Boston Scientific
Advancing science for life™

Leveraging data mining to identify potential patients for left atrial appendage closure (LAAC) therapy

A retrospective analysis of DRG data, based on ICD codes, CHA2DS2-VASc score and severe bleeding in patient history.

In patients with atrial fibrillation (AF), 90% of thrombi leading to stroke are formed in the left atrial appendage (LAA).[1] Although oral anticoagulants (OAC) significantly reduce the risk associated with AF, some patients remain contraindicated or intolerant. In order to reduce the risk of stroke in these non-valvular AF patients, LAAC is a percutaneous approach that has been shown to be safe and effective[2,3]. Nonetheless, the therapy still faces challenges in its deployment, one of them being patient identification.

Objectives

Assess if a data mining approach using retrospective electronic medical record (EMR) diagnosis information (based on the International Classification of Diseases 10th Revision or ICD-10) can support the identification of potential patients. The assessment will be attempting to identify patients who would have been suitable for left atrial appendage closure (LAAC) therapy within the inpatient hospital setting. The secondary objective is to improve interdisciplinary cross-departmental cooperation in the clinical decision making process.

Methods

We created a patient selection query tool to analyse patients on the basis of common LAAC indications as defined in European Society of Cardiology guidelines[4] and consensus statements[5,6]. The tool was used by Sana Klinikum Berlin Lichtenberg on an anonymised dataset from their EMR, containing final diagnosis coding data at individual level. As a mandatory pre-selection, all patients with AF who had been admitted to the hospital in the previous 11 months were analysed. All, as a prerequisite, were at least 65 years old and had either paroxysmal, persisting or permanent AF. Among these AF patients, a second query to analyse prior oral anticoagulant-related bleeding was performed.

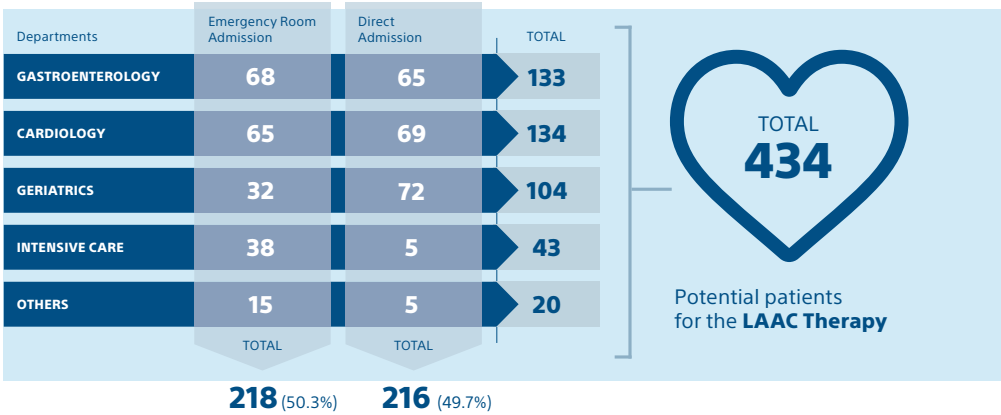
Results

Out of the included hospital admissions (all with AF as either primary or secondary diagnosis), 2,233 unique patients (3,117 admissions) were identified with a CHA2DS2-VASc score[7] of 2 or higher. Out of these, 434 were considered as potential LAAC patients as they had experienced a bleeding episode in the past or as part of the admission. 78 of these patients entered the hospital with an acute bleed.

50.3% (218 unique patients) of all potential LAAC patients were admitted through the emergency room – 30.6% were patients admitted within the gastroenterology department, 30.9% were admitted within cardiology and 23.9% within the geriatric department. This clearly shows that an interdisciplinary approach is required to proactively identify potential LAAC patients.

Furthermore, compared to Sana Klinikum Berlin Lichtenberg's LAAC programme size (15-20 patients per year), the analysis shows that there is a large group of potential LAAC patients admitted into the cardiology department itself. These patients have a history of bleeding and documented AF, but were admitted with a primary diagnosis related to another cardiac problem(s).

An additional manual validation performed by the Sana Klinikum Berlin Lichtenberg physicians on a sample of more than 30% of the potential patients identified (n=136 out of 434) showed that 73.5% appear relevant for further LAAC screening. The main reason for patients being marked as non-suitable were multi morbidity or palliative care (11.0%).



ADVANTICS™
Innovative Healthcare Solutions

Conclusion

Out of all patients with AF and a CHA2DS2-VASc score of 2 or higher, 19.4% appeared to qualify as potential LAAC patients based on the defined protocol. Considering the 73.5% (318 unique patients) relevancy rate of identified potential patients for further LAAC screening, this indicates that 14.2% of AF patients cared for at Sana Klinikum Berlin Lichtenberg could qualify for the therapy.

Compared to the results of the GARFIELD[8] and ORBIT AF[9] cohorts that showed respectively that 9.8% (CHADS2 over or equal to 2) and 13.1% (all CHADS2 score) of the AF population suffers from a relative or absolute contraindication to OAC, this result appears slightly higher because of wider patient criteria set to avoid missing potentially relevant patients (e.g. as per bleeding ICD codes used).

The approach taken in Sana Klinikum Berlin Lichtenberg shows that a data mining approach using retrospective information is suitable for patient identification in less established therapies, such as LAAC. This was corroborated through manual validation of a sample representative of the identified patient population and by comparison of the proportion of identified potential LAAC patients within the AF population to rates previously published. The results highlight the need for a multi-disciplinary approach, as many suitable patients are admitted and treated in departments outside of cardiology, where LAAC is rarely discussed as a therapeutic option. These results should enhance the cooperation among different clinical departments and within the cardiology unit to drive appropriate adoption of this therapy.

Disclaimer

This white paper and the associated criteria for patient identification were defined with Dr. Tessin and Dr. Göing, Boston Scientific providing technical support to deploy the data mining approach. Identification of a potential patient through approach is not sufficient to ensure LAAC eligibility and do not dispense physician from further screening activities. The approach does not provide treatment recommendation. Results from case studies are not predictive of outcomes in other projects. Actual results in different environments may vary.

Material not intended for use in France.

ADVANTICS™ LAAC Solution is available in limited markets only. Please check through your local Boston Scientific representative.

About

SANA Klinikum Berlin Lichtenberg

Sana Klinikum Lichtenberg is a multi-specialty centre in Berlin (Germany), with 641 beds and more than 1,000 employees. On a yearly basis, the hospital treats nearly 32,000 inpatients in addition to around 59,000 outpatient visits. The hospital is part of the Sana group, one of the biggest private hospital operators in Germany.

References

1. Pison L. et al., Left atrial appendage closure – indications, techniques, and outcomes: results of the European Heart Rhythm Association Survey, Europace (2015) 17, 642–646
2. Reddy VY, 5-Year Outcomes After Left Atrial Appendage Closure From the PREVAIL and PROTECT AF Trials. JACC 2017 Dec 19;70(24):2964-2975.
3. Boersma LV et al. Efficacy and safety of left atrial appendage closure with WATCHMAN in patients with or without contraindication to oral anticoagulation: 1-Year follow-up outcome data of the EWOLUTION trial. Heart Rhythm. 2017 Sep;14(9):1302-1308
4. Kirchhof P. et al., 2016 ESC Guidelines for the management of atrial fibrillation developed in collaboration with EACTS, European Heart Journal (2016) 37:2893–2962
5. Meier B. et al., EHRA/EAPCI expert consensus statement on catheter-based left atrial appendage occlusion, EP Europace (2014) 16(10):1397–1416.
6. Tzikas A. et al., Percutaneous left atrial appendage occlusion: the Munich consensus document on definitions, endpoints, and data collection requirements for clinical studies, Europace (2017) 19:4–15
7. Lip GY. et al., Refining clinical risk stratification for predicting stroke and thromboembolism in atrial fibrillation using a novel risk factor-based approach: the euro heart survey on atrial fibrillation, Chest (2010) 137(2):263-72.
8. Kakkar AK. et al., Risk Profiles and Antithrombotic Treatment of Patients Newly Diagnosed with Atrial Fibrillation at Risk of Stroke: Perspectives from the International, Observational, Prospective GARFIELD Registry, PLoS ONE (2013) 8(5):e63479.
9. O'Brien EC. et al., Physician practices regarding contraindications to oral anticoagulation in atrial fibrillation: findings from the Outcomes Registry for Better Informed Treatment of Atrial Fibrillation (ORBIT-AF) registry, American heart journal (2014) 167(4):601-609.

ADVANTICS™ Innovative Healthcare Solutions

Together, we have developed flexible, sustainable, data-driven advisory and digital programmes that address your most complex challenges.

Grow your programme

Drive efficiency & quality

Enhance your financial health

Boston Scientific
Advancing science for life™

BostonScientific.eu

CORP-709301-AB SEP21

Learn more at BostonScientific.eu/ADVANTICS