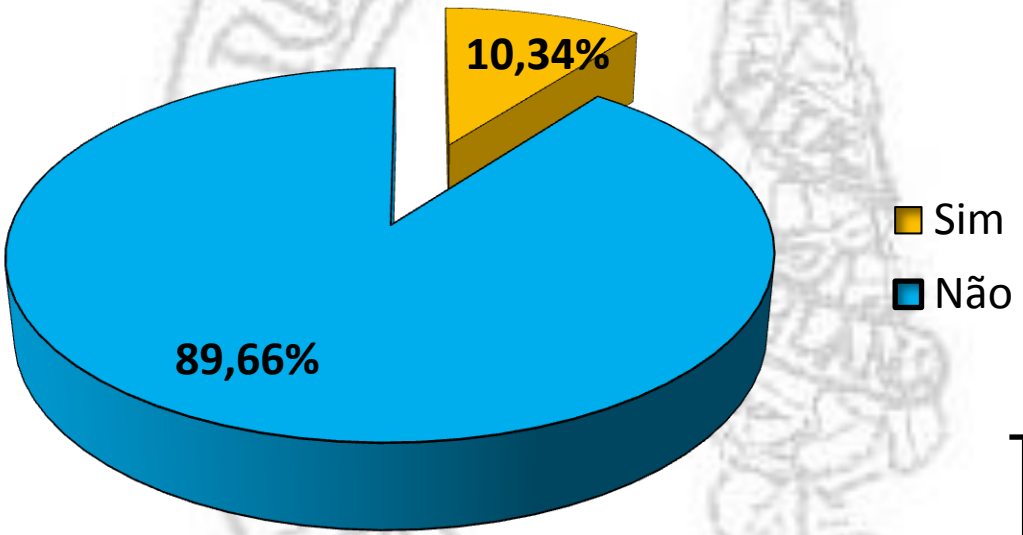
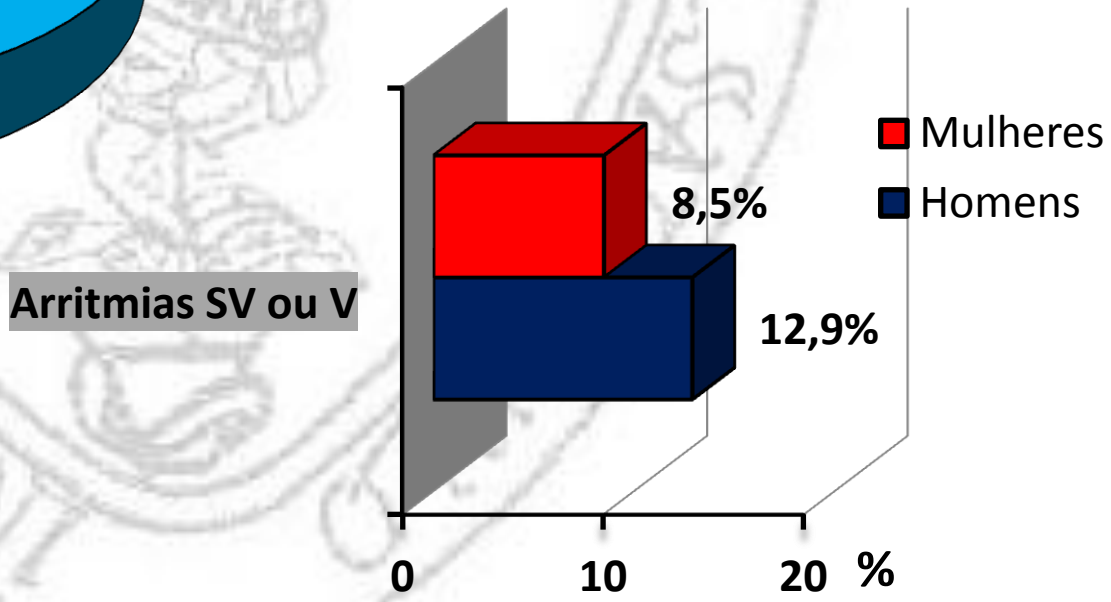
Rio Branco
Colombo
Ponta Grossa
Itararé
Jaguariaíva
Apiaí
Itapeva
Sorocaba
Osasco

Distribuição das arritmias n= 462815 exames

Presença de arritmias supraventriculares ou ventriculares



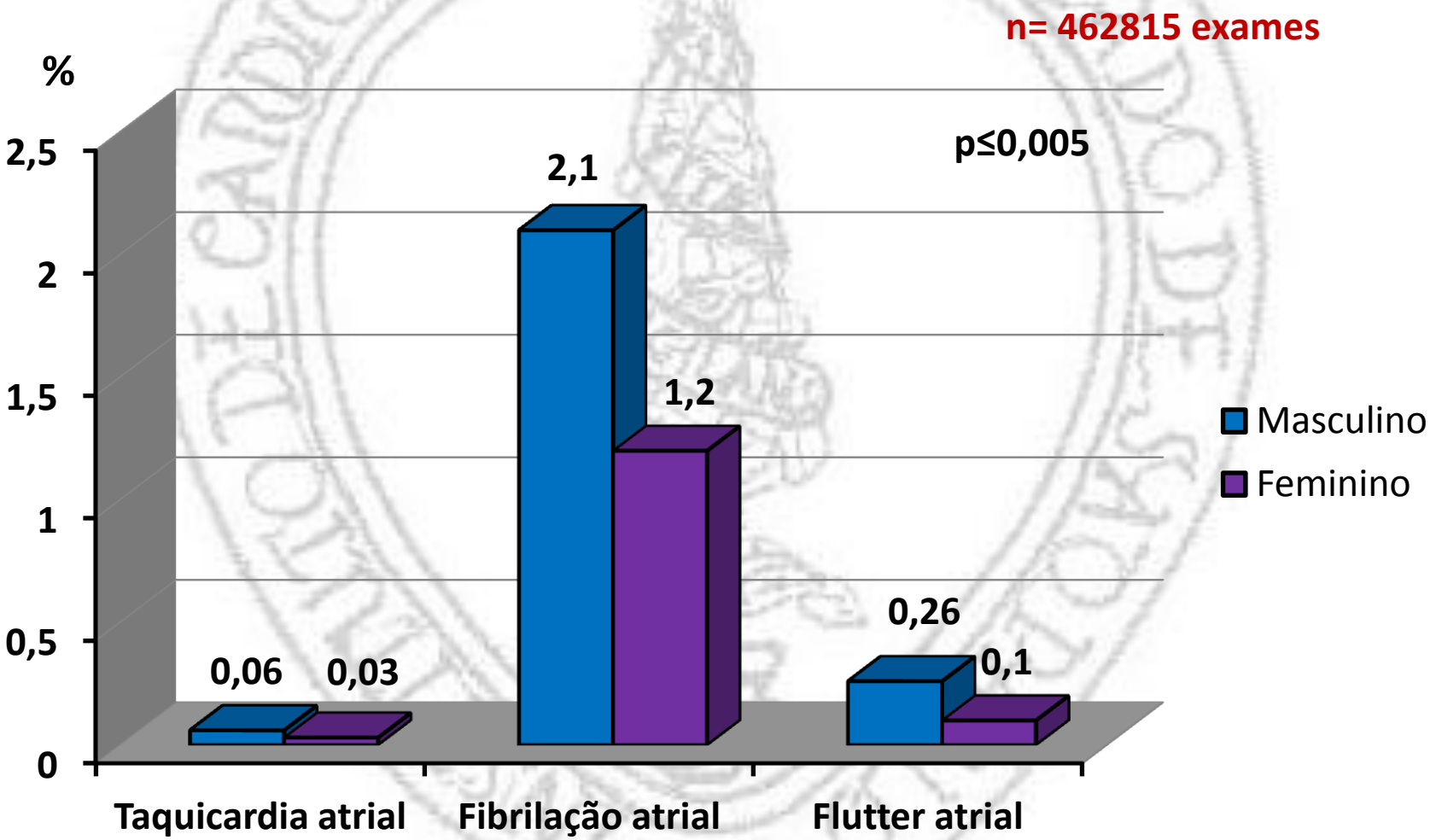
P≤0,05



Sexo masculino 178513 exames
Sexo feminino 284302 exames

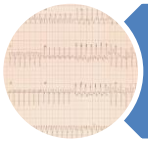
Andalaft, R; França F, Almeida C et al – Relampa 2013

Distribuição das arritmias atriais

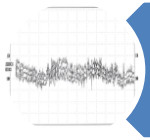


Andalaft, R; França F, Almeida C et al – Relampa 2013

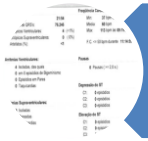
Quantos dias em média levamos para iniciar a investigação



ECG - 1 dia



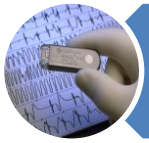
Holter – 3 dias



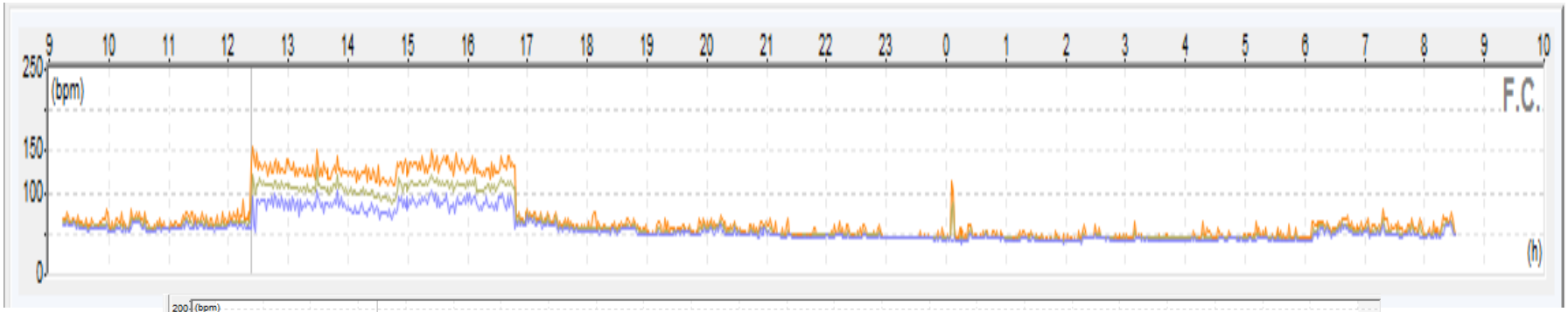
Segundo Holter e Holter 7 dias – 39 dias

Telemetria ambulatorial - 27 dias

Monitor de eventos externo – 40 dias



Monitor eventos implantável 80 dias


(bpm)
F.C.
(h)


(bpm)
C 1
C 2
C 3
Supra com aberrância entrada FA
16/06/2012 12:24:13

Exame Editar Traçados Análise Gravação Configurações Exibir Janela ?

Menu

Geral
Morfologias
Arritmias/ST
Histogram...
Gráficos 24h
ECG Comp...
CardioSeven

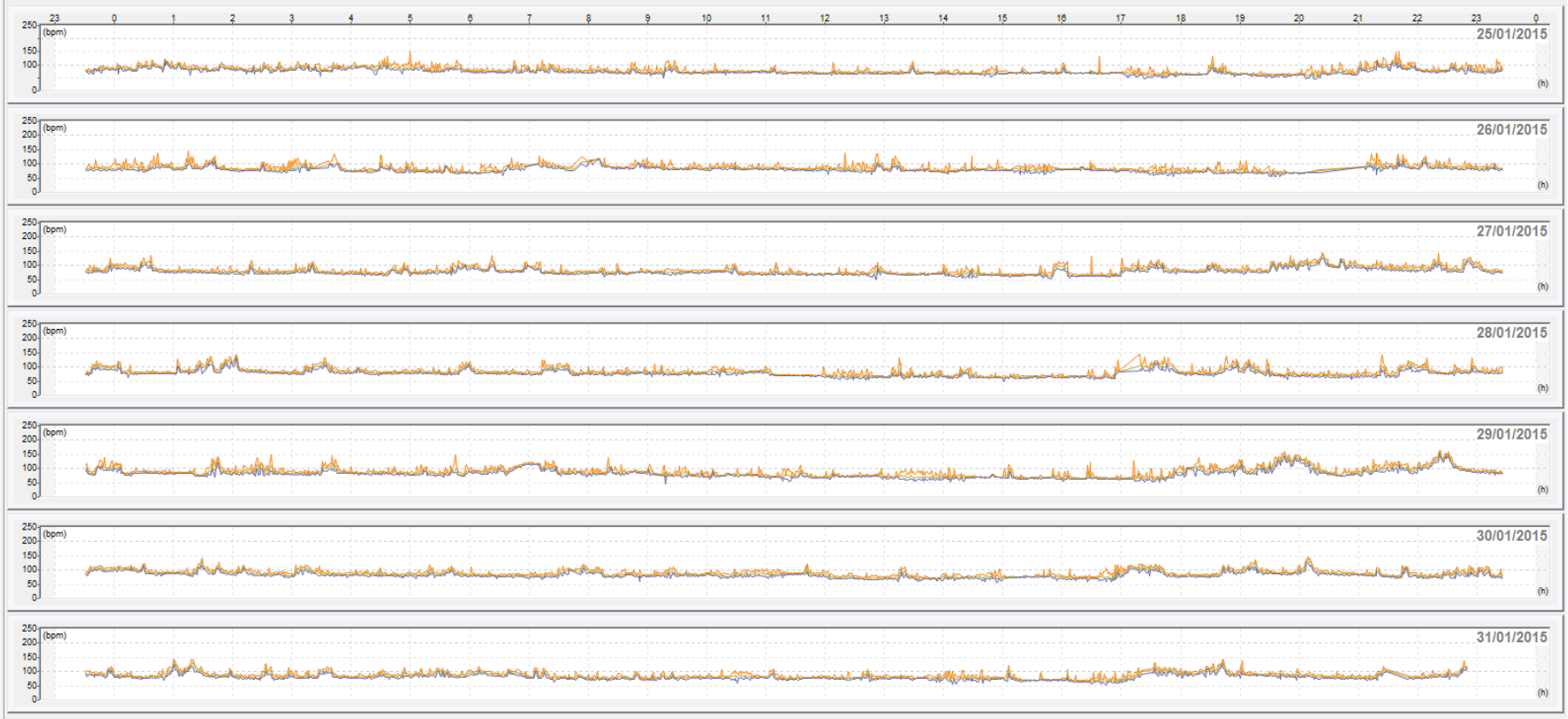
Seven 24h

Resumo 7 dias

Tabelas
VFC
Tacograma
Apneia
Fib. Atrial
MAPA
Exemplos

Gráfico F.C.

Exibir Lista de exames



Para ajuda, pressione [F1]

Resumo 7 dias

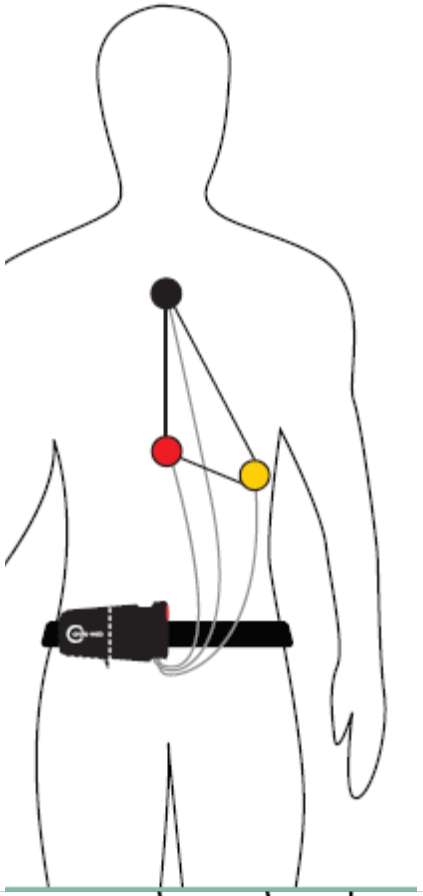
Nº do Exame	Paciente:	Código:
5859780	Data do Exame:	1J4-00017

Data	FC Mín.	FC Méd.	FC Máx.	V iso.	V par.	Total V	SV iso.	SV par.	Total SV	Pausas	> Pausa	% Artefato	> Depr. ST	Inclin. ST	Depr. Cn
25/01/2015	46	76	151	378	35	475	91	153	511	17	7,8	18 %			
26/01/2015	54	82	141	438	31	509	123	171	548	4	4,3	19 %			
27/01/2015	52	81	145	108	10	128	37	61	182	2	3,2	6 %			
28/01/2015	49	82	144	84	5	94	45	48	238	9	4,7	2 %			
29/01/2015	46	87	163	90	5	100	92	114	571	2	19,1	4 %			
30/01/2015	54	87	145	23	0	23	14	11	56	3	2,9	< 1 %			
31/01/2015	53	85	144	15	1	17	10	11	129	0		< 1 %			
Total	46	83	163	1136	87	1346	412	569	2235	37	19	7 %			

Data	Taq. V	TV maior	TV mais rápida	TV mais lenta	aq. S	TSV maior	TSV mais rápida	TSV mais lenta
25/01/2015	8	5 bat., 125 bpm 05:25:28	3 bat., 180 bpm 02:45:50	4 bat., 92 bpm 04:18:14	24	13 bat., 124 bpm 16:38:02	3 bat., 216 bpm 09:01:37	5 bat., 88 bpm 17:10:44
26/01/2015	3	3 bat., 233 bpm 21:40:02	3 bat., 233 bpm 21:40:02	3 bat., 123 bpm 04:35:40	21	8 bat., 97 bpm 17:34:13	3 bat., 250 bpm 18:38:11	4 bat., 94 bpm 15:43:03
27/01/2015	0				3	15 bat., 93 bpm 12:51:40	3 bat., 233 bpm 16:30:07	5 bat., 90 bpm 12:52:20
28/01/2015	0				17	16 bat., 91 bpm 12:29:01	4 bat., 205 bpm 22:55:55	10 bat., 90 bpm 12:37:21
29/01/2015	0				38	18 bat., 91 bpm 17:53:12	4 bat., 188 bpm 02:11:33	6 bat., 87 bpm 13:47:38
30/01/2015	0				3	14 bat., 102 bpm 16:59:40	3 bat., 159 bpm 06:01:12	14 bat., 102 bpm 16:59:40
31/01/2015	0				7	35 bat., 94 bpm 16:32:14	3 bat., 150 bpm 10:29:24	9 bat., 93 bpm 07:26:06
Total	11	5 bat., 125 bpm 05:25:28	3 bat., 233 bpm 21:40:02	4 bat., 92 bpm 04:18:14	113	35 bat., 94 bpm 16:32:14	3 bat., 250 bpm 18:38:11	6 bat., 87 bpm 13:47:38

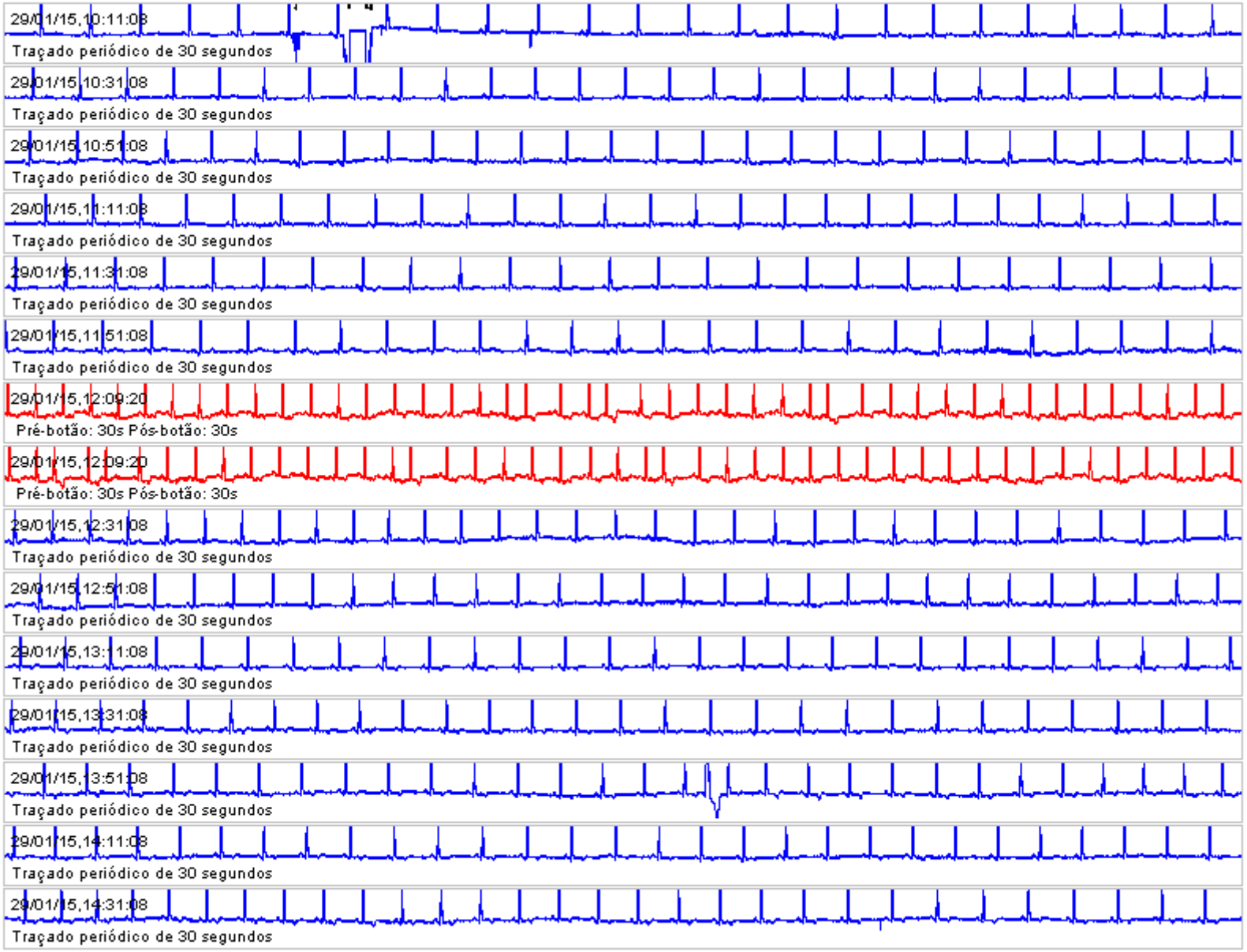
Looper com transmissão via internet

BOTÃO DE EVENTOS



VERMELHO (RA)	Apêndice Xifóde (V1-2)
AMARELO (LA)	Quinto espaço intercostal esquerdo (V5)
PRETO (RL)	Manúbrio Esternal (M)

Looper com transmissão via internet



ACIONAMENTO DO BOTÃO DE EVENTOS

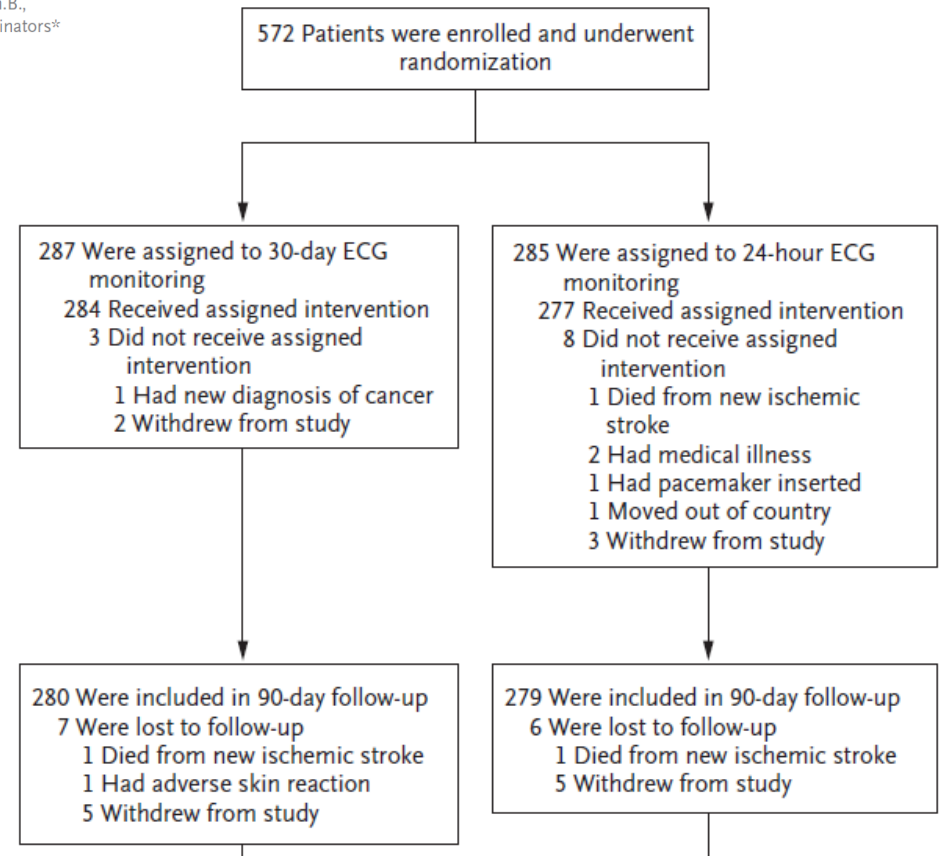
REGISTROS ALEATÓRIOS COM TEMPO PROGRAMÁVEL

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 JUNE 26, 2014 VOL. 370 NO. 26

Atrial Fibrillation in Patients with Cryptogenic Stroke

David J. Gladstone, M.D., Ph.D., Melanie Spring, M.D., Paul Dorian, M.D., Val Panzov, M.D., Kevin E. Thorpe, M.Math., Judith Hall, M.Sc., Haris Vaid, B.Sc., Martin O'Donnell, M.B., Ph.D., Andreas Laupacis, M.D., Robert Côté, M.D., Mukul Sharma, M.D., John A. Blakely, M.D., Ashfaq Shuaib, M.D., Vladimir Hachinski, M.D., D.Sc., Shelagh B. Coutts, M.B., Ch.B., M.D., Demetrios J. Sahlas, M.D., Phil Teal, M.D., Samuel Yip, M.D., J. David Spence, M.D., Brian Buck, M.D., Steve Verreault, M.D., Leanne K. Casaubon, M.D., Andrew Penn, M.D., Daniel Selchen, M.D., Albert Jin, M.D., David Howse, M.D., Manu Mehdiratta, M.D., Karl Boyle, M.B., B.Ch., Richard Aviv, M.B., Ch.B., Moira K. Kapral, M.D., and Muhammad Mamdani, Pharm.D., M.P.H., for the EMBRACE Investigators and Coordinators*



Incremento diagnóstico com o prolongamento da monitorização

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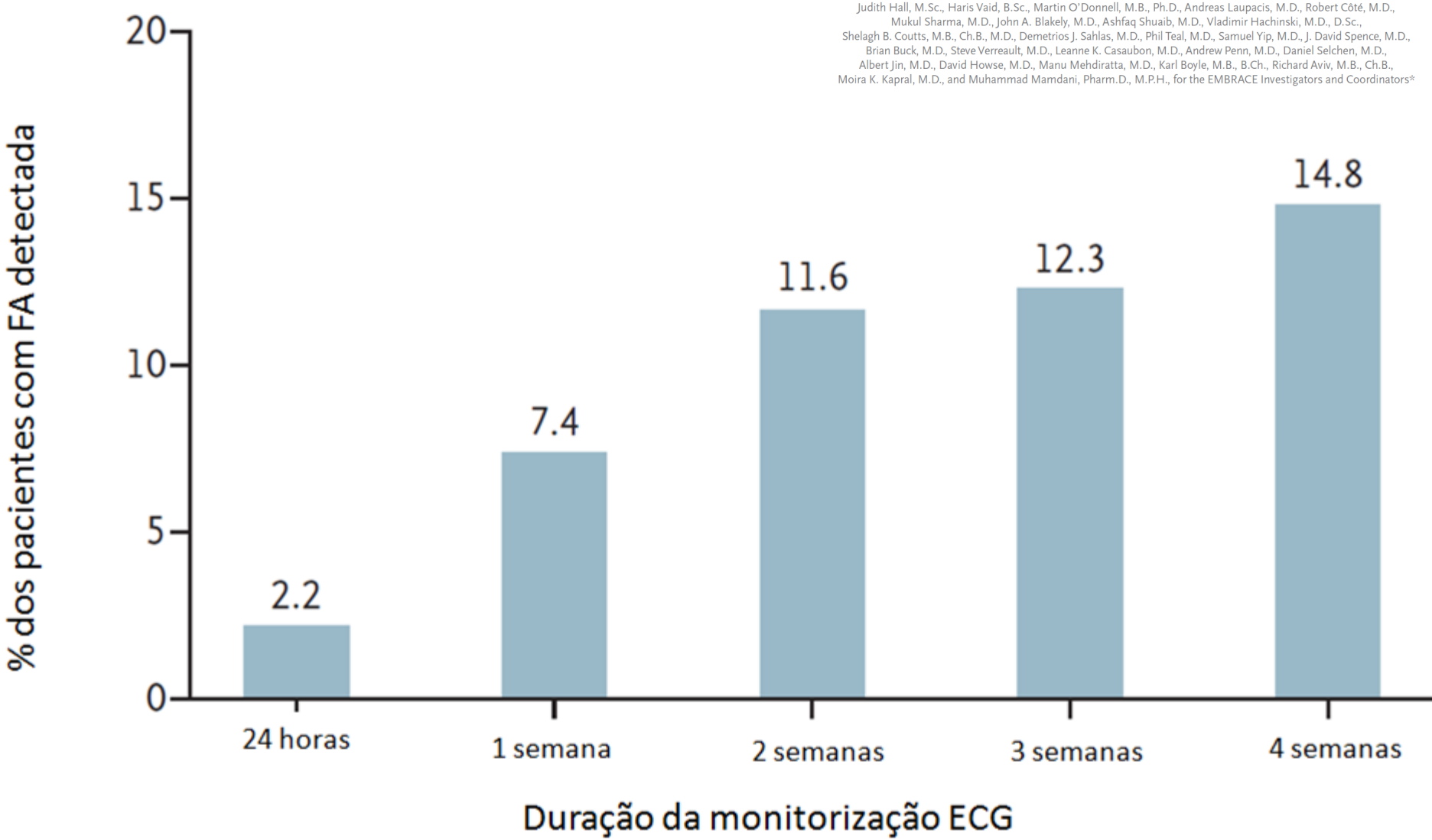

INTERNAL MEDICINE JOURNAL

Brief Communications

Twenty-eight day Holter monitoring is poorly tolerated and insensitive for paroxysmal atrial fibrillation detection in cryptogenic stroke

H. T. Tu,[1,2] S. Spence,[3] J. M. Kalman[1,3] and S. M. Davis[1,2]

[1]University Department of Medicine, Departments of [2]Neurology and [3]Cardiology, Royal Melbourne Hospital, The University of Melbourne, Melbourne, Victoria, Australia

Key words
atrial fibrillation, stroke, Holter monitoring, diagnosis, screening.

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Abstract

This pilot study in a prospective cohort of 20 cryptogenic stroke patients showed that a significant proportion has paroxysmal atrial fibrillation undetected by 24-h Holter monitoring. However, longer monitoring with 28-day Holter was poorly tolerated and still insufficiently sensitive for paroxysmal atrial fibrillation detection. Further studies are urgently needed to elucidate the optimal timing, method and duration of cardiac rhythm monitoring following ischaemic stroke.

Finding atrial fibrillation in stroke patients: Randomized evaluation of enhanced and prolonged Holter monitoring—Find-AF$_{RANDOMISED}$ —rationale and design

Mark Weber-Krüger, MD,[a] Götz Gelbrich, PhD,[b,c] Raoul Stahrenberg, MD,[d] Jan Liman, MD,[e] Pawel Kermer, MD,[f] Gerhard F. Hamann, MD,[g] Joachim Seegers, MD,[h] Klaus Gröschel, MD,[i,j] and Rolf Wachter, MD[a,j], on behalf of the Find-AF$_{RANDOMISED}$ investigators *Göttingen, Würzburg, Northeim, Sande, Günzburg, Regensburg and Mainz, Germany*

Background Detecting paroxysmal atrial fibrillation (AF) in patients with ischemic strokes presenting in sinus rhythm is challenging because episodes are often short, occur randomly, and are frequently asymptomatic. If AF is detected, recurrent thromboembolism can be prevented efficiently by oral anticoagulation. Numerous uncontrolled studies using various electrocardiogram (ECG) devices have established that prolonged ECG monitoring increases the yield of AF detection, but most established procedures are time-consuming and costly. The few randomized trials are mostly limited to cryptogenic strokes. The optimal method, duration, and patient selection remain unclear. Repeated prolonged continuous Holter ECG monitoring to detect paroxysmal AF within an unspecific stroke population may prove to be a widely applicable, effective secondary prevention strategy.

Study Design Find-AF$_{RANDOMISED}$ is a randomized and controlled prospective multicenter trial. Four hundred patients 60 years or older with manifest (symptoms ≥24 hours or acute computed tomography/magnetic resonance imaging lesion) and acute (symptoms ≤7 days) ischemic strokes will be included at 4 certified stroke centers in Germany. Those with previously diagnosed AF/flutter, indications/contraindications for oral anticoagulation, or obvious causative blood vessel pathologies will be excluded. Patients will be randomized 1:1 to either enhanced and prolonged Holter ECG monitoring (10 days at baseline and after 3 and 6 months) or standard of care (≥24-hour continuous ECG monitoring, according to current stroke guidelines). All patients will be followed up for at least 12 months.

Outcomes The primary end point is newly detected AF (≥30 seconds) after 6 months, confirmed by an independent adjudication committee. We plan to complete recruitment in autumn 2014. First results can be expected by spring 2016. (Am Heart J 2014;0:1-9.)


Medtronic
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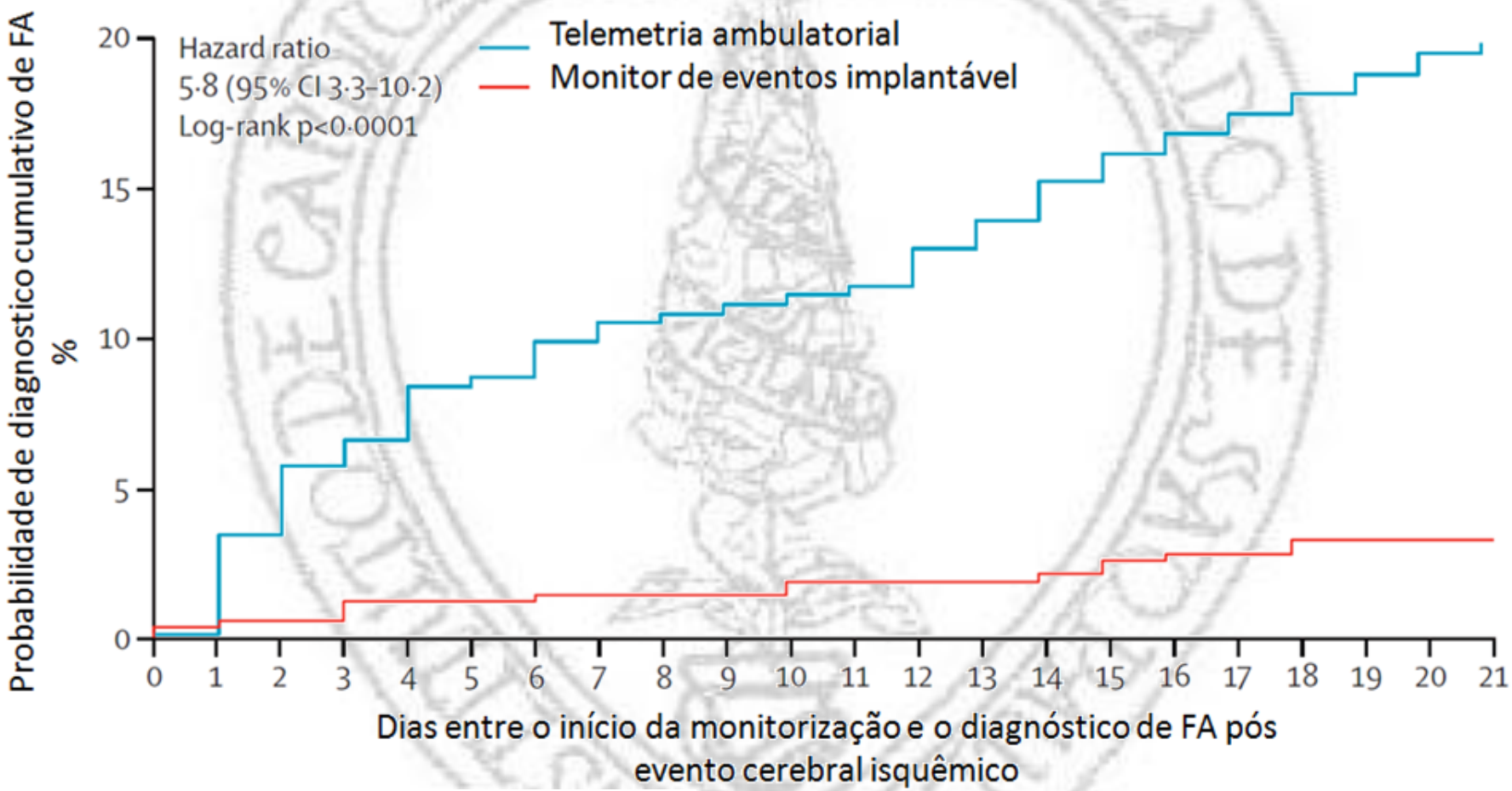
REVEAL® DX
MODEL 9528
SN RAB410834H
Medtronic

Partir dos sintomas ou partir do sinal eletrocardiográfico ?



Diagnosis of atrial fibrillation after stroke and transient ischaemic attack: a systematic review and meta-analysis

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Sobre o monitor implantável

Reveal
1998

Avaliação de síncope

Reveal Plus
2000

Automatização

Reveal DX
2007

Maior Bateria (3 anos) Maior capacidade de memória (50 minutos)log para taquicardia e CDI

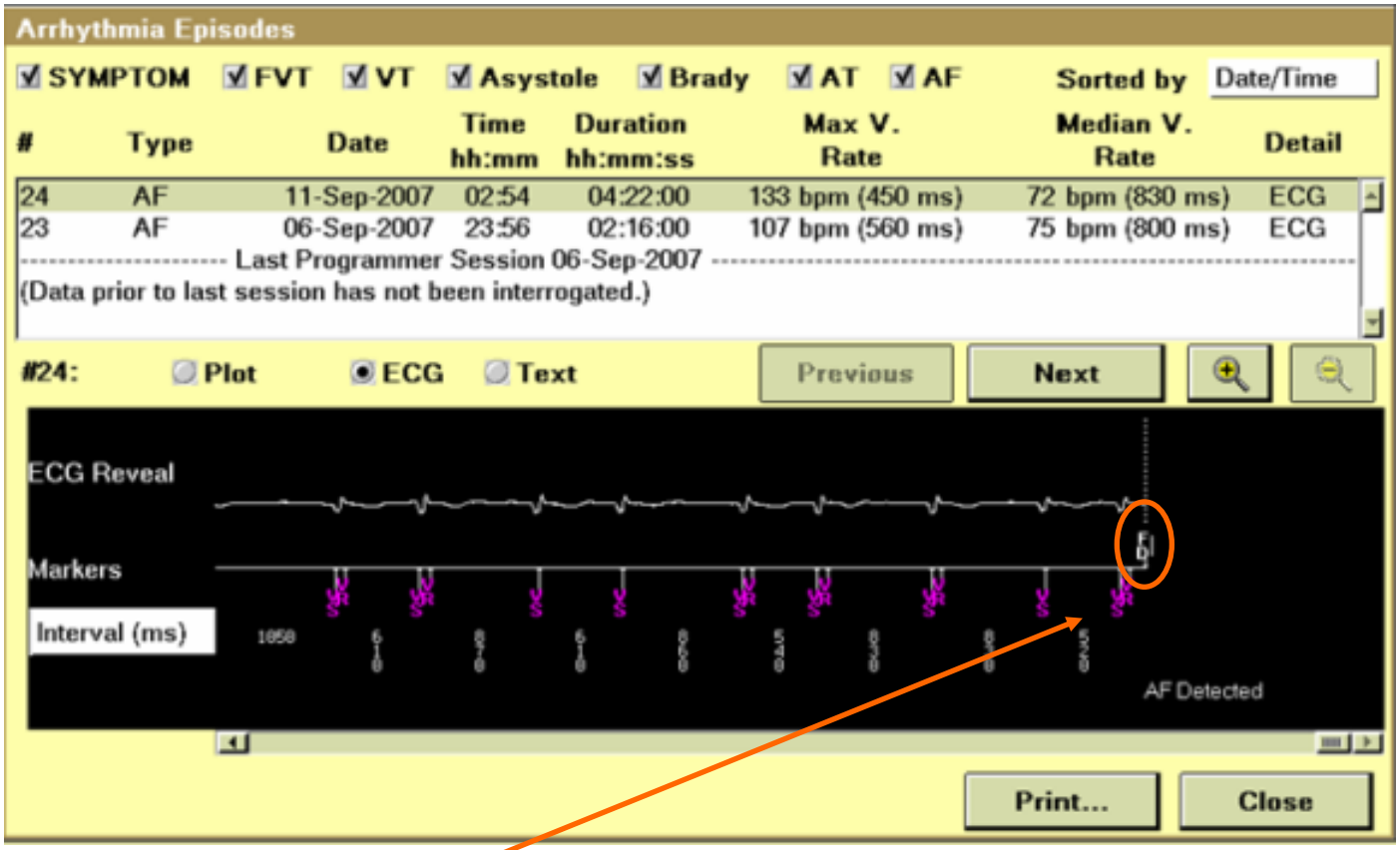
Acesso remoto e uso em RNM

Reveal XT
2009

Detecção de FA

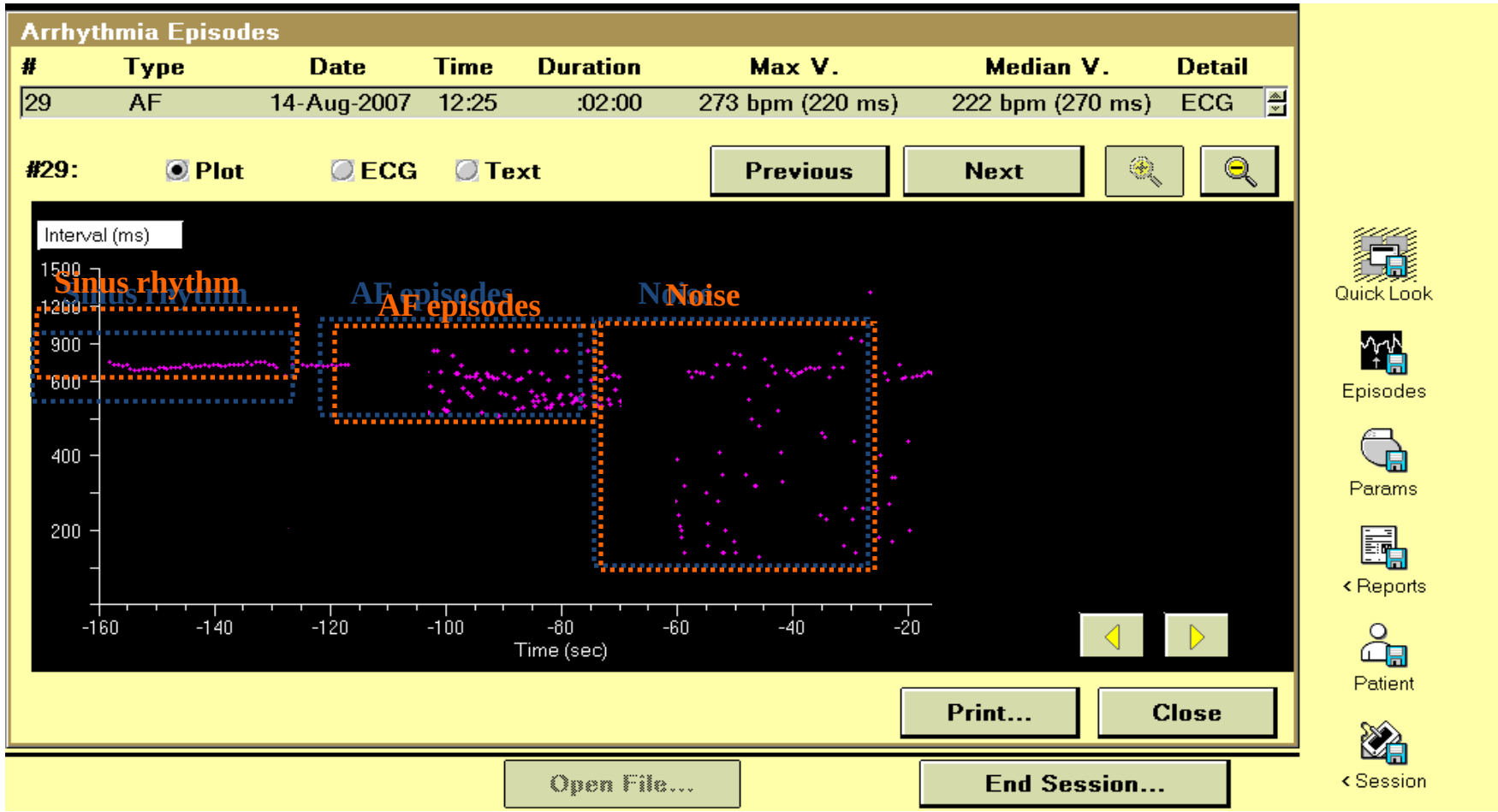
Compasso

Marcadores de Sense - Reveal XT

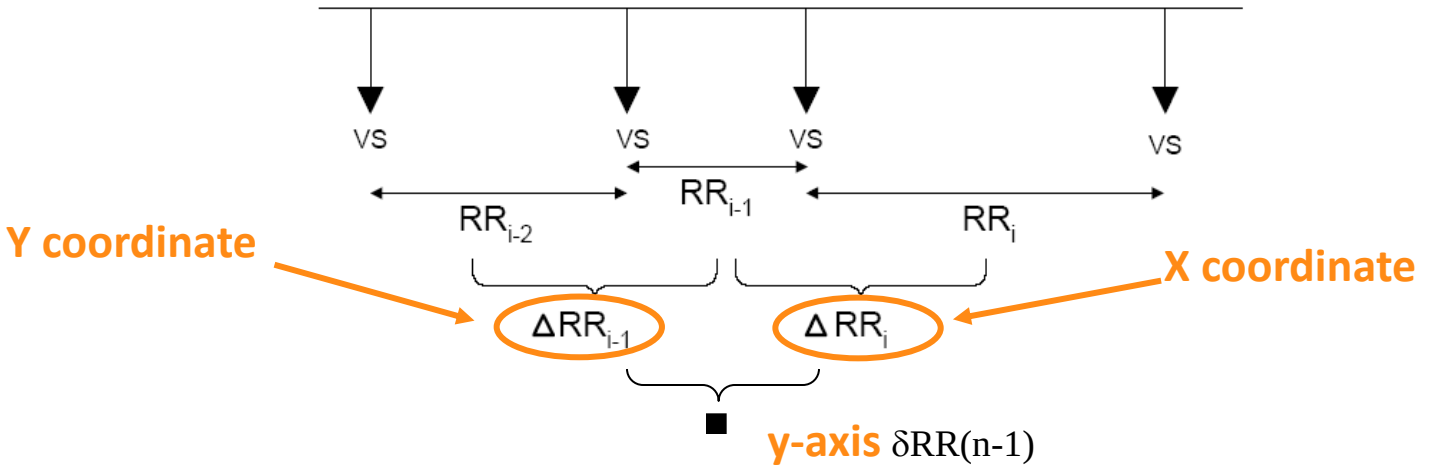


Marca	Definição
FD	**Detecção** inicial de um episódio **AF** –**ACIMA DA LINHA DE BASE**
TD	**Detecção** inicial de um episódio **AT**– **ACIMA DA LINHA DE BASE**

Ritmos Cardíacos no Programador

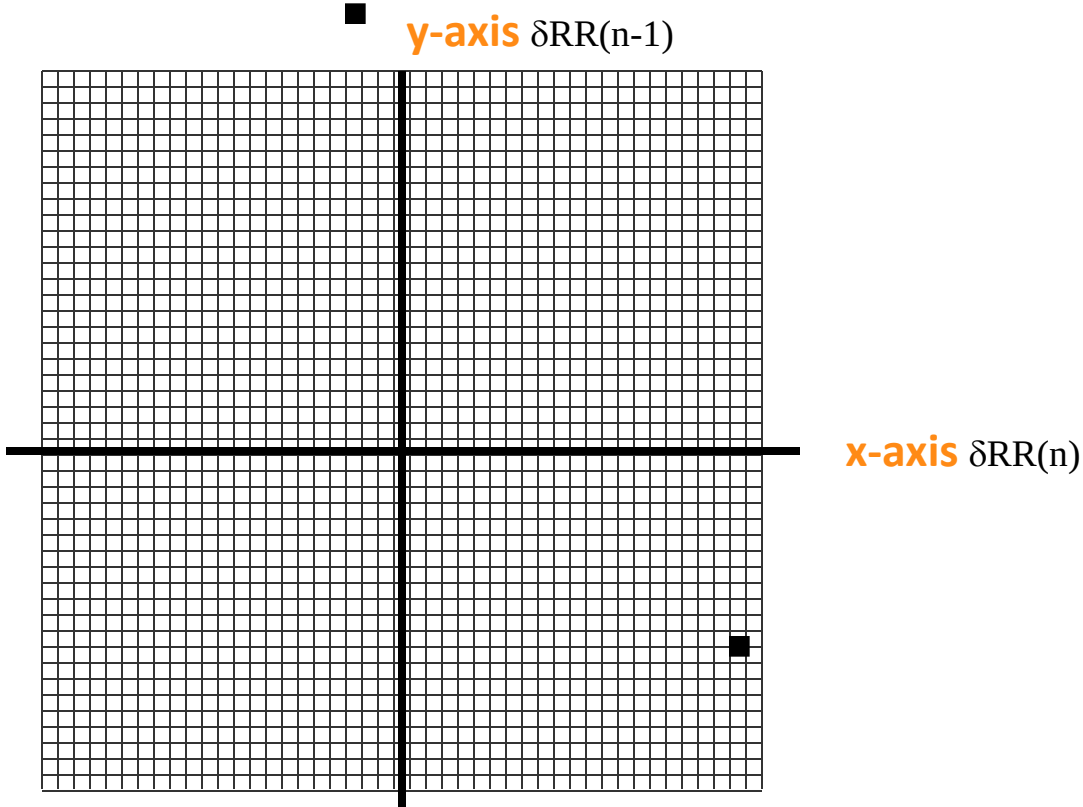
- 

Plotagem dos intervalos RR em Lorenz Plot

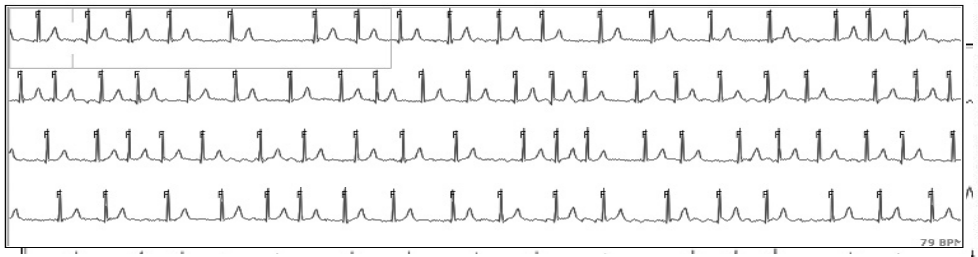


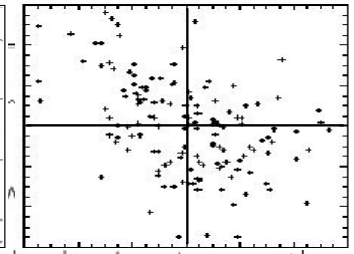
Lorenz Plot:

- 961 bins
- 40ms x -40ms
- -620 ms to +620ms

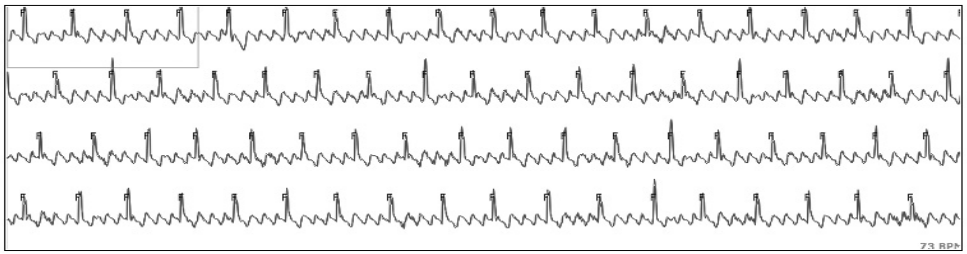


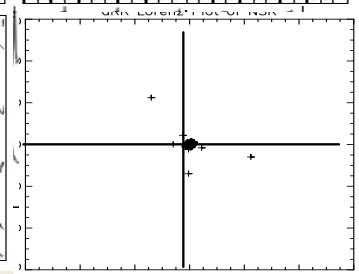
Como se apresentam os Ritmos no monitor de eventos implantável



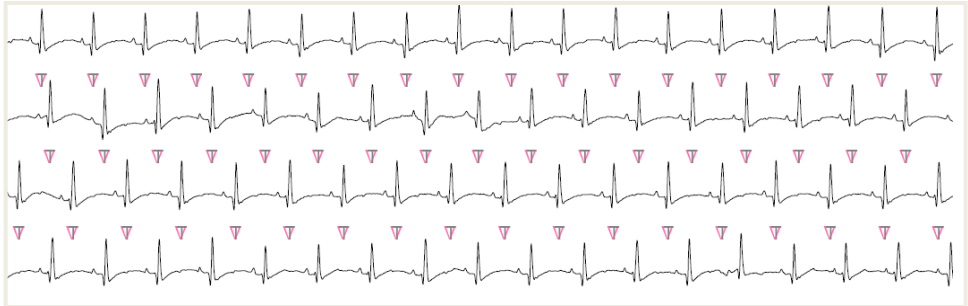


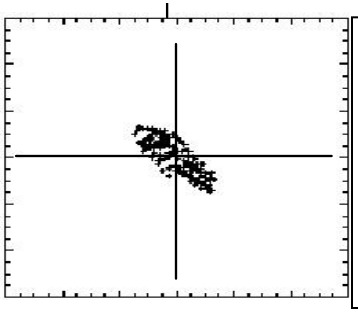
Fib Atrial





Flutter Atrial
3:1





Ritmo Sinusal

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Cryptogenic Stroke and Underlying Atrial Fibrillation

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N ENGL J MED 370;26 NEJM.ORG JUNE 26, 2014

- Pacientes com AVC criptogênico
- Seguimento convencional vs monitor implantável
  - convencional = ECG +Holter 24h e Telemetria 72h
- Seguimento por 6 meses, 12 meses e 36 meses

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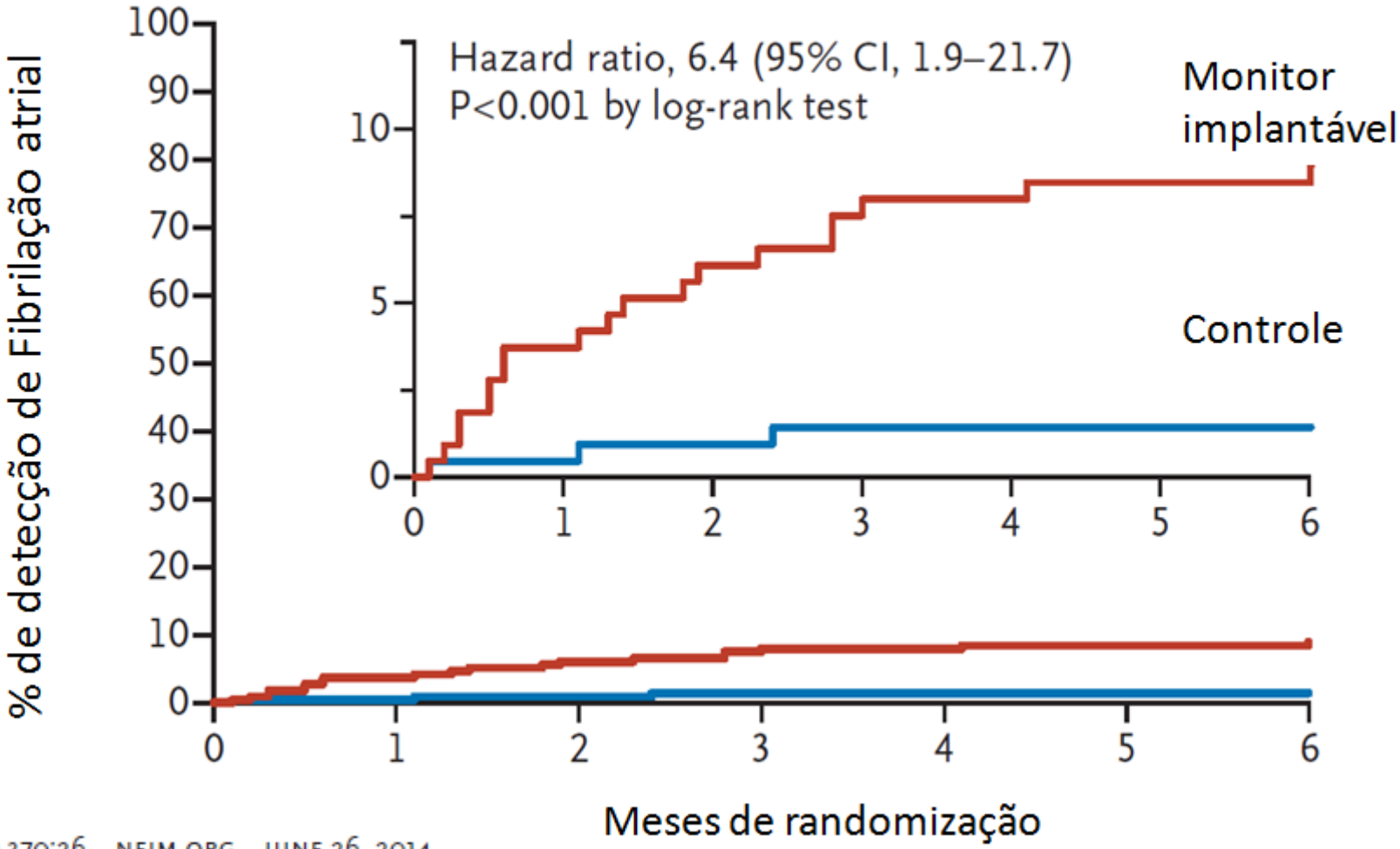
6 meses

Detecção de Fibrilação Atrial em 6 meses



12 meses

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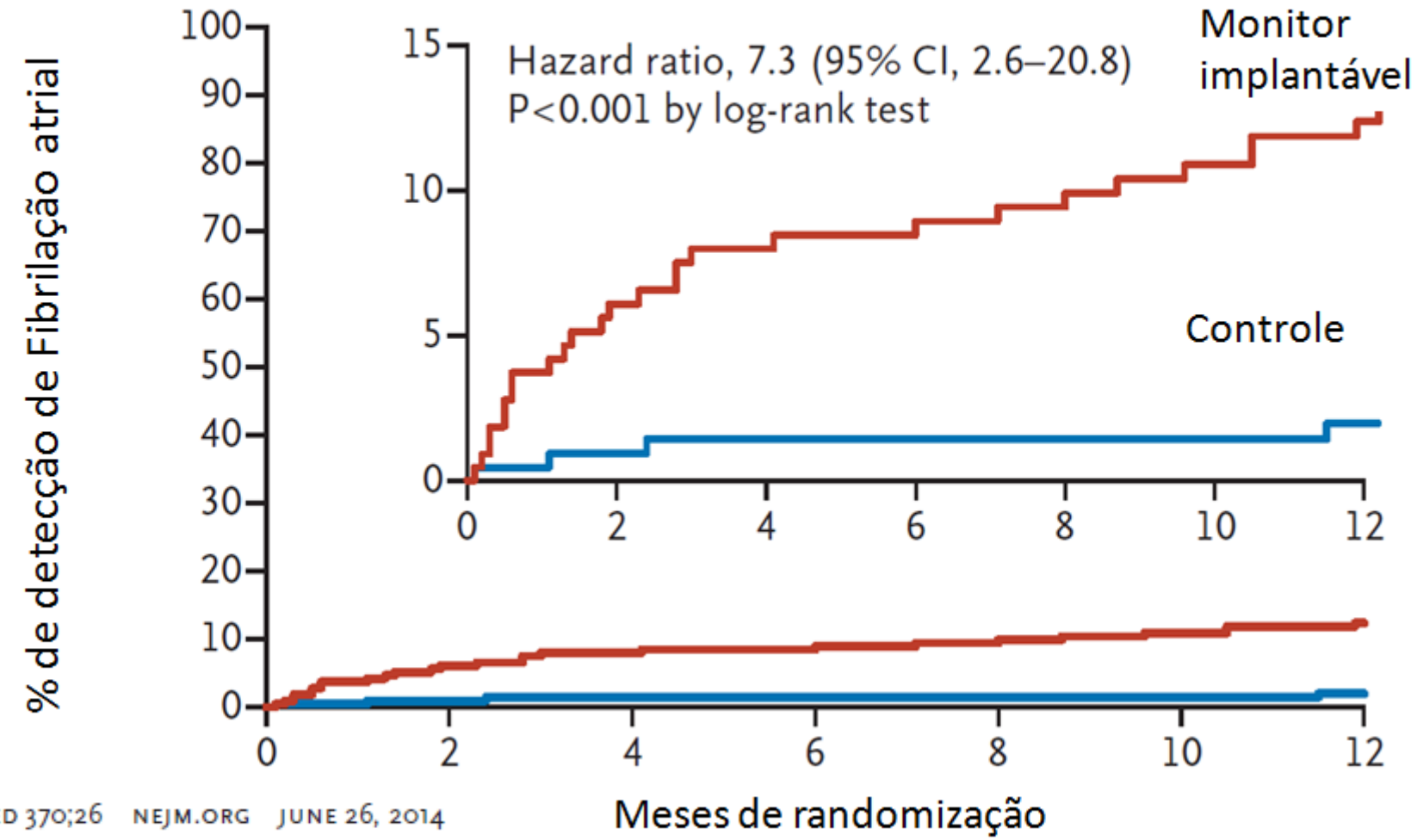
Detecção de Fibrilação Atrial em 12 meses



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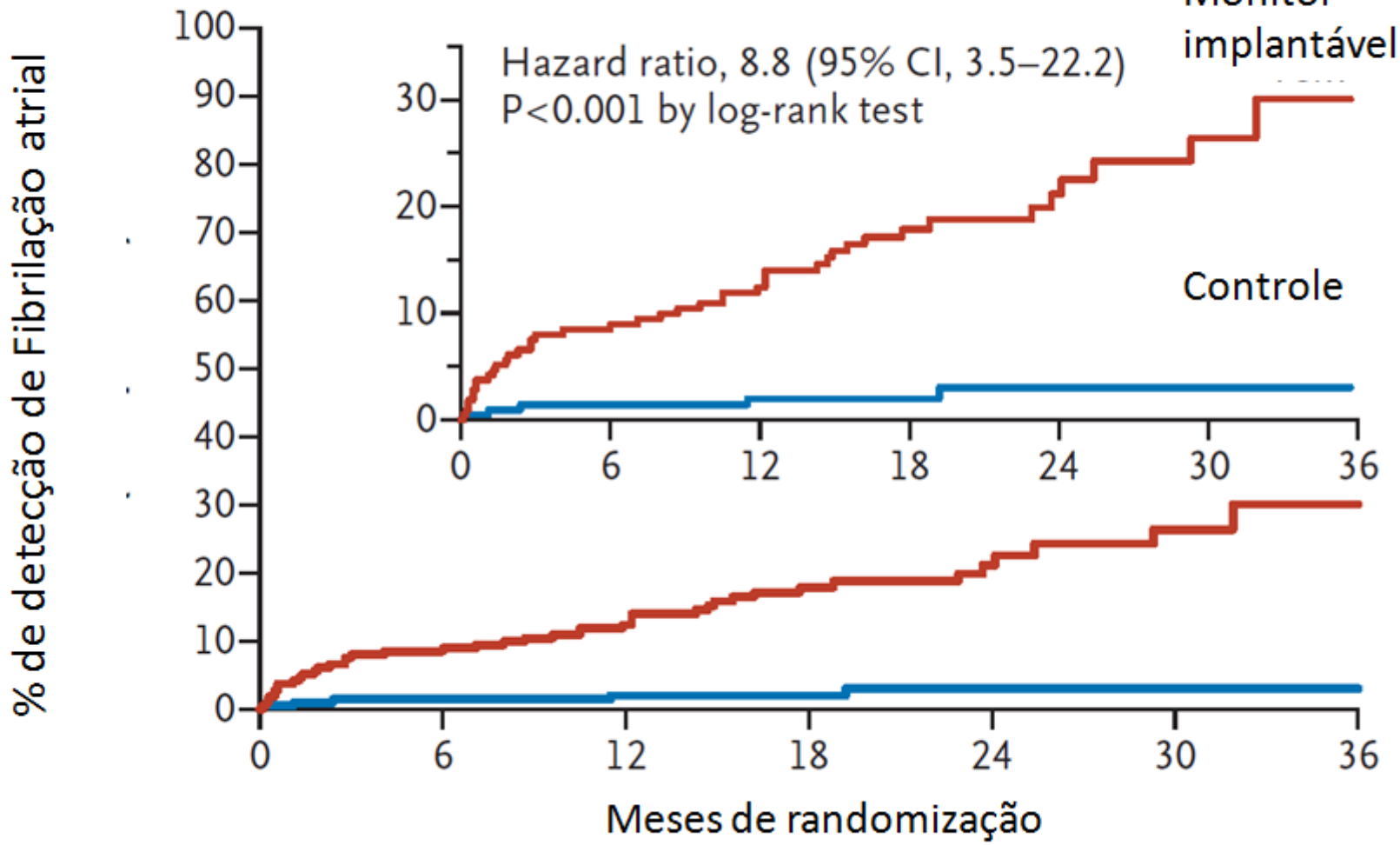
36 meses

Detecção de Fibrilação Atrial em 36 meses



Diagnosis of atrial fibrillation after stroke and transient ischaemic attack: a systematic review and meta-analysis

Luciano A Sposato, Lauren E Cipriano, Gustavo Saposnik, Estefanía Ruíz Vargas, Patricia M Riccio, Vladimir Hachinski

Summary

Background Among patients with atrial fibrillation, the risk of stroke is highest for those with a history of stroke; however, oral anticoagulants can lower the risk of recurrent stroke by two-thirds. No consensus has been reached about how atrial fibrillation should be investigated in patients with stroke, and its prevalence after a stroke remains uncertain. We did a systematic review and meta-analysis to estimate the proportion of patients newly diagnosed with atrial fibrillation after four sequential phases of cardiac monitoring after a stroke or transient ischaemic attack.

Methods We searched PubMed, Embase, and Scopus from 1980 to June 30, 2014. We included studies that provided the number of patients with ischaemic stroke or transient ischaemic attack who were newly diagnosed with atrial fibrillation. We stratified cardiac monitoring methods into four sequential phases of screening: phase 1 (emergency room) consisted of admission electrocardiogram (ECG); phase 2 (in hospital) comprised serial ECG, continuous inpatient ECG monitoring, continuous inpatient cardiac telemetry, and in-hospital Holter monitoring; phase 3 (first ambulatory period) consisted of ambulatory Holter; and phase 4 (second ambulatory period) consisted of mobile cardiac outpatient telemetry, external loop recording, and implantable loop recording. The primary endpoint was the proportion of patients newly diagnosed with atrial fibrillation for each method and each phase, and for the sequential combination of phases. For each method and each phase, we estimated the summary proportion of patients diagnosed with post-stroke atrial fibrillation using random-effects meta-analyses.

Findings Our systematic review returned 28 290 studies, of which 50 studies (comprising 11 658 patients) met the criteria for inclusion in the meta-analyses. The summary proportion of patients diagnosed with post-stroke atrial fibrillation was 7·7% (95% CI 5·0–10·8) in phase 1, 5·1% (3·8–6·5) in phase 2, 10·7% (5·6–17·2) in phase 3, and 16·9% (13·0–21·2) in phase 4. The overall atrial fibrillation detection yield after all phases of sequential cardiac monitoring was 23·7% (95% CI 17·2–31·0).

Interpretation By sequentially combining cardiac monitoring methods, atrial fibrillation might be newly detected in nearly a quarter of patients with stroke or transient ischaemic attack. The overall proportion of patients with stroke who are known to have atrial fibrillation seems to be higher than previously estimated. Accordingly, more patients could be treated with oral anticoagulants and more stroke recurrences prevented.

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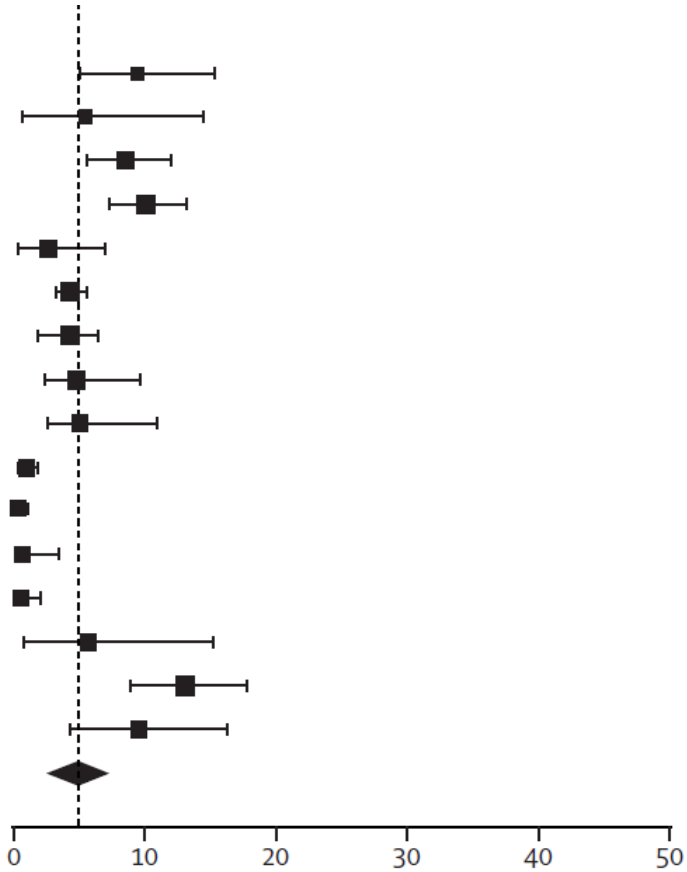
Detecção com Holter intrahospitalar

	Pacientes com FA		Incidência
In-hospital Holter monitoring			
Atmuri et al (2012)[46]	12	129	9·3% (4·9–15·0)
Barthélémy et al (2003)[25]	3	55	5·5% (0·7–14·4)
Beaulieu-Boire et al (2013)[26]	24	284	8·5% (5·5–12·0)
Dogan et al (2012)[47]	40	400	10·0% (7·2–13·1)
Douen et al (2008)[27]	3	117	2·6% (0·3–6·9)
Grond et al (2013)[48]	49	1135	4·3% (3·2–5·6)
Hornig et al (1996)[49]	10	266	3·8% (1·8–6·4)
Jabaudon et al (2004)[29]	7	139	5·0% (2·0–9·5)
Lazzaro et al (2012)[44]	8	133	6·0% (2·5–10·8)
Ritter et al (2013; 1 day)[31]*	6	649	0·9% (0·3–1·9)
Rizos et al (2012)[40]	1	456	0·2% (0·0–1·1)
Schaer et al (2009)[32]	1	145	0·7% (0·0–3·4)
Suissa et al (2013)[39]	2	338	0·6% (0·0–2·0)
Thakkar et al (2014)[50]	3	52	5·8% (0·7–15·2)
Wohlfahrt et al (2013)[34]	29	224	12·9% (8·9–17·7)
Yu et al (2009)[45]	9	96	9·4% (4·3–16·2)
Subtotal (random effects)	**207**	**4618**	**4·5% (2·7–6·7)**
Q=142, p(Q)<0·0001, I^2=89·4%			



Proporção dos pacientes com FA diagnosticada

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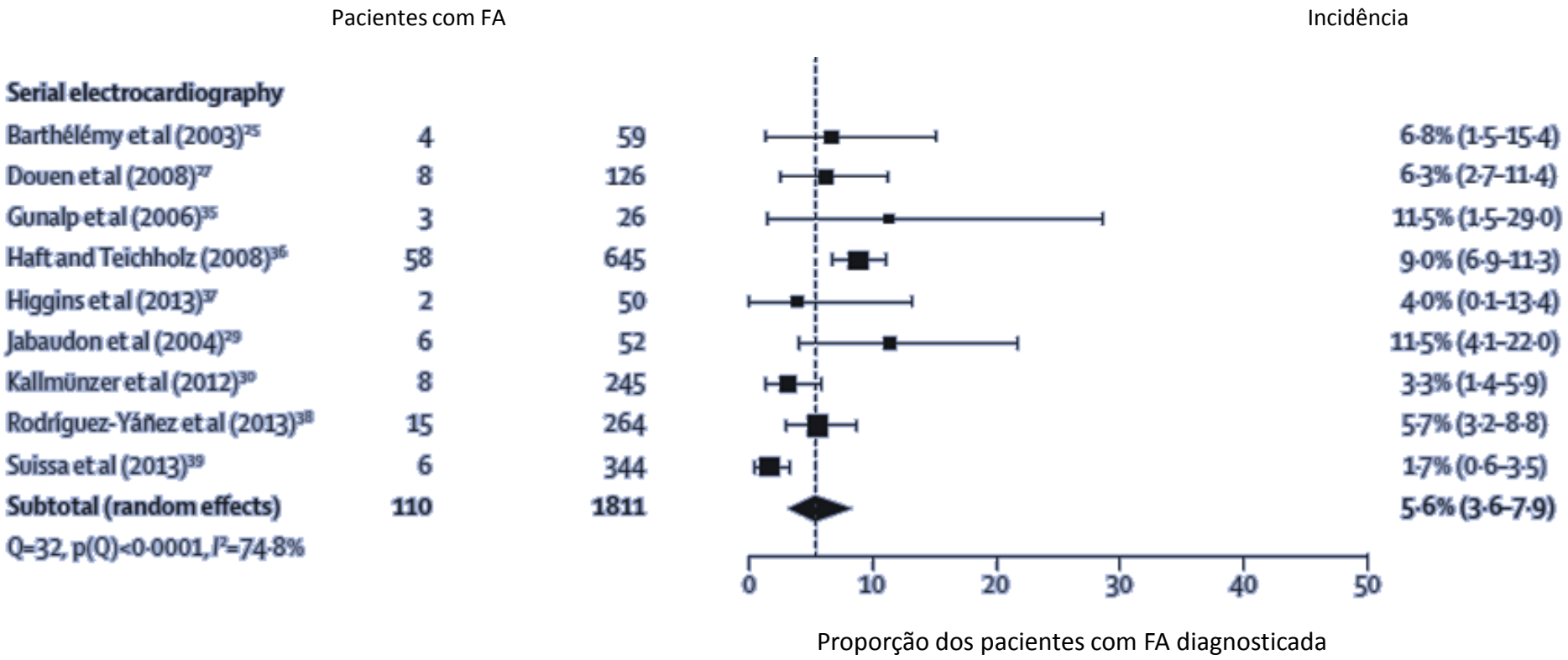
Detecção com ECG seriado



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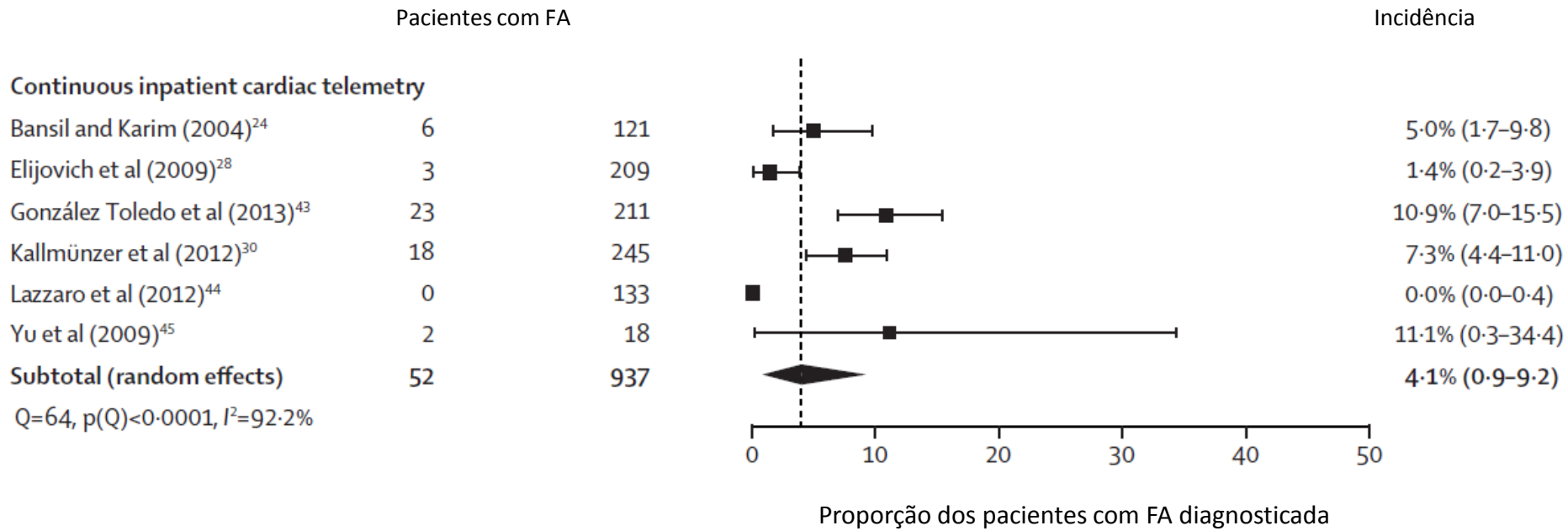
Detecção com Telemetria



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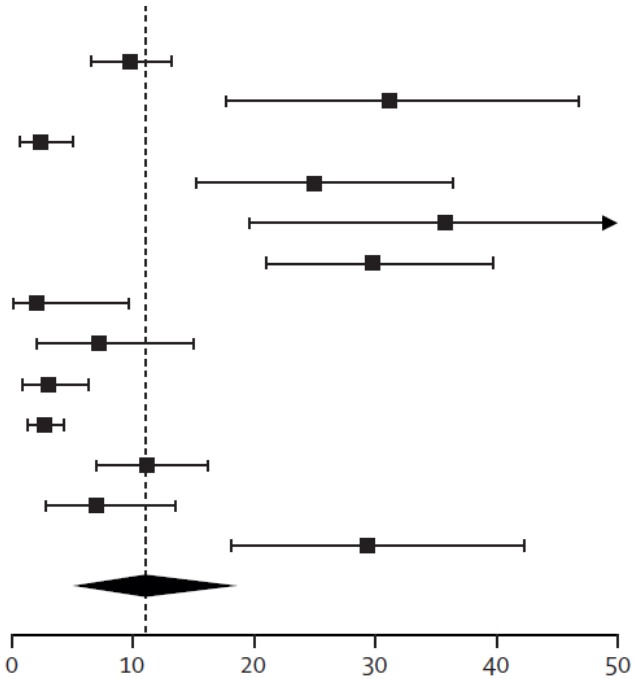
Holter ambulatorial

	Pacientes com FA		Incidência
Ambulatory Holter monitoring			
Alhadramy et al (2010)[51]	39	413	9·4% (6·8–12·5)
Dangayach et al (2011)[52]	13	49	26·5% (15·1–39·9)
Doliwa et al (2012)[53]	5	249	2·0% (0·6–4·3)
Fonseca et al (2014)[54]	17	80	21·3% (13·0–30·9)
Gunalp et al (2006)[35]	8	23	34·8% (16·7–55·5)
Manina et al (2014)[55]	29	114	25·4% (17·9–33·9)
Ritter et al (2013; 7 days)[31]*	1	60	1·7% (0·1–8·2)
Schuchert et al (1999)[56]	5	82	6·1% (1·8–12·7)
Shafqat et al (2004)[57]	5	196	2·6% (0·7–5·4)
Shibazaki et al (2012)[41]	12	536	2·2% (1·1–3·7)
Tagawa et al (2007)[33]	26	241	10·8% (7·2–15·0)
Vandenbroucke and Thijs (2004)[58]	7	114	6·1% (2·4–11·5)
Yodogawa et al (2013)[59]	17	68	25·0% (15·4–36·0)
Subtotal	**184**	**2225**	**10·7% (5·6–17·2)**
Q=148, p(Q)<0·0001, I^2=91·9%			



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Instituto Dante Pazzanese de Cardiologia

Equipe de Eletrofisiologia Pediátrica

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