

Anticoagulation in patients with mechanical heart valves: follow the guidelines!

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Heart valve surgery has been one of the great leaps forward in the management of heart disease in the last 60 years. Thanks to technical developments, artificial heart valves were constructed that prove to be competent and durable. Besides the risk of infective endocarditis, thromboembolism from the foreign body structures of the prosthesis remains a major problem, which can be effectively reduced, but not annihilated by the use of oral anticoagulants. For nearly all patients on oral anticoagulants, bleeding is the most common problem. The only available and proven effective oral anticoagulants for carriers of mechanical heart valve prosthesis are the vitamin-K antagonists (VKA). They need intensive monitoring of the anticoagulation status through the dense network of thrombosis clinics in the Netherlands. Recently, non-VKA direct-acting oral anticoagulants were introduced, which are safer and more effective than VKA in stroke prevention in atrial fibrillation [1]. They have also been tested in patients undergoing mechanical heart valve replacement and in those with recent implantation, but here they failed in efficacy and safety in comparison with VKA [2]. Thus, VKA remains the standard of anticoagulation care for patients carrying artificial heart valves.

In the today's issue of the *Netherlands Heart Journal* the results of a retrospective registry of mechanical aortic valve replacement (AVR) are presented by Swinkels et al. [3]. Data were collected in a single-centre experience and have a very long follow-up. Bleeding complications were collected in relation to age (<60, 60–65 and >65 years) at the time of surgery. The authors found a high rate of major bleeding per

year: the lowest in the youngest age group and the highest in the oldest. Intracranial haemorrhage was seen at an unacceptable rate (0.6–0.7/year) in all age groups. Therefore, the authors conclude that the use of mechanical AVR below the age of 60 years is associated with a similar rate of intracranial bleeding as seen in older patients.

This report shows the deleterious effect of over-anticoagulation in many patients with a low-risk mechanical aortic prosthesis. Bleeding on VKA is highly dependent on INR monitoring. Since 2007 international guidelines recommend a target INR of 2.5 in carriers of a mechanical aortic valve without risk factors such as atrial fibrillation. The St. Jude Medical prosthesis in the aortic position, which was used in half of the patients, is considered a valve with a low thrombotic risk and only very few of the patients under 60 years of age had atrial fibrillation. Therefore, the bleeding—especially intracranial bleeding—encountered in this cohort is unacceptable. Of course, this knowledge was not available at the time the first patients were included in this cohort; however, already in 1996 the Leiden group published the low thrombosis rate in this type of valve [4]. And in 2006 and 2007 the American [5] and European [6] guidelines became available and have not changed on this topic since then (Fig. 1) [7]. But it was not until 2010 that the Netherlands Federation of Thrombosis Clinics mentioned, in their yearly report, the existence of a differentiated approach for patients with artificial heart valves [8]. This explains why the rate of major bleeding described in this cohort did not seem to drop over the years.

Thus, knowledge of the guidelines is essential in the management of patients in general, but of this group of patients with a delicate balance between thrombosis and bleeding in particular.

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Prosthesis thrombogenicity ^a	Patient-related risk factors ^b	
	No risk factor	≥ 1 Risk factor
Low	2.5	3.0
Medium	3.0	3.5
High	3.5	4.0

LVEF = left ventricular ejection fraction, MS = mitral stenosis.
^aProsthesis thrombogenicity: Low = Carbomedics (aortic position), Medtronic Hall, St Jude Medical (without Silzone); Medium = Bjork-Shiley, other bileaflet valves; High = Lillehei-Kaster, Omniscience, Starr-Edwards.
^bPatient-related risk factors: mitral, tricuspid, or pulmonary valve replacement; previous thrombo-embolism; atrial fibrillation; left atrial diameter > 50 mm; left atrial dense spontaneous contrast; MS of any degree; LVEF < 35%; hypercoagulable state.

Fig. 1 2007 recommendations of the European Society of Cardiology on the INR in the anticoagulant management of patients with mechanical heart valve prosthesis. [6]

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