Ärztlicher Kreisverband Traunstein
15. Januar 2020

Lipid-Update:
Was sagen die neuen ESC Leitlinien?

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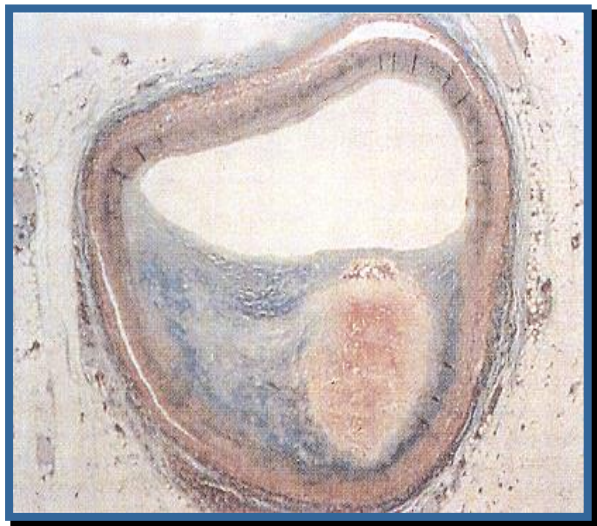


CONFLICT OF INTEREST (COI) - DISCLOSURE

- *Honorarium for Lectures:* AstraZeneca, Novartis, Amgen, Sanofi, Roche
- *Consulting:* Novartis, Pfizer, The Medicines Company, Amgen, AstraZeneca, Kowa, Corvidia
- *Participation in Clinical Trials:* CANTOS (Novartis), FOURIER, GLAGOV (Amgen), OPTIONS I und II (Sanofi/Regeneron), SPIRE (Pfizer), CAIN III (MHICC), PROMINENT (Kowa), DalGene (DalCor), COLCOT (MHICC)
- *Research Contracts:* Abbott, Roche Diagnostics, Beckmann, Singulex
- *Stockholder of a Healthcare Company:* none

2019 ESC/EAS Guidelines for the management of dyslipidaemias: *lipid modification to reduce cardiovascular risk*

ESC
European Society of Cardiology

EAS

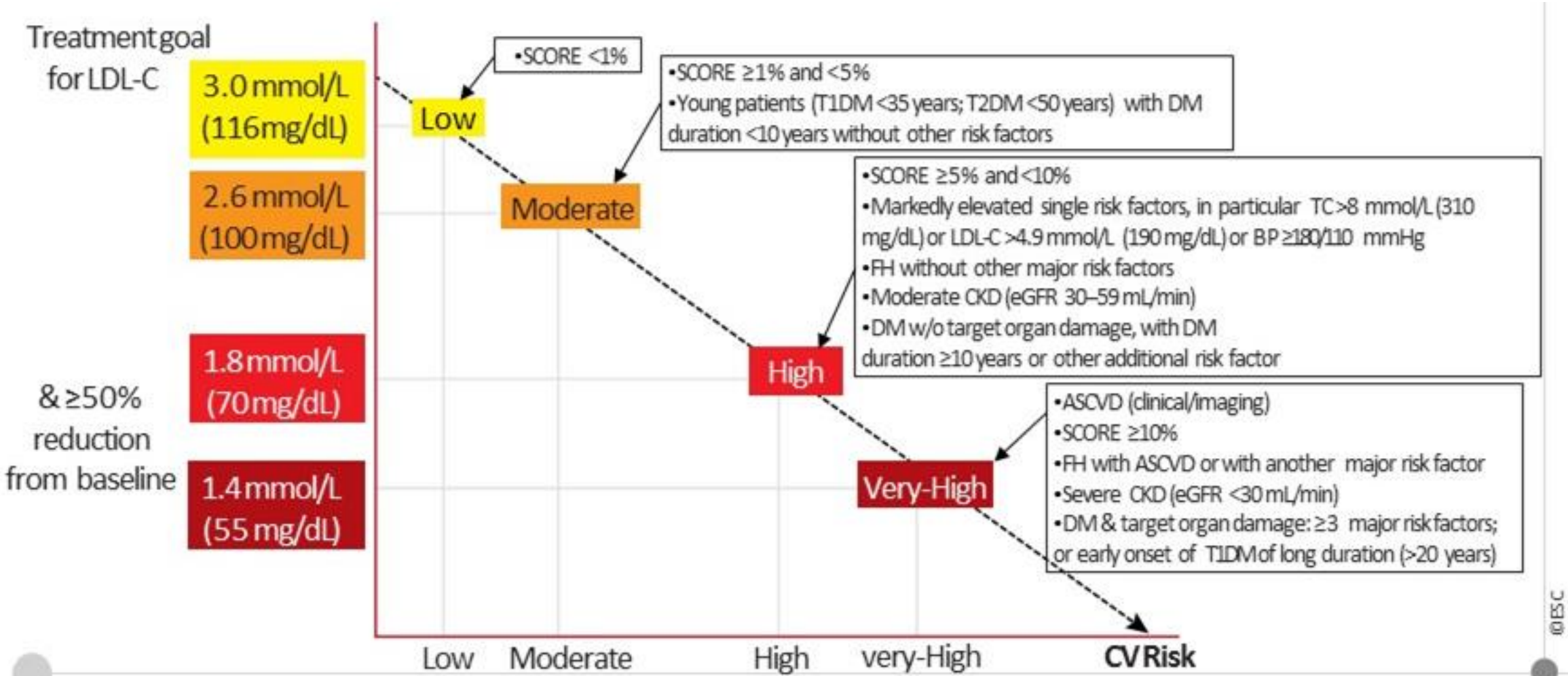
ESC CLASSES OF RECOMMENDATIONS

	Definition	Wording to use
Class I	Evidence and/or general agreement that a given treatment or procedure is beneficial, useful, effective.	Is recommended or is indicated
Class II	Conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of the given treatment or procedure.	
Class IIa	Weight of evidence/opinion is in favour of usefulness/efficacy.	Should be considered
Class IIb	Usefulness/efficacy is less well established by evidence/opinion.	May be considered
Class III	Evidence or general agreement that the given treatment or procedure is not useful/effective, and in some cases may be harmful.	Is not recommended

www.escardio.org/guidelines

2019 ESC/EAS Guidelines for the management of dyslipidaemias: lipid modification to reduce cardiovascular risk (European Heart Journal 2019 -doi: 10.1093/eurheartj/ehz455)

CENTRAL ILLUSTRATION UPPER PANEL TREATMENT GOALS FOR LOW-DENSITY LIPOPROTEIN CHOLESTEROL (LDL-C) ACROSS CATEGORIES OF TOTAL CARDIOVASCULAR DISEASE RISK



www.escardio.org/guidelines

2019 ESC/EAS Guidelines for the management of dyslipidaemias: lipid modification to reduce cardiovascular risk (European Heart Journal 2019 -doi: 10.1093/eurheartj/ehz455)

NEW RECOMMENDATIONS (1)

Cardiovascular imaging for assessment of ASCVD risk

Assessment of arterial (carotid and/or femoral) plaque burden on arterial ultrasonography should be considered as a risk modifier in individuals at low or moderate risk.

Cardiovascular imaging for assessment of ASCVD risk

CAC score assessment with CT may be considered as a risk modifier in the CV risk assessment of asymptomatic individuals at low or moderate risk.

Lipid analyses for CVD risk estimation

Lp(a) measurement should be considered at least once in each adult person's lifetime to identify those with very high inherited Lp(a) levels >180 mg/dL (>430 nmol/L) who may have a lifetime risk of ASCVD equivalent to the risk associated with heterozygous familial hypercholesterolaemia.

2019 ESC/EAS Guidelines for the management of dyslipidaemias: lipid modification to reduce cardiovascular risk (European Heart Journal 2019 -doi: 10.1093/eurheartj/ehz455)

NEW RECOMMENDATIONS (2)

Drug treatments of patients with hypertriglyceridaemia
In high-risk (or above) patients with TG between 1.5 and 5.6 mmol/L (135 - 499 mg/dL) despite statin treatment, n-3 PUFAs (icosapent ethyl 2 x 2g/day) should be considered in combination with statins.

Treatment of patients with heterozygous FH
In primary prevention, for individuals with FH at very-high risk, an LDL-C reduction of ≥50% from baseline and an LDL-C goal of <1.4 mmol/L (<55 mg/dL) should be considered.

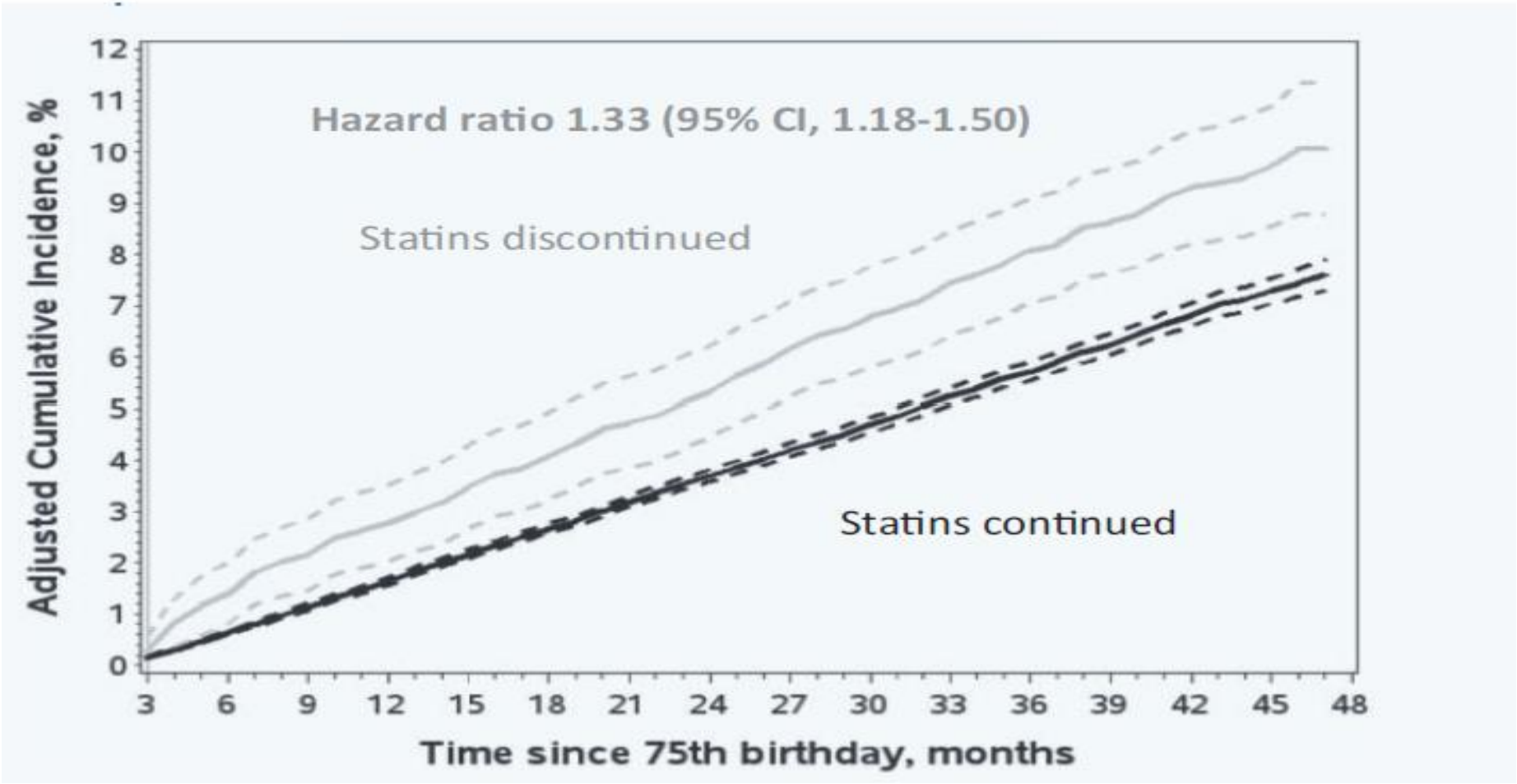
Treatment of dyslipidaemias in older people
Treatment with statins is recommended for primary prevention, according to the level of risk, in older people aged ≤75.

Treatment of dyslipidaemias in older people
Initiation of statin treatment for primary prevention in older people aged >75 may be considered, if at high risk or above.

www.escardio.org/guidelines

2019 ESC/EAS Guidelines for the management of dyslipidaemias: lipid modification to reduce cardiovascular risk (European Heart Journal 2019 -doi: 10.1093/eurheartj/ehz455)

INCREASED ADMISSION FOR CV EVENTS IN 75 YEAR OLD PATIENTS AFTER DISCONTINUATION OF STATIN THERAPY



N = 120173 patients in primary prevention, FU 2,4 years

Giral et al Eur Heart J 2019; 40:3516-3525

NEW RECOMMENDATIONS (3)

Treatment of dyslipidaemias in DM

In patients with T2DM at very-high risk, an LDL-C reduction of ≥50% from baseline and an LDL-C goal of <1.4 mmol/L (<55mg/dL) is recommended.

In patients with T2DM at high risk, an LDL-C reduction of ≥50% from baseline and an LDL-C goal of <1.8 mmol/L (<70 mg/dL) is recommended.

Statins are recommended in patients with T1DM who are at high or very-high risk.

Treatment of dyslipidaemias in DM

Intensification of statin therapy should be considered before the introduction of combination therapy.

If the goal is not reached, statin combination with ezetimibe should be considered.

Treatment of dyslipidaemias in DM

Statin therapy is not recommended in pre-menopausal patients with DM who are considering pregnancy or not using adequate contraception.

2019 ESC/EAS Guidelines for the management of dyslipidaemias: lipid modification to reduce cardiovascular risk (European Heart Journal 2019 -doi: 10.1093/eurheartj/ehz455)

NEW RECOMMENDATIONS (4)

Lipid-lowering therapy in patients with ACS

For patients who present with an ACS, and whose LDL-C levels are not at goal despite already taking a maximally tolerated statin dose and ezetimibe, adding a PCSK9 inhibitor early after the event (if possible, during hospitalization for the ACS event) should be considered.

2019 ESC/EAS Guidelines for the management of dyslipidaemias: lipid modification to reduce cardiovascular risk (European Heart Journal 2019 -doi: 10.1093/eurheartj/ehz455)

CHANGES IN RECOMMENDATIONS (1)

2016	2019
Lipid analyses for CVD risk estimation	**Lipid analyses for CVD risk estimation**
ApoB should be considered as an alternative risk marker whenever available, especially in individuals with high TG.	ApoB analysis is recommended for risk assessment, particularly in people with high TG, DM, obesity or metabolic syndrome, or very low LDL-C. It can be used as an alternative to LDL-C, if available, as the primary measurement for screening, diagnosis, and management, and may be preferred over non-HDL-C in people with high TG, DM, obesity, or very low LDL-C.

2019 ESC/EAS Guidelines for the management of dyslipidaemias: lipid modification to reduce cardiovascular risk (European Heart Journal 2019 -doi: 10.1093/eurheartj/ehz455)

CHANGES IN RECOMMENDATIONS (2)

2016	2019
Pharmacological LDL-C lowering	**Pharmacological LDL-C lowering**
If the LDL goal is not reached, statin combination with a cholesterol absorption inhibitor should be considered.	If the goals are not achieved with the maximum tolerated dose of statin, combination with ezetimibe is recommended.

2019 ESC/EAS Guidelines for the management of dyslipidaemias: lipid modification to reduce cardiovascular risk (European Heart Journal 2019 -doi: 10.1093/eurheartj/ehz455)

CHANGES IN RECOMMENDATIONS (3)

2016	2019
Pharmacological LDL-C lowering	**Pharmacological LDL-C lowering**
In patients at very-high risk, with persistent high LDL-C despite treatment with maximal tolerated statin dose, in combination with ezetimibe or in patients with statin intolerance, a PCSK9 inhibitor may be considered.	For secondary prevention, patients at very-high risk not achieving their goal on a maximum tolerated dose of statin and ezetimibe, a combination with a PCSK9 inhibitor is recommended.
	For very-high-risk FH patients (that is, with ASCVD or with another major risk factor) who do not achieve their goals on a maximum tolerated dose of statin and ezetimibe, a combination with a PCSK9 inhibitor is recommended.

2019 ESC/EAS Guidelines for the management of dyslipidaemias: lipid modification to reduce cardiovascular risk (European Heart Journal 2019 - doi: 10.1093/eurheartj/ehz455)

CHANGES IN RECOMMENDATIONS (4)

2016	2019
Drug treatments of hypertriglyceridaemia	**Drug treatments of hypertriglyceridaemia**
Statin treatment may be considered as the first drug of choice for reducing CVD risk in high-risk individuals with hypertriglyceridaemia.	Statin treatment is recommended as the first drug of choice for reducing CVD risk in high-risk individuals with hypertriglyceridaemia [TG >2.3 mmol/L (200 mg/dL)].

2019 ESC/EAS Guidelines for the management of dyslipidaemias: lipid modification to reduce cardiovascular risk (European Heart Journal 2019 -doi: 10.1093/eurheartj/ehz455)

CHANGES IN RECOMMENDATIONS (5)

2016	2019
Treatment of patients with heterozygous FH	**Treatment of patients with heterozygous FH**
Treatment should be considered to aim at reaching an LDL-C <2.6 mmol/L (<100 mg/dL) or in the presence of CVD <1.8 mmol/L (<70 mg/dL). If targets cannot be reached, maximal reduction of LDL-C should be considered using appropriate drug combinations.	For FH patients with ASCVD who are at very-high risk, treatment to achieve at least a 50% reduction from baseline and an LDL-C <1.4 mmol/L (<55 mg/dL) is recommended. If goals cannot be achieved, a drug combination is recommended.

2019 ESC/EAS Guidelines for the management of dyslipidaemias: lipid modification to reduce cardiovascular risk (European Heart Journal 2019 -doi: 10.1093/eurheartj/ehz455)

CHANGES IN RECOMMENDATIONS (6)

2016	2019
Treatment of patients with heterozygous FH	**Treatment of patients with heterozygous FH**
Treatment with a PCSK9 antibody should be considered in FH patients with CVD or with other factors putting them at very-high risk for CHD, such as other CV risk factors, family history, high Lp(a), or statin intolerance.	Treatment with a PCSK9 inhibitor is recommended in very-high-risk FH patients if the treatment goal is not achieved on maximal tolerated statin plus ezetimibe.

2019 ESC/EAS Guidelines for the management of dyslipidaemias: lipid modification to reduce cardiovascular risk (European Heart Journal 2019 -doi: 10.1093/eurheartj/ehz455)

CHANGES IN RECOMMENDATIONS (7)

2016	2019
Treatment of dyslipidaemias in older adults	**Treatment of dyslipidaemias in older adults**
Since older people often have comorbidities and have altered pharmacokinetics, lipid-lowering medication should be started at a lower dose and then titrated with caution to achieve target lipid levels that are the same as in younger people.	It is recommended that the statin is started at a low dose if there is significant renal impairment and/or the potential for drug interactions, and then titrated upwards to achieve LDL-C treatment goals.

2019 ESC/EAS Guidelines for the management of dyslipidaemias: lipid modification to reduce cardiovascular risk (European Heart Journal 2019 -doi: 10.1093/eurheartj/ehz455)

CHANGES IN RECOMMENDATIONS (8)

2016	2019
Lipid-lowering therapy in patients with ACS	**Lipid-lowering therapy in patients with ACS**
If the LDL-C target is not reached with the highest tolerated statin dose and/or ezetimibe, PCSK9 inhibitors may be considered on top of lipid-lowering therapy; or alone or in combination with ezetimibe in statin-intolerant patients or in whom a statin is contraindicated.	If the LDL-C goal is not achieved after 4 - 6 weeks despite maximal tolerated statin therapy and ezetimibe, addition of a PCSK9 inhibitor is recommended.

2019 ESC/EAS Guidelines for the management of dyslipidaemias: lipid modification to reduce cardiovascular risk (European Heart Journal 2019 -doi: 10.1093/eurheartj/ehz455)

TAKE HOME MESSAGES I

EAS ESC European Society of Cardiology

- More intensive LDL-C reduction across all CV risk categories
- PCSK9i moved from class IIb recommendation to a Class I within 3 years
- Very-high risk patient population redefined and is in-line with ASCVD patient population in the FOURIER CV outcomes study
- Only LDL-C goals, no thresholds - risk and LDL-C level determine treatment
  - Very-high risk: >50% LDL-C reduction AND LDL-C <55 mg/dL (Class I)
  - Recurrent events: LDL-C <40 mg/dL should be considered for ASCVD patient experiencing second vascular event within 2 years (Class IIb)
  - There are no known adverse effects of very low LDL-C concentrations eg <1 mmol/L (40 mg/dL)
- Lp(a) measurement should be considered at least once in each adult person's lifetime
  - Very high inherited Lp(a) levels >180 mg/dL (>430 nmol/L) may indicate a lifetime risk of ASCVD equivalent to that of patients with heterozygous FH

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TAKE HOME MESSAGES II

- **ACS patients:**
  - **High-dose statin therapy should be initiated or continued as early as possible, regardless of initial LDL-C values**
  - **Re-evaluate lipids at 4–6 weeks and then again 4–6 weeks later**
  - **If after adding ezetimibe and LDL-C <55 mg/dL not achieved, add PCSK9 inhibitor**
- **First ever recommendation for in-hospital PCSK9 inhibitor initiation for patients already taking maximal lipid lowering therapy prior to their event and not at LDL-C goal**

TAKE HOME MESSAGES II

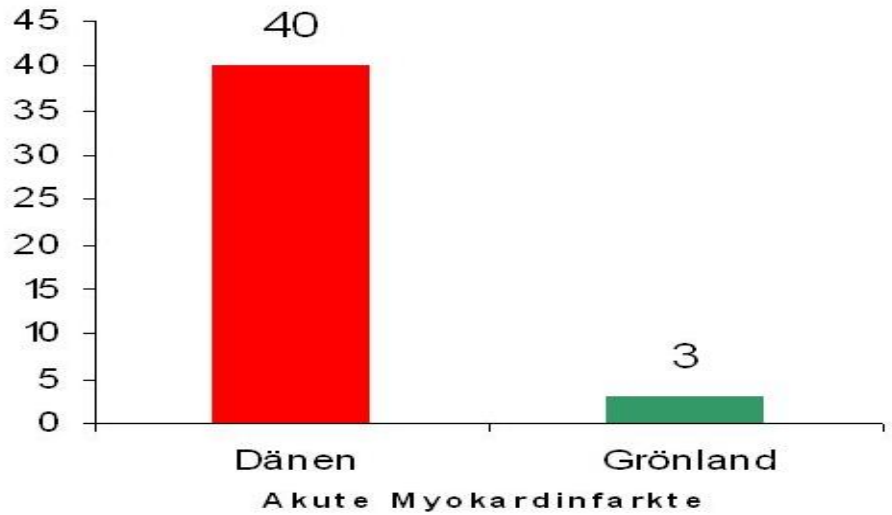
- ACS patients:
  - High-dose statin therapy should be initiated or continued as early as possible, regardless of initial LDL-C values
  - Re-evaluate lipids at 4–6 weeks and then again 4–6 weeks later
  - If after adding ezetimibe and LDL-C <55 mg/dL not achieved, add PCSK9 inhibitor
- First ever recommendation for in-hospital PCSK9 inhibitor initiation for patients already taking maximal lipid lowering therapy prior to their event and not at LDL-C goal

MYTHOS OMEGA-3 FETTSÄUREN

Mehr Omega-3- Fettsäuren weniger KHK?

URSPRÜNGE DER N-3- FETTSÄURE HYPOTHESE

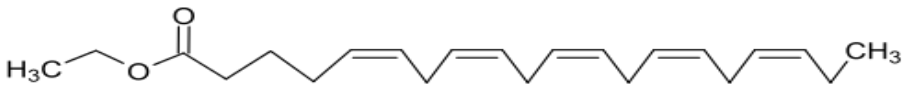
- **Anfang 20. Jahrhundert: (Fallberichte)**
  - **Eskimos ernähren sich fett- und cholestereinreich, haben aber selten KHK**
- **1973 Bang & Dyerberg (Fall-Kontrollstudie)**
  - **KHK Mortalität bei grönländischen Eskimos ist 50 % niedriger als bei Dänen.**
  - **<u>mögliche Ursache:</u> hoher Konsum von n3-Fettsäuren (>50% der Gesamtkalorienzufuhr**



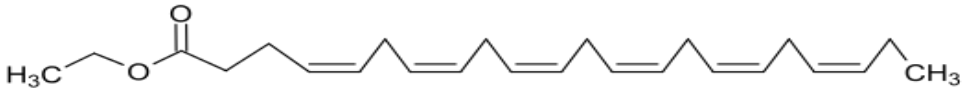
OMEGA-3-FETTSÄUREN

- **Mehrfach ungesättigte Fettsäuren: Essentiell**
- **3 wichtig für Stoffwechsel**
  - **ɑ-Linolensäure > Planzliche Kost**
  - **Docosahexansäure (DHA) > Fette Fische**
  - **Eicosapentaensäure (EPA)> Fette Fische**
- **Tagesempfehlung: 1,3 g Tag (1 Esslöffel Rapsöl)**

Omega-3-Säurenethylester 90



EPA-Ethylester



DHA-Ethylester

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Cardiovascular Risk Reduction with Icosapent Ethyl for Hypertriglyceridemia

Deepak L. Bhatt, M.D., M.P.H., P. Gabriel Steg, M.D., Michael Miller, M.D., Eliot A. Brinton, M.D., Terry A. Jacobson, M.D., Steven B. Ketchum, Ph.D., Ralph T. Doyle, Jr., B.A., Rebecca A. Juliano, Ph.D., Lixia Jiao, Ph.D., Craig Granowitz, M.D., Ph.D., Jean-Claude Tardif, M.D., and Christie M. Ballantyne, M.D., for the REDUCE-IT Investigators*

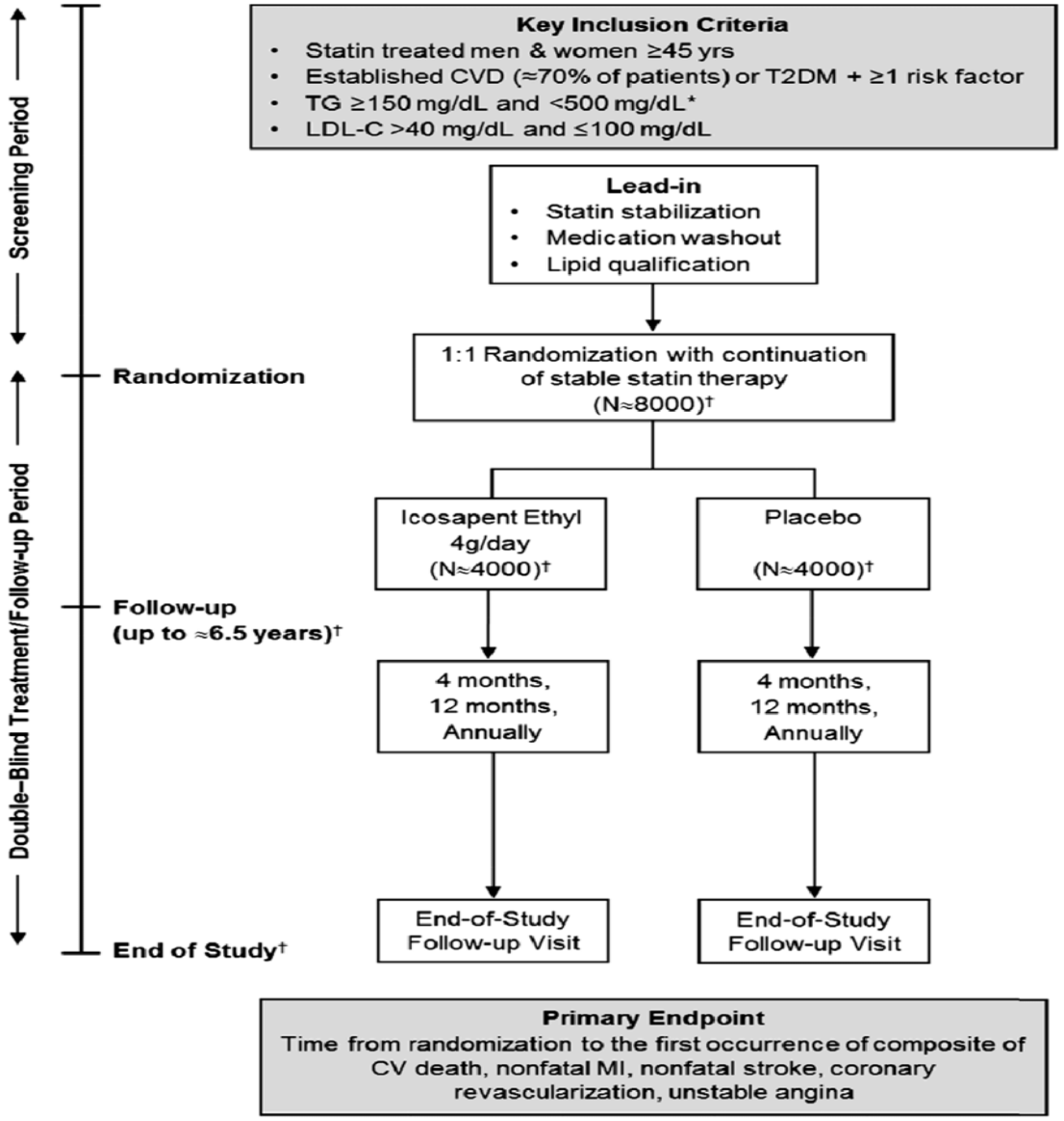
HINTERGRUND

- **TG unabhängiger Risikofaktor**
- **Pat. mit KHK und ↑TG haben ein erhöhtes Risiko für kardiovaskuläre Ereignisse > residuelles Risiko**
- **Icosapent Ethyl → hochgereinigt EPA-Ester senkt TG**
  - **antiinflammatorisch, antioxidativ, plaque- und membranstabilisierend**

- **Leitlinienempfehlung:**
  - **AHA/ACC Leitlinien: Empfehlung in der Sekundärprävention**
  - **ESC Leitlinien: Empfehlung mediterrane fischreiche Kost**

Führt eine Therapie mit **ICOSAPENT ETHYL** (Vascepa®) bei Hochrisikopatienten unter Statintherapie zu einer Reduktion von ischämischen Ereignissen?

STUDIENDESIGN:



- **multicenter , randomisiert, doppelblind, placebokontrolliert**
- **n= 8179**
- **4g Icosapent Ethyl pro Tag versus Placebo**
- **„time to event“ Analyse**
- **Beobachtungszeit 4,9 Jahre**

reduce-it™

EINSCHLUSSKRITERIEN

- **Männer und Frauen >45 J mit koronarer Herzerkrankung**
- **oder >50 J mit Diabetes und mind. 1 zusätzlichen kardiovask. Risikofaktor**
- **erhöhte TG > 150 mg/dl und <500 mg/dl**
- **LDL-C Werte >40 mg/dl und <100 mg/dl unter mindestens 4 wöchiger Statintherapie**

→ **Wirkung in der Primär- und Sekundärprävention geprüft**

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REDUCE-IT: PATIENTENKOLLEKTIV

Table 1. Characteristics of the Patients at Baseline.*

Characteristic	Icosapent Ethyl (N = 4089)	Placebo (N = 4090)
Age		
Median (IQR) — yr	64.0 (57.0–69.0)	64.0 (57.0–69.0)
≥65 yr — no. (%)	1857 (45.4)	1906 (46.6)
Male sex — no. (%)	2927 (71.6)	2895 (70.8)
White race — no. (%)†	3691 (90.3)	3688 (90.2)
Body-mass index‡		
Median (IQR)	30.8 (27.8–34.5)	30.8 (27.9–34.7)
≥30 — no. (%)	2331 (57.0)	2362 (57.8)
Geographic region — no. (%)§		
United States, Canada, the Netherlands, Australia, New Zealand, and South Africa	2906 (71.1)	2905 (71.0)
Eastern European	1053 (25.8)	1053 (25.7)
Asia–Pacific	130 (3.2)	132 (3.2)
Cardiovascular risk stratum — no. (%)		
Secondary-prevention cohort	2892 (70.7)	2893 (70.7)
Primary-prevention cohort	1197 (29.3)	1197 (29.3)
Ezetimibe use — no. (%)	262 (6.4)	262 (6.4)
Statin intensity — no. (%)		
Low	254 (6.2)	267 (6.5)
Moderate	2533 (61.9)	2575 (63.0)
High	1290 (31.5)	1226 (30.0)
Data missing	12 (0.3)	22 (0.5)
Diabetes — no. (%)		
Type 1	27 (0.7)	30 (0.7)
Type 2	2367 (57.9)	2363 (57.8)
No diabetes at baseline	1695 (41.5)	1694 (41.4)
Data missing	0	3 (0.1)
Median high-sensitivity CRP level (IQR) — mg/liter	2.2 (1.1–4.5)	2.1 (1.1–4.5)
Median triglyceride level (IQR) — mg/dl	216.5 (176.5–272.0)	216.0 (175.5–274.0)
Median HDL cholesterol level (IQR) — mg/dl	40.0 (34.5–46.0)	40.0 (35.0–46.0)
Median LDL cholesterol level (IQR) — mg/dl	74.0 (61.5–88.0)	76.0 (63.0–89.0)
Distribution of triglyceride levels — no./total no. (%)		
<150 mg/dl	412/4086 (10.1)	429/4089 (10.5)
≥150 to <200 mg/dl	1193/4086 (29.2)	1191/4089 (29.1)
≥200 mg/dl	2481/4086 (60.7)	2469/4089 (60.4)
Triglyceride level ≥200 mg/dl and HDL cholesterol level ≤35 mg/dl — no. (%)	823 (20.1)	794 (19.4)
Median eicosapentaenoic acid level (IQR) — μg/ml	26.1 (17.1–40.1)	26.1 (17.1–39.9)

reduce-it™

ENDPUNKTE UND ERGEBNISSE

Primärer kombinierter Endpunkte:

- kardiovask. Tod
- MI
- Schlaganfall
- Revaskularisation
- Instabile Angina Pectoris mit Hospitalisierung

17,2% in der Icosapent Ethyl Gruppe versus 22 % Placebo (NNT 21)

Sekundäre Endpunkte:

- kardiovask. Tod
- MI
- Schlaganfall
- Tod anderer Ursache

11,2% in der Icosapent Ethyl Gruppe versus 14,8 % Placebo (NNT 28)

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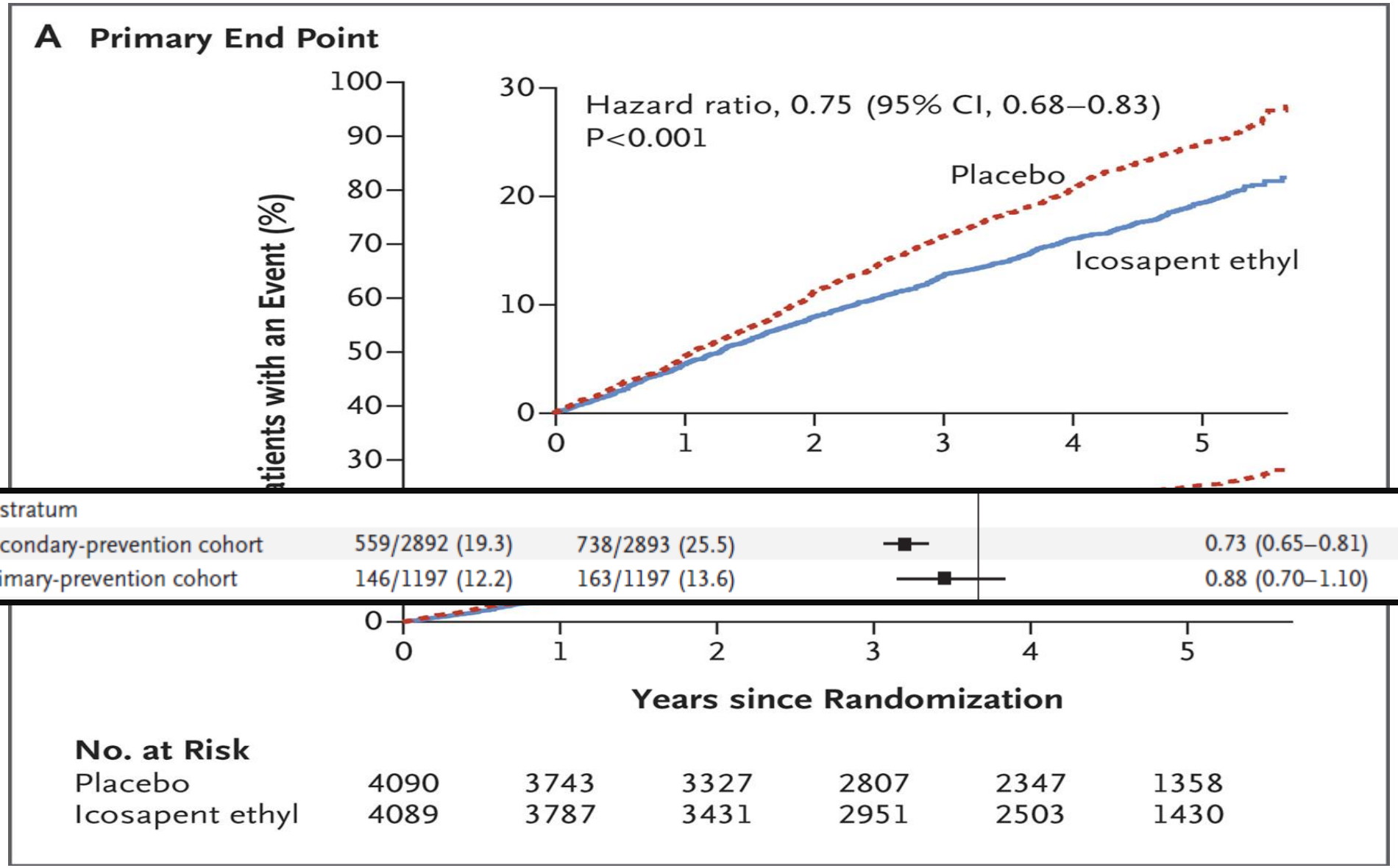
PRIMÄRER ENDPUNKT



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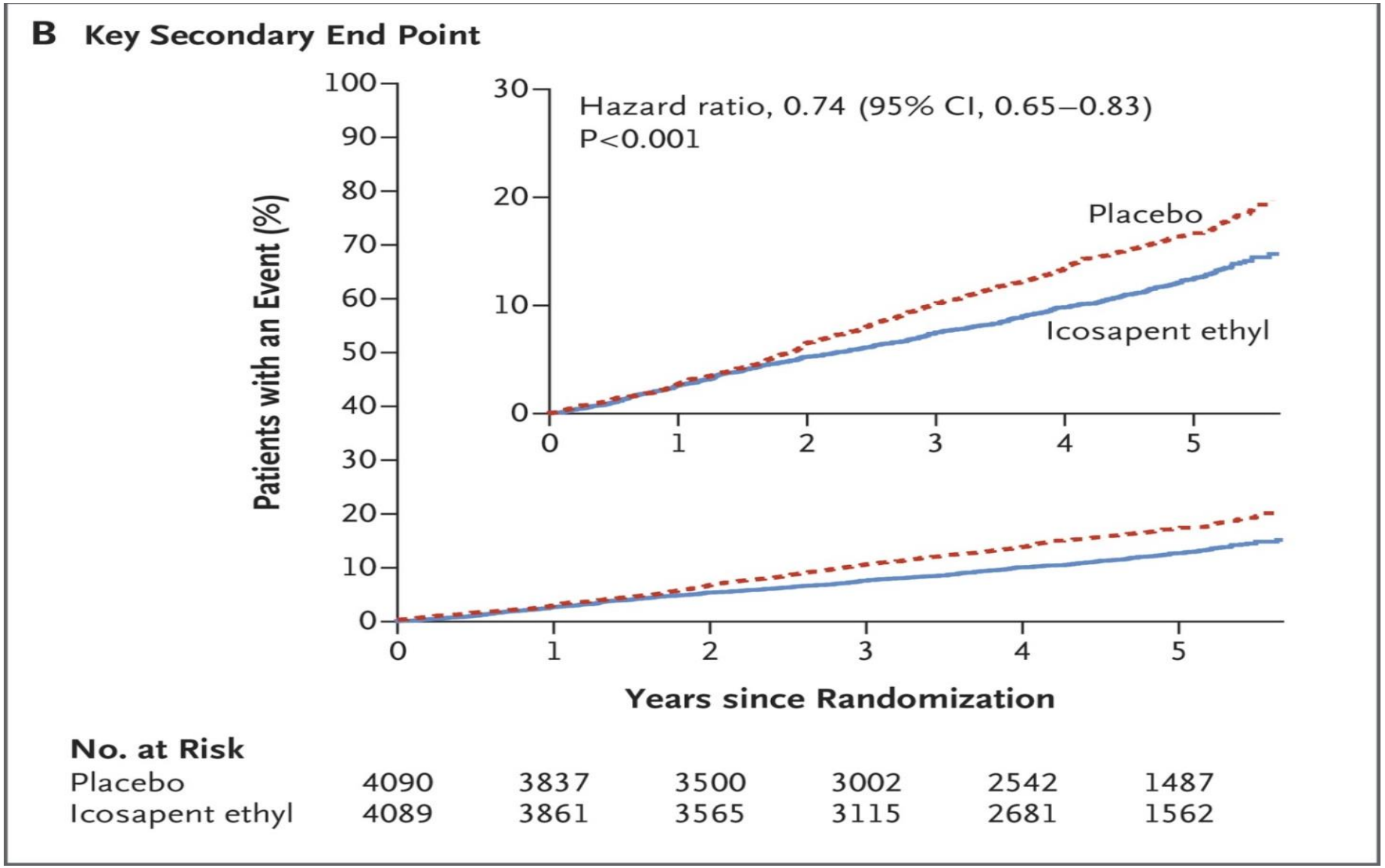
SEKUNDÄRER ENDPUNKT



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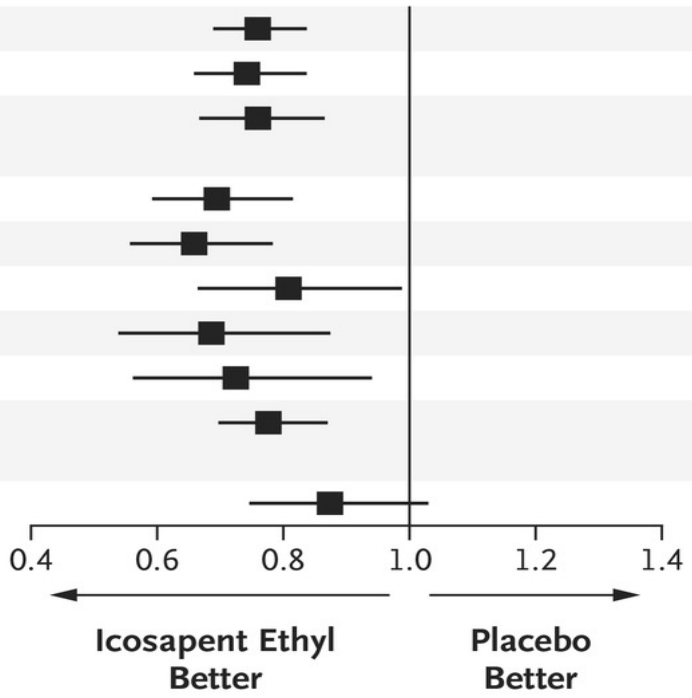
ENDPUNKTE

End Point	Icosapent Ethyl (N=4089)	Placebo (N=4090)	Hazard Ratio (95% CI)	P Value for Interaction
	no. of patients with event (%)			
Primary composite	705 (17.2)	901 (22.0)	0.75 (0.68–0.83)	<0.001
Key secondary composite	459 (11.2)	606 (14.8)	0.74 (0.65–0.83)	<0.001
Cardiovascular death or nonfatal myocardial infarction	392 (9.6)	507 (12.4)	0.75 (0.66–0.86)	<0.001
Fatal or nonfatal myocardial infarction	250 (6.1)	355 (8.7)	0.69 (0.58–0.81)	<0.001
Urgent or emergency revascularization	216 (5.3)	321 (7.8)	0.65 (0.55–0.78)	<0.001
Cardiovascular death	174 (4.3)	213 (5.2)	0.80 (0.66–0.98)	0.03
Hospitalization for unstable angina	108 (2.6)	157 (3.8)	0.68 (0.53–0.87)	0.002
Fatal or nonfatal stroke	98 (2.4)	134 (3.3)	0.72 (0.55–0.93)	0.01
Death from any cause, nonfatal myocardial infarction, or nonfatal stroke	549 (13.4)	690 (16.9)	0.77 (0.69–0.86)	<0.001
Death from any cause	274 (6.7)	310 (7.6)	0.87 (0.74–1.02)	—



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SICHERHEIT UND NEBENWIRKUNGEN

In beiden Gruppen vergleichbar

- **Einzige schwerwiegende NW (2%):**
  - **Pneumonie (2,6% in der Icosapent Ethyl-Gruppe) versus 2,9% Placebo-Gruppe)**
- **Vorhofflimmern: 3,1 % (Icosapent Ethyl-Gruppe) versus 2,1 %**
- **nicht tödl. Blutungskomplikationen: 2,7 % (Icosapent Ethyl-Gruppe) versus 2,1% (Placebo)**

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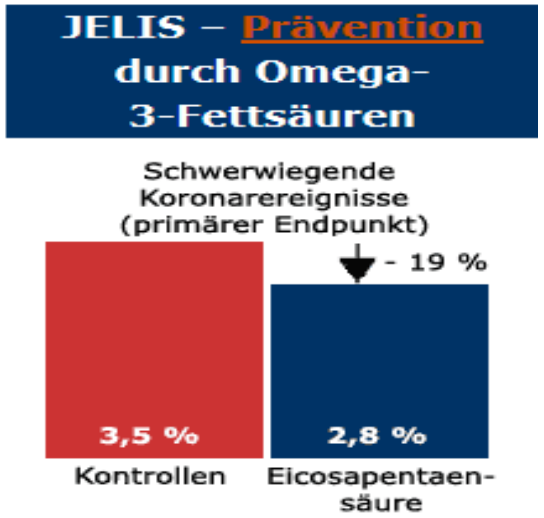
DISKREPANTE STUDIENLAGE

- **ASCEND-Studie:**
  - 1g Kapsel (460 mg EPA und 380 mg DHA),
  - n= 15000 mit Diabetes (Primärprävention)
    - Keine Wirkung: Risiko für MI, Schlaganfälle, TIA, kardiovask. Tod 9,2% versus Placebo 8,9%
- **Metaanalyse (Omega-3-Treatment Trialists Group):**
  - 1g Kapsel (226-1.800 mg EPA , 0-700 mg DHA),
  - n=77.917
    - keine signifikante Reduktion von tödlichen oder nicht tödlichen kardiovask. Ereignissen
- **VITAL-Studie:**
  - 1g Kapsel (460 mg EPA und 380 mg DHA),
  - n=25.851 (Primärprävention)
    - keine Wirkung auf MI, Schlaganfälle, kardiovask. Tod

DISKREPANTE STUDIENLAGE

- **JELIS- Study** (2007 Japan):
  - n= 18.645 mit Hypercholesterinämie
  - Eicosapentaensäure (1,8 g EPA) + Statintherpie
  - Statintherapie mono
    - kardiovaskuläres Risiko in der EPA Gruppe signifikant 19% reduziert



- In großen Studien **(LURIC, Framingham, Womens-Health)** zeigte ein hoher Omega 3-Index (Spiegel von EPA und DHA)
  - ➢ höhere Lebenserwartung, weniger kardiovaskuläre Ereignisse

- **GISSI:** (1999)
  - 1g Kapseln n=11.323
  - Postinfarktpatienten (Sekundärprävention)
    - ➢ 45% Reduktion plötzlicher Herztod
    - ➢ 30% Reduktion kardiovask. Tod

MÖGLICHE ERKLÄRUNG

1. **In REDUCE-IT: Eicosapentansäure (EPA) in reiner Form > enthält keine Docosahexansäure (DHA) wie in anderen Studien**
   - **Höhere Dosierung (2x 2g/d)!**
2. **Probleme der Bioverfügbarkeit : durch falschen Einnahmezeitpunkt**
3. **Ausgangsspiegel von Omega-3-Fettsäuren?**
4. **möglicherweise zusätzlicher Effekt erklärt durch reduziertes CRP (CANTOS antinflammatory thrombosis outcome study) Canakinumab signifik. Reduktion CV Ereignisse**

FAZIT: Ergebnisse von REDUCE-IT nicht auf herkömmliche Fischölkapseln übertragbar

ZUSAMMENFASSUNG

- **Tödliche kardiovaskuläre Ereignisse konnten bei Hochrisikopatienten unter Statintherapie mit erhöhten TG durch 2x täglich 2g Icosapent Ethyl signifikant reduziert werden.**
- **Relative Risikoreduktion von 25% für primären Endpunkt**
- **Die vorliegende Evidenz rechtfertigt noch keine generelle Empfehlung für die Einnahme von n-3-Fettsäuren**
- **mediterrane-fischreiche Ernährung empfehlenswert!**

VIELEN DANK FÜR IHRE AUFMERKSAMKEIT

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