Implications of new-onset atrial fibrillation after cardiac surgery on long-term prognosis: A community-based study

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Background
Atrial fibrillation (AF) is an abnormal heart rhythm characterized by rapid and irregular beating. It is the most prevailing clinically significant arrhythmia and foretells a considerable risk of thromboembolism.

Post-operative Atrial Fibrillation (POAF) is a major area of concern after cardiac surgery in 30% to 40% patients. It has been estimated that paroxysmal AF finally progresses to permanent AF in 25% patients over 5 to 10 years, with a majority of patients having underlying heart disease. Hence, POAF is considered to be a risk marker of AF occurrence subsequently.

Evidence is lacking behind the predictive and pathophysiology of AF reappearance associated with long-term mortality in patients after cardio-pulmonary bypass surgery.

Design of Experimentation
The study was conducted in Olmsted County, Minnesota, with an estimated 2014 population of 150,287 out of which 86.2% were white residents. Data from all Olmsted County patients undergoing cardiac surgery, prospectively maintained in a clinical database, were retrospectively reviewed to examine the correlation between new-onset POAF after cardiac surgery and the risk of late AF and long-term mortality.

The patients incorporated in this particular study were examined for primary documentation of late AF or death within 30 days from cardiac surgery. Multivariate cox regression logistics are applied to analyze the independent correlation of POAF with late AF and long-term mortality. For this investigation, inclusion criteria were residents of all ages with preoperative sinus rhythm (SR) who underwent isolated coronary artery bypass graft (CABG) or valvular repair or replacement (or some combination thereof) and survived for 30 days following the index operation.

Echocardiography
Comprehensive echocardiography was conducted before surgery according to a previously pronounced protocol 14 in 363 patients (12 patients who died within 30 days of surgery were excluded). The subsequent classification of diastolic function on echocardiography was demarcated:

Grade 0: normal left ventricular (LV) filling
Grade 1: impaired relaxation or mild diastolic dysfunction
Grade 2: pseudo-normal or moderate diastolic dysfunction
Grade 3: restrictive LV filling or severe diastolic dysfunction

Definitions of exposure and outcome ascertainment
New-onset POAF was defined as AF occurring within 30 days of cardiac surgery based on clinical evidences of AF events (≥30 seconds in duration) by non-stop telemetry during hospitalization, electrocardiograms (ECGs), or Holter monitoring. Late AF was defined as AF occurring after 30 days post-operatively from systematic follow-up appointments with ECGs. Holter monitoring was defined as patients who died at >30 days succeeding their index cardiac surgery and were examined by clinical review of medical records and querying the Social Security Death Index.

Discussion
Major findings
In the current study, it has been observed that POAF was independently predictive of late AF in the years after the index cardiac surgery. Nearly 60% patients with new-onset POAF after cardiac surgery established late AF within a mean follow-up of 8.3 ± 4.2 years. The maximum risk of late AF occurrence among patients with new-onset POAF undergoing cardiac surgery was detected within the first year at 18
% and consequently reduced progressively to around 7.2% per year within 5 years and 5.5% per year within 10 years. In this study, it was proved that LV diastolic dysfunction; a strong factor of POAF, was a common denominator that individually influenced the probability of both late AF and long-term mortality.

**Potential mechanism of POAF progression to late AF**

It has been clearly observed from the study result that there was an independent correlation between the risk of late AF and diastolic dysfunction, signifying that the incidence of prolonged primary cardiovascular disease played an important part in tempering the switch of POAF to late AF.

Diastolic dysfunction persuades structural alteration of the atria through continuous stretch and atrial dilation, leading to atrial fibrosis and disruption of gap junction, which endorses re-entry.

**Clinical implications**

The existing study noticeably reveals that new-onset POAF after cardiac surgery is correlated with the occurrence of late AF, indicating that “POAF predicts AF” after cardiac surgery.

The data suggests that recognition of POAF should prompt close rhythm investigation and satisfactory management of AF (e.g., oral anticoagulation, rate or rhythm control strategies) to lessen cardiovascular events linked to AF.

**Conclusion**

Newly developed POAF is a common and frequently occurred anomaly after cardiac surgery and also linked to significant clinical implications.

POAF is an independent marker for development of late AF which has no association with higher mortality.

The independent association of late AF with higher mortality symptomatically represents an underlying persistent cardiovascular pathophysiologic conditions linked to POAF.
Undiagnosed diabetes is prevalent in younger adults and associated with a higher risk cardio metabolic profile compared to diagnosed diabetes

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Background
At present, 382 million people in the world currently have diabetes; this prevalence will increase to 592 million by 2035 according to statistics from the International Diabetes Federation. Subjects with diabetes have at least two-fold increase risk of cardiovascular disease (CVD). A large number of population is unaware of having diabetes and most of those are undiagnosed.

Objective
The objective of the study was to investigate the cardiometabolic features in subjects with undiagnosed diabetes compared to those with normal fasting glucose (NFG), impaired fasting glucose (IFG) and diagnosed diabetes in a large number of adults (aged \( \geq 20 \)).

Methods
Korea National Health and Nutrition Examination Survey (KNHANES) analyzed the data of nationally representative samples derived from a total of 25,490 subjects (10,977 men and 14,513 women) which was conducted in 2008 to 2011. Total cholesterol, high-density lipoprotein cholesterol (HDL-C), triglycerides (TG) and fasting glucose levels were considered as physiological parameters which are important to determine the cardiometabolic characteristics in patients with diabetes. Blood pressure, anthropometric parameters, BMI and different lifestyle factors e.g., cigarette smoking, alcohol consumption, household income and education levels were also given preference as the parameters to be measured.

Clinical diagnosis of diabetes mellitus was confirmed

Figure: Prevalence of diagnosed and undiagnosed diabetes among adults in the KNHANES 2008 to 2011 stratified by age or gender. (A) Prevalence of undiagnosed and diagnosed diabetes stratified by age. Dark and light boxes indicate the proportion of undiagnosed and diagnosed diabetes, respectively. (B) Proportion of subjects with undiagnosed diabetes among all diabetes stratified by age and gender. Light and dark boxes indicate men and women, respectively.
Chronic Kidney Disorder (CKD) was found in patients with diagnosed diabetes than undiagnosed diabetes. It was predicted that these individuals have more risk of CVD with multiple risk factors. This study highlights the significance of early identification of undiagnosed diabetes and risk factor management in these patients.

**Conclusion**

The study suggests that early and aggressive screening of diabetes followed by proper management of cardiovascular risk factors should be stressed in public health care system to prevent future CVD events and deaths. Further studies are needed to confirm the effect of undiagnosed diabetes on the development of CVD and establish the most fruitful strategy to identify and treat individuals with undiagnosed diabetes.

**Discussion**

Undiagnosed diabetes is considerably more prevalent than diagnosed diabetes especially among young and middle-aged adults. Individuals with undiagnosed diabetes are more likely to have hypertension and hyper-LDL cholesterol compared to people with diagnosed diabetes. Significantly increased risk of Chronic Kidney Disorder (CKD) was found in patients with diagnosed diabetes than undiagnosed diabetes. It was predicted that these individuals have more risk of CVD with multiple risk factors. This study highlights the significance of early identification of undiagnosed diabetes and risk factor management in these patients.

on the basis of insulin or oral hypoglycemic agent use, fasting plasma glucose (≥126 mg/dL) or glycated hemoglobin ≥6.5%.

The cut-point of age defining younger or older adults was 50 based on their findings that the prevalence of diabetes was markedly increased in people older than 50 years.