Underutilization of Oral Anticoagulants in Patients with Atrial Fibrillation undergoing Percutaneous Coronary Intervention: A Nationwide Population-Based Study

Jiesuck Park, MD, a Eue-Keun Choi, MD, PhD, a Kyung-Do Han, PhD, b You-jung Choi, MD, a Euijae Lee, MD, a Wonseok Choe, MD, a So-Ryoung Lee, MD, c Myung-Jin Cha, MD, a Woo-Hyun Lim, MD, PhD, d Seil Oh, MD, PhD, a Gregory Y H Lip, MD e

aDepartment of Internal Medicine, Seoul National University Hospital, Seoul, Republic of Korea
bDepartment of Biostatistics, College of Medicine, The Catholic University of Korea, Seoul, Republic of Korea
cDepartment of Internal Medicine, Soon Chun Hyang University Hospital, Seoul, Republic of Korea
dDepartment of Internal Medicine, Seoul National University Boramae Medical Center, Seoul, Republic of Korea
eInstitute of Cardiovascular Sciences, University of Birmingham, United Kingdom and Aalborg Thrombosis Research Unit, Department of Clinical Medicine, Aalborg University, Aalborg, Denmark.
The Korean Society of Cardiology
COI Disclosure

Name of First Author: Jiesuck Park

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PCI in patients with Atrial Fibrillation

- Between 5–15% of patients with AF require PCI with stent implantation during the lifetime.
- Approximately 5–10% of patients undergoing PCI present with AF.
- Oral anticoagulants had shown benefit in reducing the risk of stroke in AF patients.
- Patients with PCI are recommended for dual antiplatelet agents to prevent stent thrombosis.

References:
Patients with AF undergoing PCI in Korean Population

Numbers of Patients

Year


Total

Male

Female

CHAD2-VASc ≥ 2

%
Current Guidelines for Antithrombotic Therapy

- In patients with AF at risk of stroke, **triple therapy** with aspirin, clopidogrel and an oral anticoagulant should be considered for 1~3 month after PCI (Class IIa)

- After than, **dual therapy** with an oral anticoagulant with aspirin or clopidogrel should be considered for **up to 12 months** (Class IIa), followed by **monotherapy** with oral anticoagulants (Class IB)

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AF patient undergoing PCI with Stent Implantation

Time from PCI (Month)

- **Triple therapy**
  - OAC + Aspirin + Clopidogrel

- **Dual therapy**
  - OAC + Aspirin or Clopidogrel

- **Mono therapy**
  - OAC

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Eur Heart J 2016;37:2893-2962.
Circulation 2014;130:e199-267.
Study purpose

- To evaluate the compliance of current guideline in clinical practice for antithrombotic treatment after PCI in AF patients.

- To evaluate compliance of current guideline in clinical practice for antithrombotic therapy at 1-year after PCI in AF patients.

- To assess prognostic impact of underuse of OAC at 1-year after PCI in AF patients.

AF patient undergoing PCI with Stent Implantation

- **Triple therapy** = OAC + Aspirin + Clopidogrel

- **Dual therapy** = OAC + Aspirin or Clopidogrel

- **Mono therapy** = OAC

Time from PCI (Month)

0

1~3

12

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- To assess prognostic impact of underuse of OAC at 1-year after PCI in AF patients.
Study population and Methods

- Claims Database established by the Korean National Health Insurance Service (NHIS)

Patients with Non-valvular AF + PCI From 2006 ~ 2015 (N=28,280)

Atrial Fibrillation (AF):
ICD-10-CM codes I480–I484 or I489 during hospitalization or those with ≥2 diagnoses in outpatient clinics
Exclude mitral stenosis (I50, I52, and I59) or mechanical heart valves (Z952–Z954)

PCI:
Procedure codes of M6561, M6562, M6563, and M6564

Antithrombotic Therapy:
Inpatient and outpatient prescription records for aspirin, clopidogrel, vitamin K antagonists (VKAs), and NOACs
Results

10-Years Prescription Patterns of Antithrombotic Treatment

Total Population

High stroke risk (CHA$_2$DS$_2$-VASc Score $\geq 2$)
### Results

Factors associated with prescriptions of triple therapy after PCI

<table>
<thead>
<tr>
<th>Factor</th>
<th>Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stroke/Systemic Embolism</td>
<td>2.00 (1.73-2.33)</td>
</tr>
<tr>
<td>Age over 75</td>
<td>1.53 (1.27-1.85)</td>
</tr>
<tr>
<td>Age 65-74</td>
<td>1.42 (1.18-1.72)</td>
</tr>
<tr>
<td>Hypertension</td>
<td>1.35 (1.10-1.65)</td>
</tr>
<tr>
<td>Congestive Heart Failure</td>
<td>1.30 (1.12-1.50)</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>1.11 (0.96-1.28)</td>
</tr>
<tr>
<td>Intracranial Hemorrhage</td>
<td>1.11 (0.73-1.68)</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>0.97 (0.80-1.19)</td>
</tr>
<tr>
<td>Female</td>
<td>0.89 (0.76-1.04)</td>
</tr>
<tr>
<td>Peripheral Arterial Disease</td>
<td>0.83 (0.71-0.98)</td>
</tr>
<tr>
<td>Previous PCI</td>
<td>0.77 (0.63-0.93)</td>
</tr>
<tr>
<td>Myocardial Infarction</td>
<td>0.75 (0.65-0.86)</td>
</tr>
</tbody>
</table>

Odds Ratio

- **Lower prescription**
- **Higher prescription**
Summary 1

- Apart from the current guidelines, most of the patients with AF had DAPT after PCI without OAC, although they were indicated for anticoagulation.

- Prescription of triple therapy has increased over 30% of patients in 2015, contributed by recent increment in those based on NOAC.

- Previous history of MI, PAD and PCI were associated with underuse of triple therapy.
Study purpose

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- To assess prognostic impact of underuse of OAC at 1-year after PCI in AF patients.

AF patient undergoing PCI with Stent Implantation

- Triple therapy = OAC + Aspirin + Clopidogrel
- Dual therapy = OAC + Aspirin or Clopidogrel
- Mono therapy = OAC

Time from PCI (Month)

0

1~3

12
Study population and Methods

- Claims Database established by the Korean National Health Insurance Service (NHIS)

Patients with Non-valvular AF + PCI
From 2009 ~ 2013
(N=14,141)

Exclusion (N=5,250)
- Recurrent PCI in 2-years f/u
- Deceased before 2-years f/u

Total 8,891 patients with ≥2 years follow-up periods

Analysis of prescription patterns of antithrombotic therapy by 3-months intervals
Results

Post PCI Prescription patterns of antithrombotic treatment (N=8,891)
Results

Post PCI Prescription patterns in patients with oral anticoagulants (N=1,519)
Results

Risk factors associated with prescription of OAC in 1-years after PCI

- **OAC at Discharge**: 12.33 (10.29-14.78)
- **Congestive Heart Failure**: 1.32 (1.15-1.52)
- **Age over 65**: 1.29 (1.10-1.52)
- **Stroke/Systemic Embolism**: 1.27 (1.10-1.47)
- **Dyslipidemia**: 1.17 (0.94-1.33)
- **Previous PCI**: 1.11 (0.88-1.41)
- **Diabetes mellitus**: 1.00 (0.87-1.15)
- **Intracranial Hemorrhage**: 0.98 (0.70-1.39)
- **Hypertension**: 0.85 (0.69-1.05)
- **Myocardial Infarction**: 0.85 (0.74-0.99)
- **Peripheral Arterial Disease**: 0.83 (0.71-0.98)
- **Female**: 0.73 (0.63-0.85)
- **DAPT at Discharge**: 0.37 (0.31-0.45)

Lower prescription → Odds ratio → Higher prescription
The proportion of patients with OAC was consistently low less than 20% through post PCI periods.

Among patients with OAC, over 30% of them still continued triple therapy, and only 9% of them had OAC monotherapy at 1-year after PCI.

Prescription of DAPT at discharge was strongly associated with underuse of OAC 1-year after PCI.
Study purpose

- To evaluate the compliance of current guideline in clinical practice for antithrombotic treatment after PCI in AF patients.

- To evaluate compliance of current guideline in clinical practice for antithrombotic therapy at 1-year after PCI in AF patients.

- To assess prognostic impact of underuse of OAC at 1-year after PCI in AF patients.

**AF patient undergoing PCI with Stent Implantation**

- **Triple therapy** = OAC + Aspirin + Clopidogrel
- **Dual therapy** = OAC + Aspirin or Clopidogrel
- **Mono therapy** = OAC

Time from PCI (Month)

0

1

12

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Study population and Methods

• Claims Database established by the Korean National Health Insurance Service (NHIS)

 Patients who had PCI From 2009 ~ 2013 (N=226,118)

Exclusion (N=210,557)
• Recurrent PCI in 1-years f/u
• Deceased before 1-years f/u
• Without AF
• Without Treatment at 1-year after PCI

Total 14,055 Non-valvular AF patients who had PCI 1-year ago

OAC therapy after 1-year (N = 1,989)

Antiplatelet therapy only after 1-year (N = 12,066)

• Primary endpoint: Composite outcome (Death + MI + Stroke)
• Secondary endpoint: Death, MI, Stroke, ICH, Repeated PCI
Results

Primary Endpoints

Composite outcome: Death + Myocardial infarction + Stroke

Adj Hazard Ratio 1.85 (1.45-2.35)
Log-rank p-value p<0.001

Cumulative Risk of Event

Numbers at Risk

<table>
<thead>
<tr>
<th>Years</th>
<th>OAC</th>
<th>Antiplatelet only</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1989</td>
<td>12066</td>
</tr>
<tr>
<td>1</td>
<td>1424</td>
<td>9040</td>
</tr>
<tr>
<td>2</td>
<td>961</td>
<td>6318</td>
</tr>
<tr>
<td>3</td>
<td>537</td>
<td>3905</td>
</tr>
<tr>
<td>4</td>
<td>280</td>
<td>2150</td>
</tr>
<tr>
<td>5</td>
<td>116</td>
<td>846</td>
</tr>
<tr>
<td>6</td>
<td>16</td>
<td>138</td>
</tr>
</tbody>
</table>
## Results

### Secondary Endpoints

<table>
<thead>
<tr>
<th>Event</th>
<th>Antiplatelet (N=12,066)</th>
<th>OAC (N=1,989)</th>
<th>Adjusted HR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>18.7</td>
<td>3.2</td>
<td>6.52 (3.85-11.10)</td>
</tr>
<tr>
<td>MI</td>
<td>6.9</td>
<td>5.3</td>
<td>1.36 (0.88-2.11)</td>
</tr>
<tr>
<td>Stroke</td>
<td>14.8</td>
<td>14.5</td>
<td>1.16 (0.89-1.53)</td>
</tr>
<tr>
<td>ICH</td>
<td>1.6</td>
<td>2.6</td>
<td>0.66 (0.34-1.31)</td>
</tr>
<tr>
<td>Repeated PCI</td>
<td>9.9</td>
<td>7.7</td>
<td>1.42 (0.98-2.05)</td>
</tr>
</tbody>
</table>
Patients without OAC at 1-year after PCI showed significantly higher risk of composite outcome for death, myocardial infarction and stroke.
Limitations

- Detailed results of the blood test including renal or liver function and time in therapeutic range (TTR) in patients with VKAs were not included in our study results.

- Characteristics of coronary lesions and results of PCI procedure were not available in our study.

- As most of the patients with OAC had VKA, the real-world clinical benefit of NOAC in patients with AF after PCI needs further investigation.
Conclusion

AF patient undergoing PCI with Stent Implantation

**Triple therapy**
- OAC + Aspirin + Clopidogrel

**Dual therapy**
- OAC + Aspirin or Clopidogrel

**Mono therapy**
- OAC

**Significant underuse of triple therapy after PCI**

**Significant underuse of OAC at 1-year after PCI**

**Significantly higher risk of mortality in patients without OAC at 1-year after PCI**
Thank you for your attention