



# **LAA occlusion vs. standard care in patients with atrial fibrillation and intracerebral hemorrhage**

**A propensity score matched follow-up study**

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☒ **I have the following potential conflicts of interest to report:**

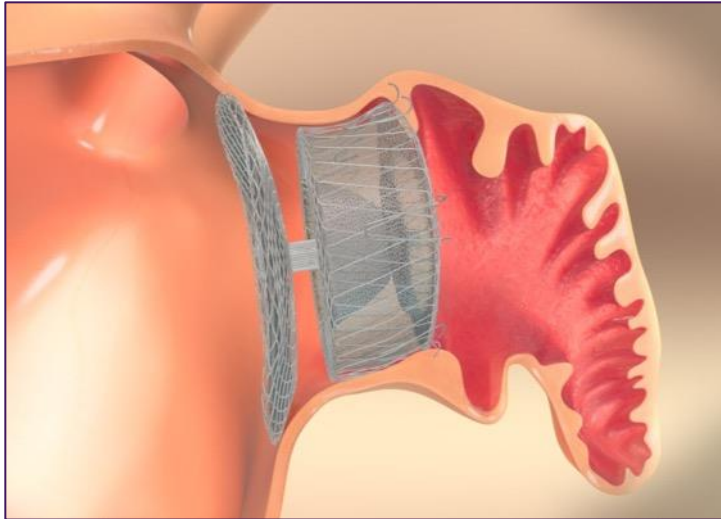
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- Patients with atrial fibrillation (AF) and an intracerebral hemorrhage (ICH) have a high risk of both ischemic stroke and recurrent ICH.
- There is no consensus on how to treat AF post-ICH and such patients are often left without anticoagulation due to the fear of recurrent serious bleedings.
- Transcatheter left atrial appendage occlusion (LAAO) might be of potential clinical benefit in this patient group.
- The aim of this study was to compare the clinical outcome of LAAO versus standard medical care in patients with AF and a prior ICH.
- This was done in a propensity score matched follow-up trial with the LAAO and standard care groups matched according to stroke and bleeding risks (CHA<sub>2</sub>DS<sub>2</sub>-VASc and HAS-BLED scores).

- **Study population:**
  - **LAAO:** Patients from Nordic LAAO centers (*Sweden:* Gothenburg, Stockholm and Lund; *Finland:* Tampere, Turku and Helsinki, *Denmark:* Copenhagen and Aarhus) treated between 2009-2015. n=172
  - ACP and Amplatzer Amulet devices (St. Jude Medical) used for LAAO
  - **Standard care:** Danish ICH patients with atrial fibrillation who survived at least 180 days after admission with ICH between 2005-2014. n=787
- **Design:** Propensity-score matched follow-up study
  - Used to balance stroke and bleeding risks in the two patient groups
  - Matched CHA<sub>2</sub>DS<sub>2</sub>-VASc, HAS-BLED scores and each separate risk factor for stroke and bleeding
- **Primary endpoint:** Composite clinical outcome of:
  - All cause mortality
  - Acute ischemic stroke
  - Major bleeding
    - Includes gastrointestinal bleeding, recurrent ICH, other intracranial bleeding



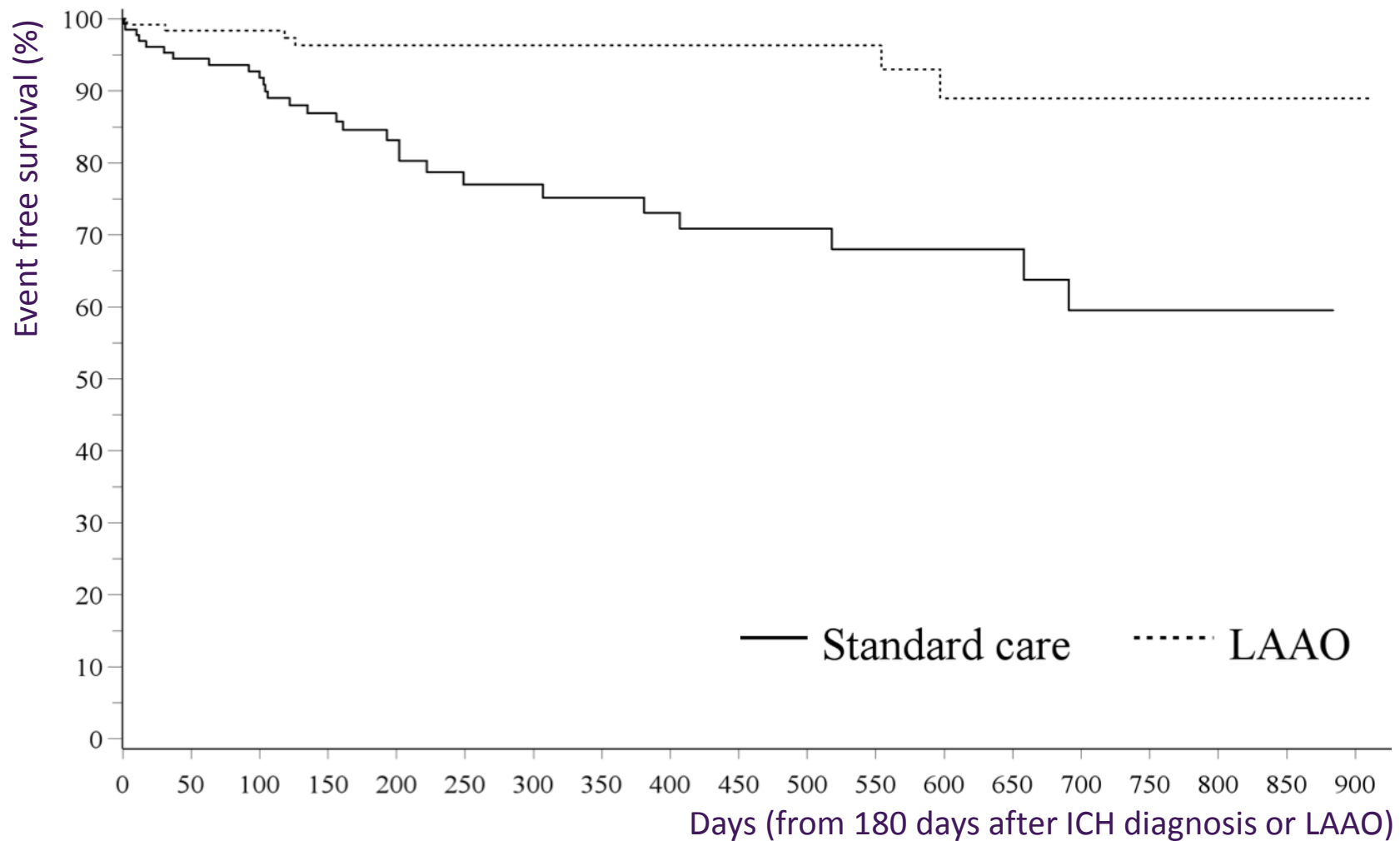
- Amplatzer Cardiac Plug (ACP) or Amplatzer Amulet (n=176)
- Procedural success 97.7% (172/176)
- Periprocedural complications 4.0% (7/176)
  - 1 ICH (full spontaneous recovery), 1 hematemesis, 3 vascular access site bleedings
  - 1 device migration, 1 pericardial effusion
  - No mortality

Characteristics (propensity score matched patients)	Standard care (n=147)	LAAO (n=147)
Age, mean (SD)	<b>73.3</b> (9.1)	<b>71.9</b> (8.7)
Gender (male) n (%)	<b>97</b> (66.0)	<b>96</b> (65.0)
CHA <sub>2</sub> DS <sub>2</sub> -VASc mean (SD)	<b>4.0</b> (1.5)	<b>3.9</b> (1.5)
HAS-BLED mean (SD)	<b>4.2</b> (0.8)	<b>4.2</b> (0.8)
<b>Antithrombotic treatment</b>	(during follow-up)	(at latest follow-up)
Warfarin	<b>20%</b>	<b>0%</b>
NOAC	<b>23%</b>	<b>0%</b>
Platelet inhibitors	<b>37%</b>	<b>71%</b>
No treatment	<b>44%</b>	<b>29%</b>

Median follow-up time: 166 days (25%/75% quartile: 70/458 days)

Median time from ICH to LAAO: 189 days (25-4533 days)

Combined endpoint (n = 294)





Clinical outcome	Standard care (n=147)	LAAO (n=147)
<b>Ischemic stroke/major bleeding/mortality</b>		
Events	<b>28</b>	<b>6</b>
Event rate (events/1000 patient years) (95% CI)	<b>278.9</b> (229.3 - 339.2)	<b>47.9</b> (40.2-57.1)
<b>Ischemic stroke</b>		
Events	<b>5</b>	<b>2</b>
Event rate (events/1000 patient years) (95%)	<b>48.6</b> (40.1-59.0)	<b>15.5</b> (13.0-18.4)
<b>Major bleeding</b>		
Events	<b>9</b>	<b>4</b>
Event rate (events/1000 patient years) (95%)	<b>88.3</b> (72.7-107.2)	<b>31.7</b> (26.6-37.7)
ICH	<b>3</b>	<b>1</b>
<b>Mortality</b>		
Events	<b>23</b>	<b>2</b>
Event rate (events/1000 patient years) (95%)	<b>216.9</b> (179.3-262.4)	<b>15.4</b> (13.0-18.3)

Clinical outcome HR by Cox-regression analysis n = 147 in each PS-matched patient group	LAAO vs. Standard care Hazard ratio (95% CI)	Relative risk reduction (%)
Ischemic stroke/major bleeding/mortality	<b>0.19</b> (0.08-0.46)*	<b>81%</b>
Ischemic stroke	<b>0.35</b> (0.07-1.79)	<b>65%</b>
Major bleeding	<b>0.39</b> (0.12-1.28)	<b>61%</b>
ICH	<b>0.29</b> (0.03-2.82)	<b>71%</b>
Mortality	<b>0.08</b> (0.02-0.32)*	<b>92%</b>

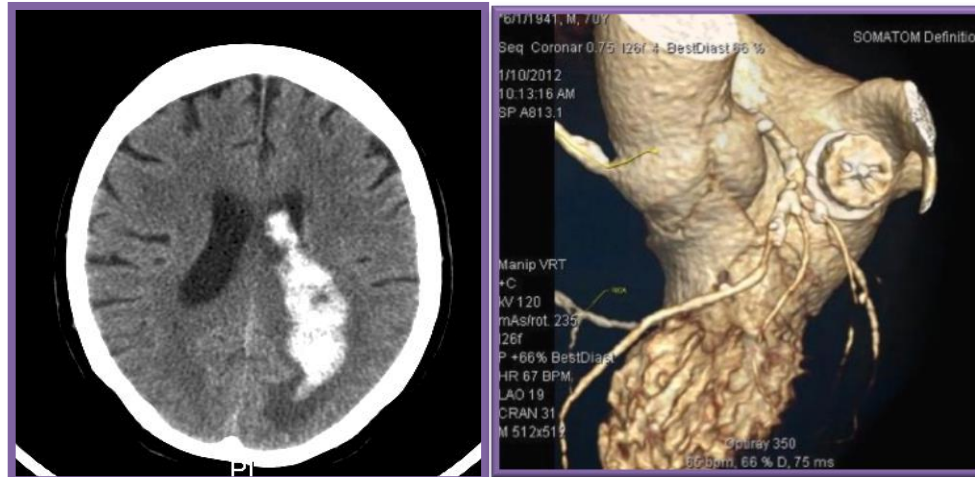
\*p&lt;0.05

- There is no consensus on stroke prevention in AF patients with intracerebral hemorrhage (ICH)
  - Increased risk for both ischemic stroke and recurrent ICH.
  - Transcatheter left atrial appendage occlusion (LAAO) can be an alternative
- Propensity score matched study on prognosis in AF/ICH patients with LAAO versus standard medical care
  - 147 patients from Nordic countries with Amplatzer Cardiac Plug or Amplatzer Amulet
  - vs 147 patients propensity score matched standard medical care from Danish stroke registry
  - Matching risk factors (CHA<sub>2</sub>DS<sub>2</sub>-VASc, HAS-BLED and individual risk factors)
  - Primary endpoint: composite of all-cause mortality, ischemic stroke and major bleeding.
- Patients with AF and a prior ICH treated by LAA Occlusion
  - Lower risk of composite outcome (Hazard ratio: 0.19)
  - Lower risk of mortality (Hazard ratio: 0.08)
  - Hazard ratios for stroke (0.35) and major bleeding (0.39) in favour of LAAO
- LAA Occlusion is suggested to be of major clinical benefit in AF patients with prior ICH

Event rate/1000 years	Standard	LAAO
Ischemic stroke/major bleeding/mortality	278.9	47.9

- These study data suggests transcatheter LAAO to be a beneficial stroke prevention strategy in patients with atrial fibrillation and prior intracerebral hemorrhage
- The results should be confirmed in a randomized clinical trial
- A Nordic randomized clinical LAAO trial (STROKECLOSE) will be initiated in 2016

Thank you for your attention!





BACKUP

# OAC-treated standard care patients

ICH patients with AF treated either by standard medical care or LAAO.

All standard care patients started oral anticoagulant within 180 days after ICH

Characteristics (propensity score matched patients)	Standard care, OAC (n=103)	LAAO (n=103)
Age, mean (SD)	<b>74.8</b> (9.0)	<b>72.9</b> (9.6)
Gender (male) n (%)	<b>64</b> (62.1)	<b>64</b> (62.1)
CHA <sub>2</sub> DS <sub>2</sub> -VASc mean (SD)	<b>4.0</b> (1.5)	<b>3.8</b> (1.5)
HAS-BLED mean (SD)	<b>4.2</b> (0.7)	<b>4.1</b> (0.7)
Antithrombotic treatment	(during follow-up)	(at latest follow-up)
Warfarin	<b>72%</b>	<b>0%</b>
NOAC	<b>100%</b>	<b>0%</b>
Platelet inhibitors	<b>18%</b>	<b>65%</b>
No treatment	<b>0%</b>	<b>35%</b>

# OAC-treated standard care patients

ICH patients with AF treated either by standard medical care or LAAO.

All standard care patients started oral anticoagulant within 180 days after ICH

<b>Clinical outcome</b> HR by Cox-regression analysis n = 147 in each PS-matched patient group	<b>LAAO vs. Standard care</b> <b>Hazard ratio (95%CI)</b>	<b>Relative risk reduction (%)</b>
<b>Ischemic stroke/major bleeding/mortality</b>	<b>0.26</b> (0.09-0.80)*	<b>74%</b>
<b>Ischemic stroke</b>	<b>0.32</b> (0.06-1.56)	<b>68%</b>
<b>Major bleeding</b>	<b>0.66</b> (0.11-3.94)	<b>34%</b>
<b>ICH</b>	<b>0.51</b> (0.05-5.65)	<b>49%</b>
<b>Mortality</b>	<b>0.28</b> (0.06-1.36)	<b>72%</b>