

HRC Birmingham 2009

AF and Exercise

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AF and Exercise: Aims of the session:

- Understand the context of AF
- Why is physical activity & exercise important?
- What is the likelihood of cardiac complications with exercise?
- What influences the likelihood of a complication during exercise?
- How do we recognise AF (ECG and SOB/OE)?
- Is all exercise equally beneficial?

Arrhythmias

- Around 600,000 people in England have AF – 1.2% of the population
- The annual cost to the NHS and personal social services budget of strokes attributable to AF is estimated to be around £148 million:
 - Hospital costs around £103 million
 - Post discharge care around £45 million
- Atrial fibrillation (AF) is the most common sustained arrhythmia and its incidence increases as age increases
- If unmanaged AF is strongly associated with Stroke, MI and heart failure (*Cochrane 2007*)

Atrial fibrillation (AF)

- Atria quiver instead of pumping effectively
 - Greatest clinical consequence is that the blood in the atria may pool and clot which is strongly associated with stroke
- The atrial rate can range from 300 to 600 beats per minute
 - the AV node limits the amount of impulses that reach the ventricles
- When AF occurs, the ventricular rate may also be irregular and can range from 50 to 200 bpm
- The lack of atrial synchronization reduces the heart's pumping efficiency by as much as 20 to 30%
- Patients will be SOB and may feel tired and weak

Treatment of AF

- Two basic approaches:
 - rate-control where atrial fibrillation is allowed to continue and treatment aims to control heart rate and to prevent stroke, usually with anticoagulants AFFIRM (n=4060)
 - rhythm-control where treatment aims to restore normal sinus rhythm, using different antiarrhythmic drugs, electrical cardioversion or a combination of both. PIAF (n=252)
- Both approaches have comparable longterm outcomes (*J Cordina and G Mead, Cochrane Database of Systematic Reviews 2007 Issue 1*)

Exercise and AF

- No clinical trials directly investigating the efficacy of exercise on AF
- CR exercise studies have shown significant benefits in reducing the impact of IHD which is the strongest predictor of mortality in AF.
 - Jolliffe et al, (2000) Taylor et al (2007) S. CD001800.
 - Rees et al, (2004) CD003331.
 - Smart N, Marwick TH. Am J Med. 2004 May 15;116(10):693-706.
- In patient with cardiac disease CR exercise is associated with a 26% reduction in premature death within three years and improved quality of life

The challenge of preventing CVD!



UK adult Stats:

~70% sedentary
(< 1 session/wk)

24% moderately
fit and mod active

5% fit & high
levels of exercise

1% athletic

Should we take a
population or
Individual approach
in setting targets?

Basic recommendations from ACSM 2009, AHA 2007, CMO England etc...

- Do moderately intense cardio 30 minutes a day, five days a week
Or
- Do vigorously intense cardio 20 minutes a day, 3 days a week
And
- Do strength-training exercises twice weekly
- But what is vigorous activity? Above 6 METs

Total mortality after changes in leisure time physical activity in 50 year old men: 35 year follow-up of population based cohort

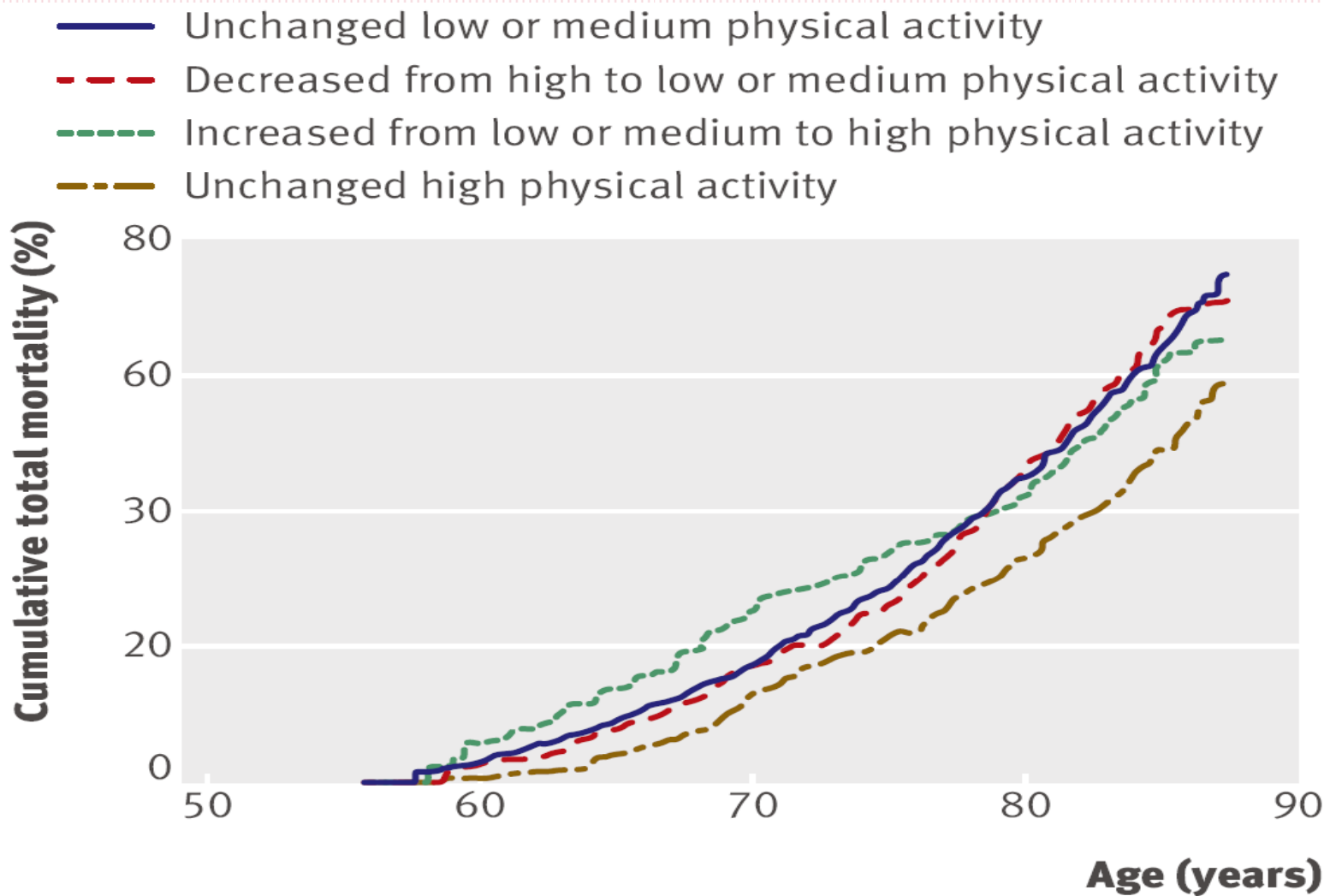
Lyberg et al. BMJ 2009; 338: b688, DOI 10.1136/bmj.b688

Objective: To examine how change in level of physical activity after middle age influences mortality and to compare it with the effect of smoking cessation.

Design Population based cohort study with follow-up over 35 years.
Setting Municipality of Uppsala, Sweden.

Participants: 2205 men aged 50 in 1970-3 who were re-examined at ages 60, 70, 77, and 82 years. Main outcome measure Total (all cause) mortality

Conclusions: Increased physical activity in middle age is eventually followed by a reduction in mortality to the same level as seen among men with constantly high physical activity. This reduction is comparable with that associated with smoking cessation.



Age

60

70

77

82

End of study

Men at risk

1759

1261

996

816

761

Is exercise safe?

Cardiac rehab based exercise:

- One nonfatal cardiac complication per **35,000** patient hours of exercise participation (Haskell 1978)
- One fatal event for every **116,000** patient hours of exercise participation

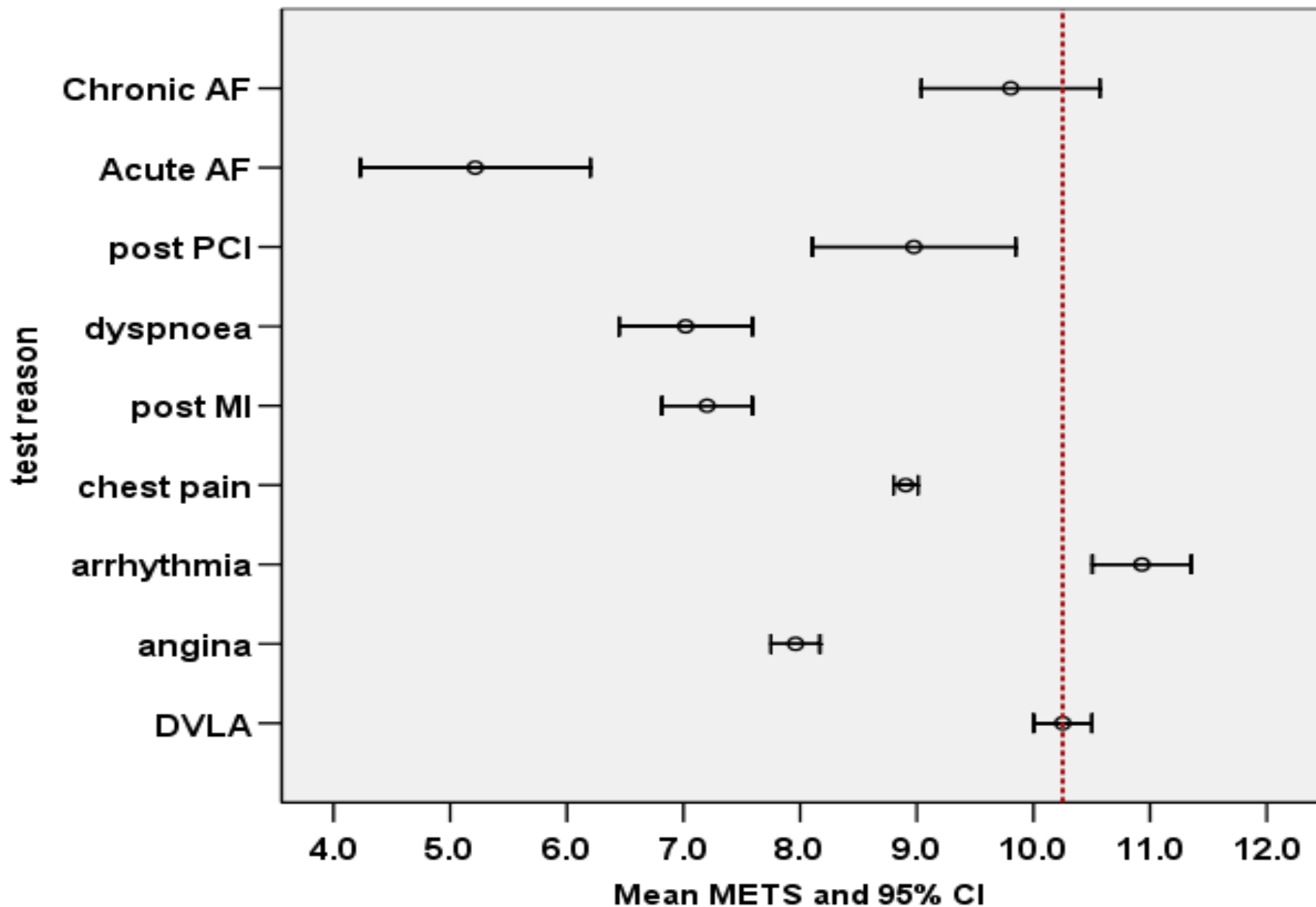
Exercise testing in cardiology:

- How does it compare to cardiology exercise testing:
 - Four non-fatal complications per **10,000**
 - (Fletcher et al 2001)

General:

- AF exists in all aspects of life and is not any greater during skilled exercise at moderate intensity

Relative fitness of 7,000 cardiac patients



Where and what type of exercise

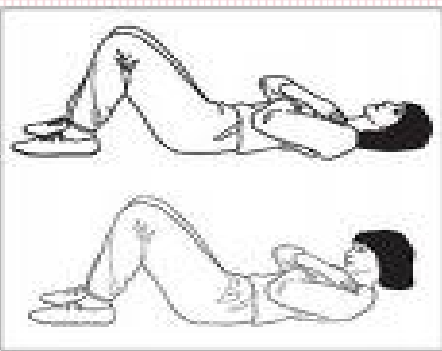
- Hospital, local community and home based
- Gyms are fine if you have access but Walking or cycling are very good ways to exercise and to meet your daily physical activity requirements
- Moderate intensity (<6 METs) with high volume
- Strength in increasing important can be maintained or even improved by using light weights and some body weight exercise
- Efficiency of movement (same work for less effort!) is also important

We know what works: Good exercise if done this way!



Exercising 30 minutes a day can help you lose weight, which can lower blood pressure.

#ADAM

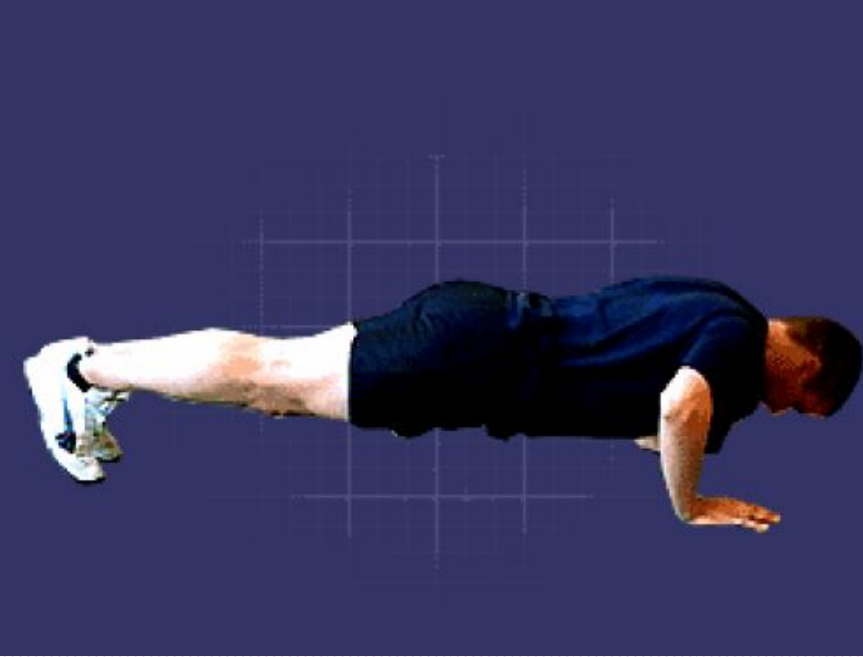


60+ Tai Chi

Whether you walk or jog, it is important to exercise at 60-85% of your maximum heart rate.

#ADAM

We know what doesn't work: more harm than good!



Characteristics of AF
during exercise:
ECG and SOBOE

08/09/2003
11:30:07

69 bpm

PRETEST
SUPINE
0:29

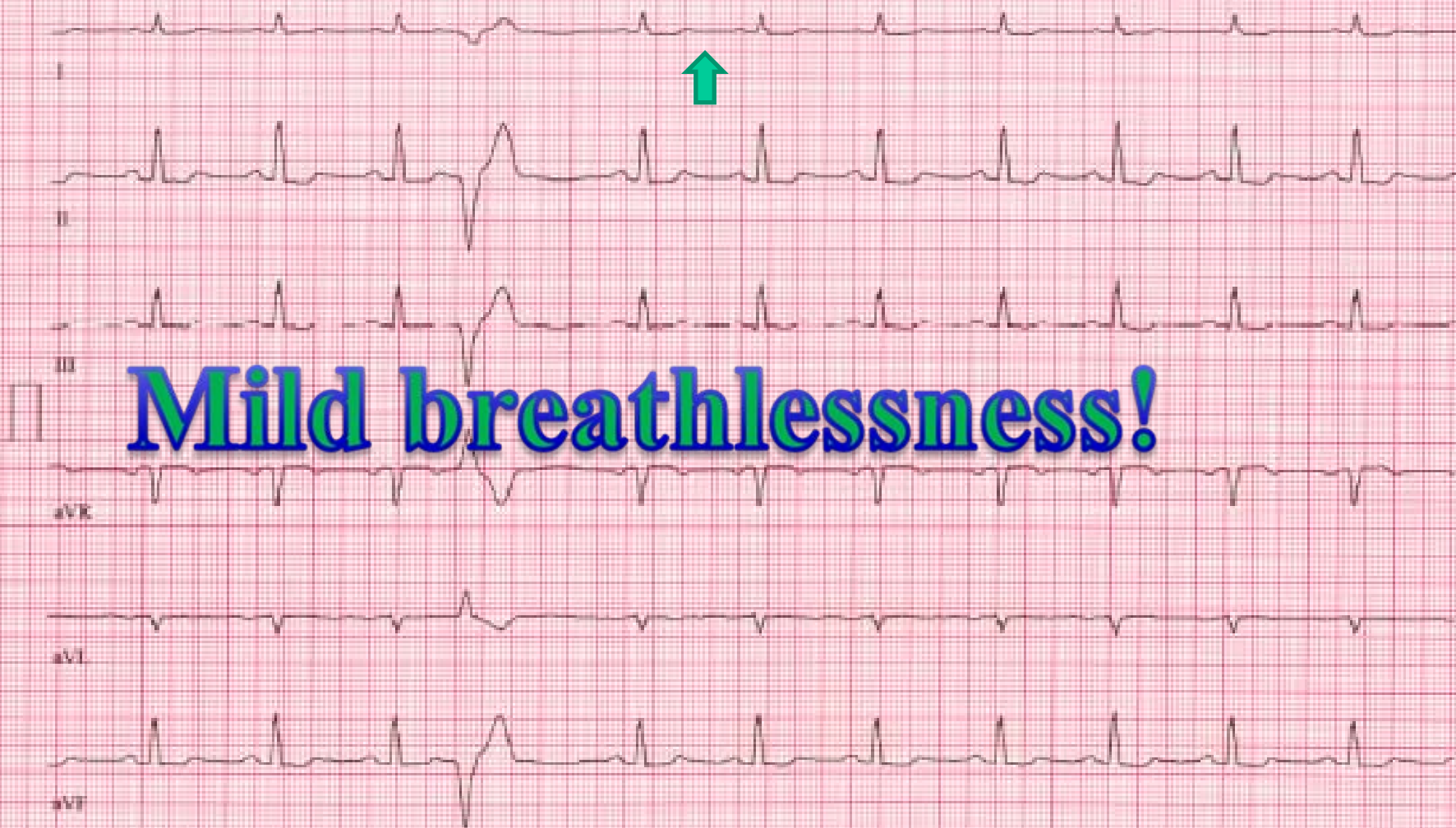
DRUCE
0.0 mph
0.0 %



pvc A/F ON EXERCISE



Mild breathlessness!

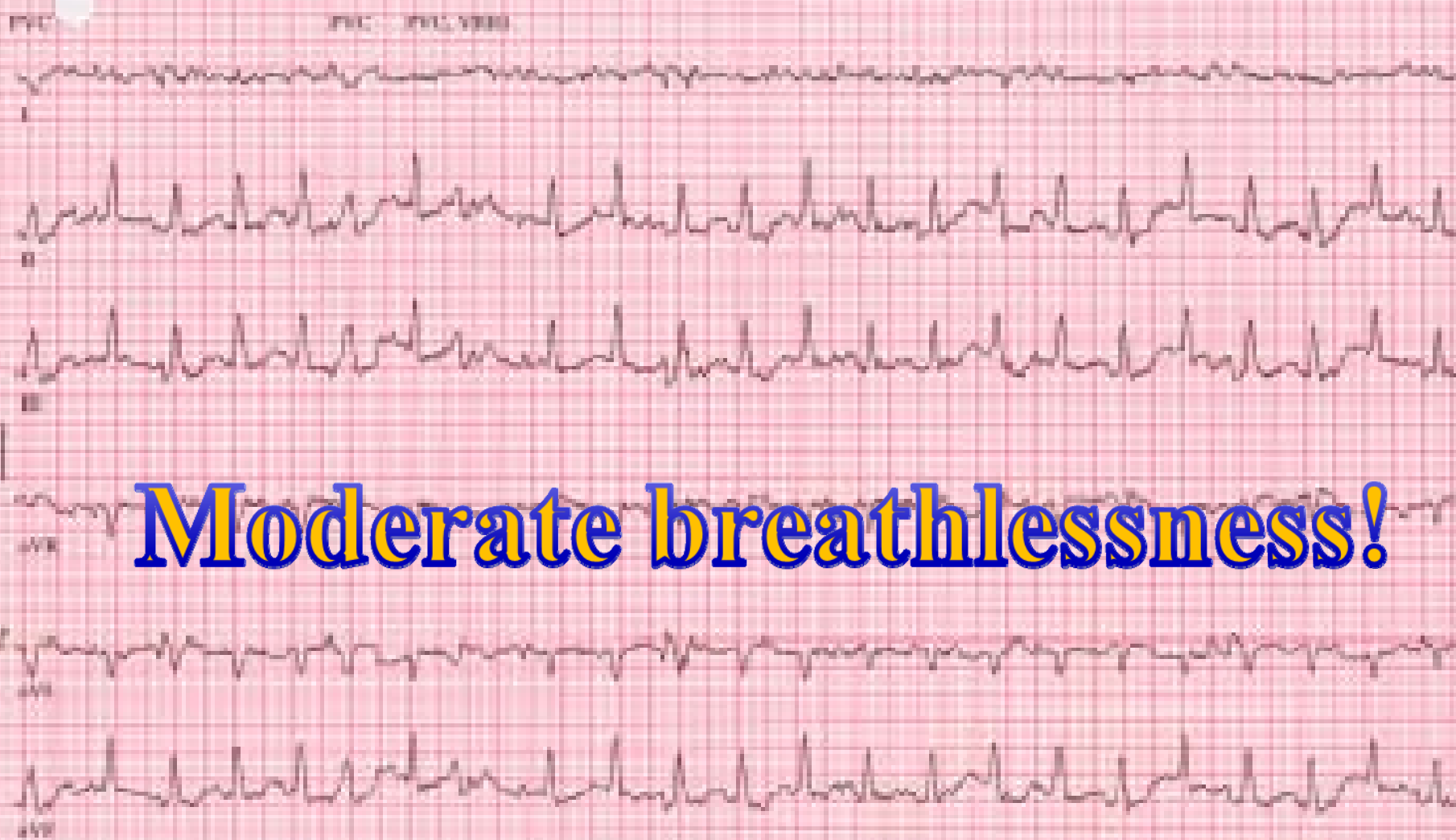


06/09/2003
11:15:20

144 bpm
180/120 mmHg

EXERCISE
STAGE 2
252

HR/HR
1:1 single
100%



Rate and rhythm meds



RPP = 280

EXERCISE TEST ARRHYTHMIA REVIEW

Manchester Royal Infirmary

09.11.2005
3:32:01

134 bpm

EXERCISE
STAGE 3
8:18

BRUCE
3.3 mph
14.0 %

PVC PVC
PVC RUNPSVQPSVC

PVC

PSVC



Severe breathlessness!



08.09.2003 74 years Caucasian Male
 11:29:38 167 cm 71.3 kg
 Meds: atenolol, stopped 48hrs.
 Test Reason:
 Medical History: chest pain, ? arrythmia,
 Ref. MD [REDACTED]
 Technician: Sheila/Emma Test Type: Treadmill Stress Test
 Comment: COP

BRUCE Total Exercise Time 03:33
 Max HR: 166 bpm 110% of max predicted 150 bpm
 Max BP: 198/116 Maximum Workload: 5.20 METS
 Max ST Level -4.40 mm in V4; RECOVERY 2:57
Reasons for Termination: Leg discomfort, Dyspnoea
Summary: Resting ECG: normal. HR Response to Exercise: appropriate. BP Response to Exercise: normal resting BP - appropriate response. Chest Pain: non-limiting. Arrhythmias: atrial fibrillation, ventricular premature beats-couplets. ST Changes: Depression horizontal. Overall Impression: Positive stress test typical of ischemia.
Conclusion: patient went into af immediately on recovery

Phase Name	Stage Name	Time in Stage	Speed (mph)	Grade (%)	Workload (METS)	HR (bpm)	BP (mmHg)	RPP (*100)	VE (/min)	ST Level V4(mm)	Comment
PRETEST	SUPINE	02:27	0.00	0.00	1.0	75	144/76	108	1	-0.35	
	STANDING	00:25	0.30	0.00	1.0	76	146/76	110	1	-0.35	
EXERCISE	STAGE 1	03:00	1.70	10.00	4.6	136	183/126	248	9	-0.80	
	STAGE 2	00:34	2.50	12.00	5.2	150			7	-2.10	
RECOVERY		12:45	0.00	0.00	1.0	106	161/99	170	2	-2.50	

Exercise Test**Tabular Summary****Manchester Heart Centre**

Date: 18.06.2003 53 years male

BRUCE exercise test time: **09.00**Meds: **Beta blockade stopped 48hrs**Max HR: **214 bpm** 128% of max predictedHistory: **Chest pain and AF**Max BP: **150/80** Workload: **10.4 METS**Test end reason: **SOB**

Phase	Stage	duration (in stage)	Speed (mph)	Grade (%)	Workload (METS)	HR (bpm)	BP (mmhg)	RPP (.01)	VE (/min)	ST (mm)
Rest						87	120/80	104	0	.10
Exercise	1	00:03	1.7	10	4.6	111	130/80	144	0	.05
	2	00:03	2.5	12	7.0	133	140/80	178	1	-.85
	3	00:03	3.4	14	10.4	214	150/80	321	4	-3.75
Recovery		00:17				125	140/70	175	0	-1.40

Exercise Test**Tabular Summary****Manchester Heart Centre**

Date: 02:07.2003 53 years male

BRUCE exercise test time: **12.01**Meds: **Beta blockade** **continued**Max HR: **118 bpm** 71% of max predictedHistory: **Chest pain and AF**Max BP: **160/75** Workload: **13.4 METS**Test end reason: **Fatigue**

Phase	Stage	duration (in stage)	Speed (mph)	Grade (%)	Workload (METS)	HR (bpm)	BP (mmhg)	RPP (.01)	VE (/min)	ST (mm)
Rest						57	120/80	68	0	.04
Exercise	1	00:03	1.7	10	4.6	75	120/80	90	0	.05
	2	00:03	2.5	12	7.0	83	130/80	108	1	-.85
	3	00:03	3.4	14	10.4	96	142/80	136	4	-.90
	4	00:03	4.2	16	13.4	118	160/75	190	5	-.95
Recovery		00:10				63	155/70	175	0	.30

How can we adapt the exercise

- Always warm up in a style that complements the final mode of exercise
- Pursue moderate intensity exercise governed by the individual (rating of exertion 1 to 10)
- Avoid sudden cessation of exercise (double impact!)
- Breath holding and sustained isometric muscle work, especially of the trunk, needs to be kept to a minimum in patients with low FC and arrhythmia risk

Exercise considerations

- Mode of exercise
 - most exercises should be performed in standing,
 - Horizontal lying and seated exercises is associated with reduced ventricular function (*Pashkow et al 1997, Fletcher et al 2001, Pina et al (2003)*).
 - Seated exercise, especially using arm work, is associated with reduced pre load and decreased EDV
 - This leads to a concomitant decrease in cardiac output compared to the cardiac response to an equivalent exercise in standing
 - An increase in heart rate is often used to compensate for reduced pre load
 - If seated arm exercise is the only option then the intensity of the exercise should be lowered and the emphasis placed on muscular endurance.

Summary

- Patients with AF taking appropriate (rate- rhythm) medication tolerate exercise very well
- Acute bouts of AF reduces functional capacity significantly and has a higher cardiovascular accident risk
- Exercise with a warm-up, relative moderate intensity and cool down is very safe and effective
- People are generally at greater risk of a cardiac event when performing novice strenuous activity

Thank you for listening

Questions welcome

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