Periprocedural anticoagulation in transcatheter aortic valve replacement: Heparin vs bivalirudin

Sir,

Transcatheter aortic valve replacement (TAVR) has emerged as an option for patients with severe aortic stenosis. Placement of Aortic Transcatheter Valves trial showed similar 2-year outcomes in the context of mortality, symptoms reduction, and improved valve hemodynamics.[1] Currently, unfractionated heparin (UFH) is the standard of care for preprocedural anticoagulation during the TAVR. Another option available for anticoagulation is bivalirudin which has a shorter half-life of 25 min as compared to 1.5 h of UFH but has no reversal agent available. Previously, many trials have been conducted to compare the safety and efficacy of UFH versus bivalirudin in patients who underwent percutaneous coronary intervention (PCI). The use of bivalirudin reduced the 30-day mortality and net adverse cardiovascular events when compared to heparin plus glycoprotein IIb/IIIa inhibitors in patients with ST elevation myocardial infarction who underwent PCI.[2]

A few trials have been conducted to compare the efficacy of two in patients undergoing TAVR. Recently, a multicenter retrospective analysis evaluated the safety and efficacy of UFH versus bivalirudin in patients undergoing TAVR.[3] Lange *et al*. investigated 461 patients, of which 339 patients received bivalirudin and 339 patients received UFH. The primary outcome was the incidence of any bleeding, and the secondary outcomes were all-cause mortality and "cardiovascular mortality at 72 h and at 30 days." No significant difference was observed in the two groups in terms of bleeding, all-cause mortality, or "cardiovascular mortality at 72 h and at 30 days." Moreover, both the groups had device implantation success of >90%. Another randomized, open-label trial (Bravo-3 trial) aimed to determine if bivalirudin could be used in place of UFH.[4] A total of 802 patients were enrolled in seven countries to undergo TAVR and receive bivalirudin (n = 404) or UFH (n = 398). The two primary endpoints were major bleeding within 48 h or net adverse cardiovascular events at 30 days. Bivalirudin superiority was not shown in the context of reduced major bleeding at 48 h or net adverse cardiovascular events at 30 days; however, no hypothesis was met in regard to the latter factor.

The use of bivalirudin has been extensively studied in patients undergoing PCI with ACS, and it has shown to reduce bleeding complications when compared to UFH. However, similar results have not been reproduced in patients undergoing TAVR. This could be secondary to the small sample sizes that have been used in the studies until now. The theoretical pharmacokinetic advantage of bivalirudin (small size and short half-life) needs to be exploited to reduce the complications associated with TAVR. The data to this date reveal similar efficacy and bleeding complications of UFH and bivalirudin. Hence, it is reasonable to use bivalirudin in patients in whom heparin is contraindicated. UFH has the lower cost and remains to be the standard of care. Further studies with larger sample sizes are needed to evaluate the use of bivalirudin during TAVR.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Abdul Mannan Khan Minhas, Salman Assad[1]

Department of Medicine, Orange Park Medical Center, Terrace, Florida, USA, [1]Department of Medicine, Shifa Tameer-e-Millat University, Islamabad, Pakistan

Address for correspondence: Dr. Salman Assad, Department of Medicine, Shifa Tameer-e-Millat University, Islamabad, Pakistan.
E-mail: salmanassad91@gmail.com

REFERENCES

1. Kodali SK, Williams MR, Smith CR, Svensson LG, Webb JG, Makkar RR, *et al*. Two-year outcomes after transcatheter or surgical aortic-valve replacement. N Engl J Med 2012;366:1686-95.
2. Stone GW, Witzenbichler B, Guagliumi G, Peruga JZ, Brodie BR, Dudek D, *et al*. Bivalirudin during primary PCI in acute myocardial infarction. N Engl J Med 2008;358:2218-30.
3. Lange P, Greif M, Bongiovanni D, Thaumann A, Näbauer M, Bischoff B, *et al*. Bivalirudin vs. heparin in patients who undergo transcatheter aortic valve implantation. Can J Cardiol 2015;31:998-1003.
4. Dangas GD, Lefèvre T, Kupatt C, Tchetche D, Schäfer U, Dumonteil N, *et al*. Bivalirudin versus heparin anticoagulation

© 2017 Journal of Research in Medical Sciences | Published by Wolters Kluwer - Medknow

in transcatheter aortic valve replacement: The randomized BRAVO-3 trial. J Am Coll Cardiol 2015;66:2860-8.

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

Access this article online

Quick Response Code:

Website: www.jmsjournal.net

DOI: 10.4103/jrms.JRMS_301_17

How to cite this article: Minhas AM, Assad S. Periprocedural anticoagulation in transcatheter aortic valve replacement: Heparin vs bivalirudin. J Res Med Sci 2017;22:97.