

Survival improvement in Extensive Mycocardial
infarction with PERsistent ischemia Following Intra-
aortic balloon pump implantation

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I have the following potential conflicts of interest to report:

Receipt of honoraria or consultation fees: Maquet Getinge Group

- *Intra-aortic balloon pump* is the most widely used mechanical circulatory support device
- Effects of IABP therapy consist a combination of
 - *Afterload reduction*, a decrease in myocardial workload and oxygen demand
 - *Improved coronary blood flow*, increase of myocardial oxygen supply
- In patients with *acute myocardial infarction*, these effects could theoretically lead to a decrease in infarct size and better prognosis

- Recent studies have shown that the effect of IABP on coronary flow is *highly dependent on the status of the coronary autoregulation*
 - With exhausted coronary autoregulation (as in STEMI), coronary blood flow is directly dependent on perfusion pressure
 - Therefore, positive effects of IABP on coronary blood flow and myocardial oxygen supply can be expected
- Non-prespecified substudies show a *benefit of IABP therapy* in patients with *extensive myocardial infarction complicated by persistent ischemia* (i.e. exhausted coronary autoregulation)

What did we study?

- This study aimed to *prospectively* investigate the effect of IABP support in patients with large myocardial infarction complicated by persistent ischemia after primary PCI in a *randomized* way
- Primary endpoint:
 - Mortality, necessity of mechanical circulatory support, and hospital re-admission for congestive heart failure at 6 months
- Power analysis estimated an inclusion of approximately 400 patients
- Pilot study with *100 patients*

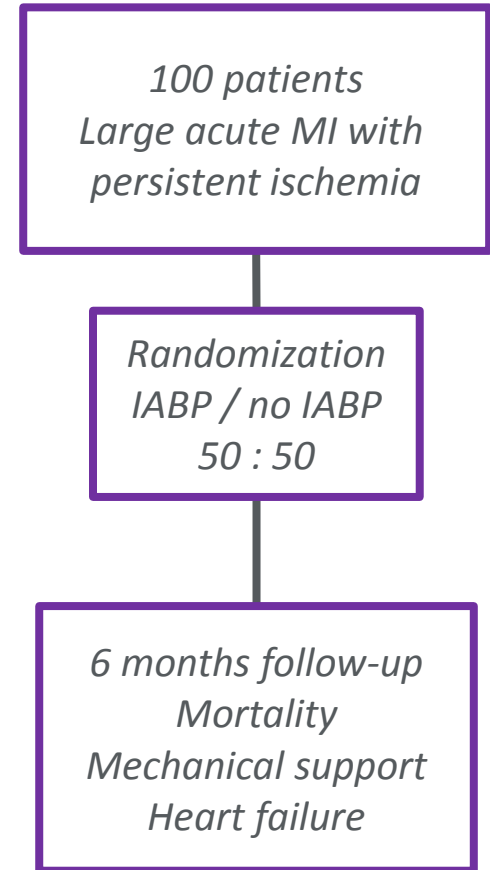
How was the study executed?

• Inclusion criteria

- Age 18-80 years old
- Large acute ST-segment elevation myocardial infarction
 - Summed ST-deviation (\sum ST-D) \geq 15mm
- Persistent ischemia after primary PCI
 - Insufficient ST-segment resolution $<50\%$

• Exclusion criteria

- Chest pain onset <2 hrs or >8 hrs before arrival in the cath lab
- Clinical characteristics prohibitive for use of IABP (severe aortic regurgitation / aortic abnormalities)
- Inability to provide informed consent
- Cardiogenic shock requiring immediate mechanical support



What are the essential results?

Baseline Characteristics	Total (n=100)	IABP group (n=50)	Control group (n=50)
Age (years)	63±10	64±10	65±15
Male sex (n (%))	76	37 (74)	39 (78)
Medical History			
Hypertension	28	12 (24)	16 (32)
Dyslipidemia	27	9 (18)	18 (36)
Diabetes	13	4 (8)	9 (18)
Smoking	65	27 (56)	38 (76)
Blood pressure (mmHg)			
Systolic	120±25	115±24	125±26
Diastolic	73±17	69±16	76±17
Heart rate (bpm)	75±18	73±18	77±19

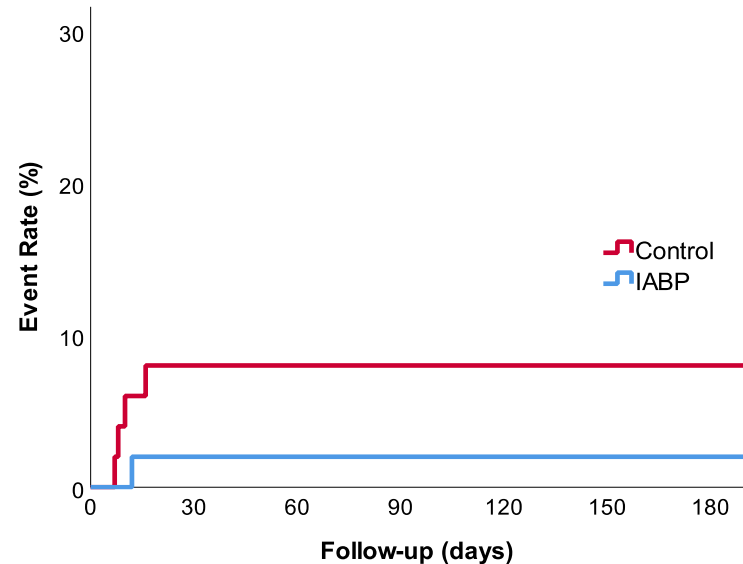
What are the essential results? (2)

<i>MI Characteristics</i>	<i>Total (n=100)</i>	<i>IABP group (n=50)</i>	<i>Control group (n=50)</i>
Infarct location			
Anterior	50	25 (50)	25 (50)
Inferior	50	25 (50)	25 (50)
Symptom duration (min)	188±157	184±142	190±171
Σ ST-D prePCI (mm)	21±8	21±8	22±8
Σ ST-D postPCI (mm)	22±11	21±9	22±12
ST-resolution (%)	5±49	5±40	5±57
Duration of IABP support (hrs)	-	15±7	-

What are the essential results? (3)

<i>Infarct size</i>	<i>IABP group (n=50)</i>	<i>Control group (n=50)</i>	<i>P-value</i>
CK-MB (U/L)	338±219	311±191	0.532

<i>Events</i>	<i>IABP</i>	<i>Control</i>	<i>P-value</i>
Primary endpoint n(%)	1 (2)	4 (8)	0.16
Mortality N(%)	1	2	0.56



Why is this important?

- In this *pilot study of 100 patients* presenting with large acute myocardial infarction, use of IABP showed a trend towards decreased mortality and readmission for heart failure within 6 months
- *IF* these results are representative for a fully powered randomized trial (extrapolation to 400 patients), the results would show a significant benefit for IABP therapy in these patients

The essentials to remember

- Use of IABP in patients presenting with persistent ischemia after primary PCI is a plausible concept
- *In the presence of persistent ischemia, coronary autoregulation is exhausted and myocardial blood flow is directly and proportionally dependent upon perfusion pressure, which is augmented by diastolic inflation of the IABP*
- This study is the first prospective pilot study showing a trend towards a better prognosis in these patients if treated with IABP