Cost Analysis of Intra-Aortic Balloon Pump Support Device in Patients with ST Elevation Myocardial Infarction Complicated by Cardiogenic Shock

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Introduction

Intra-aortic balloon pumps (IABP) are the most commonly used mechanical support devices in patients with cardiogenic shock after a ST segment elevation myocardial infarction (STEMI) worldwide (1). Recently, the usage of IABP has been scrutinized after the IABP-SHOCK II trial in 2012 failed to demonstrate improvement in short or long term all-cause-mortality in patients treated with IABP versus medical therapy with STEMI and cardiogenic shock (CS). The European Society of Cardiology’s STEMI guidelines update in 2017 recommended against routine use of IABP in patients with STEMI and CS (3). Furthermore, recent ACCF/AHA STEMI guidelines have downgraded their level of recommendation from a Level I to a Level IIB recommendation. As cardiogenic shock contributes significantly to the economic health care burden with greater than a $2.7 billion dollars in annual hospitalization cost, we aim to perform a cost analysis of IABPs versus medical therapy (vasopressors and inotropes) in this subpopulation.

Methods

A retrospective analysis was performed through chart review from January 2016 to September 2019. Using Premier Healthcare database, patient encounters with ICD 10 codes for cardiogenic shock, acute myocardial infarction and the procedural code for mechanical support device were selected. Each chart was individually reviewed and the presence of cardiogenic shock (defined as systolic blood pressure <90 and diastolic <60) was confirmed in addition to STEMI and presence or absence of a mechanical support device.

Results

The initial ICD 10 search yielded a total of 802 cases; after eliminating those that did not meet criteria, 91 in the IABP group and 50 in the medical therapy group remained. The average total cost of hospital stay per patient was higher in the IABP group than the medical therapy group; $52,271.44 versus $37,907 (p-value=.023). The observed/expected (O/E) cost was also higher in the IABP group with an O/E ratio of 1.54 vs 1.31. Although the average observed mortality was higher in the medical therapy group (44% vs 35% in IABP), the expected mortality was also higher in the medical therapy group (48% versus 44%). Furthermore, the O/E mortality was comparable in the subgroups; 2.38 medical therapy vs 2.31 IABP.

Discussion

Our data showed that an additional $14,364.44 in total hospital cost was observed in patients treated with IABP versus medical therapy. The observed/expected mortalities were comparable in the two groups, consistent with prior studies suggesting no mortality benefit when IABPs were used. Our study
suggests that IABP may not be cost effective in comparison to medical therapy in patients with STEMI complicated by cardiogenic shock.

References


