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Efficacy and safety of statins and ezetimibe in primary prevention of cardiovascular disease in the elderly: A systematic review protocol.

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We use this protocol and it's working

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Abstract

Cardiovascular diseases (CVD) are the leading cause of death globally (1). The risk increases with age. Statins and ezetimibe are indicated for the prevention of CVD and its efficacy in secondary prevention (patients who have had an adverse CVD event) has been demonstrated in all age groups (2). However, there is controversy about its use in primary prevention (people without established CVD) in the elderly (3, 4), since the patients older than 75 years are a group of underrepresented population in clinical trials. This age threshold has been used in meta-analysis of randomized controlled trials that did not shown evidence of an effect in cardiovascular events in people older than 75 years without vascular disease (5–7) . The latest clinical guidelines published in the United States and Europe differ notably in their recommendations (8–10).

As other medicines, statins and ezetimibe are not exempt from adverse events. These are more frequent in geriatric patients, since comorbidities and polypharmacy frequently coexist. These factors can increase the risk of drug interactions and contribute to the impairment of renal and hepatic function (11).

We describe a protocol for a systematic review that will evaluate the effectiveness and safety of statins and ezetimibe in people over 75 years of age.



Title

- 1 Efficacy and safety of statins and ezetimibe in primary prevention of cardiovascular disease in the elderly: A systematic review protocol.

Author Contributions

- 2 JFG: conceptualization, methodology, developing the search strategy and literature search, data selection, extraction, statistical analysis, and writing the protocol and original draft. IIR: Support in the search strategy and bibliographic search, data selection and extraction, review and edit the protocol. NAI: Support in the search strategy and bibliographic search, review and edit the protocol. AEG: Support in the search strategy and bibliographic search, review and edit the protocol. JGP: conceptualization, methodology, develop the search strategy and search, review and edit the protocol and the manuscript. CL: Assist, edit and review protocol and manuscript.

Support

- 3 The protocol and systematic review are part of the main author's doctoral thesis. It will also include the results of a study on health outcomes of statin and ezetimibe deprescription strategy in the elderly, funded by the Institute of Health Carlos III (ISCIII) through the project PI21/01931 and co-financed by the European Union in the Call for Action Strategy in Health (AES) 2021.

Rationale

- 4 Cardiovascular diseases (CVD) are the leading cause of death globally (1). The risk increases with age. Statins and ezetimibe are indicated for the prevention of CVD and its efficacy in secondary prevention (patients who have had an adverse CVD event) has been demonstrated in all age

groups (2). However, there is controversy about its use in primary prevention (people without established CVD) in the elderly (3, 4), since the patients older than 75 years are a group of underrepresented population in clinical trials. This age threshold has been used in meta-analysis of randomized controlled trials that did not shown evidence of an effect in cardiovascular events in people older than 75 years without vascular disease (5–7) . The latest clinical guidelines published in the United States and Europe differ notably in their recommendations (8–10). As other medicines, statins and ezetimibe are not exempt from adverse events. These are more frequent in geriatric patients, since comorbidities and polypharmacy frequently coexist. These factors can increase the risk of drug interactions and contribute to the impairment of renal and hepatic function (11). We describe a protocol for a systematic review that will evaluate the effectiveness and safety of statins and ezetimibe in people over 75 years of age.

Objective

- 5 To assess effectiveness and safety of statins and ezetimibe in people over 75 years of age in primary prevention of CVD.
Population: patients older than 75 years who do not have a history of CVD defined as ischemic heart disease, ischemic cerebrovascular disease, or peripheral arterial disease.
Intervention: Treatment with statins and/or ezetimibe for the primary prevention of CVD.
Comparator: placebo or no intervention.
Outcomes: Death from any cause. Hospitalization. Major cardiovascular event: non-fatal myocardial infarction, non-fatal stroke, or cardiovascular death. For adverse effects: selfreported muscle symptoms, clinically confirmed muscle disorders, liver dysfunction, kidney failure, diabetes mellitus and eye diseases.

Methods

- 6 Eligibility criteria
The studies that we will include in the review will be those carried out on the general population

(primary care setting), over 75 years of age and who are undergoing lipid-lowering treatment
with a statin or ezetimibe indicated for the prevention of CVD Inclusion Criteria:
Clinical trials and analytical observational studies published since 2010 or systematic reviews
and meta-analyses published in the last 5 years (2018-2023) (12) that report data on the population over the age of 75.
Studies carried out in primary care setting, in the general population and in primary prevention of CVD.
Studies whose data of outcomes of interest have been obtained or can be calculated.
Studies with at least 1,000 patients.
Clinical practice guidelines that issue recommendations on the use of statins or ezetimibe in people over 75 and in primary prevention of CVD; that are evidence-based.
Exclusion Criteria:
Studies in a specific subset of the population (eg, hospital outpatients, institutionalized, studies based on disease or diagnosis).
Studies published exclusively as abstracts.
Studies published in a language other than English or Spanish.
Observational studies that select active principles.

7

Information sources

A systematic search of the literature will be conducted through the following sources:
Cochrane
Library, Pubmed, CENTRAL, Epistemonikos and EMBASE, with the date of consultation from January 2010 until January 2022.
Primary studies will be identified through the ClinicalTrials.gov database, the Spanish Clinical Trials Registry (REEC), the EU Clinical Trials Registry, the EU post-authorization study registry (ENCePP), and the International Clinical Trials Registry Platform (ICTRP) of the World Health Organization. A search in PROSPERO will be carried out to identify completed and/or ongoing reviews.

8

Search Strategy

Based on the PICO elements, a preliminary search conducted on December 27th of 2022 is described on the Appendix 1.
The strategy will be built with the following keywords and boolean operators for the initial

question:

("Ezetimibe" AND "primary prevention [Mesh]); ("statins" AND "primary prevention" [Mesh])

9 Data management

Database search results will be imported into an Access® database. We will collate multiple reports of the same study.

10 Selection process

Title and abstract will be screened by two independent reviewers using the following questions:

- 1) Does the title or abstract describe a study involving statins or ezetimibe?
- 2) Does the title or abstract describe a study in general population or primary care (not in a specific subset of the population)?

If both reviewers answer "no" for one of the questions the study will be excluded.

Conflicts

between the two reviewers will be discussed, if necessary a third reviewer will participate until

an agreement is reached. A full manuscript screening will be performed by two reviewers. This

screening will include following questions:

- 3) Does the title or abstract describe a study involving elderly people (over 75)?
- 4) Is the study conducted in primary prevention or primary and secondary prevention of CVD?
- 5) Is the study an observational study (cohorts), Clinical Trials (randomized or not), systematic reviews or meta-analyses?
- 6) Is the study written in English or Spanish?
- 7) Is the study published after 2010?
- 8) Is the study master size at least 1,000?
- 9) Can the study provide effectiveness or safety outcomes versus placebo or no intervention in primary prevention of CVD?

Studies will be excluded if answered "no" for one or more of the questions. The exclusion reason

will be recorded at this screening level.

We will include clinical practice guidelines that issue recommendations on the use of statins or

ezetimibe in people over 75 and in primary prevention of CVD; that are evidence-based.

For

assessing this we will use items 7-11 in the domain 3. Rigor of Development of AGREE II Instrument. (13)

11 Data collection process

Data from studies will be extracted with a data extraction form into an electronic spreadsheet

and it will be reviewed. Data extraction form will be tested on 5 studies randomly selected. Data

extracted will include:

1. General information: journal name, language, country, author's name and affiliation, year of

publication, funding information.

2. Type of study: Observational studies (cohorts), Clinical Trials (randomized or not), systematic

reviews or meta-analyses.

3. Duration of the study and/or follow-up time.

4. Limitations of the study.

5. Population characteristics: sex and age.

6. Intervention and comparator: Lipid-lowering agent studied: statin, ezetimibe, or both.

7. Outcomes: type, mean differences from control, unit of results, lower/upper 95% CI, standard

error, standard deviation, P-value, and time point of each measurement.

For dichotomous outcomes information: number of each one, proportion, total number of each

one, unit of results, odd ratio, relative risk, lower/ upper 95% CI, P-value, and time point of each

measurement.

12 Data items

Outcomes and prioritization

Effectiveness and efficacy data: mortality, hospital admission, or major cardiovascular event

(non-fatal myocardial infarction, non-fatal stroke, or cardiovascular death).

Adverse effects: self-reported muscle symptoms, clinically confirmed muscle disorders, liver

dysfunction, renal insufficiency, diabetes, and eye diseases.

Risk of bias in individual studies

The risk of bias assessment will be performed using the RoB 2 tool for randomized trials and the

ROBINS-I tool for non-randomised studies (14). Two reviewers will independently assess the risk

of bias of the studies. Disagreements will be resolved by consensus, if necessary a third reviewer

will participate until an agreement is reached.



Studies will be classified as low risk of bias or moderate to high risk of bias.

Data synthesis

If the results are sufficiently homogeneous, we will do a meta-analysis.

Heterogeneity between estimates will be tested using the I^2 statistic. An I^2 value greater than 75% will be considered as highly heterogeneous. The meta-analysis would be performed using

a random effects model. Pooled prevalence would be calculated with a 95% confidence interval.

Those variables identified a priori as possible sources of variation in the estimate of the effect

will be evaluated: risk of bias and method of data collection.

The Grading of Recommendations, Assessment, Development and Evaluations (GRADE) methodology will be applied to evaluate the quality of the evidence for the main outcomes (15).

Protocol references

1. World Health Organization. Cardiovascular diseases (CVDs). 2021. [Internet]. Available from: [https://www.who.int/en/news-room/fact-sheets/detail/cardiovascular-diseases-\(cvds\)](https://www.who.int/en/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds)).
2. Shepherd J, Blauw GJ, Murphy MB, Bollen EL, Buckley BM, Cobbe SM, et al. PROSPER study group. PROspective Study of Pravastatin in the Elderly at Risk. Pravastatin in elderly individuals at risk of vascular disease (PROSPER): a randomised controlled trial. *Lancet*. 2002;360:1623–1230.
3. Giral P, Neumann A, Weill A, Coste J. Cardiovascular effect of discontinuing statins for primary prevention at the age of 75 years: a nationwide population-based cohort study in France. *Eur Heart J*. 2019;40:3516–3525.
4. Mortensen MB, Falk E. Primary Prevention With Statins in the Elderly. *J Am Coll Cardiol*. 2018;71:85–94.
5. Chou R, Cantor A, Dana T, Wagner J, Ahmed AY, Fu R, et al. Statin Use for the Primary Prevention of Cardiovascular Disease in Adults. *JAMA*. 2022;328:754.
6. Armitage J, Baigent C, Barnes E, Betteridge DJ, Blackwell L, Blazing M, et al. Efficacy and safety of statin therapy in older people: a meta-analysis of individual participant data from 28 randomised controlled trials. *The Lancet*. 2019;393:407–415.
7. Gencer B, Marston NA, Im KA, Cannon CP, Sever P, Keech A, et al. Efficacy and safety of lowering LDL cholesterol in older patients: a systematic review and meta-analysis of randomised controlled trials. *The Lancet*. 2020;396:1637–1643.
8. Visseren FLJ, Mach F, Smulders YM, Carballo D, Koskinas KC, Bäck M, et al. 2021 ESC Guidelines on cardiovascular disease prevention in clinical practice. *Eur Heart J*. 2021;42:3227–337.
9. Grundy SM, Stone NJ, Bailey AL, Beam C, Birtcher KK, Blumenthal RS, et al. 2018 AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/PCNA Guideline on the Management of Blood Cholesterol: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *J Am Coll Cardiol*. 2019;73:e285–350.
10. Cardiovascular disease: risk assessment and reduction, including lipid modification. London: National Institute for Health and Care Excellence (NICE); 2023. [Internet]. Available from: <https://www.nice.org.uk/guidance/cg181>
11. Curfman G. Risks of Statin Therapy in Older Adults. *JAMA Intern Med*. 2017;177:966
12. Eder M, Feightner A, Webber E, Guirguis-Blake J, Whitlock E. Developing and Selecting Topic Nominations for Systematic Reviews. *Methods Guide for Comparative Effectiveness Reviews*. Agency for Healthcare Research and Quality. November 2012. AHRQ Publication No. 12(13)-EHC153-EF. [Internet]. Available from: <https://effectivehealthcare.ahrq.gov/products/methods-guidance-topic-nomination/methods>
13. AGREE Next Steps Consortium (2017). The AGREE II Instrument [Electronic version]. Available from: <http://www.agreetrust.org>
14. Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA (editors). *Cochrane Handbook for Systematic Reviews of Interventions* version 6.3 (updated February 2022). Cochrane, 2022. [Internet]. Available from: www.training.cochrane.org/handbook.
15. Schünemann H, Brozek J, Guyatt G, Oxman A. *GRADE handbook*. Handbook for grading the quality of evidence and the strength of recommendations using the GRADE approach. Updated October 2013. The GRADE Working Group; 2013–2014. [Internet]. Available from: <http://gdt.guidelinedevelopment.org/app/handbook/handbook.html>