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Identifying potential patients for left atrial appendage closure (LAAC) in recurring admissions based on patient history

Learnings of six months working with a semi prospective tool.

Objectives

Evaluate if a semi prospective tool integrated in the EMR (Electronic Medical Record), as developed within the ADVANTICS™ portfolio of digital services and therapy solutions, can support the identification of potential patients for LAAC.

Methods

Based on the retrospective patient selection query tool1 developed according to the ESC guidelines2 and consensus statements3,4 for LAAC, an anonymised dataset retrieved from the EMR at Sana Klinikum Lichtenberg, including all patient admissions within the last two years, was analysed. All patients had, as a prerequisite, an age of at least 65 years, and either paroxysmal, persisting or permanent atrial fibrillation (AF). Among these patients, a second query on prior anticoagulant related bleeding was performed.

The proposed approach was to match daily admissions with historic data to highlight potential patients, meeting the criteria through past diagnoses, upon re-admission. A so called "LAAC potential patient list" with past potential patients fulfilling the theoretical criteria for the therapy was assembled by the hospital. A daily comparison, within the hospital EMR, of current admission with the potential patient list (through unique patient identifier) provided the clinical team with a list showing all potential patients within the inpatient hospital setting. Potential patients could then be screened within all hospital departments and commented in the tool regarding their eligibility, which will in the long term create a database to further enhance the LAAC query (Fig.1).

In summary, the approach consisted of four steps:

1. Creation of the LAAC potential patient list
2. Review each admission based on this list
3. Flagging of patient when on the LaaC potential patient list
4. Cyclic update of the potential patient list

Results

LAAC flagging provides a dynamic live view of all patients identified as potential LAAC patients who were admitted to the hospital. This worklist was available to the cardiology department in the EMR to directly access the patient's clinical information. The clinical team had to study these potential patients more closely to see if they were truly clinically relevant.

After this thorough review of flagged patients, the cardiologist could choose for each of them whether the patient is eligible for the therapy or not (Fig.2).

Between October 2019 and March 2020 (24 weeks) a total of 185 cases (172 unique patients) were screened and commented after flagging.
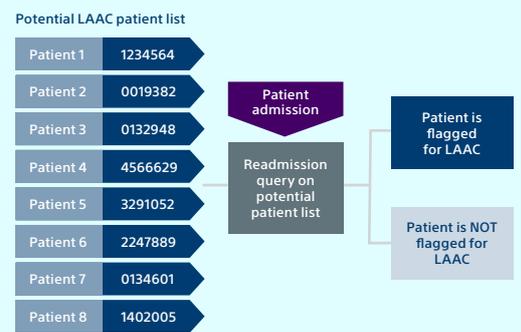
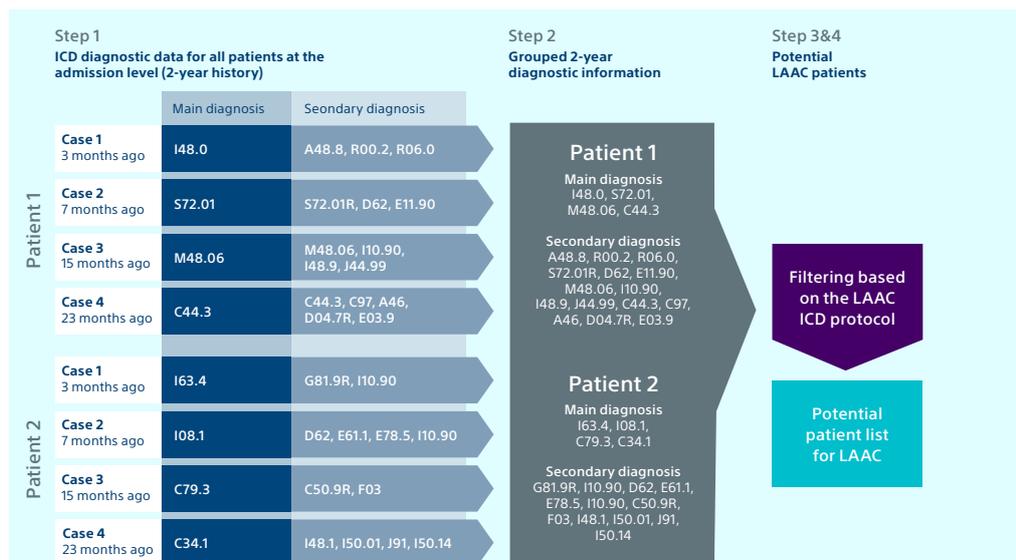**Fig. 2** Verification based on the potential LAAC patient list

Fig. 1 Creation of the potential LAAC patient list

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Discussion

Overall, the presented semi prospective tool allows a more focused screening on recurring patients who present with the therapy selection criteria in their history. The goal of the first implementation of that semi prospective tool was to validate EMR integrability rather than high flagging accuracy.

As a result, the patient selection query, which is the base for the potential LAAC patient list and the initial retrospective analysis, has been refined and adapted to optimise flagging of potential patients, including some additional exclusion criteria (such as an already implanted LAAC device, palliative care, OAC indication because of a mechanical valve replacement, ongoing tumorous diseases, etc.). These adaptions allow for a more focused and efficient screening of flagged patients.

The approach taken at Sana Klinikum Lichtenberg shows that the evolution of a data mining approach using retrospective analysis into a semi prospective process helps in further professionalising an LAAC programme by enabling a more focused screening with an average of 8.21 patients screened per week. It strengthens the overall awareness of all disciplines within the hospital for the eligible patient population and helps this underpenetrated therapy to be more present in the daily routine.

However, it also shows that the patient population for LAAC is very complex with a variation of co diagnosis that make it difficult to identify potential patients only through the inclusion criteria from ESC guidelines[2] and consensus statements[3,4]. As a result, any patient selection query needs to be adapted and refined when transitioning to a live solution. Additional exclusion criteria (as detailed above) need to be considered as well to ensure that the potential patient list is as specific as possible in order to allow the clinical team to use its available resources for potential patient screening in the most efficient way.

Disclaimer

This white paper and the associated criteria for potential patient identification were defined by Dr. Tessin and Dr. Göing, Boston Scientific only provides technical support via the algorithm to automate the query. The algorithm does not have a medical purpose and does not provide treatment recommendations.

Integration of the algorithm and associated approaches into Sana Klinikum Lichtenberg IT infrastructure was performed by the clinic staff, in accordance with local rules and organisation.

Identification of a potential patient through this algorithm is not sufficient to definitively determine LAAC eligibility and does not alleviate the physician from performing standard screening activities.

Results from white papers 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. Leveraging data mining to identify potential patients for left atrial appendage closure (LAAC) therapy, Boston Scientific, 2019.

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3. Meier B. *et al.,* EHRA/EAPCI expert consensus statement on catheter based left atrial appendage occlusion, 2014 Europace, doi:10.109 europace/euu174.

4. Tzikas A. *et al.,* Percutaneous left atrail appendage occlusion: the Munich consensus document; EuroIntervention 2016:12:103 111.

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