ABSTRAKTER PRESENTERT PÅ VÅRMØTET

Increased left atrial volume index is a marker of left ventricular diastolic dysfunction in Tanzanian diabetic patients

Chillo P[1,2], Åshild Rieck[1], Lwakatare J[3], Lutale J[3], Gerdts E[1,4]. [1]Institute of Medicine, University of Bergen, Bergen, Norway and [2]Department of Internal Medicine, Muhimbili National Hospital, [3]Muhimbili University of Health and Allied Sciences, Dar es Salaam, Tanzania, and [4]Department of Heart Disease, Haukeland University Hospital, Bergen, Norway.

Background: Left atrial enlargement is a marker of cardiac target organ damage reflecting the severity of left ventricular (LV) diastolic dysfunction. This relation has been less studied in sub-Saharan African diabetic patients.

Methods: Cardiovascular risk assessment and echocardiography was performed in 184 diabetic out-patients attending Muhimbili National Hospital in Dar es Salaam, Tanzania.

Patients were categorized into groups of normal LV diastolic function (n = 73), impaired relaxation (n = 51), pseudonormal (n = 58) and restrictive LV filling (n = 2) patterns based on their mitral inflow and tissue Doppler indices. Left atrial volume was measured using biplane Simpson's method and indexed to body surface area (LAVI).

Results: The study population included 61 type 1 and 123 type 2 diabetic patients, mean age 44±19 years, 61% females. LAVI increased progressively with increasing LV diastolic dysfunction (Table 1), and was more often dilated (>28ml/m^2) in type 2 diabetic patients (48% vs 31%, respectively, p<0.05). In univariate analysis, larger LAVI was associated with older age, longer duration of diabetes, higher body mass index, blood pressure, LV mass index and E/E', presence of mitral regurgitation as well as lower ejection fraction and eGFR (all p<0.05). In multivariate linear regression analysis (multiple R^2 = 0.37, p<0.001) including the four groups of diastolic function as dummy variables, LAVI was associated with the severity of LV diastolic dysfunction independent of significant associations with LV hypertrophy (ß = 0.29, p < 0.001) and presence of mitral regurgitation (ß = 0.25, p < 0.001).

Conclusion: LAVI is a marker of severity of LV diastolic dysfunction in diabetic patients of sub-Saharan African origin independent of LV hypertrophy and presence of mitral regurgitation.

Table 1: Impact of LV diastolic dysfunction on LAVI

	Mean LAVI (ml/m^2)	Beta coefficients (versus normal)	
		Unadjusted	Adjusted in multivariate model
Normal LV diastolic function	25.8	-	-
Impaired LV diastolic relaxation	26.2	0.02	0.12
Pseudonormal LV filling	32.2	0.30*	0.18*
Restrictive LV filling	58.1	0.34**	0.25**

*p<0.05, **p<0.001

Symptoms of Anxiety and Depression after Percutaneous Coronary Intervention are associated with Decreased Heart Rate Variability, Impaired Endothelial Function and Increased Inflammation.

Kjetil Isaksen1, Alf Inge Larsen,2 Peter Scott Munk1. (1) Stavanger University Hospital, Department of Medicine, Stavanger, Norway (2) Stavanger University Hospital & Institute of Medicine, University of Bergen, Stavanger, Norway

Background: Depression and anxiety are prevalent risk factors for cardiac events in patients with coronary artery disease. However, little is known about the pathophysiological mechanisms responsible for this association.

Methods: Four weeks after successful revascularization by percutaneous coronary intervention for angina pectoris or an acute coronary syndrome 94 patients completed the Hospital Anxiety and Depression Scale, underwent measurement of endothelial function, assessment of heart rate variability and measurement of plasma levels of C-reactive protein.

Results: Twenty-three patients showed a HADS-anxiety score ≥8 and 19 patients had a HADS-depression score ≥5. Those patients had significant lower means of heart rate variability measures reflecting parasympathetic activity, impaired endothelial function and higher levels of C-reactive protein compared to patients with normal HADS scores (Table 1). Seven patients with a HADS-anxiety score ≥8 had a cardiovascular event, while there were six events in the

Table 1. Measures of heart rate variability, endothelial function and inflammation according to HADS scores.

	Normal HADS score	HADS-A score ≥8	HADS-D score ≥5
rMSSD (ms)	40±19	23±14***	20±9***
pNN50%	11±10	3±4***	3±2***
FMD (%)	9±5	5±5**	4±4**
CRP	2.1±1.9	3.8±2.9*	3.8±2.9*

*HADS, Hospital Anxiety and Depression Scale (A, Anxiety; D, Depression); rMSSD, Root Mean Square of Differences between successive NN intervals; pNN50%, Percentage of differences between adjacent NN intervals that are >50 msec; FMD, Flow Mediated Dilation; CRP, C-reactive protein. *p<0.05, **p<0.01, ***p<0.001.*

group with normal HADS-anxiety scores during 30±10 months follow-up (p=0.017).

Conclusions: Depressive and anxiety symptoms after revascularization for coronary artery disease are prevalent and are associated with decreased parasympathetic mediated heart rate variability, impaired endothelial function and increased inflammation, potentially contributing to explain the association between anxiety and depression and the increased risk for cardiac events in this patient population.

Ekkokardiografiske data for det første årets TAVI-pasienter

E S Davidsen, K Kuiper, V Tuseth, E Packer, Ø Bleie. Hjerteavdelingen, Haukeland Universitetssykehus, Bergen

Bakgrunn. Ved transkatheter-implantasjon av aortaventil kommer det brått til stor trykkavlastning av venstre ventrikkel, samtidig som hjertet ikke har vært påvirket av perikardiotomi eller kardioplegi, og den akustiske tilgangen ikke er vanskeliggjort etter inngrepet.

Metode. 35 pasienter fikk transkatheter-implantert aortaventil ved Haukeland Universitetssykehus i løpet av det første året slik behandling ble tilbudt. Ekkokardiografisk undersøkelse ble utført dagen før inngrepet og før utreise, ca en uke etter inngrepet.

To pasienter som døde <3 døgn etter inngrepet, er utelatt fra materialet, og av de øvrige presenteres her de 25 første.

Resultater.
Venstre ventrikkel hadde ejeksjonsfraksjon = 0,58 (0,15); masseindeks = 135 (40) g/m^2 og relativ bakreveggstykkelse = 0,48 (0,12).

Venstre ventrikkels dimensjoner (middel ± S.D.)

	Endediastolisk	Endesystolisk
Septum interventriculare (cm)	1,57 (0,33)	
Innerdiameter (cm)	4,63 (0,59)	3,24 (0,84)
Nedrevegg (cm)	1,11 (0,23)	

Aortastenosen hadde maksimalgradient = 75 (24) mmHg, middelgradient = 50 (15) mmHg, og korrigert åpningsareal = 0,28 (0,08) cm^2/m^2.

Efter behandling var maksimalgradient = 15 (7) mmHg, middelgradient = 9(5) mmHg, og korrigert åpningsareal = 0,9 (0,2) cm^2/m^2.

Klaffelekkasjer før og efter implantasjonen (antall pasienter)

Aortaklaffeinsufficiens	Før	Efter
Grad 1	10	18
Grad 2	4	3
Grad 3	1	0
Grad 4	0	0

Mitralinsufficiens	Før	Efter
Grad 1	9	7
Grad 2	7	6
Grad 3	5	4
Grad 4	0	0

Samtlige mitrallekkasjer skyldtes klaffedegenerasjon.

Konklusjon. Pasienter med alvorlig aortastenose og høy operasjonsrisiko oppnår gode haemodynamiske resultat med CoreValve® aortaventil. Mild, paravalvulær lekkasje kan påvises hos >80% av pasientene 1 uke etter implantasjonen. Degenerativt betingede mitrallekkasjer avtar bare i ubetydelig grad ved trykkavlastningen av venstre ventrikkel.

Første års erfaring med transkateter implantasjon av Corevalve® for aortastenose ved Haukeland universitetssykehus

Packer E[2], Bleie Ø[2], Kvitting P[2], Haaverstad R[2], Tuseth V[1], Davidsen ES[2] Larsen T[2], Nordrehaug JE[2], Steien E[2], Bleie H[2], Kuiper K[2]. Hjerteavdelingen[2] og kirurgisk serviceklinikk (thoraxanestesiologisk seksjon)[2], Haukeland Universitetssykehus, Bergen.

Bakgrunn: Transkateter aortaklaffimplantasjon (TAVI) er gjort i over 20000 pasienter på verdensbasis og er et behandlingsalternativ ved symptomatisk aortastenose hos pasienter med høy operasjonsrisiko ved åpen kirurgi. Haukeland Universitetssykehus har siden april 2010 implantert Medtronics CoreValve® aortaventil.

Metode: I perioden 4/2010 - 3/2011 har vi behandlet 35 pasienter, hvorav 17 kvinner. Gjennomsnittsalder (± SD) var 81.5 ± 4.9 år med logistisk euroscore 24.0 ± 16.9%.

Årsaker til avslått standard klaffeimplantasjon var høy alder, redusert allmenntil-

stand, porselensaorta, tidligere CABG, nyresvikt, angiodysplasi, høy BMI, tidligere strålebehandling mot mediastinum, dårlig lungefunksjon eller en kombinasjon av disse.

Preoperativt var gjennomsnittlig NYHA funksjonsklasse 3.2 ± 0.6.

Ved ekkokardiografi før TAVI-prosedyren var maks/middel gradientene over aortaklaffen 83.3 ± 19.3 /50.0 ± 12.5 mmHg, korrigert areal 0.33 ± 0.08 cm^2/m^2 og EF 48.7 ± 9.0%.

Femoral tilgang ble brukt hos 30 pasienter, subclavia tilgang hos 5.

Resultater: Implantasjonen var vellykket hos alle pasientene, 1 pasient fikk en ekstra ventil pga dislokasjon av den første. Arteriell hylsetid var 100.1 ± 29.1 min hvorav tid til ventilimplantasjon var 10.8 ± 8.0 min. Det var ingen påvisbar invasiv gradient etter prosedyren.

Komplikasjoner: 1 pasient døde peroperativt på grunn av aortaruptur, 1 pasient døde dag 2 på grunn av sannsynlig intracerebral katastrofe. 1 pasient døde etter 160 dager. 2 pasienter hadde cerebrale hendelser, 1 pasient hadde forbigående afasi. 1 pasient ble endarterektomert i hø. a. femoralis. I løpet av oppfølgingstiden har alle forbedret sin funksjonsklasse.

Konklusjon: Eldre pasienter med alvorlig aortastenose og høy operasjonsrisiko har god symptomatisk effekt av transkateter implantasjon av CoreValve® aortaventil med akseptabel komplikasjonsrate.

Evaluation of long-term results of catheter ablation in non-paroxysmal atrial fibrillation: a retrospective study.

Alessandro De Bortoli, MD; Ole-Jørgen Ohm, MD, PhD; Per Ivar Hoff, MD; Eivind Solheim, MD; Peter Schuster, MD, PhD; Jian Chen, MD, PhD

Background. Catheter ablation is a feasible treatment for atrial fibrillation (AF). The long-term outcome of these procedures is still unclear, particularly among patients with non-paroxysmal AF. Our knowledge concerning the best ablation strategy for these patients is limited.

Methods. Ninety-eight consecutive patients (85 males, 13 females, mean age 58.8 ± 8.7) with a documented history of non-paroxysmal AF (23 persistent; 75 long-standing persistent) underwent catheter ablation and were followed up on an outpatient basis. The procedures included stand-alone pulmonary vein isolation (PVI) (PVI group, n=35) and, at the operator's discretion, additional ablation at areas of complex fractionated atrial electrograms (CFAE) (PVI + CFAE group, n=63). In the PVI group 23 recurrent

patients underwent repeat procedures, 6 with PVI and 17 with PVI + CFAE; in the PVI + CFAE group 15 received repeat procedures with the same approach.

Results. A mean of 1.5 ± 0.7 procedures was performed in all patients; multiple procedures (up to 4) were required in 38 patients (9 persistent; 29 long-standing persistent). The PVI group had higher number of repeat procedures (65.7% vs 23.8%; p<0.001). After a mean follow-up of 15.3 ± 9.5 months, 55 patients (56.1%) maintained sinus rhythm (SR), 8 had atrial flutter (8.1%) and 35 (35.7%) AF. The proportion of patients in SR in the persistent group was significantly higher than in the long-standing persistent group (78.2% vs 49.3%; p<0.01). In terms of outcome after the first procedure, the combined PVI + CFAE ablation approach had higher long-term success than stand-alone PVI (SR 42.8% vs 17.1%; p<0.01), in particular among the long-standing persistent group (SR 37.7% vs 4.5%; p<0.01).The duration of uninterrupted AF prior to procedure showed an inverse correlation with the long-term success. Among the patients who underwent PVI + CFAE ablation the success rate was 78.2%, 62.9% and 33.3% (p<0.01) with histories of < 2, 2 to 4 and >4 years, respectively. No correlation was found between ablation success and left atrial size or left ventricular ejection fraction.

Conclusions. The duration of uninterrupted AF prior to the procedure has an important impact on the ablation outcome during long-term follow-up. SR can be restored and maintained in the majority of patients after extensive ablation, particularly in persistent AF. A combination of PVI + CFAE ablation as first approach appears to confer better results than stand-alone PVI with a lower occurrence of repeated procedures.

Circulating Markers of Collagen Turnover Following ST Segment Elevation Myocardial Infarction and Primary Percutaneous Coronary Intervention Predict Infarct Size and Left Ventricular Volumes, Estimated by Serial Cardiac Magnetic Resonance Imaging for up to 1 Year

Cord Manhenke[1,2]; Stein Ørn[1,2]; Thor Ueland[3]; Pål Aukrust[3]; Kenneth Dickstein[1,2]. [1] Stavanger Universitetssjukehus, Stavanger, [2] Universitet i Bergen, Bergen, [3] Institutt for indremedisinsk forskning, Rikshospitalet, Universitet i Oslo, Oslo

Background: We investigated the time profile and predictive value of circulating markers of collagen turnover (CTO) for infarct size (IS), ejection

fraction (EF) and left ventricular (LV) volumes, determined by serial cardiac magnetic resonance imaging (cMRI) in patients undergoing primary percutaneous coronary angioplasty for ST-elevation myocardial infarction (STEMI).

Methods: Forty-two patients with first time STEMI, 1-vessel disease, and successful revascularization of the proximal occluded infarct related artery were included. Serum samples were obtained at admission, 2 days, 7 days, 2 months and 1 year post-STEMI. We analyzed CTO markers of collagen synthesis: N-terminal procollagen type I (PINP), N-terminal procollagen typeIII (PIIINP), and collagen degradation: C-terminal telopeptide of type I collagen (ICTP); established markers of outcome: Troponin-T (TnT), C-reactive protein (CRP), and N-terminal pro brain natriuretic peptide (NT-proBNP). Late enhancement and cine cMRI was performed on day 2, day 7, 2 months and 1 year post-STEMI.

Results: Median time from symptom debut to admission was 145 minutes (range: 25–720). CTO- marker analyses from admission samples were available in 35 patients. Significant time-dependent changes did occur for all 3 CTO-markers and the PINP/ICTP ratio ($p < 0.001$ for trend for all markers). In multivariable analysis including markers of CTO, TnT, CRP and NT-proBNP at admission, PINP was the only independent predictor of IS, EF and LV volumes at all imaging time-points (R^2 ranging from 0.17 for LV end systolic volume index at 2 months [$p < 0.05$], to 0.36 for EF at 1 year [$p < 0.001$]). For serum samples drawn at 2 days, a model containing PINP/ICTP ratio, CRP, TnT and NT-proBNP was highly predictive for LV volumes, infarct size and EF at all imaging time-points, explaining up to 80 % of the variance of cMRI findings ($R^2 = 0.80$ for IS at 2 months, $p < 0.0001$).

Conclusions: Following STEMI, PINP appears to be a very early predictor of infarct size and LV-volumes, while the combination of PINP/ICTP ratio, CRP, NT-proBNP and TnT at 2 days post-STEMI is highly predictive for cMRI findings for up to 1 year. Our findings support the potential role of circulating markers of CTO as surrogates for subsequent extracellular cardiac matrix remodeling.

Physiological effects of combined thermal and electrical muscle stimulation (cTEMS) in healthy individuals

Espen Rostrup[a,c], MD, Monika A. H. Christensen[b,c], MD, Reinhard Seifert[a], BSc, Jan Erik Nordrehaug[a,c], MD, PhD [a] Department of Heart Disease, Haukeland University Hospital, Bergen, Norway. [b] Hormone laboratory, Haukeland University Hospital, Bergen, Norway, [c] Institute of Medicine, Faculty of Medicine and Dentistry, Bergen, Norway

Purpose: Electrical muscle stimulation may be an alternative to exercise training for individuals not able or willing to take part in regular physical exercise. Oxygen uptake (VO2) is an established effect-parameters in exercise and the purpose of this study was primarily to investigate the effects of combined thermal and electrical muscle stimulation (cTEMS) on oxygen uptake at different levels of heat and modes of electrical stimulation.

Methods: In an observational experimental trial 14 healthy persons aged 30 to 70

were randomly assigned to undergo stimulation with 5 different electrical pulse types. A total of 10 electrical pulse types were tested in random order at low and high heat intensity and at 20% of the maximum output (194 mA) and at each individual's maximal stimulation intensity. We measured peak oxygen uptake ($VO_{2\,peak}$) and in addition capillary lactate, catecholamines, growth hormone (GH) and hemodynamic parameters at each heat and electricity intensity level.

Results: Multivariate analyses showed that electrical stimulation significantly increased the $VO_{2\,peak}$ and the levels of capillary lactate, catecholamine and GH. Increasing the heat intensity in the stimulation protocol led to additional hemodynamic response and a rise in GH, but had no effect on attainable stimulation intensity, $VO_{2\,peak}$, lactate or catecholamine levels. Using a 100 Hz monophasic stimulation as the reference, all electrical pulse types increased $VO_{2\,peak}$ significantly. We observed a dose-response relationship for $VO_{2\,peak}$ for each 10% increase in stimulation. The highest $VO_{2\,peak}$ was observed with biphasic continuous stimulation at 7 Hz ($p < 0.001$).

Conclusions: cTEMS elicited a physiological response similar to physical activity with increased oxygen uptake, capillary lactate and catecholamines. There were significant differences in $VO_{2\,peak}$ between the different electrical pulse types, but heat intensity only affected the hemodynamic responses and growth hormone.

Hypoperfusion by Contrast Echocardiography does not reflect Gender Differences in Angiographic Disease Severity in NSTEMI

Mai Tone Lønnebakken[1,2], Eva M. Staal[3], Jan Erik Nordrehaug[1,2], Eva Gerdts[1,2]

Institute of Medicine, University of Bergen[1], Dept. of Heart Disease, Haukeland University Hospital, Bergen[2], Dept. of Cardiology, Stavanger University Hospital, Stavanger[3],Norway.

Background: Significant gender differences in angiographic severity of coronary artery disease in patients with non-ST-elevation myocardial infarction (NSTEMI) has been demonstrated. However, less is known about gender differences in the extent of myocardial hypoperfusion by contrast echocardiography.

Methods: We assessed segmental myocardial wall motion and perfusion by contrast echocardiography in 110 patients (34 women and 76 men) with NSTEMI prior to scheduled coronary angiography. Number of hypoperfused segments using a 17 segment left ventricular model was compared to angiographic coronary artery disease by quantitative coronary angiography (QCA).

Results: Age (70±12 vs. 66±12 years), troponin T level (0.53±0.66 vs. 0.75±1.32 µg/l), Thrombolysis In Myocardial Infarction (TIMI) risk score (3.2±1.4 vs. 3.5±1.4), left ventricular ejection fraction (58±12 vs. 55±11 %), diabetes (21 vs. 18%) and hypertension (44 vs. 45 %) did not differ between women and men in the study (all p=ns). However, proportionally more women were ≥65 years of age (74% vs. 51%, p<0.05). More women had angiographically normal coronary arteries and fewer women had multivessel disease (both p<0.05) (Table). However, neither the number of segments with wall motion abnormality nor the number of segments with hypoperfusion by contrast echocardiography differed between genders (Table).

Conclusion: Compared to men, women with NSTEMI had angiographically less severe coronary artery disease, but similar extent of myocardial hypoperfusion by contrast echocardiography. These findings suggest that microvascular disease may be more common in women than in men with NSTEMI.

Table

|	Women (n=34)	Men (n=76)
No significant stenosis by QCA (%)	27*	9
Multivessel disease by QCA (%)	35*	57
Wall motion abnormality (LV segments)	4.1±0.7	3.5±0.4
Hypoperfusion (LV segments)	7.0±3.7	7.3±3.4

* p<0.05 compared to men

Impact of hypertension on progression of left ventricular hypertrophy and cardiovascular events in patients with aortic valve stenosis

Ashild E Rieck MD[1], Dana Cramariuc MD, PhD[2], Barbara P. Lund MD[2], Mai Tone Lønnebakken MD, PhD[1]and Eva Gerdts MD, PhD[1,2].
[1]Institute of Medicine, University of Bergen, Bergen, Norway, [2]Haukeland University Hospital, Bergen, Norway

Background: Hypertension is commonly found to coexist with aortic stenosis (AS). However, less is known about how this comorbidity influences left ventricular (LV) structure and outcome in these patients.

Methods: Clinical, echocardiographical and outcome data (ischemic cardiovascular events [ICE] and aortic valve events [AVE], both secondary study endpoints) from annual study visits during an average of 45.8 months follow-up in 1725 patients with initial asymptomatic AS randomised in the Simvastatin and Ezetimibe in Aortic Stenosis (SEAS) study was used. LV geometry was assessed from LV mass indexed to height[2.7] and relative wall thickness in combination.

Results: Compared to normotensive patients (NT, n=464), the hypertensive (HT, n=1261) group had significantly higher age, body mass index, blood pressure and LV mass at baseline (all p<0.05). Aortic valve area/body surface at base-

Baseline   Last visit
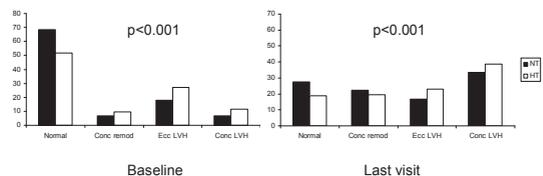
line and in-study change in peak aortic jet velocity did not differ between groups. LV geometry changed from predominantly normal geometry, to predominantly concentric LV hypertrophy at final visit in both groups, but HT patients had significantly higher prevalence of LV hypertrophy (62 % vs 38 %, p<0.001 Fig. 1) In univariate Cox regression analysis, HT predicted a 46% higher rate of ICE (p=0.007), while no association with rate of AVE was found. In multivariate Cox regression, adjusting for age, gender, aortic valve area, and LV mass, HT did not predict increased rate of events.

Conclusion: In AS, concomitant HT is associated with more abnormal LV geometry, but not with increased rate of cardiovascular events.

Impact of aortic valve stenosis and hypertension on radial strain in multiple myocardial layers

Dana Cramariuc[1], Johannes Hjertaas[2], Leidulf Segadal[3], Einar S. Davidsen[1], Knut Matre[2] and Eva Gerdts[1,2]. [1]Department of Heart Disease, Haukeland University Hospital, Bergen, Norway; [2]Institute of Medicine, University of Bergen, Bergen, Norway; [3]Department of Surgical Sciences, University of Bergen, Bergen, Norway.

Purpose: In young healthy individuals, left ventricular (LV) radial strain is gradually increasing from the subepicardial to the subendocardial layer. In patients with aortic stenosis (AS), LV global systolic function by either ejection fraction or midwall shortening decreases in response to chronic pressure overload. Our aim was to investigate regional changes in myocardial layer function measured as radial strain in AS.

Methods: Systolic strain was assessed in three layers in the inferior LV wall by tissue Doppler imaging in 70 patients with AS (73±10yrs, 41 women, 50% hypertensive). Three small regions of interest (size 2x6 mm, strain length 2 mm) were tracked for peak systolic radial strain measurements. 37 patients had mild/moderate and 33 severe AS by aortic valve area corrected for pressure recovery.

Results: Strain was significantly lower in the subepicardial layer (33.8±40.7%), but similar in the mid-myocardial and subendocardial layers: 52.8±39.3 vs. 55.2±41.5%, both p<0.001. In all three layers, strain was lower in patients with severe AS compared to those with mild/moderate AS (p <0.05). In multivariate regression analyses, strain in the mid-myocardium was attenuated by the presence of hypertension independent of age, gender, LV mass, severity of AS and subepicardial strain (Table). Strain in the subendocardium was significantly influenced by severe AS only (Table).

Conclusions: In patients with AS, AS severity mainly influences subendocardial strain, while concomitant hypertension primarily influences mid-myocardial strain. Chronic pressure overload in AS is associated with changed strain gradient across the LV myocardial wall.

LDL kolesterol - mål oppnåelse hos pasienter med angiografisk verifisert koronar hjertesykdom.
Et ett års (2010) materiale på 314 pasienter i kardiologisk praksis utenfor sykehus.

Magnus Heldal, Terje R Pedersen. Gardermoen Hjertesenter og Avdeling for forebyggende medisin, Oslo universitetssykehus.

Bakgrunn: I tillegg til utarbeidelse av guidelines er implementering av disse sentralt for å gi pasienter et godt behandlingstilbud i samsvar dagens kunnskapsnivå. Pasienter med etablert koronar hjertesykdom bør ha LDL kolesterol <= 2 mmol/L. Mange oppnår ikke dette målet, men det er lite kjent hvor stort problemet er i klinisk praksis.

Metoder: I en kardiologisk spesialist praksis der pasienter mottas etter henvisning fra første linje tjenesten ble journalene til alle pasienter fra året 2010 med diagnosen i25.1, (atherosclerotisk hjertesykdom, definert som angiografisk dokumentert coronar hjertesykdom) gjennomgått retrospektivt.

Resultater: 314 pasienter fylte kriteriet, 83 % menn, alder, mean(SD) 65(8) år. Tid fra siste kontakt med spesialist helsetjenesten var 25(18) måneder. Trettisyv % var ACB operert, og 65 % PCI behandlet. Femten % hadde diabetes. Førtifem % var henvist for symptomer, 55 % for kontroll uten aktuelle besvær.

Lipider: Total kolesterol (mean-SD) 4.3(0.9) mmol/L, HDL 1.2(0.3), LDL 2.4(0.8), TG 1.4(0.8) . Trettiseks % hadde LDL <=2.0 mmol/L.

Lipidsenkende behandling: Simvastatin 57 %, mean dose 41 mg, Atorvastatin 32 %, mean dose 51 mg, andre statiner 4 %, Ezetimib 10 %.

Konklusjon: Bare en tredjedel av pasientene har LDL verdier som oppfyller behandlingsmålet for denne gruppen. "Rutinekontroll" er nyttig for å påvise behov for viktig endring i medisinering.

 Neste trinn i prosjektet er å kartlegge effekten av forskjellige strategier for å bedre måloppnåelse.

	Mid-myocardial strain (R²=0.36, p<0.001)		Subendocardial strain (R²=0.24, p<0.01)	
	Beta	p	Beta	p
Age (yrs)	0.02	0.85	-0.15	0.21
Gender	0.14	0.27	0.26	0.06
LV mass (g)	-0.07	0.55	-0.14	0.29
Hypertension	-0.20	0.05	-0.05	0.64
Severe AS	-0.12	0.28	-0.27	0.03
Subepicardial strain (%)	0.50	0.01	0.10	0.39

Dose Finding Study of Intracoronary Insulin Infusion in a Porcine Model

Grete Slettom, MD*, Anne Kristine Jonassen, PhD#, Vegard Tuseth, MD, PhD*, Reidar Johan Pettersen MD, PhD*, Terje Hjalmar Larsen, MD, PhD*#, Reinhard Seifert BSc*, Jan Erik Nordrehaug, MD, PhD*. *Department of Heart Disease, Haukeland University Hospital, § Institute of Medicine, University of Bergen, # Department of Biomedicine, University of Bergen

Background: Insulin given at immediate reperfusion reduces myocardial infarct size in the in vitro and the ex vivo rat heart. In vivo, insulin may cause hypoglycaemia, hypokalemia and elevation of catecholamines, potentially harmful during an acute myocardial infarction. The purpose of this study was to evaluate tolerance and safety of intracoronary insulin infusions in a porcine model applying percutaneous intervention techniques.

Methods: Intracoronary insulin (90 mU-2U), was administered in the left main coronary artery over 3x30 s. Serum glucose, potassium, nephrines and haemodynamics were measured at baseline and regularly for 30 min. Maximum tolerated insulin dose was titrated within the confinements of glucose $\geq$ 2.5 mmol/ l and potassium $\geq$ 3.0 mmol/ l.

Results: Nine fasting and 16 non-fasting pigs were included. In fasting pigs 100 mU of insulin satisfied the criteria for maximum tolerated dose, while a tenfold higher dose (1U) was tolerated among non-fasting animals. Baseline values for glucose and potassium were significantly different between groups, (p=0.003 and p=0.01 respectively). Glucose and potassium remained stable in the fasting group. In the non-fasting group, both variables changed significantly (p<0.001), but within the predefined limits, with no subsequent catecholamine rise or hemodynamic alterations.

Conclusions: Tolerated intracoronary insulin dosage differs tenfold between fasting and non-fasting animals. The use of both fasting and fed pigs reflects clinical emergency situations. Percutaneous catheter based techniques appear ideal and safe for intracoronary reperfusion therapy with insulin

Plasma choline and betaine levels and long-term prognosis in patients with coronary heart disease

Hall Schartum-Hansen MD[a,b], Eva Ringdal Pedersen MD[a], Kaare Harald Bønaa MD, PhD[c,d,e] Gard Svingen MD[a], Per Magne Ueland MD PhD[f,g], Reinhard Seifert BSc[h], Jan Erik Nordrehaug MD PhD[a,h], Inger Njølstad MD PhD[c], Marta Ebbing MD PhD[h], Øyvind Bleie MD PhD[h], Dennis W Nilsen MD PhD[j], Ottar Nygård MD PhD[a,b,h]. [a]Institute of Medicine, University of Bergen, Bergen, Norway; [b]Nordic Centre of Excellence in Human Nutrition – MitoHealth, University of Bergen, Bergen, Norway; [c]Department of Community Medicine, University of Tromsø, Tromsø, Norway; [d]Unit of Applied Clinical Research, Department of Cancer Research and Molecular Medicine, Norwegian University of Science and Technology, Trondheim, Norway; [e]Department of Heart Disease, St.Olav University Hospital, Trondheim, Norway; [f]Section for Pharmacology, Institute of Medicine, University of Bergen, Norway; [g]Laboratory of Clinical Biochemistry, Haukeland University Hospital, Bergen, Norway; [h]Department of Heart Disease, Haukeland University Hospital, Bergen, Norway; [i]Department of Medicine, Stavanger University Hospital, Stavanger, Norway

Background: Choline and its metabolite betaine are methylamines connected to one-carbon and lipid metabolism. Circulating choline has also been implicated as a biomarker in acute coronary syndrome (ACS).

Objectives: We studied associations of plasma choline and betaine to clinical presentation of patients hospitalized for suspected coronary heart disease (CHD), and to long-term risk of acute myocardial infarction (AMI) and all-cause mortality.

Methods: Samples were obtained from 6770 participants in two Norwegian randomized clinical trials (Norwegian Vitamin Trial (NORVIT) and Western Norway B-Vitamin Intervention Trial (WENBIT)), of whom 2579 had stable angina pectoris (SAP) and 4191 ACS.

Results: At baseline, plasma levels of both betaine and choline were >10% lower in ACS than in SAP patients, and after 1-3 months, levels rose 10-40% compared to baseline. During a mean (SD) follow-up of 34.0 (13.4) months, 13.8% of the patients suffered from AMI and during an extended follow-up of 73.5 (23.4) months, 14.9% died. In multivariate survival analyses (comparing the 4th versus the 1st quartile), baseline plasma choline in ACS patients predicted all-cause mortality (hazard ratio (HR) (95% confidence interval) 1.51 (1.16, 1.97), p=0.002),

but not AMI. However, discrimination in receiver operating curve models did not improve. Plasma choline did not predict either endpoint in patients with SAP. Plasma betaine was not associated with endpoints in any subgroups.

Conclusion: P*lasma values of both choline and betaine are* transiently *lowered in ACS* and choline levels are weakly predictive of all-cause mortality these patients. Plasma betaine showed no association with risk of incident acute events in any category of CHD patients.

2-D speckle strain after exercise testing using a new multiplan probe to improve the detection of ischemia .

Per Anton Sirnes Md. Phd, Cardiology consultant , Practice. Moss

Background. For the detection of ischemia in patients with suspected stable coronary artery disease,(CAD) the exercise test (ET) is still the "work horse" in many practices. However it is well known that ET has a limited sensitivity and specificity. Detection of wall motion abnormalities by stress echo during dobutamine infusion is a well-established technique, but requires a set-up which is difficult to obtain regarding personnel, drugs, infusion pumps etc. in a small private practice outside hospital. Deformation imaging using 2-D speckle strain (2DSS) has in recent years been well established as a method to detect myocardial ischemia in acute coronary syndromes. However to use 2DSS in the immediate post exercise period with rapidly

declining heart rate has been problematic as the AFI method requires that the heart rate is not too different in the three apical echocardiographic views. By using a multiplane probe acquiring all three planes simultaneously this problem is solved, but the obtainable frame rate has so far been too low to use the simplified and rapid AFI method for global 2D strain. However, the new V4 multiplane 4D probe for the Vivid E-9 echo machine has an improved frame rate, and I decided to try to detect ischemia in the immediate post-exercise period using this probe

Methods. Patients with suspected CAD were examined by standard echo techniques including AFI 2DSS before they underwent treadmill ET. Using a 4m extension cable for the ECG leads the patients were immediately brought back to the echo bench after finishing exercise and using the 4D probe from the apex frames were stored for AFI analysis including Post Systolic Index (PSI)

Results. Post ET frames of sufficient quality for AFI analysis were obtainable from most patients. However, careful selection of frames with good quality in all walls and careful attention to probe orientation to visualize all walls correctly was of paramount importance. In patient undergoing invasive investigation there was a good agreement with respect to the "bulls eye" AFI plot and the effected artery. In particular, the PSI bulls eye plot seemed to be diagnostic

Conclusion. 2DSS post exercise using a modern multiplane probe with a high acquisition rate seems to be a valuable addition to the standard ET with a minimum of use of extra time for the practicing cardiologist. Full case reports will be provided

2DSS PRE AND POST   PSI PRE AND POST ECG Peak EX