

Diabetes og hjertet

Landskursus for diabetes sygeplejersker

Koldingsjord (og Houston)

Thomas Kümler

Overlæge, Ph.D., seniorforsker

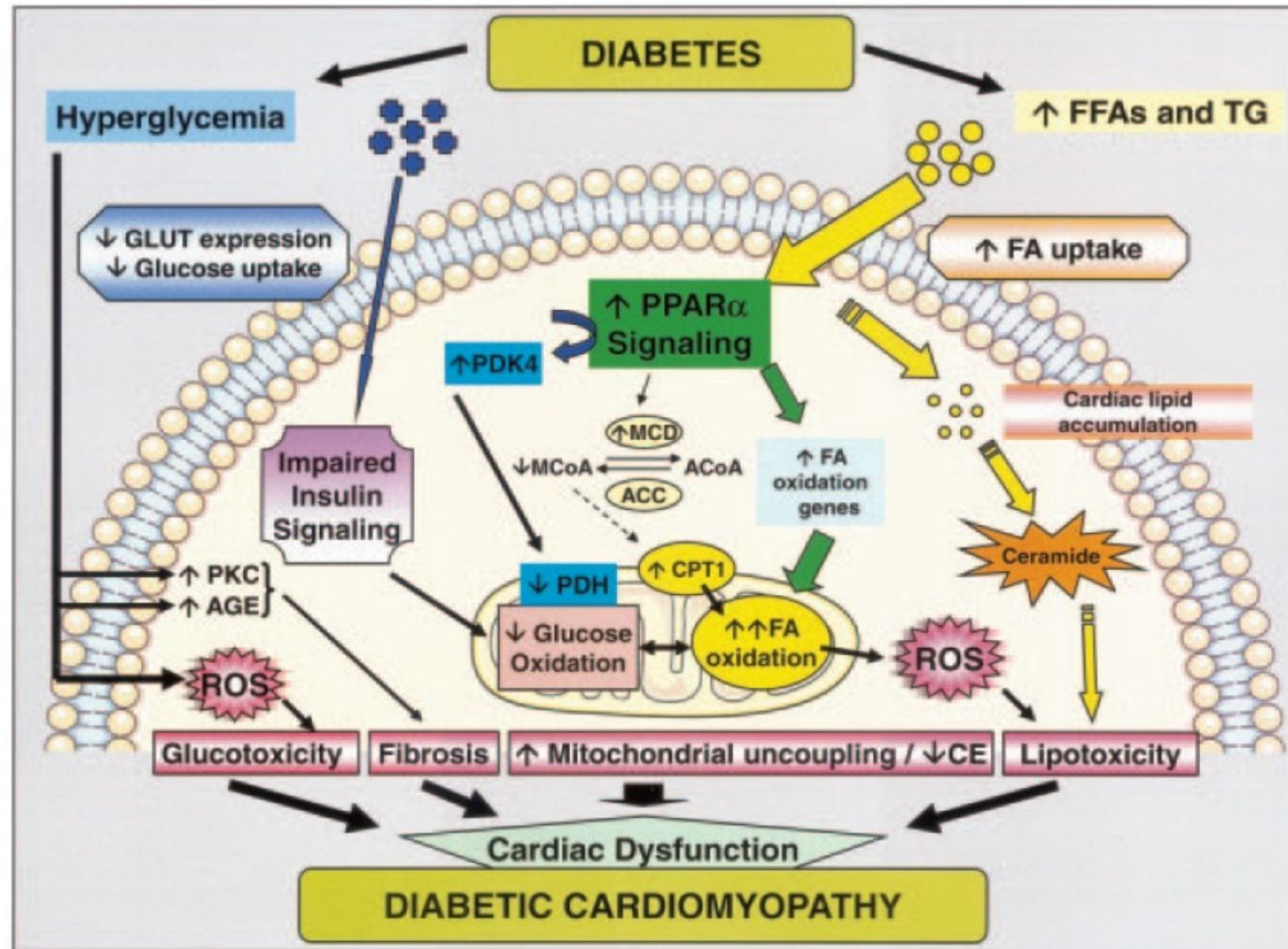
Kardiologisk afd. Herlev-Gentofte hospital og Steno Diabetes Center

Superior doctors prevent the disease.

Mediocre doctors treat the disease before evident.

Inferior doctors treat the full blown disease.

***- Huang Dee: Nai-Ching (2600 B.C. 1st Chinese
Medical Text.)***



Case study Pernille:

Presentation and history

- Recently admitted to hospital for suspected Myocardial Infarction (not confirmed)
- Diabetes diagnosed as an inpatient
- Hypertension treated with amlodipine
- Sedentary lifestyle
- 20 cigarettes per day
- Mother died from MI aged 55 years

Investigations and findings

- HbA_{1c}: 71mmol/mol
- BP: 165/92 mmHg
- BMI: 32 kg/m²
- Serum creatinine: 99 µmol/L
- Urinary albumin creatinine ratio 330 mg/g
- eGFR: 44 ml/min/1.73 m²

Pernille har lige fået konstateret diabetes

Kan hun have komplikationer til sin diabetes?
Hvordan skal hun undersøges for at komme det nærmere?
Hvordan skal hun behandles nu?
Hvordan skal hun følges?
 hvor hyppigt?,
 hvilke undersøgelser?

Diabetic Complications

Microvascular

Leading cause
of blindness
in working age
adults

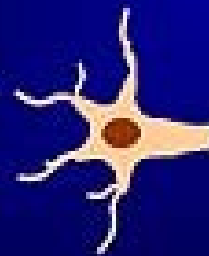


Diabetic
Retinopathy



Diabetic
Nephropathy

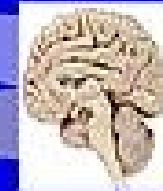
Leading cause of
end-stage renal
disease



Diabetic
Neuropathy

Leading cause of non-traumatic
lower extremity amputations

Macrovascular



Stroke



Cardiovascular
Disease

2 to 4 fold
increase in
cardiovascular
mortality
and stroke



Screening/detection



Ophthalmoscopy/
fundus photography



Visual acuity



Urinary albumin excretion
and s-creatinine/eGFR



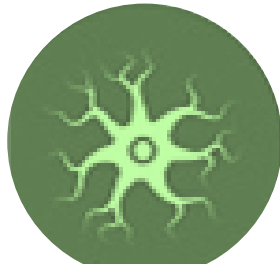
Blood pressure



Electrocardiogram



Foot inspection, pulse and
vibration sensation
threshold



Autonomic neuropathy



Erectile
dysfunction

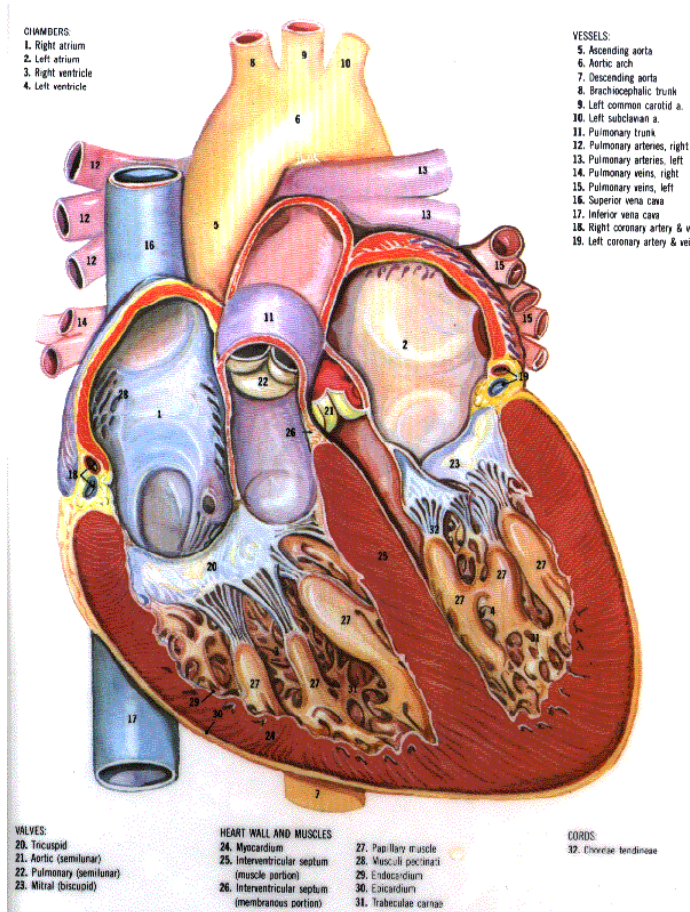


Lipids



Advanced cases: PTH, calcium,
phosphate, bicarbonate,
electrolytes, anaemia

eGFR, estimated glomerular filtration rate; PTH, parathyroid hormone



Diabetes og hjertekarsygdom

- Risikofaktorer!!
- Ved såvel stabil iskæmisk hjertesygdom som ved akut koronart syndrom (AKS) og hjertesvigt har diabetespatienten en væsentligt dårligere prognose end patienter uden diabetes men også en øget gevinst ved intensiv farmakologisk behandling.
- Det er derfor meget vigtigt, at den medicinske behandling er optimal og aggressiv.
- Hjertekarsygdomme er #1 dødsårsag hos patienter med diabetes
- Diabetes patienter har 2-4 gange øget risiko for at udvikle hjertekarsygdom sammenlignet med personer uden diabetes

Stort overlap

Fælles risikofaktorer

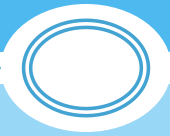
Livsstil

- Kost/overvægt

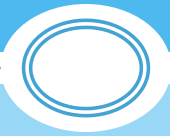


Rygning





Alkohol



Motion

Hvilken hjertekarsygdomme udvikler diabetespatienter?

- Koronarsygdom
 - Akut myokardieinfarkt
 - Ofte kompleks sygdom der kan kræve bypass kirurgi (eks. 3 karsygdom)
- Cerebrovaskulær sygdom
 - TCI og apopleksi (stroke).
 - Perifer arteriesklerose, claudicatio, kroniske sår, koldbrand og amputationer
- Hjertheinsufficiens
 - Som følge af underliggende hjertesygdom, eks. koronarsygdom, hypertension
 - Diabetes kan bidrage til udvikling af forandringer i hjertet og primær hjertheinsufficiens
- Atrieflimmer
- Diabetisk nyresygdom
 - Som følge af direkte vaskulære anormaliteter som følger diabetes

Symptomer

- Åndenød
- Brystsmerter
- Hjertebanken

Diabetes og risiko for AMI

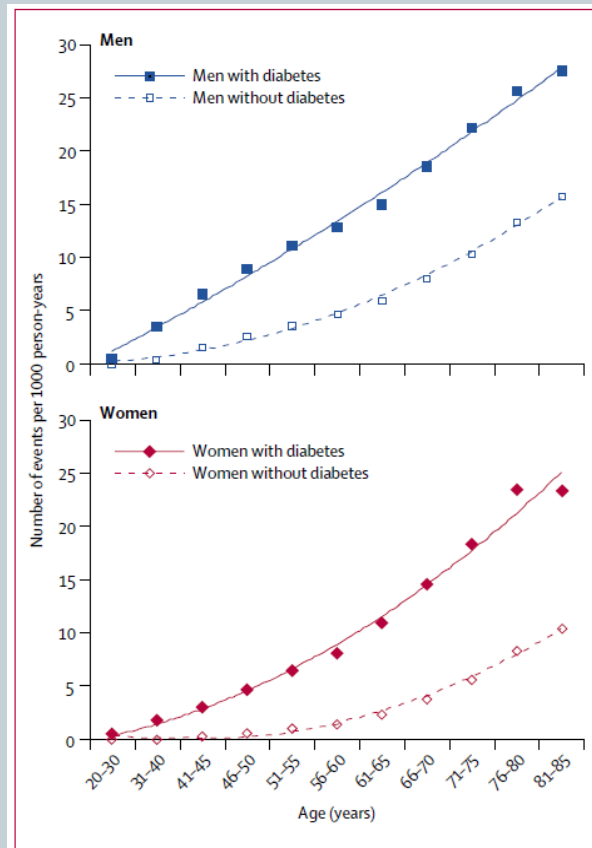


Figure 1: Relation between age and rates of AMI by diabetes status and sex
All lines fitted according to a polynomial equation. $R^2 > 0.99$ for each fitted line.

Betydning af diabetes som riskofaktor for IHD

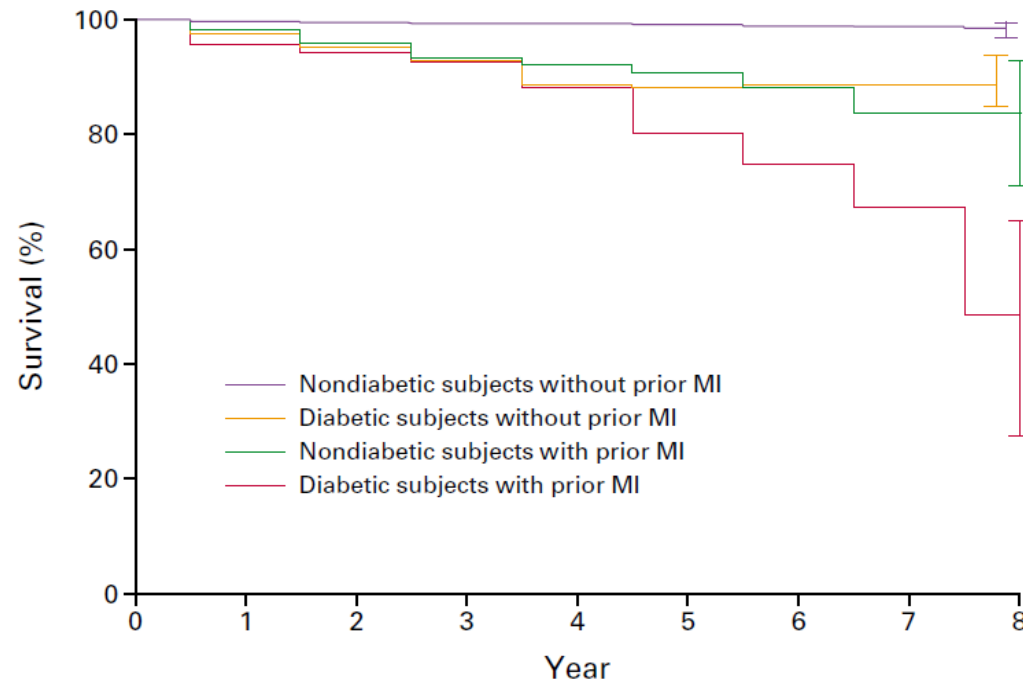
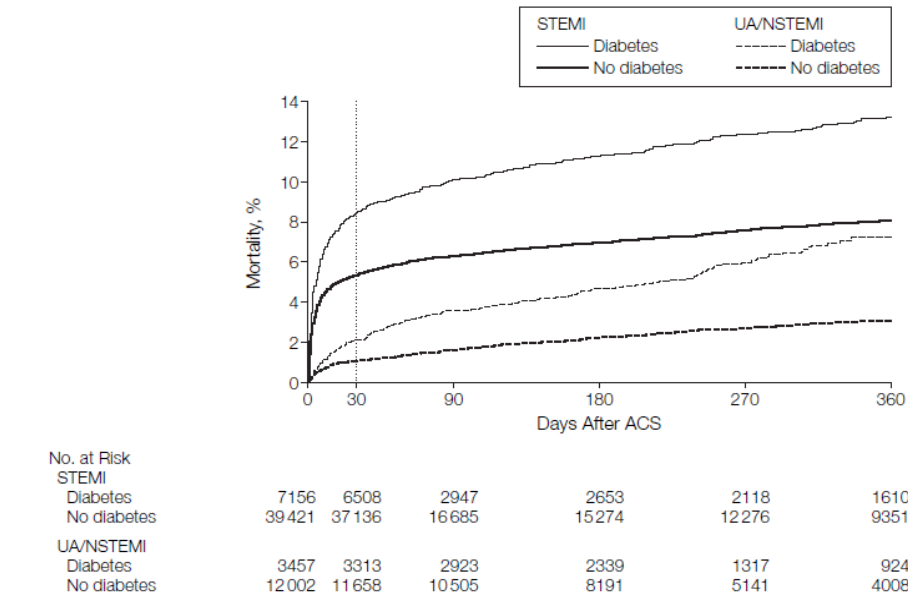


Figure 1. Kaplan–Meier Estimates of the Probability of Death from Coronary Heart Disease in 1059 Subjects with Type 2 Diabetes and 1378 Nondiabetic Subjects with and without Prior Myocardial Infarction. MI denotes myocardial infarction. I bars indicate 95 percent confidence intervals.

Diabetes og betydning for grad af koronarsygdom og prognose

Figure 3. Cumulative Incidence of All-Cause Mortality Through 1 Year After ACS



ACS indicates acute coronary syndromes; STEMI, ST-segment elevation myocardial infarction; UA/NSTEMI, unstable angina/non-STEMI. Vertical dotted line represents 30 days after ACS. Patients with diabetes are at higher risk of death at 30 days following either UA/NSTEMI (2.1% vs 1.1%, $P < .001$) or STEMI (8.5% vs 5.4%, $P < .001$). By 1 year after ACS, the cumulative mortality in patients with diabetes vs without diabetes was higher in UA/NSTEMI (7.2% vs 3.1%, $P < .001$) and STEMI (13.2% vs 8.1%, $P < .001$), and accrues at a higher rate in patients with diabetes than in patients without diabetes. The relative increase in mortality for the patients with diabetes following UA/NSTEMI exceeds that of STEMI ($P = .004$ for interaction between diabetes status and ACS stratum).

Diabetes medfører samme risiko som kendt hjertekars sygdom uden diabetes

Personer med hjertesygdom

Personer med diabetes uden hjertesygdom

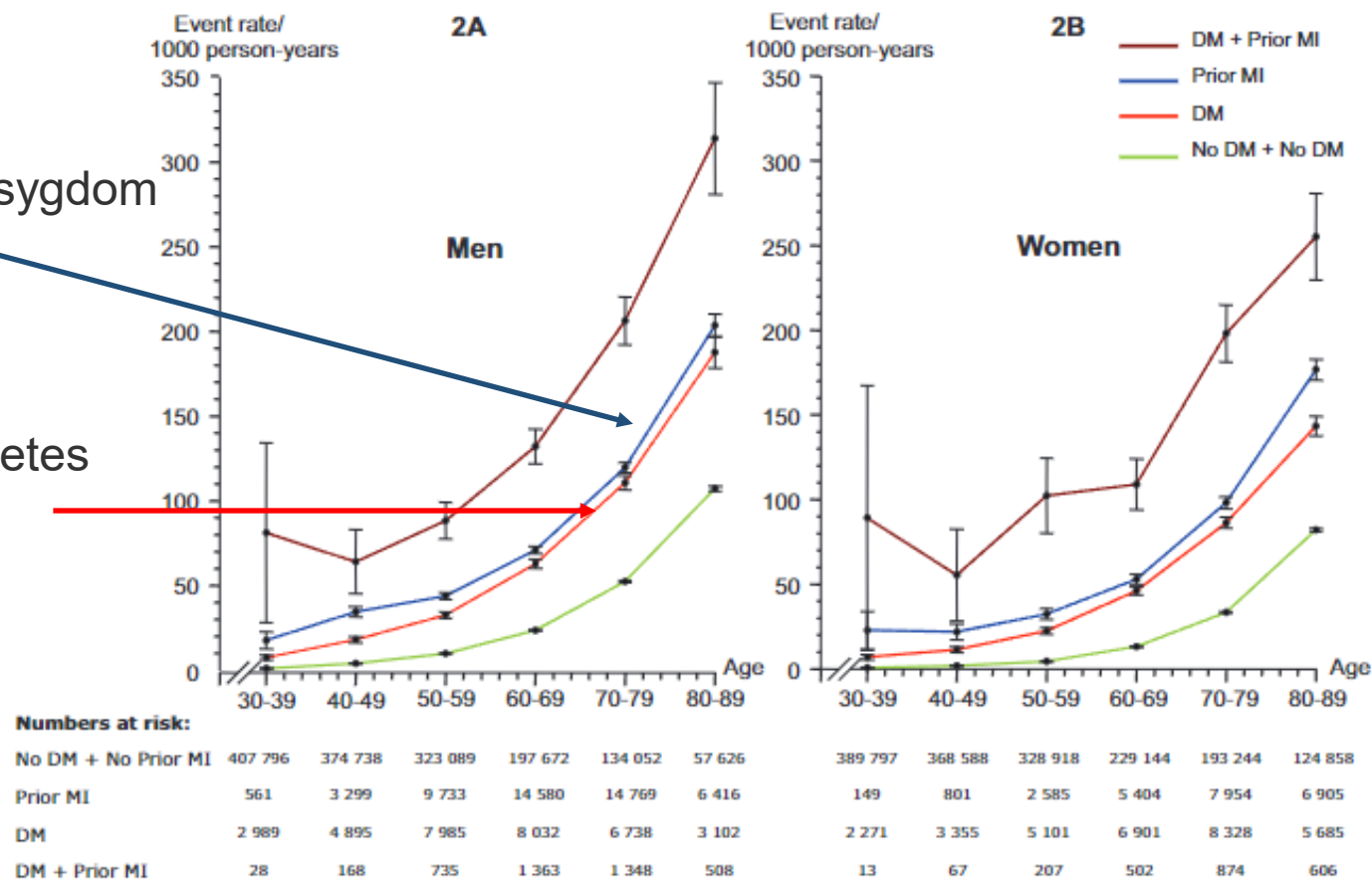


Figure 2. Event rates for the composite end point of MI (nonfatal), stroke (nonfatal), and cardiovascular death in men (A) and women (B) stratified by age in relation to diabetes mellitus (DM) and a prior MI.

Schramm et al, Circulation 2008

ORIGINAL INVESTIGATION

Open Access

Diabetes is an independent predictor of survival 17 years after myocardial infarction: follow-up of the TRACE registry

Thomas Kümler*¹, Gunnar H Gislason², Lars Køber¹ and Christian Torp-Pedersen²

Abstract

Background: The shown to be high **Purpose:** To study **Methods:** The pati National Patient R and evaluated wh as symptoms of h **Results:** A registe predictive value w **Conclusion:** The c © 2008 European **Keywords:** Accutac



European J
doi:10.1092

Persisten ventricul myocarc TRACE

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Copenhagen University Hospi
Received 21 October 2009; rev

Aims

Methods and results

Conclusion

Keywords

Abstract

Background: In patients hospitalized for myocardial infarction, there are limited data examining the long-term prognostic effect of diabetes.

The aim of this study was to systematically evaluate the development of diabetes as an independent long-term prognostic factor after myocardial infarction.

Methods: Prospective follow-up of 6676 consecutive MI patients screened for entry in the Trandolapril Cardiac Evaluation (TRACE) study. The patients were analysed by Kaplan-Meier survival analysis, landmark analysis and Cox proportional hazard models and outcome measure was all-cause mortality.

Results: The mortality in patients with diabetes was 82,7% at 10 years of follow-up and 91,1% at 15 years of follow-up, while patients without diabetes had a mortality of 60,2% at 10 years of follow-up and 72,9% at 15 years of follow-up ($p < 0.0001$). Landmark analysis continued to show prognostic significance of diabetes throughout the duration of follow-up. Multivariable Cox proportional-hazards model showed that the hazard ratio for death in patients with diabetes overall was 1.47 (95% confidence intervals (CI) 1.35-1.61) and varied between 1.19 (CI 1.04-1.37) and 2.13 (CI 1.33-3.42) in the 2-year periods of follow-up.

Conclusions: Diabetes is an important independent long-term prognostic factor after MI and continues to predict mortality even 17 years after index MI.

This underscores the importance of aggressive diagnostic and therapeutic approach in diabetes patients with MI.

Conclusions: One estimate of renal function is a strong and independent long-term prognostic factor for 10-12 years following a MI.

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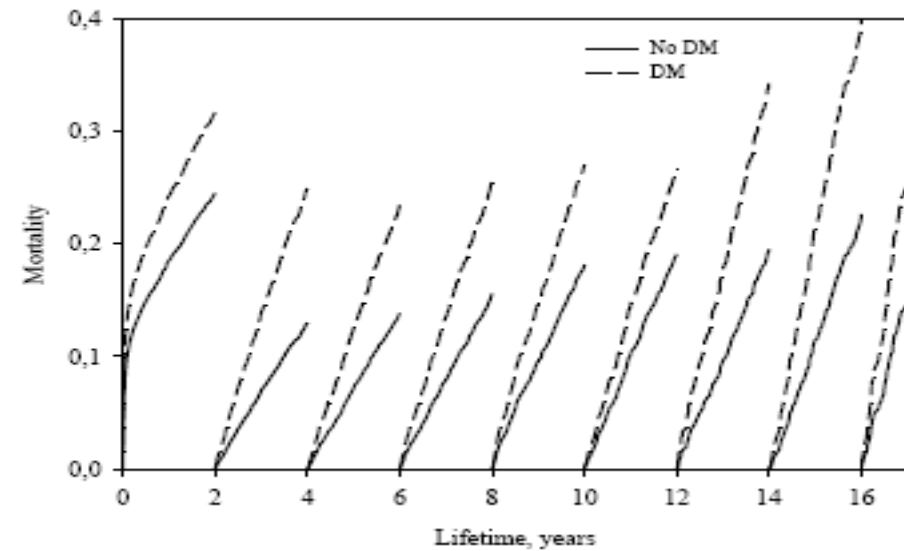
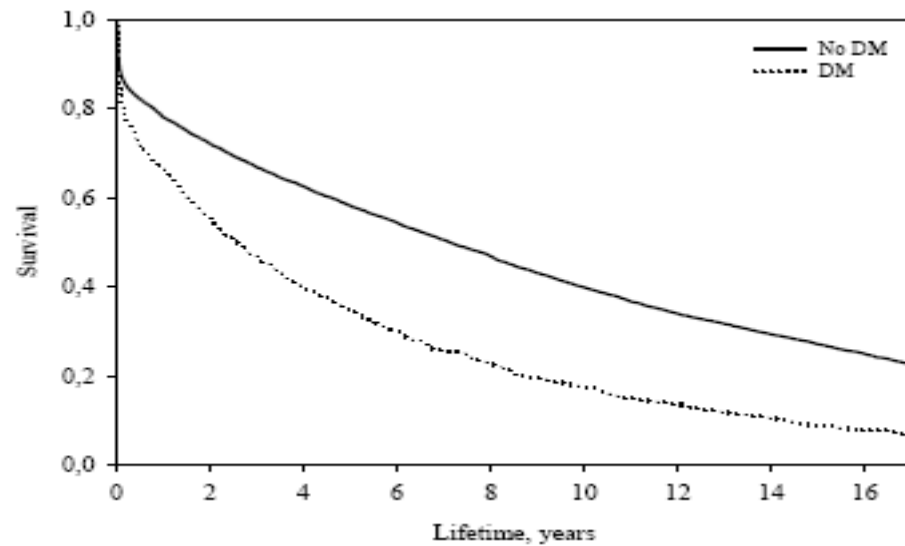
farction (MI), but
independent

plapril Cardiac
analysis and Cox

s present in 42%
ial-hazards models
azard ratio 1,72
normal renal
period in 2-year
ostic effect until
listed for 12 years
h normal eGFR,
1,97 (CI 1,65-

Results

Diabetes, Paper III



Landmark analysis adjusted for age, gender, WMI

Landmark analysis: Pronostic significance for 12 years.

Cox proportional-hazards models: Prognostic significance for 16 years, HR 1.10 (CI 0.99-1.36) and 1,27 (CI 1.20-1.34)

Conclusion

Diabetes, Paper III

- With a follow-up of 17 years, we found that diabetes continued to represent a strong independent prognostic factor for all-cause mortality.
- This underscores the necessity of an aggressive approach towards diagnosing diabetes in MI patients.

Hjertesvigt

Kan være asymptomatisk og derfor forblive uopdaget (1, 2).

Tidligere diagnostik og intervention af kardiovaskulære sygdom kan bedre den kardielle funktion og mindst risikoen for hospitalisering (3, 4).

1. L. J. Boonman-de Winter, F. H. Rutten, M. J. Cramer, M. J. Landman, A. H. Liem, G. E. Rutten, and A. W. Hoes, "High prevalence of previously unknown heart failure and left ventricular dysfunction in patients with type 2 diabetes," *Diabetologia*, vol. 55, no. 8, pp. 2154-62, 2012.
2. P. G. Jorgensen, M. T. Jensen, R. Mogelvang, B. J. von Scholten, J. Bech, T. Fritz-Hansen, S. Galatius, T. Biering-Sorensen, H. U. Andersen, T. Vilsboll, P. Rossing, and J. S. Jensen, "Abnormal echocardiography in patients with type 2 diabetes and relation to symptoms and clinical characteristics," *Diab Vasc Dis Res*, vol. 13, no. 5, pp. 321-30, 2016.
3. M. Ledwidge, J. Gallagher, C. Conlon, E. Tallon, E. O'Connell, I. Dawkins, C. Watson, R. O'Hanlon, M. Bermingham, A. Patle, M. R. Badabhagani, G. Murtagh, V. Voon, L. Tilson, M. Barry, L. McDonald, B. Maurer, and K. McDonald, "Natriuretic peptide-based screening and collaborative care for heart failure: the STOP-HF randomized project," *JAMA*, vol. 310, no. 1, pp. 66-74, 2013.
4. M. Huelsmann, S. Neuhold, M. Resl, G. Strunk, H. Brath, C. Francesconi, C. Adlbrecht, R. Prager, A. Luger, R. Pacher, and M. Clodi, "PONTIAC (NT-proBNPselected prevention of cardiac events in a population of diabetic patients without a history of cardiac disease): a prospective randomized controlled project," *J Am Coll Cardiol*, vol. 62, no. 15, pp. 1365-72, 2013.

Diabetes og hjertesvigt

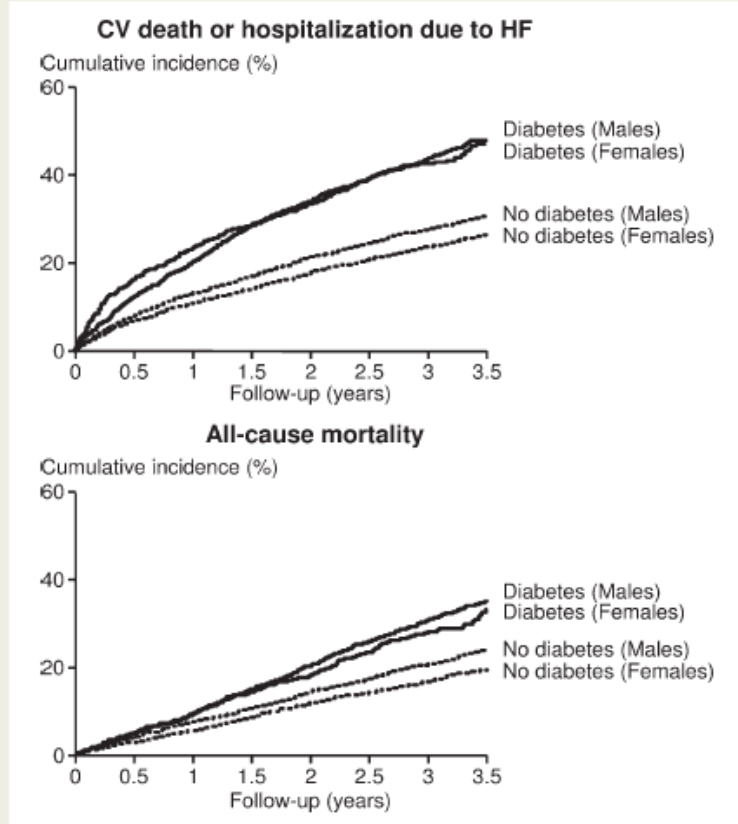


Figure 1 Outcomes in diabetic and non-diabetic patients based on sex. The cumulative incidence of cardiovascular death or heart failure hospitalization and all-cause mortality in diabetic and non-diabetic patient based on sex are shown. CV, cardiovascular; HF, heart failure

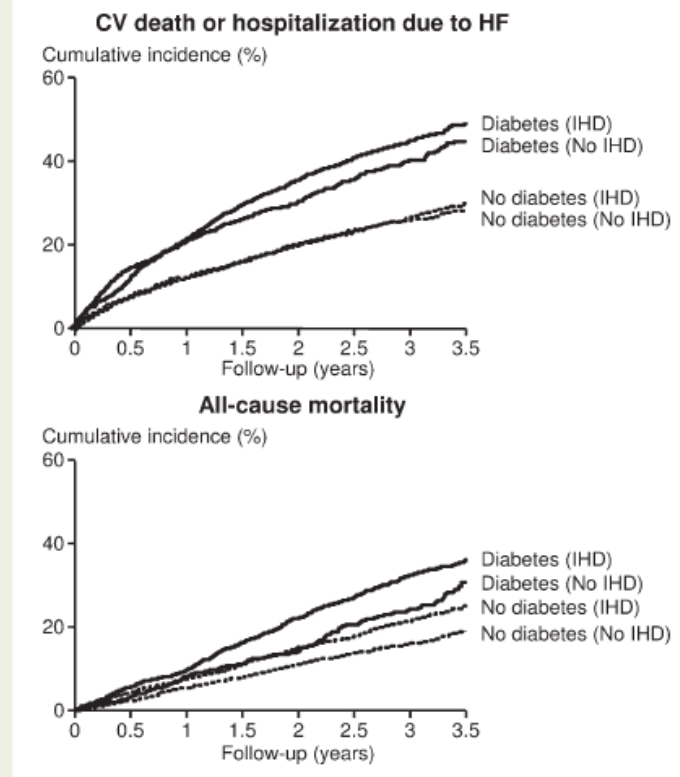
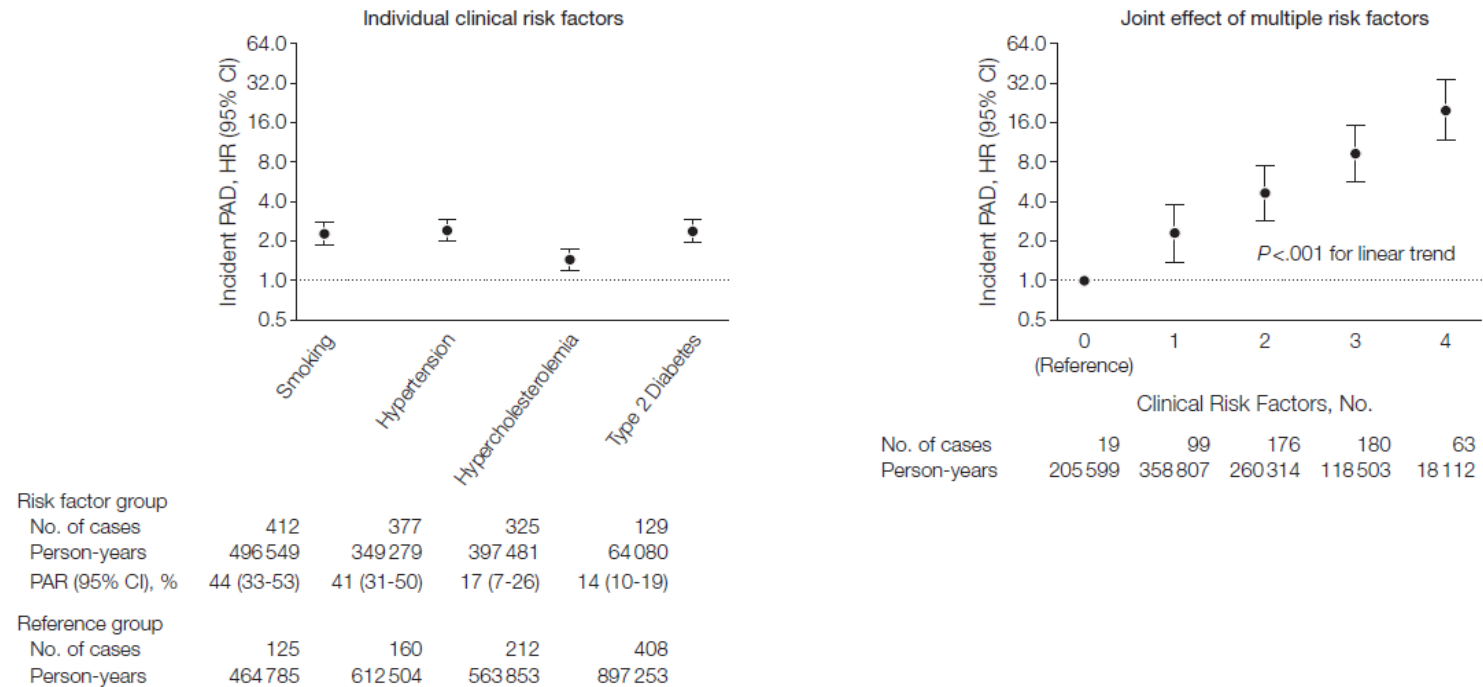


Figure 2 Outcomes in diabetic and non-diabetic patients based on aetiology (ischaemic vs. non-ischaemic). The cumulative incidence of cardiovascular death or heart failure hospitalization and all-cause mortality in diabetic and non-diabetic patients based on aetiology of heart failure are shown. CV, cardiovascular; HF, heart failure; IHD, investigator designated ischaemic heart disease aetiology

Diabetes og risiko for PAD

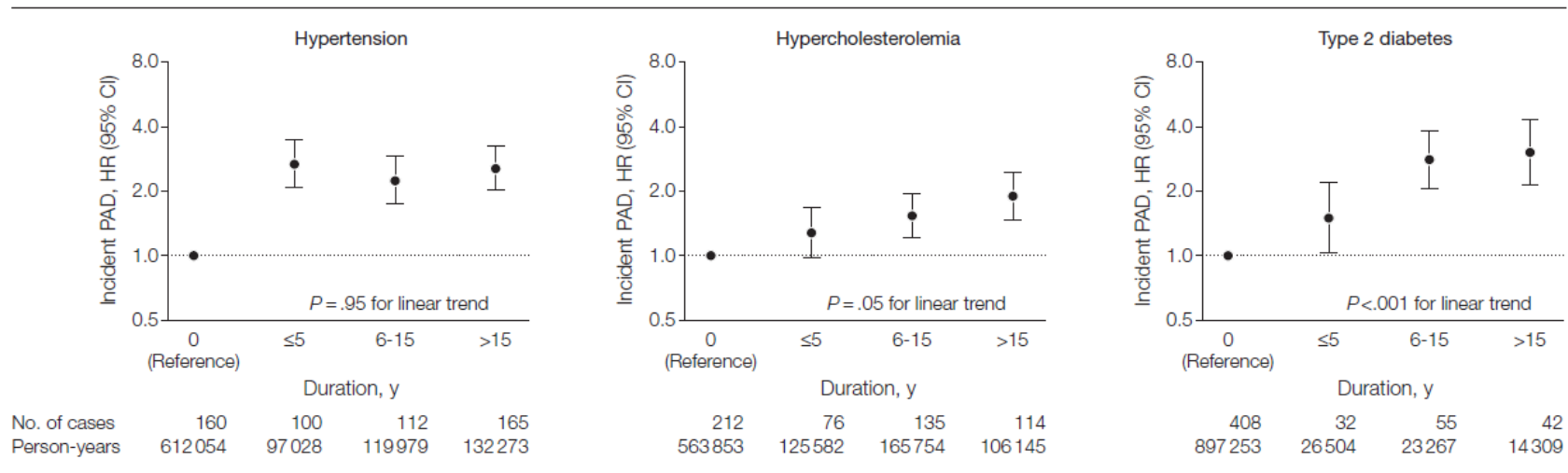
Figure 1. Incident Peripheral Artery Disease (PAD) According to Individual and Joint Clinical Risk Factors



The hazard ratios (HRs) were adjusted for age, height, aspirin use, parental history of myocardial infarction at age 60 years or younger, geographical region, body mass index, physical activity, alcohol consumption, and each of the other 3 clinical risk factors. The reference group for each of the individual risk factors was the remainder of the cohort without the individual risk factor. The population attributable risk (PAR) percentages for each individual risk factor were calculated using pooled logistic regression models and were adjusted for the same factors mentioned above. The linear trend for the joint risk factors was obtained by treating the number of risk factors as a continuous variable.

Varighed af diabetes og risiko for PAD

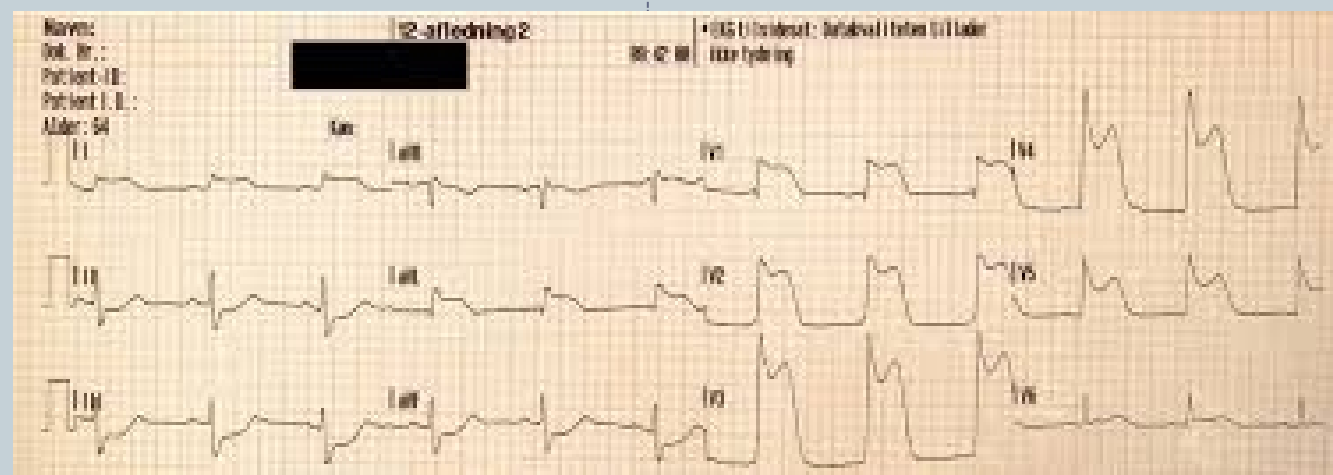
Figure 4. Incident Peripheral Artery Disease (PAD) According to Duration of Hypertension, Hypercholesterolemia, and Diabetes



The hazard ratios (HRs) were adjusted for age, height, smoking status, history of diabetes, hypertension, hypercholesterolemia, aspirin use, parental history of myocardial infarction at age 60 years or younger, geographical region, body mass index, physical activity, and alcohol consumption. Linear trends are based only on participants with the disease and are tested by using the median of each duration category as a continuous variable. The reference group for each of the individual risk factors was the remainder of the cohort without the individual risk factor.

Diagnostik af IHD hos diabetes patienten

- EKG på diagnosetidspunktet
- Årlig udspørgen om kardielle symptomer (hjertebanken, dyspnø, brystmerter)
- EKG ved symptomer



Hvile EKG

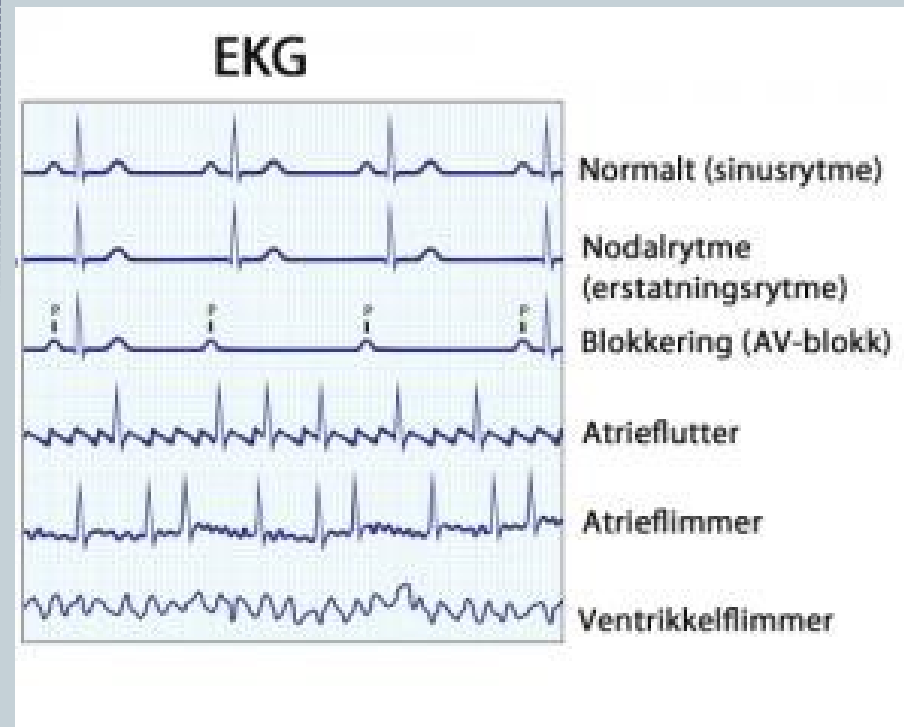
- Sensitivitet, specificitet er utilstrækkelig (*Am J Cardiol* 2007 April 1;99(7):951-5).
- Kun sikkert positivt resultat i form af tidligere infarkt er anvendeligt

Arb. EKG

Symptomer (smerter, åndenød, hjertebanken) under belastning.

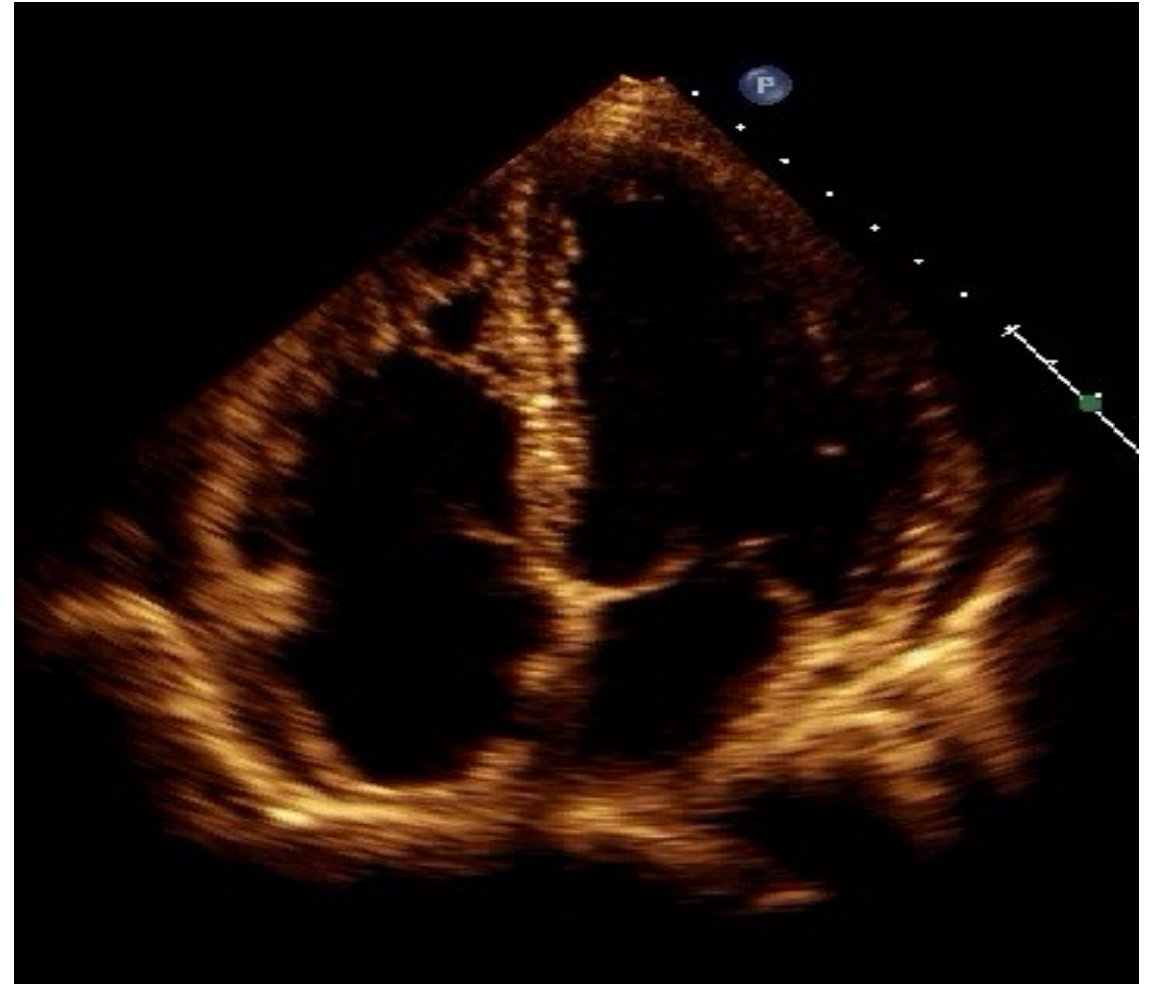


Langtids EKG

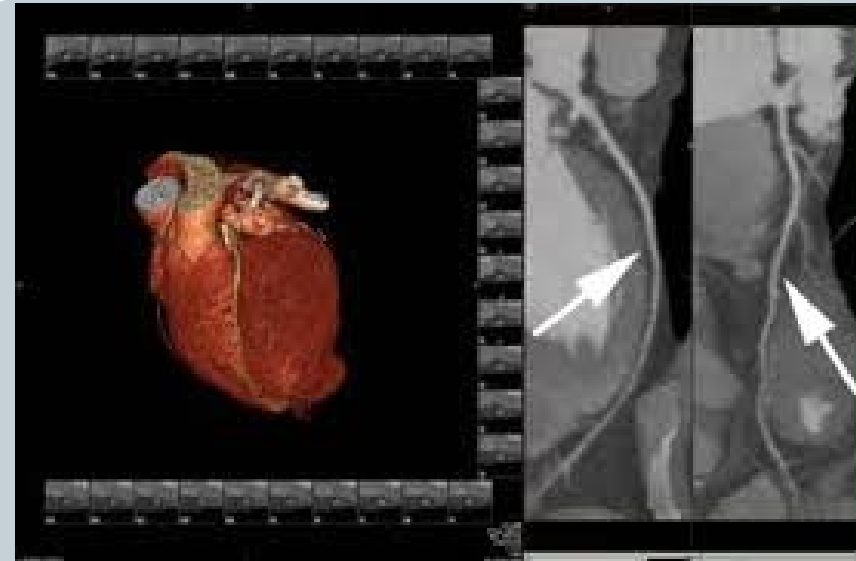


Ekkokardiografi

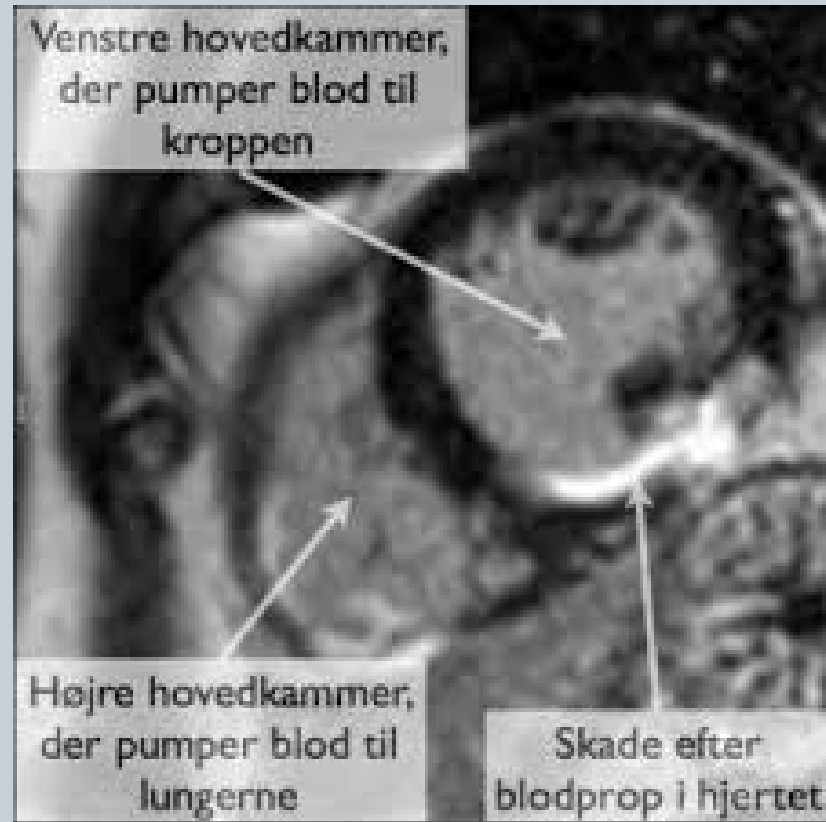
- *Hjørneste(n)* i diagnostik af:
 - Hjertheinsufficiens
 - Strukturelle forhold
 - Funktionelle forhold: Systolisk og diastolisk funktion
 - Klapforhold
- Iskæmisk hjertesygdom?!



Hjerte-CT



Hjerte-MR





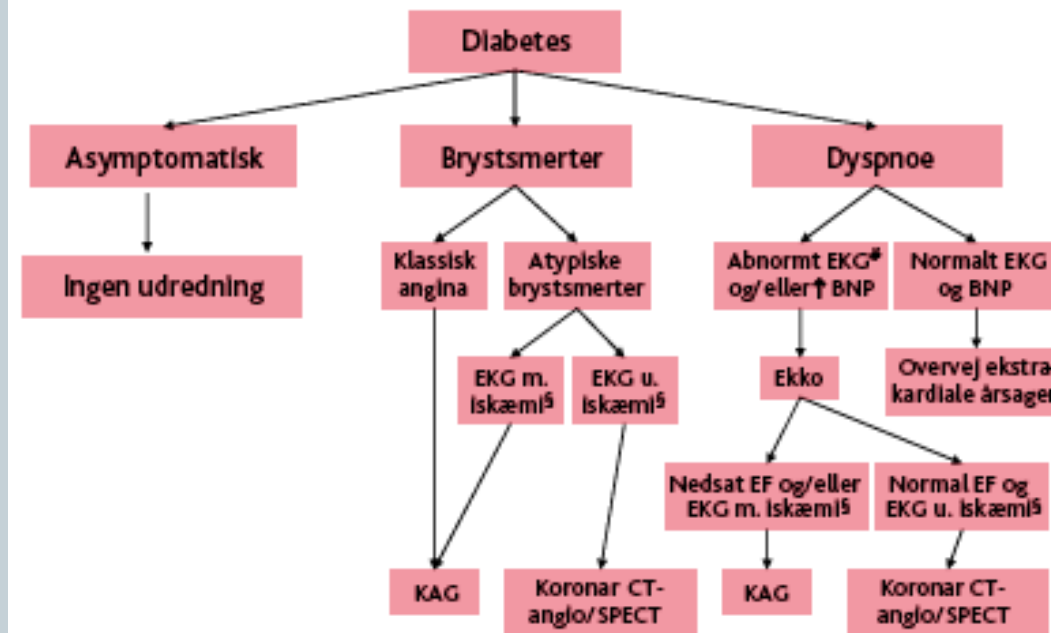
MIRO VAUTICH & SANCER

Kooperativa
Extra Insurance Group

Flowchart

- Vi screener ikke asymptomatiske diabetes pt.

Figur 2. Udredning for iskæmisk hjertesygdom og hjerterinsufficiens hos diabetespatienter



§ Iskæmi Q-takker eller ST/T-taks abnormiteter, ny-udviklet venstresidigt grenblok

F.eks. Iskæmi, hypertrofi, atrieflimren

Egen mening



- Godt/delvist/slet ikke videnskabeligt underbygget:
- Hvile EKG med infarkt mønster indicerer ekko!
- Arbejds-EKG ubrugeligt som diagnostisk redskab hos diabetiker (og ikke diabetiker)!
- Al udredning for iskæmisk hjertesygdom hos DM (og ikke DM) inkluderer ekkokardiografi
- Ved mistanke om hjertheinsufficiens kommer man ikke uden om ekkokardiografi (og hvorfor skulle man?)!
- Hyppigt indikation for rtg. af thorax og lungefunktionsundersøgelse, mistanke lungesygdom, differentialdiagnostisk

Trætte?

