

# Routine Invasive Versus Selective Invasive Strategy in Elderly Patients Older Than 75 Years With Non-ST-Segment Elevation Acute Coronary Syndrome: A Systematic Review and Meta-Analysis

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## Abstract

**Objective:** To evaluate outcomes of routine invasive strategy (RIS) compared with selective invasive strategy (SIS) in elderly patients older than 75 years with non-ST-segment elevation acute coronary syndrome (NSTEMI-ACS).

**Methods:** We systematically searched databases for randomized controlled trials (RCTs) between January 1, 1990, and October 1, 2016, comparing RIS with SIS for elderly patients (age > 75 years) with NSTEMI-ACS. Random effects meta-analysis was conducted to estimate odds ratio (OR) with 95% CIs for composite of death or myocardial infarction (MI), and individual end points of all-cause death, cardiovascular (CV) death, MI, revascularization, and major bleeding.

**Results:** A total of 6 RCTs with 1887 patients were included in the final analysis. Compared with an SIS, RIS was associated with significantly decreased risk of the composite end point of death or MI (OR, 0.65; 95% CI, 0.51-0.83). Similarly, RIS led to a significant reduction in the risk of MI (OR, 0.51; 95% CI, 0.40-0.66) and need for revascularization (OR, 0.31; 95% CI, 0.11-0.91) compared with SIS. There were no significant differences between RIS and SIS in terms of all-cause death (OR, 0.85; 95% CI, 0.63-1.20), CV death (OR, 0.84; 95% CI, 0.61-1.15), and major bleeding (OR, 1.96; 95% CI, 0.97-3.97).

**Conclusion:** In elderly patients older than 75 years with NSTEMI-ACS, RIS is superior to SIS for the composite end point (death or MI), primarily driven by reduced risk of MI.

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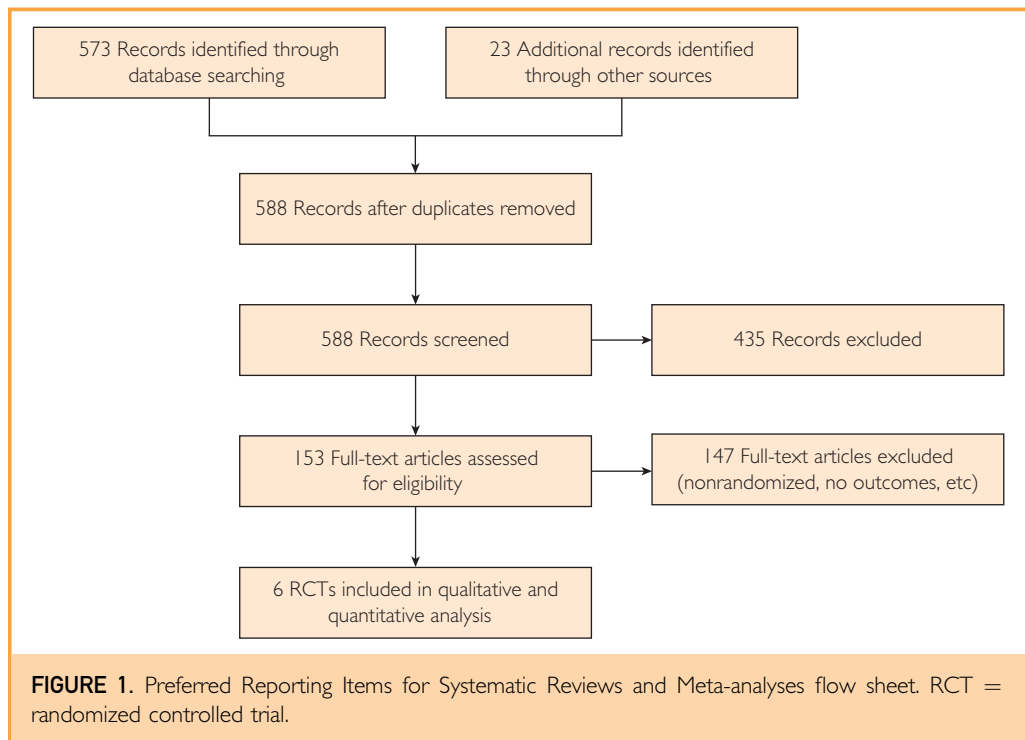
Non-ST-segment elevation acute coronary syndrome (NSTEMI-ACS) has shown a gradual rise in prevalence over the past decade, and now accounts for approximately 70% of ACS presentations.<sup>1</sup> Although current evidence supports a routine invasive strategy (RIS) over a selective invasive strategy (SIS) (ie, coronary angiography only in subjects with ongoing ischemia or objective evidence of ischemia on stress test) in most patients, elderly patients aged 75 years or more still present a clinical conundrum in the real-world setting.<sup>2-7</sup> Elderly patients are at a higher risk of adverse events after sustaining NSTEMI-ACS as demonstrated by a strong correlation between increasing age and outcomes in

multivariate analyses of individual trials.<sup>7,8</sup> However, revascularization rates in the elderly continue to be low, often hindered by physician reluctance and lack of definitive clinical evidence.<sup>9</sup> This is reflected by the underrepresentation of elderly patients older than 75 years in the contemporary randomized controlled trials (RCTs) comparing the RIS versus SIS for NSTEMI-ACS.<sup>3-5</sup> Furthermore, the only 2 dedicated RCTs comparing RIS and SIS in elderly patients (>75 years) have shown conflicting results.<sup>10,11</sup> Accordingly, we conducted this meta-analysis to study the cumulative evidence for an RIS versus an SIS in patients older than 75 years with NSTEMI-ACS.



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## METHODS

We carried out a literature search using MEDLINE, EMBASE, Web of Science, and Cochrane databases, of all studies published between January 1, 1990, and October 1, 2016, reporting on direct comparisons between RIS and SIS for NSTEMI-ACS. We used the Medical Subject Headings search headings “Routine invasive,” “Selective invasive,” “Conservative,” “NSTEMI-ACS,” and “Elderly” in different combinations. The review was conducted in accordance with Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines.<sup>12</sup>

An RIS was defined as routine, early coronary angiography with assessment for revascularization (percutaneous coronary intervention [PCI] or coronary artery bypass grafting [CABG]) when appropriate. An SIS (or initial conservative) involved initial medical management and coronary angiography only in case of refractory angina, reinfarction, hemodynamic instability, and/or objective evidence of ischemia on noninvasive testing.

The following criteria were applied for study inclusion: (1) RCTs or subanalysis of RCTs comparing RIS and SIS published in peer-reviewed journals; (2) mean age of patients more than 75 years; (3) median follow-up of at

least 1 month; and (3) reporting at least 1 clinical end point based on treatment approach. Exclusion criteria were (1) nonrandomized study design; (2) ST-segment elevation myocardial infarction (MI); and (3) PCI before stent era.

Two reviewers (A.G. and A.R.) independently screened study reports for eligibility, assessed risk of bias, and collected data from each eligible study using predetermined forms. Any disparities between the 2 investigators were discussed with a third investigator (L.G.) until consensus was reached. From eligible RCTs, we collected information on study characteristics (study design, year of publication, inclusion and exclusion criteria, data source, sample size, follow-up period, and primary and secondary end-point definitions), baseline patient characteristics, coronary angiography and revascularization data, and event rate of end points.

Prespecified end points of interest were the composite of death or MI, and the individual end points of all-cause death, cardiovascular (CV) death, MI, repeat revascularization (either PCI or CABG), and major bleeding at maximal available follow-up. Myocardial infarction was defined as per individual study protocol; criteria were ischemic chest pain, electrocardiogram changes, and cardiac

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