A 64-year-old man was transferred to our hospital for external cardioversion (ECV) of symptomatic persistent atrial fibrillation (AF). At the time of hospital admission the patient presented with functional NYHA class III; he had a clinical history of symptomatic coronary artery disease, ischaemic cardiomyopathy with severely impaired left ventricular function, and chronic kidney disease stage 3B to 4 (creatinine clearance [CrCL] 29 ml/minute). Pretreatment with the vitamin-K antagonist (VKA) phenprocoumon was instituted in 2006 due to a high AF related thromboembolic risk with an actual CHA\textsubscript{2}DS\textsubscript{2}-VASc score of 6. Since the international normalised ratio (INR) was not well controlled before elective ECV we performed a transesophageal echocardiography (TEE), which revealed a small thrombus formation (11 x 12 mm) in the apex of the left atrial appendage (LAA) (Figure 1A). Therefore, ECV was deferred for six weeks under closely controlled VKA therapy with levels of INR ranging between 2.5 – 3.5 (mean 3.2 ± 0.7, range 2.4 to 4.2). Interestingly, repeated TEE (Figure 1B) showed a markedly increased giant thrombus mass (12 x 45mm) now protruding into the left atrium.

In general VKAs have a slow onset of action and their indirect anticoagulant activity depends on clearance of the vitamin K–dependent clotting proteins and replacement with functionally impaired factors (1). In contrast to current guidelines, there is increasing evidence that VKAs have a poor capability to resolve large intracardiac thrombi. Therefore, we decided to switch oral anticoagulation (OAC) to the direct factor Xa (FXa) inhibitor rivaroxaban dosed with 15 mg once daily.

After four weeks of rivaroxaban treatment TEE showed a relevantly decreased thrombus size (Figure 1C) and a complete thrombus resolution was achieved after six weeks of anticoagulant therapy with the FXa inhibitor (Figure 1D). Finally, ECV was performed successfully without clinical signs of cardiac embolism and the patient was discharged in good medical conditions under continued anticoagulant treatment with rivaroxaban.

To the best of our knowledge this is the first documented case of LAA thrombus resolution under rivaroxaban therapy and illustrates some clinically important characteristics of the new direct acting FXa inhibitor.

First, in contrast to indirect acting VKAs, FXa inhibitors have the potential to (a) prevent de novo thrombus formation and - more importantly - (b) to resolve established thrombi by direct inhibition of free and thrombus-associated FXa. Thereby they reduce clot-induced fibrinopeptide A generation to a similar extent as hirudin, a potent inhibitor of thrombin (2).

Figure 1: Thrombus development under different oral anticoagulant regimen with vitamin K antagonist (VKA) (A, B) and rivaroxaban (C, D). A) Small thrombus formation in the left atrial appendage (LAA) apex at first presentation (arrows). B) 2D and 3D enface view (smaller image) of markedly increased giant thrombus mass (12 x 45mm) now protruding into the left atrium. C) Decreased thrombus formation after four weeks (arrow). D) Complete thrombus resolution after six weeks of anticoagulant therapy with rivaroxaban (D, arrow pointing at “empty” LAA in the 3D enface view). MV, mitral valve.
Second, in patients with renal insufficiency a reduced rivaroxaban dosage seems highly effective in reducing cardio-embolic risk. This is very important in clinical practice, since significant renal impairment affects up to 60% of patients with symptomatic cardiovascular disease (3).

Third, rivaroxaban treatment enabled thrombus resolution within a manageable time period. Therefore, this OAC could be considered as a new therapeutic option in similar cases. Especially since LAA thrombi persist in up to 40% of patients under VKA treatment and is associated with a poor prognosis (4). Large-scale studies, however, are needed to proof these preliminary findings.

Conflicts of interest
None declared.

References