Invited Editorial / *Davetli Editöryal Yorum*

Intra-aortic balloon pump use in acute coronary syndrome: One size does not fit all!

Akut koroner sendromda intraaortik balon pompası kullanımı: Tek beden herkese olmaz!

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Advances in the treatment of cardiogenic shock (CS) led to a reduction in mortality in recent decades, which is mainly driven by early revascularization.[1] Although coronary revascularization has been widely used in clinical practice, the mortality of acute coronary syndrome (ACS) patients presenting with CS remains quite high, with some estimates as high as 50%.[1] The intra-aortic balloon pump (IABP) is the most widely used temporary mechanical circulatory support (MCS) device in these patients. The American College of Cardiology/American Heart Association 2013 guidelines for the management of ST elevation myocardial infarction (STEMI) and the European Society of Cardiology 2012 guidelines for the management of acute heart failure had specified that it is reasonable to use IABP therapy in the setting of ACS where CS cannot be quickly reversed with pharmacological therapy (class IIa and IIb indications, respectively).[2,3] However, the recent Intraaortic Balloon Pump in Cardiogenic Shock II trial (IABP-SHOCK II) demonstrated similar 30-day and 12-month mortality in patients treated and not treated with IABP.[4] Based on the IABP-SHOCK II trial results, the latest European guidelines downgraded routine IABP use in CS to a class IIIb recommendation.[5–7] The quick revision of the guideline recommendations about IABP led to confusion among clinicians. Nevertheless, in view of the poor prognostic perspective of this clinical context, many clinicians use IABP as a bailout option. Difficulty with the availability of other MCS devices is another compelling reason for IABP use in our country. In this context, selection of the patient who would benefit from IABP insertion becomes very important.

In this issue of the journal, Hayıroglu et al.[8] examined the clinical characteristics and in-hospital mortality of patients with ACS complicated by CS who were treated with primary percutaneous coronary intervention (PPCI) in a retrospective study. In this single-center study, all of the patients admitted to the intensive cardiac care unit with ACS over a 2½-year period (September 2014 to March 2017) were identified. They selected and analyzed 142 ACS patients treated with IABP after PPCI according to inclusion criteria, and documented the demographics, comorbidities, cardiovascular risk factors, baseline laboratory parameters, and the results of ECG, transthoracic echocardiography, and coronary angiography. The authors also created 2 groups from their population based on the outcome of in-hospital mortality: survivors and

Abbreviation:	
ACS	Acute coronary syndrome
CRF	Chronic renal failure
CS	Cardiogenic shock
IABP	Intra-aortic balloon pump
MCS	Mechanical circulatory support
PPCI	Primary percutaneous coronary intervention
STEMI	ST elevation myocardial infarction
TIMI	Thrombolysis in myocardial infarction

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non-survivors. All of the patients were receiving inotropic treatment. Nearly half of the population had a history of hypertension and diabetes, and over 40% of the patients had been diagnosed with heart failure before the index event. The authors noted that 39% of the patients had chronic renal failure (CRF), although they did not specify the exact definition of this comorbidity. They found an incredibly high in-hospital mortality rate of 55%. A comparison of survivors with non-survivors revealed that non-survivors were significantly older, had a higher prevalence of CRF and final Thrombolysis in Myocardial Infarction (TIMI) flow score ≤2 in the culprit artery after PPCI. Non-survivors also had worse left ventricular ejection fraction values, and higher glucose and lactate levels than survivors. After multivariate logistic regression analysis, the authors identified that CRF, ≤TIMI-2 final flow in the culprit artery after PPCI, and glucose and lactate levels were independent predictors of in-hospital mortality.

In a field where national data are very sparse, this study highlights the poor status of ACS patients complicated by CS who had an IABP implanted after PPCI, and factors associated with in-hospital mortality. Nevertheless, there are some shortcomings in the analysis that warrant further discussion. The first is the retrospective nature of the study. As is well known, retrospective studies have important limitations. First, which is a cardinal point in this study, is the timing of the laboratory analyses. Anabolic metabolism markers, such as lactate level, are very sensitive the duration of tissue hypoxia. Due to the retrospective design of the study, of course, the authors could not standardize this point. Although the authors denoted that the venous samples were taken on admission, admission time may vary from patient to patient. Similarly, the very high percentage of CRF may be a result of late venous sampling. A late admitting patient with cardiorenal syndrome type 1 may have been misdiagnosed as CRF in the study. Second, the mortality rate in the study is strikingly high. Although the mean age of the patients was in their sixties, sicker patients, such as Killip class IV or in the late stages of the anaerobic process/with disturbed tissue perfusion and prone to a bailout situation may have been enrolled. The authors recognized these issues in the discussion section of the study. Similar to other research, the authors also demonstrated an association between suboptimal results of PPKG and mortality.[9]

Eventually, with a limited study population and retrospective design, the ability to detect any predictor, especially on clinical endpoints such as mortality, is markedly attenuated. So, we return to the question that underlies the analysis of Hayıroğlu et al., namely, how should we manage ACS patients who present with CS? Beyond early recognition and fast triage, timely revascularization remains the mainstay of the management of CS.[9] The SHOCK trial randomized patients with STEMI complicated by CS into emergency revascularization (60% PCI, 40% surgical) and initial medical stabilization.[10] The mortality rates were similar, with a trend toward some benefit at 30 days in the revascularization group and a significant benefit emerging by 6 months.[10]

Based on the neutral results of the IABP-SHOCK II trial, the European guidelines no longer recommend routine use of IABP in patients with CS. Furthermore, a recent meta-analysis did not demonstrate reduced mortality in unselected CS patients treated with other active MCS used on a routine basis.[9] In this context, neutral results may not be specific to IABP. Therefore, patient selection and identification of patients who will benefit from IABP insertion may be crucial. It is well known that approximately 50% to 60% of CS patients survive without any MCS.[1] Thus, IABP implantation having a positive impact on outcome in this patient group appears to be unlikely. There may also be futile situations, such as patients with severe brain injury. The IABP-SHOCK II score, based on 6 easily assessable parameters dividing patients into low, intermediate, and high-risk cohorts, may be helpful for patient selection, but this needs further evaluation in randomized trials.[11]

In conclusion, Hayıroğlu et al. have furthered our pursuit of answering a question many of us face daily — whether or not to use an IABP to support our ACS patients with CS.

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