



## Gender-related differences in outcome after BMS or DES implantation in patients with ST-segment elevation myocardial infarction treated by primary angioplasty: Insights from the DESERT cooperation



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### ABSTRACT

**Background:** Several studies have found that among patients with ST-segment elevation myocardial infarction (STEMI) treated by thrombolysis, female sex is associated with a worse outcome. However, still controversial is the prognostic impact of gender in primary angioplasty, especially in the era of drug-eluting stents (DES). Therefore, the aim of this study was to investigate sex-related differences in clinical outcome in patients with STEMI treated with primary angioplasty with Bare-Metal Stent (BMS) or DES.

**Methods:** Our population is represented by 6298 STEMI patients undergoing primary angioplasty and stent implantation included in the DESERT database. Follow-up data were collected from 3 to 6 years after primary angioplasty.

**Results:** Female gender was observed in 1466 (23.2%) out of 6298 STEMI patients. Women were older ( $65.3 \pm 12.4$  vs  $59.3 \pm 11.4$  years,  $p < 0.001$ ), with higher prevalence of diabetes (18.6% vs 14.5%,  $p < 0.001$ ), hypertension (52.4% vs 41.4%,  $p < 0.001$ ), slightly longer ischemia time ( $272 \pm 247$  vs  $258 \pm 220$  min,  $p = 0.06$ ). No difference was observed in terms of angiographic and procedural characteristics. Follow-up data were available at a mean of  $1201 \pm 441$  days. At long-term follow-up female gender was associated with a significantly higher rate of death (11.7% vs 8.5%, HR [95% CI] = 1.45 [1.18–1.78],  $p < 0.001$ ), while no difference was observed in terms of reinfarction (HR [95% CI] = 1.14 [0.89–1.45],  $p = 0.3$ ), ST (HR [95% CI] = 1.12 [0.85–1.48],  $p = 0.4$ ), with similar temporal distribution (acute, subacute, late and very late) between male and female patients, and no difference in TVR (HR [95% CI] = 1.11 [0.95–1.3],  $p = 0.2$ ,  $p = 0.2$ ). These results were confirmed in both patients receiving BMS

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or DES. The impact of female gender on mortality disappeared after correction for baseline confounding factors (HR [95% CI] = 0.88 [0.71–1.09],  $p = 0.25$ ).

**Conclusions:** This study shows that in patients with STEMI treated by primary angioplasty, female gender is associated with higher mortality rate in comparison with men, and this is mainly due to their higher clinical and angiographic risk profiles. In fact, female sex did not emerge as an independent predictor of mortality.

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A larger availability of pharmacologic and mechanical reperfusion therapies has greatly contributed to the remarkable improvement that has been observed in the last years in the treatment of patients with ST-segment elevation myocardial infarction (STEMI) [1,2]. Improvement in antithrombotic therapies and mechanical devices has contributed to further reduction in mortality [3–5]. Female gender has been shown to be associated with impaired outcome among patients with STEMI treated by thrombolysis, mainly due to worse risk profile (more diabetes, more advanced age, and Killip class at presentation), in comparison with men [6–8]. Still contrasting are data on the impact of sex on outcome in patients with STEMI treated by primary angioplasty [9–12], with no data in the era of Drug-Eluting Stent (DES). Therefore, the aim of the current study was to investigate sex-related differences in short- and long-term outcome in patients with STEMI treated with primary angioplasty with DES or Bare Metal Stent (BMS).

## 1. Methods

Our population is represented by STEMI patients included in the DESERT cooperation. Detailed data have been previously described [13]. Briefly, we collected data from 11 randomized trials on DES in STEMI, including baseline characteristics (age, gender, diabetes, hypertension, hypercholesterolemia, smoking, previous revascularization, infarct location, ischemia time) and major angiographic

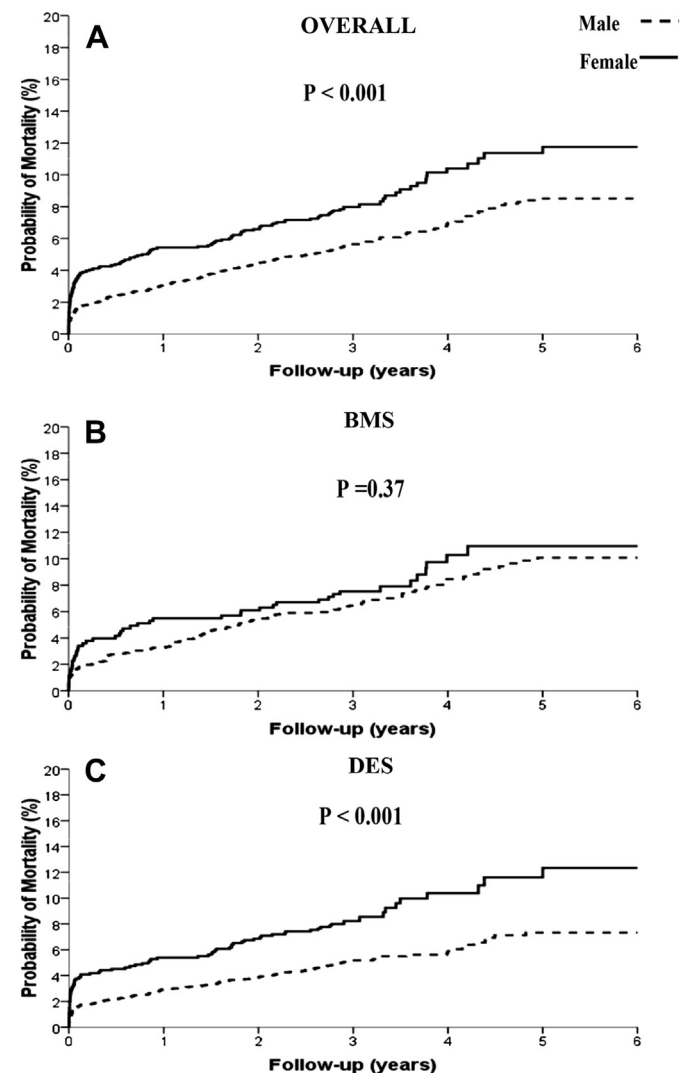
variables (preprocedural TIMI flow, infarct-related artery, post-procedural TIMI flow, use of Gp IIb/IIIa inhibitors), and complete follow-up data, such as mortality, reinfarction, TVR, and stent thrombosis (ST) (defined according to the Academic Research Consortium (ARC) definite or probable definition). A temporal analysis was performed for ST events, that were divided in acute (within 24 h), subacute (between 24 h and 30 days), late (between 1 and 12 months) and very late (later than 12 months follow-up).

### 1.1. Statistical analysis

Statistical analysis was performed with the SPSS 15.0 statistical package. Continuous data were expressed as mean  $\pm$  SD and

**Table 1**  
Patients characteristics according to gender.

Clinical characteristics	Female gender ( $n = 1466$ )	Male gender ( $n = 4832$ )	$p$ Value
Age (mean $\pm$ SD)	65.3 $\pm$ 12.4	59.3 $\pm$ 11.4	<0.001
Diabetes (%)	18.6	14.5	<0.001
Hypercholesterolemia (%)	39.6	36.9	0.15
Hypertension (%)	52.4	41.4	<0.001
Previous revascularization (%)	3.8	6.4	0.01
Symptom onset to balloon time (min)	272 $\pm$ 247	258 $\pm$ 220	0.06
Mean $\pm$ SD			
Anterior MI (%)	42.6	44.7	0.16
Preprocedural TIMI flow 0–1 (%)	65.7	66.5	0.6
Postprocedural TIMI flow 3	89.5	90.7	0.17
DES (%)	63.8	63	0.59
Type of DES			0.42
Cypher (%)	16.9	16.8	
Taxus (%)	45.9	45.6	
Endeavor (%)	1	0.6	
Glycoprotein IIb/IIIa inhibitors (%)	70.1	70.5	0.82
Infarct-related artery (%)			0.27
LM	0	0.2	
LAD	43.5	44.8	
AL	0.1	0.1	
LCX	11.7	13.7	
RCA	43.6	40.1	
Graft	0.1	0.1	
Multivessel disease (%)	35.1	37.5	0.31
DAT at follow-up			
6 months (%)	91.8	92.5	0.38
12 months (%)	63.1	63.7	0.65
24 months (%)	16.3	17.0	0.55
36 months (%)	13	11.1	0.06



**Fig. 1.** Kaplan–Meier survival curves showing the impact of female gender on survival in overall population (A), in patients with BMS (B) and DES (C).

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