Revascularisation versus medical treatment in patients with stable coronary artery disease: network meta-analysis

The European Myocardial Revascularisation Collaboration

EDITORIAL by Ziada and Moliterno

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STUDY QUESTION

Does revascularisation using coronary artery bypass grafting or Food and Drug Administration approved techniques for percutaneous revascularisation (balloon angioplasty, bare metal stents, early and new generation drug eluting stents) improve survival compared with medical treatment among patients with stable coronary artery disease?

SUMMARY ANSWER

Coronary artery bypass grafting and new generation drug eluting stents (everolimus eluting and zotarolimus eluting (Resolute) stents) but no other percutaneous revascularisation technology were associated with improved survival compared with medical treatment among patients with stable coronary artery disease.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

The survival benefit of coronary bypass artery grafting over medical treatment is well established. This study confirms and extends previous reports, adding evidence from study populations in more recent trials with more effective medical regimens, increased use of arterial bypass grafting, and improved perioperative management, providing a more robust and precise estimate of the associated survival benefit.

Selection criteria for studies

We searched Medline and Embase from 1980 to 2013 for randomised trials comparing medical treatment with revascularisation.

Primary outcome

All cause mortality.

Main results and role of chance

100 trials in 93 553 patients with 262 090 patient years of follow-up were included. Coronary artery bypass grafting was associated with a survival benefit compared with medical treatment. New generation drug eluting stents (everolimus and zotarolimus (Resolute)) but not balloon angioplasty, bare metal stents, or early generation drug eluting stents (paclitaxel, sirolimus, and zotarolimus (Endeavor)) were associated with improved survival compared with medical treatment. For secondary outcomes, coronary artery bypass grafting reduced the risk of myocardial infarction compared with medical treatment (rate ratio 0.79, 95% credibility interval 0.63 to 0.99), and everolimus eluting stents showed a trend towards a reduced risk of myocardial infarction (0.75, 0.55 to 1.01). The risk of subsequent revascularisation was noticeably reduced by coronary artery bypass grafting (0.16, 0.13 to 0.20) followed by new generation drug eluting stents (zotarolimus (Resolute): 0.26, 0.17 to 0.40; everolimus: 0.27, 0.21 to 0.35), early generation drug eluting stents (zotarolimus (Endeavor): 0.37, 0.28 to 0.50; sirolimus: 0.29, 0.24 to 0.36; paclitaxel: 0.44, 0.35 to 0.54), and bare metal stents (0.69, 0.59 to 0.81) compared with medical treatment.

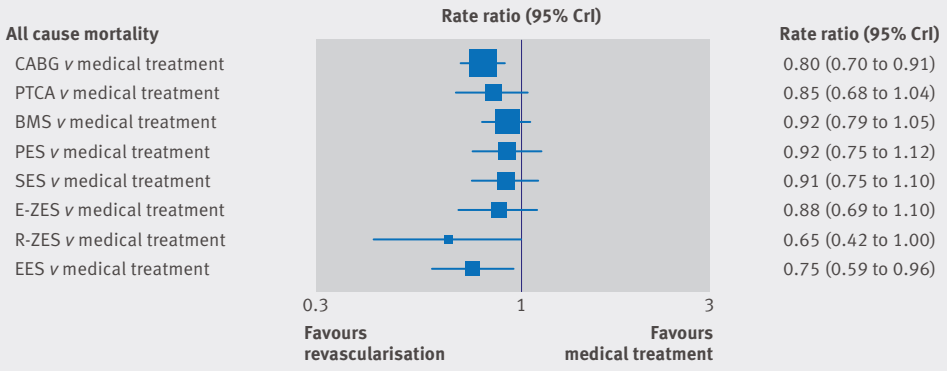
Bias, confounding, and other reasons for caution

Findings were robust in sensitivity analyses for concealed allocation, blinded adjudication, intention to treat analyses, duration of follow-up, and proportion of patients lost to follow-up.

Study funding/potential competing interests

This study was supported by intramural funds from the Department of Cardiology, Bern University Hospital, and the Institute of Social and Preventive Medicine, University of Bern, Switzerland.

Estimated rate ratios from network meta-analyses for different revascularisation modalities compared with medical treatment–overall analyses



Size of squares is proportional to statistical precision of estimates
CABG=coronary artery bypass grafting; PTCA=percutaneous transluminal coronary angioplasty; BMS=bare metal stents; PES=paclitaxel eluting stent; SES=sirolimus eluting stent; E-ZES=zotarolimus eluting (Endeavor) stent; R-ZES=zotarolimus eluting (Resolute) stent; EES=everolimus eluting stent

Comparative safety of anesthetic type for hip fracture surgery in adults: retrospective cohort study

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STUDY QUESTION

Is there an association between type of anesthesia administered and risk of in-hospital mortality among adults undergoing hip fracture surgery?

SUMMARY ANSWER

In-hospital risk of mortality did not differ significantly by anesthesia type among adults undergoing hip fracture surgery; this result was robust across several sensitivity and subgroup analyses.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

The use of regional anesthesia has been hypothesized to reduce the risk of postoperative mortality among patients undergoing surgery for hip fracture. In this study of a large nationwide sample of hospital admissions with detailed information on patient comorbidities, mortality risk did not differ significantly by anesthesia type among adults undergoing surgical repair of hip fracture.

Participants and setting

73 284 adults in the United States undergoing hip fracture surgery between 2007 and 2011. Data were obtained from the Premier research database. The primary analysis included only those patients who underwent surgery on the second day of hospital admission or thereafter to obtain a preoperative period in which to measure patients' baseline comorbidities and other risk factors.

Design, size, and duration

This was a retrospective cohort study. The primary outcome was all cause mortality during the index hospital admission. To control for confounding, we fit a multivariable logistic regression model including relevant confounders and their proxies; we also used mixed effects analysis to account for potential differences between hospitals.

Relative risk of in-hospital mortality comparing different type of anesthesia in patients undergoing hip fracture surgery. Values are risk ratios (95% confidence intervals) unless stated otherwise

Variables	General anesthesia (n=61 554)	Regional anesthesia (n=6939)	General and regional anesthesia (n=4791)
No of in-hospital deaths	1362	144	115
Unadjusted analysis	Ref	0.94 (0.79 to 1.11)	1.09 (0.90 to 1.32)
Age, sex, ethnicity, and calendar year adjusted analysis	Ref	0.93 (0.78 to 1.11)	1.04 (0.85 to 1.26)
Fully adjusted analysis	Ref	0.93 (0.78 to 1.11)	1.00 (0.82 to 1.22)
Mixed effects analysis	Ref	0.91 (0.75 to 1.10)	0.98 (0.79 to 1.21)

Main results and the role of chance

In-hospital deaths occurred in 1362 (2.2%) patients receiving general anesthesia, 144 (2.1%) receiving regional anesthesia, and 115 (2.4%) receiving combined general and regional anesthesia. In the multivariable adjusted analysis, when compared with general anesthesia the mortality risk did not differ significantly between regional anesthesia (risk ratio 0.93, 95% confidence interval 0.78 to 1.11) or combined anesthesia (1.00, 0.82 to 1.22). A mixed effects analysis accounting for differences between hospitals produced similar results: compared with general anesthesia the risk from regional anesthesia was 0.91 (0.75 to 1.10) and from combined anesthesia was 0.98 (0.79 to 1.21). Findings were also consistent in subgroup analyses.

Bias, confounding, and other reasons for caution

The lack of a significant effect of anesthesia type on mortality was present across a range of sensitivity and subgroup analyses. Given the observational nature of this investigation, however, the potential for some residual confounding cannot be completely ruled out.

Generalisability to other populations

Future studies will need to determine whether specific population subgroups may meaningfully benefit from the use of regional anesthesia.

Study funding/potential competing interests

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Impact of peer review on reports of randomised trials published in open peer review journals: retrospective before and after study

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STUDY QUESTION

What is the effectiveness of open peer review as a mechanism to improve reporting of randomised trials published in biomedical journals?

SUMMARY ANSWER

Peer reviewers failed to detect important deficiencies in reporting of the methods and results of randomised trials.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

Substantial uncertainty exists about the peer review process. Although most of the relatively few changes requested by the peer reviewers were classified as having a positive impact, some were inappropriate and could have a negative impact on the reporting of the final publication.

Selection criteria for studies

We included all primary reports (those reporting the main study outcome) of randomised trials (n=93) published in BioMed Central series medical journals in 2012 and indexed in PubMed with the publication type "Randomized Controlled Trial" (search as of 28 May 2013).

Design

Retrospective before and after study.

Primary outcomes

Changes to the reporting of methodological aspects of randomised trials in manuscripts after peer review, based on the CONSORT checklist, corresponding peer reviewer reports, the type of changes requested, and the extent to which authors adhered to these requests.

Main results

Important information was missing from the final manuscript on the trial methods and results. Of the 93 trial reports, 38% (n=35) did not describe the method of random sequence generation, 54% (n=50) concealment of allocation sequence, 50% (n=46) whether the study was blinded, 34% (n=32) the sample size calculation, 35% (n=33) specification of primary and secondary outcomes, 55% (n=51) results for the primary outcome, and 90% (n=84) details of the trial protocol. The number of changes between manuscript versions was relatively small; most involved adding new information or altering existing information. Most changes requested by peer reviewers had a positive impact on the reporting of the final manuscript—for example, adding or clarifying randomisation and blinding (n=27), sample size (n=15), primary and secondary outcomes (n=16), results for primary or secondary outcomes (n=14), and toning down conclusions to reflect the results (n=27). Some changes requested by peer reviewers, however, had a negative impact, such as adding additional unplanned analyses (n=15).

Bias, confounding, and other reasons for caution

We only assessed the effects of peer review on the reporting of methodological aspects of randomised trials. We did not look at the clinical aspects of peer review as this would have required specific content expertise. We are therefore unable to comment on the effect of peer review on improving the reporting of clinical aspects of randomised trials.

Generalisability to other populations

Our sample was limited to *BMC*-series medical journals where peer reviews are published and available in the public domain. The extent to which these findings are generalisable to studies published in journals with different editorial or peer review processes is unclear.

Study funding/potential competing interests

This study received no external funding. We have no competing interests.

Nature of changes requested by peer reviewers (per manuscript) and impact on reporting

		No (%)			
Nature of change	Manuscripts (n=93)	Positive impact*	No impact on reporting†	No impact on reporting§	Negative impact¶
Abstract conclusion	15 (16)	14 (93)	0	0	1 (7)
Trial design (randomisation and blinding)	29 (31)	27 (93)	2 (7)	0	0
Sample size	30 (32)	15 (50)	11 (37)	0	4 (13)
Primary and secondary outcomes: methods	22 (24)	16 (73)	3 (13)	1 (5)	2 (9)
Primary and secondary outcomes: results	15 (16)	14 (93)	0	0	1 (7)
Additional analyses	20 (22)	4 (20)	0	1 (5)	15 (75)
Conclusion	30 (32)	27 (90)	0	0	3 (10)

*Peer reviewers' comments judged to have beneficial effect on reporting, and author made change.
†Peer reviewers' comments judged to have beneficial effect on reporting, and author did not make change.
§Peer reviewers' comments judged to have harmful effect on reporting, and author did not make change.
¶Peer reviewers' comments judged to have harmful effect on reporting, and author made change.

Impact of primary health care on mortality from heart and cerebrovascular diseases in Brazil: a nationwide analysis of longitudinal data

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STUDY QUESTION

What impact did the Family Health Program (FHP), the main primary health care strategy in Brazil, have on heart and cerebrovascular disease mortality across the country from 2000 to 2009?

SUMMARY ANSWER

The level and duration of FHP coverage over the study period was associated with a reduction in hospitalisations and mortality from heart and cerebrovascular diseases causes, as included in the national list of ambulatory care-sensitive conditions.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

Use of primary health care programmes is assumed to be a cost effective strategy to confront the growing burden of cardiovascular diseases in low and middle income countries, but there are no longitudinal studies on the effectiveness of such programmes. This study used a natural experiment created by the FHP expansion over time to assess the effectiveness of increased primary care provision. The findings suggest that a nationwide strategy of comprehensive primary health care can reduce morbidity and mortality from heart and cerebrovascular diseases in resource limited countries.

Participants and setting

People living in 1622 Brazilian municipalities with adequate datasets for mortality from conditions sensitive to ambulatory care (used to monitor primary health care performance) and accidents (used as a control condition) from 2000 to 2009.

Design, size, and duration

Ecological longitudinal design, evaluating the impact of the Family Health Program (FHP) using negative binomial regression models for the municipalities' panel data with fixed effects specifications. Complementary analyses using difference-in-difference and propensity score matching methods were performed to verify the robustness of the results.

Main results and the role of chance

FHP coverage was negatively associated with mortality rates from cerebrovascular and heart diseases causes included in the national list of ambulatory care-sensitive conditions in both unadjusted models and models adjusted for demographic, social, and economic confounders. Coverage was not associated with mortality from accidents. The rate ratio for the effect of consolidated annual FHP coverage (coverage in the municipality ≥70%) on cerebrovascular disease mortality was 0.82 (95% CI 0.79 to 0.86) and on heart disease mortality was 0.79 (0.75 to 0.80); these values reached 0.69 (0.66 to 0.73) and 0.64 (0.59 to 0.68) respectively when the coverage was consolidated during all the past eight years. Moreover, FHP coverage increased the number of health education activities, domiciliary visits, and medical consultations and reduced hospitalisation rates for cerebrovascular and heart disease. Difference-in-difference and propensity score matching analyses gave comparable results, as did an analysis including all Brazilian municipalities.

Bias, confounding, and other reasons for caution

Individual risk factors such as smoking and overweight, as well as the adoption of new diagnostics or treatments have not been taken into account because data were not available and were not considered as confounding factors in our strategy of analysis. The possibility of ecological fallacy is a limitation of the study.

Generalisability to other populations

A countrywide strategy of comprehensive primary health care in Brazil—which includes actions of primary and secondary prevention, care, and follow-up of cardiovascular diseases—was associated with a reduction in morbidity and mortality from cardiovascular diseases. Elements of this programme are conceivably transportable to other low and middle income countries.

Study funding/potential competing interests

Financial support, not specific for this study, was provided by the National Council for Scientific and Technological Development (CNPq).

Adjusted rate ratios (95% CI) for the association of annual coverage with Family Health Program (FHP) on mortality rates in Brazilian municipalities, 2000-09

Variables	Cerebrovascular diseases mortality rate	Heart diseases mortality rate	Accidents mortality rate
Level of FHP coverage in municipality:			
No coverage	1	1	1
Incipient (>0 to <30%)	0.98 (0.95 to 1.00)	0.98 (0.94 to 1.02)	0.99 (0.96 to 1.02)
Intermediate (≥30% to <70%)	0.86 (0.83 to 0.89)	0.81 (0.78 to 0.85)	0.97 (0.95 to 1.00)
Consolidated (≥70%)	0.82 (0.79 to 0.86)	0.79 (0.75 to 0.80)	1.02 (0.98 to 1.06)
Percentage of population below poverty line >15.9%	1.10 (1.07 to 1.13)	1.11 (1.06 to 1.15)	1.00 (0.97 to 1.03)
Monthly per capita income >R$525	0.96 (0.93 to 0.99)	0.97 (0.93 to 1.02)	1.02 (0.97 to 1.05)
Percentage of population having basic household appliances >48.4%	0.97 (0.94 to 0.99)	0.96 (0.91 to 0.99)	1.04 (1.01 to 1.07)
Percentage of population in households with inadequate sanitation >13.8%	1.07 (1.03 to 1.12)	1.10 (1.03 to 1.17)	0.99 (0.95 to 1.03)
Percentage illiteracy among people aged over 15 years >11.0%	1.08 (1.05 to 1.12)	1.09 (1.04 to 1.15)	1.00 (0.96 to 1.03)
Presence of local hospital beds	0.93 (0.85 to 1.02)	0.86 (0.75 to 0.98)	0.95 (0.87 to 1.04)
No of physicians per 1000 inhabitants >0.55	0.97 (0.95 to 0.99)	0.95 (0.92 to 0.98)	1.02 (1.00 to 1.05)
Urbanisation rate >76.6	0.93 (0.88 to 0.99)	0.98 (0.90 to 1.07)	0.99 (0.93 to 1.05)
Percentage highly educated among people aged over 25 years >4.8%	0.94 (0.91 to 0.97)	0.89 (0.85 to 0.93)	1.01 (0.98 to 1.04)
Presence of tomography and ultrasonography in municipality	0.86 (0.84 to 0.88)	0.88 (0.85 to 0.91)	0.97 (0.95 to 0.99)
No of observations/No of municipalities	16 220/1622	16 150/1615	16 220/1622