

Peri- and postinterventional antithrombotic therapy in TAVI

Do we need antiplatelet therapy?

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Keywords

Transcatheter aortic valve replacement

Schlüsselwörter

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Summary

Interventional treatment of aortic valve stenosis by transcatheter aortic valve replacement (TAVR) has become routine practice in elderly and high risk patients in recent years. Similar to other vascular interventional or surgical procedures TAVR carries thrombotic risks such as stroke, myocardial infarction or systemic embolism as well as peri-procedural bleeding risks. These risks comprise the access site, the type of prosthesis, and the individual risk profile of the patient. Not only during the peri-procedural period but also during longterm follow-up the current target population for TAVR procedures carries a high risk for thrombotic events in particular if atrial fibrillation is present. On the other hand side the bleeding risk is also increased in these patients. Thus, to provide the optimal strategy of antithrombotic therapy during and after TAVR remains a clinical challenge.

Zusammenfassung

Die interventionelle Therapie der Aortenklappenstenose ist in den vergangenen Jahren zu einem Routineverfahren geworden. Wie auch bei anderen intravaskulären Verfahren besteht hierbei ein Thromboembolie- und ein Blutungsrisiko, das jeweils sowohl vom Patienten als auch von der Prozedur abhängt. Daher bleibt es eine klinische Herausforderung den optimalen Grad der antithrombotischen Therapie zu wählen.

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Peri- und postinterventionelle antithrombotische Therapie bei TAVI

Brauchen wir eine plättchenhemmende Therapie?

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suggesting a mechanical interaction between the device and the calcified aortic valve as the cause.

- Half of all cardiovascular events occur later than 24 h after valve implantation. In these patients other mechanisms in addition to valve manipulation appear to be involved. These include aortic wall destruction or artificial surface exposure and subsequent activation of the haemostatic system.

Moreover, there may be also an effect of turbulences or local blood stasis which contributes to the number of ischaemic events.

Another important aspect in this context is the fact that about 30% of patients undergoing a TAVR procedure develop new atrial fibrillation and up to 30% of the patients undergoing TAVR already present with chronic atrial fibrillation.

Owing the high risk patient profile of a typical TAVR candidate this high prevalence of atrial fibrillation is also characterised by a high CHA₂DS₂-VASC-score and thus these patients carry a substantial thrombotic risk (3).

On the other hand the bleeding risk is also increased in these patients. The bleeding risk comprises the access site and the individual risk profile of the patient. Thus, to provide the optimal strategy of antithrombotic therapy during and after TAVR remains a clinical challenge.

One option to address this challenge could be to compare surgical with interventional valves. Similar to surgical biologic aortic valve prostheses TAVR valves carry leaflets made from biologic material such as porcine pericardium. In TAVR valves a metallic frame similar to a vascular

Interventional treatment of aortic valve stenosis by transcatheter aortic valve replacement (TAVR) has become routine practice in elderly and high risk patients in recent years. Similar to other vascular interventional or surgical procedures TAVR carries thrombotic risks such as

- stroke,

- myocardial infarction or
- systemic embolism.

In TAVR patients the rate of clinically apparent strokes averages around 3% in the first 30 days (1, 2).

- Most of these events occur during positioning and implantation of the valve,

stent is used to hold the valve in position. The frame and the valve material are exposed to the blood and consequently hold thrombogenic potential. The data basis for antithrombotic therapy after a surgical biologic aortic valve is weak and thus it is not surprising that different guidelines provide different recommendations.

- Provided that no other indication for anticoagulation is present the ESC guideline recommends the use of aspirin for the first three months as a IIa recommendation and the use of VKA for three months as a IIb recommendation (4).
- The AHA/ACC guideline recommends the use of longterm low dose aspirin; Class IIa recommendation; level of evidence (LOE) B.
- The use of VKA is considered as reasonable for the first three months (Class IIb, LOE C) (5).
- The ACCP guideline suggests low dose aspirin over VKA (Grade 2C) (6).

Taken together, the recommendations favour aspirin versus VKA during the first three months in surgical biologic aortic valve prostheses. Thus the biological leaflets apparently do not require the routine use of anticoagulation to prevent valve thrombosis.

The main structural difference between surgical and interventional valves is the stent that exposes metal surface to the blood stream and thus may be accompanied by additional prothrombotic risk. Based on early clinical experience in TAVR and also probably because this novel procedure became available during the first decade of this millennium in which antiplatelet therapy was evolving rapidly in the field of acute coronary syndromes and percutaneous coronary stent implantation, patients receiving a TAVR procedure are frequently treated with dual antiplatelet therapy (DAPT) during the post-procedural period (7). Similar to surgical biologic valves anticoagulation is not

routinely necessary to prevent valve thrombosis. The initial clinical trials performed with the balloon expandable or the self-expandable valve types also used the DAPT strategy in TAVR patients with an acceptable risk/benefit ratio (8–10). This is also the strategy recommended by the current guidelines (4–6).

At least one smaller trial tested if aspirin alone was equally efficient as the DAPT (11). Although the data questions the use of DAPT in these patients the study has severe weaknesses in its design precluding the generalization of the results. Moreover, newer valve designs which reduce procedural problems such as residual paravalvular insufficiency e.g. by the presence of a skirt-like tissue belt and thus additional prothrombotic material may require new evaluation of the optimal antithrombotic therapy.

As mentioned every second patient undergoing TAVR has existing atrial fibrillation or develops new onset atrial fibrillation after valve implantation. In these patients a combination of an anticoagulant with an antiplatelet agent represents the current standard of care. If there is a role for the novel oral anticoagulants (NOACs) which provide a superior risk/benefit profile compared to vitamin K antagonists in atrial fibrillation patients without valvular disease and without valve prosthesis is yet to be established.

Conclusion

Dual antiplatelet therapy represents the current standard of care in patients undergoing transcatheter aortic valve replacement.

Conflict of interest

The author declares that he has received speakers honoraria from Astra Zeneca, Bayer, Boehringer Ingelheim, Bristol Myers

Squibb, Daiichi Sankyo, Glaxo Smith Kline, Lilly, Pfizer, Sanofi, The Medicines Company,

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