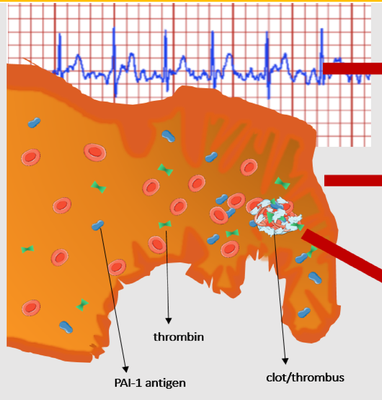
Intracardiac prothrombotic state differences in patients with atrial fibrillation and changes in the coagulation system after LAAC

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KRAKOWSKI SZPITAL SPECJALISTYCZNY IM. JANA PAWŁA II

VIRCHOW'S TRIAD IN LEFT ATRIAL APPENDAGE



I. BLOOD STASIS
- atrial fibrillation
- ineffective contraction of the atria
- turbulent blood flow

II. ENDOTHELIAL CELL DAMAGES
- dilated left atrium
- myocyte necrosis
- myocyte hypertrophy
- extracellular matrix abnormal changes

III. PROTROMBOTIC STATE

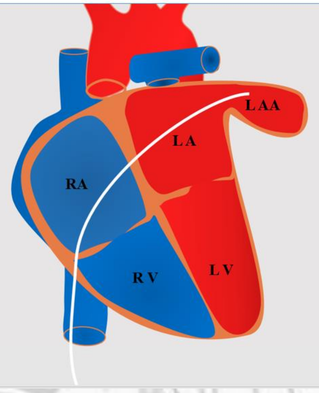
Procedure



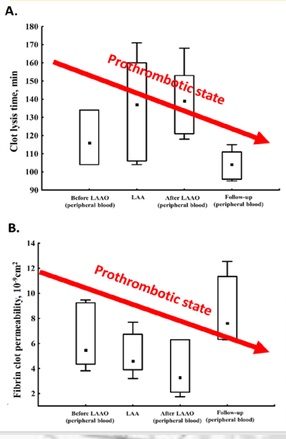
All blood samples were collected before the administration of unfractionated heparin

Before the procedure, bridge therapy with low molecular weight heparin was performed

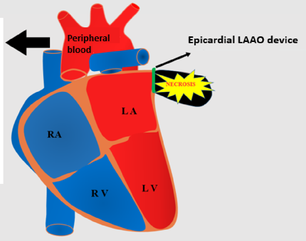
Fibrin clot analysis
Clot Permeability (K_s)
Clot lysis time
Thrombin Generation Test (by CAT)
Tissue plasminogen activator (tPA) antigen
Plasminogen activator inhibitor type 1 (PAI-1) antigen
Thrombin activatable fibrinolysis inhibitor (TAFI) antigen
Fibrynogen
Plasminogen activity



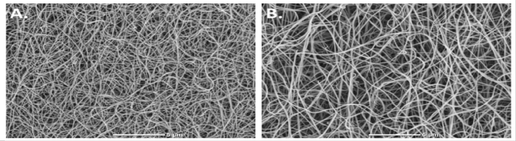
1 month after LAAC



Coagulation changes after LAAO
- Reduced risk of thromboembolism
- Improved fibrin clot permeability
- Improved clot lysis time
- Increase plasminogen activity
- Decreased PAI-1 antigen levels



Fibrin clot characteristics analysis by scanning electron microscopy (SEM)
A - Before LAAO B - After LAAO



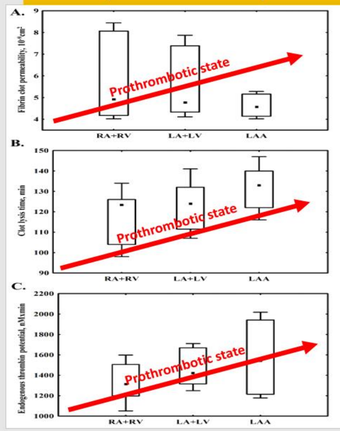
Patients

22 AF patients with indications for left atrial appendage closure (LAAC)

Variable	Patients (n=16)
Age, years (Mean ± SD)	65.4±7.8
Female	37.5% (n=6)
BMI (Mean ± SD) [kg/m²]	28.4±2.2
Left Ventricle Ejection Fraction (LVEF) (%)	54.6±4.8
$CHADS_2$ score (Mean ± SD)	2.6±1.2
CHA_2DS_2-VASc score (Mean ± SD)	3.8±1.8
HAS-BLED score (Mean ± SD)	3.2±1.5
Congestive Heart Failure	12.5% (n=2)
Hypertension	87.5% (n=14)
Hyperlipidemia	50% (n=8)
Diabetes mellitus type 2	31.2% (n=5)
Previous ischemic stroke/TIA	62.5% (n=10)
Hemorrhagic stroke	56.2% (n=9)
Myocardial infarction	6.2% (n=1)
Vascular Disease	12.5% (n=2)
Alcoholism	6.2% (n=1)

Laboratory parameters	Mean±SD
Platelet count (10^3)	227.7±38
PT-INR	1.2±0.2
PT sec	13.3±2.3
PT %	84.4±21.7
APTT (sec)	36.5±8.0
Anti-Xa activity (IU/mL)	0.5±0.3
C-reactive protein (mg/L)	1.9±1.3
Total cholesterol (mmol/L)	4.4±1.1
LDL cholesterol (mmol/L)	2.7±1.0
HDL cholesterol (mmol/L)	1.3±0.5
Preprocedural OAC	
- Vitamin K antagonist	18.7% (n=3)
- Direct oral anticoagulant	43.7% (n=7)
- Aspirin	12.5% (n=2)
- None	25.0% (n=4)

LAA cavity has an increased prothrombotic state compare to other heart chambers.



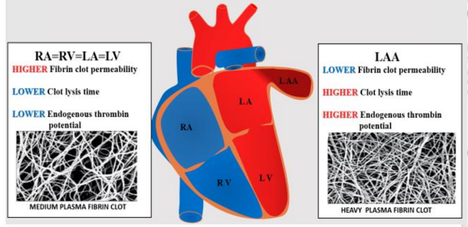
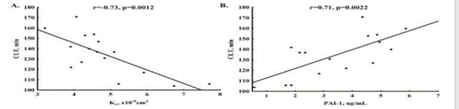
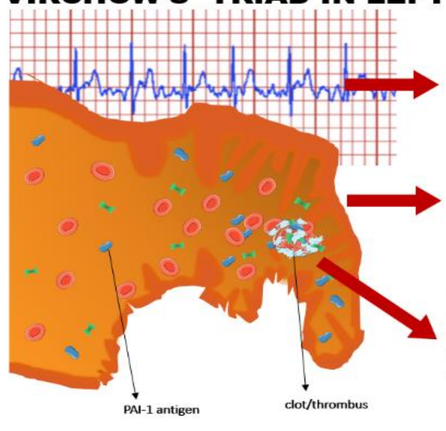


Fig. 2. Associations of clot lysis time (CLT) with fibrin clot permeability (K_s; panel A) and plasminogen activator inhibitor type 1 (PAI-1; panel B) assessed in plasma obtained from the left atrial appendage (LAA).



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II. ENDOTHELIAL CELL DAMAGES
- dilated left atrium
- myocyte necrosis
- myocyte hypertrophy
- extracellular matrix abnormal changes

III. HYPERCOAGULABLE STATE
- prolonged plasma fibrin clot permeability
- prolonged clot lysis time
- decreased plasminogen activity
- increased PAI-1 antigen levels