BACKGROUND Fractional flow reserve (FFR) invasively assesses the ischemic potential of coronary stenosis and predicts the expected improvement achievable by revascularization. A FFR value of 0.75 has been validated against ischemic testing, while a FFR value of 0.80 has been widely accepted to guide clinical decision making. Whether, and in which patients revascularization should be proposed when the FFR is between 0.76-0.80 “gray zone” is still debatable. Therefore, we studied the clinical outcome of patients with an isolated stenosis and an FFR value in and around the gray zone.

METHODS From February 1997 to June 2013, all patients presenting with single segment disease at coronary angiography and FFR within the gray zone of 0.76-0.80 and in the neighboring strata of 0.70-0.75 and 0.81-0.85 were included. Patients with previous bypass surgery, in-stent restenosis, myocardial bridge, or heart transplantation were excluded. According to FFR values, patients were divided into the following strata: a) 0.70-0.75; b) 0.76-0.80; c) 0.81-0.85. Study endpoints consisted of major adverse cardiovascular events (MACE: death, myocardial infarction and any revascularization) up to 5 years. Data were also analyzed according to their lesion location (proximal versus distal).

RESULTS Out of 17,380 patients undergoing FFR measurement: a) overall FFR values were within the gray zone in 2781 (16%) of cases; b) 1,459 fulfilled the inclusion/exclusion criteria and were included in the present analysis: 449 treated with revascularization (revasc) and 1,010 with medical therapy (MT). Clinical characteristics were similar among patients treated with revascularization or MT, except for male gender and age (more frequent in PCI group respectively \( p < 0.002 \) and \( p = 0.05 \)). Diameter stenosis, minimum lumen diameter, and FFR values were lower in revasc group (\( p < 0.0001 \)). In patients with an FFR between 0.70 and 0.75, MACE’s were more frequent after MT than after revasc (12 [23%] vs. 57 [13%], respectively, \( p = 0.046 \)). In patients with an FFR between 0.81 and 0.85, MACE’s were less frequent after MT than after revasc (59 [8%] vs. 57 [13%], respectively, \( p = 0.023 \)). Among patients treated with MT alone, a progressive increase in MACE was observed in the 3 FFR strata (FFR, 0.70-0.75: 12 [23%] vs. FFR, 0.76-0.80: 57 [14%] vs. FFR, 0.81-0.85: 59 [8%], \( p < 0.001 \)). For stenoses located only in proximal segments, decreasing FFR values were paralleled by an increase MACE and in overall mortality (respectively \( p = 0.001 \) and \( p = 0.017 \)).

CONCLUSIONS Patients with stenosis located in the proximal coronary segments and FFR in the gray zone of 0.76-0.80 demonstrate a MACE rate that is intermediate compared with that of patients < 0.75 ischemic threshold and above the 0.80 clinical threshold. These data suggest that an FFR < 0.80 is valid to guide clinical decision making with lesion located in proximal coronary segments, while distal coronary stenosis with FFR in the gray zone might be safely deferred to MT.

CATEGORIES IMAGING: FFR and Physiologic Lesion Assessment

KEYWORDS Clinical outcomes, Fractional flow reserve, Gray zone