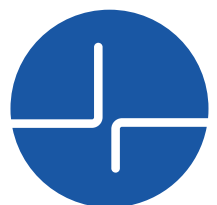


SRA[®]
Publications



Content

SRA [®] improves the detection rate	4
Algorithm accuracy	10
Patient selection	11
Overview of all publications	14

SRA® Publications
Version 2.3 / Date of issue: 30-03-2022



apoplex medical technologies GmbH
Zweibrücker Str. 185
66954 Pirmasens Germany
PRRC: Albert Hirtz

E-mail: info@apoplexmedical.com
Web: www.apoplexmedical.com
Phone: +49 6331 698 998 0
Fax: +49 6331 698 998 19

SRA[®] improves the detection rate



Atrial fibrillation detection using a automated electrocardiographic monitoring in a transient ischaemic attack service

D'Anna L, Sikdar O, Lim S, Kalladka S, Banerjee S

published in BMJ open quality 11 (1) 2022

Background: The vast majority of the transient ischaemic attacks (TIA) services in UK reported significant delays in the initiation of the routine cardiac monitoring that may result in a significant number of missed atrial fibrillation (AF) paroxysms and increased long-term risk of recurrent stroke. Automated continuous ECG monitoring (ACEM) system has shown promising results in terms of AF detection but it is unclear if ACEM improves AF detection in a rapid outpatient TIA service.

Objectives: We assessed ACEM in patients with TIA with the aim to significantly reduce the delay to initiate the cardiac monitoring and to enhance the yield of AF detection in these patients. We also aimed to determine the impact of a more rapid initiation of ACEM on the 6-month risk of recurrent stroke/TIA.

Methods: This is an observational, prospective before (phase 1: 1 July to 31 December 2018) versus after (phase 2: 1 January to 30 June 2019) study of the effect of ACEM, compared with routine initiation of 24h-Holter ECG, in patients with TIA assessed in our service.

Results: The phase 1 (n=136) and phase 2 (n=105) cohorts did not differ with regards to age, risk factors, duration of cardiac monitoring. The rate of newly detected AF was significantly higher in phase 2 compared with phase 1 (9.52% vs 2.21%, $p < 0.001$). The 6-month risk of recurrent stroke/TIA was significantly lower in phase 2 compared with phase 1 (7.4% vs 1%, $p = 0.018$).

Conclusions: Early initiation of ACEM improves AF detection after TIA in a rapid TIA service and is associated with a reduced risk of recurrent TIA/stroke.

Conclusion

- The detection rate of unknown atrial fibrillation by **SRA[®]** was significantly higher compared to the standard examination (9.25% vs. 2.21%).
- **SRA[®]** can significantly contribute to the reduction of the 6-month risk of a recurrent stroke / TIA (1% vs. 7.4%).



Stroke Risk Analysis, a System With a High Detection Rate of Atrial Fibrillation in Stroke and Transient Ischemic Attack

Gomis M, Dávalos A, Purroy F, Cardona P, Rodríguez-Campello A, Martí-Fábregas J, Pagola J, Pardo L, Muñoz-Narbona L, Benabdelhak I, Lara-Rodríguez L, Cuadrado-Godía E, Martínez-Domeño A, Juega J M, Serena J, Alvarez-Ballano J, Paipa A, Roquer J, Abilleira S, Neeter R, van de Groep A, Molina C

published in Stroke 51 (1) 2020

Background and purpose: Stroke Risk Analysis (SRA) comprises an algorithm for automated analysis of ECG monitoring, enabling the detection of paroxysmal atrial fibrillation (pxAF) and identifying patterns indicating a high risk of atrial fibrillation (R_AF). We compared Holter-enabled continuous ECG monitoring in combination with SRA (hSRA) with standard continuous ECG monitoring for pxAf detection in patients with acute ischemic stroke. Also, we sought to identify whether the detection of R_AF patterns during the first cycle (first 2 hours) of hSRA recording was associated with the detection of pxAf during the Stroke Unit stay.

Methods: We enrolled 524 consecutive patients admitted in the Stroke Unit with acute ischemic stroke or transient ischemic attack with neither history of AF nor AF at admission into a prospective multicentric observational analytic clinical study with inpatient comparison, who received both continuous ECG monitoring as well as hSRA up to 7 days. Investigators were blinded to hSRA results unless pxAf was detected on SRA.

Results: Of the 524 consecutive acute stroke patients (median age, 70.0 years; 60% male; acute ischemic stroke 93%, transient ischemic attack 7%), 462 were eligible and included in the study. Among 462 patients with hSRA available for 66 hours, AF was documented by hSRA in 79 patients (17.1%). From this group, 45 AF cases (9.7%) were confirmed after review by an independent and blinded cardiologist. continuous ECG monitoring detected 21 AF cases (4.3%; $P < 0.0001$). hSRA detected R_AF patterns in 92 patients. 35 out of the 92 R_AF patients showed an episode of AF during the Stroke Unit stay. Predictive values of R_AF patterns within the first cycle of hSRA were: sensitivity 71%, specificity 86%, positive predictive value 38%, and negative predictive value 96%.

Conclusions: Automated analysis using SRA technology strongly improves pxAf detection in acute ischemic stroke patients compared with continuous ECG monitoring. The predictive value of a R_AF pattern, as detected by hSRA during the first few hours after admission, deserves further investigation.

Conclusion

- **SRA**[®] detects 2x more atrial fibrillation than standard ECG monitoring.
- **SRA**[®] detects atrial fibrillation 56 hours earlier (2.7x faster) compared to standard ECG monitoring.
- Less effort compared with conventional atrial fibrillation screening.



Automatic Holter electrocardiogram analysis in ischaemic stroke patients to detect paroxysmal atrial fibrillation: ready to replace physicians?

Uphaus T, Lange B, Grond M, Jauss M, Gröschel S, Kirchhof P, Rostock T, Wachter R, Gröschel K
published in Eur J Neurol. 2020 Apr 12 doi: 10.1111/ene.14250

Background and purpose: The detection of paroxysmal atrial fibrillation (pAF) in patients presenting with ischaemic stroke shifts secondary stroke prevention to oral anticoagulation. In order to deal with the time- and resource-consuming manual analysis of prolonged electrocardiogram (ECG)-monitoring data, we investigated the effectiveness of pAF detection with an automated algorithm (AA) in comparison to a manual analysis with software support within the IDEAS study [study analysis (SA)].

Methods: We used the dataset of the prospective IDEAS cohort of patients with acute ischaemic stroke/transient ischaemic attack presenting in sinus rhythm undergoing prolonged 72-h Holter ECG with central adjudication of atrial fibrillation (AF). This adjudicated diagnosis of AF was compared with a commercially available AA. Discordant results with respect to the diagnosis of pAF were resolved by an additional cardiological reference confirmation.

Results: Paroxysmal AF was finally diagnosed in 62 patients (5.9%) in the cohort (n = 1043). AA more often diagnosed pAF (n = 60, 5.8%) as compared with SA (n = 47, 4.5%). Due to a high sensitivity (96.8%) and negative predictive value (99.8%), AA was able to identify patients without pAF, whereas abnormal findings in AA required manual review (specificity 96%; positive predictive value 60.6%). SA exhibited a lower sensitivity (75.8%) and negative predictive value (98.5%), and showed a specificity and positive predictive value of 100%. Agreement between the two methods classified by kappa coefficient was moderate (0.591).

Conclusions: Automated determination of 'absence of pAF' could be used to reduce the manual review workload associated with review of prolonged Holter ECG recordings.

Conclusion

- Significantly higher sensitivity of **SRA**[®] compared with cardiologists in a large patient cohort (96.7% vs. 73.8%, n=1034).
- **SRA**[®], as a resource-efficient screening tool, keeps pace with the required number of ECG recordings and significantly increases the detection rate of atrial fibrillation.

Continuous Stroke Unit Electrocardiographic Monitoring Versus 24-Hour Holter Electrocardiography for Detection of Paroxysmal Atrial Fibrillation After Stroke



Rizos T, Guntner J, Jenetzky E, Marquardt L, Reichardt C, Becker R, Reinhardt R, Hepp T, Kirchhof P, Aleynikhenko E, Ringleb P, Hacke W, Veltkamp R

published in Stroke 43 (10) 2012

Background and purpose: Cardioembolism in paroxysmal atrial fibrillation (pxAF) is a frequent cause of ischemic stroke. Sensitive detection of pxAf after stroke is crucial for adequate secondary stroke prevention; the optimal diagnostic modality to detect pxAf on stroke units is unknown. We compared 24-hour Holter electrocardiography (ECG) with continuous stroke unit ECG monitoring (CEM) for pxAf detection.

Methods: Patients with acute ischemic stroke or transient ischemic attack were prospectively enrolled. After a 12-channel ECG on admission, all patients received 24-hour Holter ECG and CEM. Additionally, ECG monitoring data underwent automated analysis using dedicated software to identify pxAf. Patients with a history of atrial fibrillation or with atrial fibrillation on the admission ECG were excluded.

Results: Four hundred ninety-six patients (median age, 69 years; 61.5% male) fulfilled all inclusion criteria (ischemic stroke: 80.4%; transient ischemic attack: 19.6%). Median stroke unit stay lasted 88.8 hours (interquartile range, 65.0–122.0). ECG data for automated CEM analysis were available for a median time of 64.0 hours (43.0–89.8). Paroxysmal AF was documented in 41 of 496 patients (8.3%). Of these, Holter detected pxAf in 34.1%; CEM in 65.9%; and automated CEM in 92.7%. CEM and automated CEM detected significantly more patients with pxAf than Holter ($P_{0.001}$), and automated CEM detected more patients than CEM ($P_{0.001}$).

Conclusions: Automated analysis of CEM improves pxAf detection in patients with stroke on stroke units compared with 24-hour Holter ECG. The comparative usefulness of prolonged or repetitive Holter ECG recordings requires further Evaluation.

Conclusion

- **SRA®** is significantly superior to standard screening: The detection rate of paroxysmal atrial fibrillation increased by 40% compared to monitoring and by 170% compared to 24-hour Holter.



Automated Continuous Electrocardiogram Monitoring Accelerates the Detection of Atrial Fibrillation after Ischemic Stroke or Transient Ischemic Attack on a Hyper Acute Stroke Unit

D'Anna L, Kar A, Brown Z, Harvey K, Banerjee S, Korompoki E, Veltkamp R
published in J Stroke Cerebrovasc Dis. 29(4) 2020

Background and aim: Rapid and sensitive detection of atrial fibrillation (AF) is of paramount importance for initiation of adequate preventive therapy after stroke. Stroke Unit care includes continuous electrocardiogram monitoring (CEM) but the optimal exploitation of the recorded ECG traces is controversial. In this retrospective single-center study, we investigated whether an automated analysis of continuous electrocardiogram monitoring (ACEM), based on a software algorithm, accelerates the detection of AF in patients admitted to our Stroke Unit compared to the routine CEM.

Methods: Patients with acute ischemic stroke or transient ischemic attack were consecutively enrolled. After a 12-channel ECG on admission, all patients received CEM. Additionally, in the second phase of the study the CEM traces of the patients underwent ACEM analysis using a software algorithm for AF detection. Patients with history of AF or with AF on the admission ECG were excluded. **Results:** The CEM (n = 208) and ACEM cohorts (n= 114) did not differ significantly regarding risk factors, duration of monitoring and length of admission. We found a higher rate of newly-detected AF in the ACEM cohort compared to the CEM cohort (15.8% versus 10.1%, $P < .001$). Median time to first detection of AF was shorter in the ACEM compared to the CEM cohort [10 hours (IQR 0-23) versus 46.50 hours (IQR 0-108.25), $P < .001$].

Conclusions: ACEM accelerates the detection of AF in patients with stroke compared with the routine CEM. Further evidences are required to confirm the increased rate of AF detected using ACEM.

Conclusion

- Significantly higher detection rate of unknown atrial fibrillation by **SRA**[®] compared with classical LT ECG monitoring (15.8 % vs. 10.1 %).
- Faster atrial fibrillation detection by **SRA**[®] (10 hours vs. 46.50 hours).

Automatic detection of paroxysmal atrial fibrillation in patients with ischaemic stroke: Better than routine diagnostic workup?



Uphaus T, Grings A, Gröschel S, Müller A, Weber-Krüger M, Wachter R, Gröschel K
published in J Stroke Cerebrovasc Dis. 29(4) 2020

Background and purpose: Prolonged electrocardiogram (ECG) monitoring after ischaemic stroke increases the diagnostic yield of paroxysmal atrial fibrillation (pAF). In order to facilitate the additional work-load involved in ECG analysis due to prolonged monitoring times, we investigated the effectiveness of pAF detection with an automated software algorithm (SA) in comparison to the routine staff-based analysis (RA) during standard stroke-unit care. Therefore, patients with acute ischaemic stroke or transitory ischaemic attack presenting with sinus rhythm on the admission ECG and no history of atrial fibrillation were prospectively included.

Methods: A 24-h Holter ECG assessment was performed using either RA based on a computer-aided evaluation and subsequent review by a cardiologist or a commercially available automated SA. In the case of discordant results concerning the occurrence of pAF between the two methods, the data underwent an independent external rating.

Results: Of 809 prospectively enrolled patients, 580 patients fulfilled the inclusion criteria. pAF was ultimately diagnosed in 3.3% of the cohort (19 patients). SA and RA correctly diagnosed pAF in 17 patients resulting in a comparable diagnostic effectiveness of the analysis methods (sensitivity: SA 89.5% vs. RA 89.5%; specificity: SA 99.3% vs. RA 99.1%; κ , 0.686; $P < 0.001$; 95% confidence interval, 0.525–0.847). RA revealed clinically relevant ECG abnormalities in an additional seven patients.

Conclusions: Although it should not completely replace RA, SA-based evaluation of Holter ECG reaches a high diagnostic effectiveness for the detection of pAF and can be used for a rapid and resource-saving analysis of ECG data to deal with prolonged monitoring times.

Conclusion

- **SRA®** offers high diagnostic efficacy for the detection of paroxysmal atrial fibrillation and can be used for rapid and resource-efficient analysis of ECG data during prolonged monitoring periods.

Algorithm accuracy



Improved Detection of Paroxysmal Atrial Fibrillation Utilizing a Software-Assisted Electrocardiogram Approach

Schaefer J R, Leussler D, Rosin L, Pittrow D, Hepp T

published in PLoS ONE 9 (2) 2014

Background and purpose: Automated complexity-based statistical stroke risk analysis (SRA) of electrocardiogram (ECG) recordings can be used to estimate the risk of paroxysmal atrial fibrillation (pAF). We investigated whether this method could improve the reliability of detection of patients at risk for pAF.

Methods: Data from 12-lead ECGs, 24-h Holter ECGs, and SRA based on separate 1-hour Holter ECG snips were collected from three groups: 70 patients with a history of pAF but who showed no AF episode in the 12-lead ECG at study entry; 19 patients with chronic AF (at study entry); and 100 young healthy individuals. AF episodes were detected by Holter ECG in 19 of the 70 non-chronic AF patients (27.1% overall, 18.6% in the first hour), and 37 of these 70 patients were classified as at risk for pAF by SRA (representing a sensitivity of 52.9% based on the first hour of analysed recording).

Results: Fifty-four of the 70 patients also showed a sinus rhythm in the first hour. SRA detected pAF risk in 23 of these 54 patients (representing a sensitivity of 42.6%). The Holter data showed at least 1 AF episode and at least 1 hour of sinus rhythm in nine of the patients with pAF. For these patients, SRA classified 77.8% as being at risk in the first hour after the end of the AF episode, and 71.4% and 42.9% as being at risk in the second and third hours, respectively. SRA detected almost all cardiologist-confirmed AF episodes that had been recorded in 1-hour ECG snips (sensitivity, 99.2%; specificity, 99.2%).

Conclusions: This outpatient study confirms previous findings that routine use of SRA could improve AF detection rates and thus may shorten the time between AF onset and initiation of prevention measures for patients at high risk for stroke.

Conclusion

- This outpatient study confirms that routine use of **SRA**[®] improves the detection rate of atrial fibrillation and thus may shorten the time between the occurrence of AF and the initiation of preventive measures in patients at high risk of stroke.

Patient selection

Refinement of detecting atrial fibrillation in stroke patients: results from the TRACK-AF Study

Reinke F, Bettin M, Ross LS, Kochhäuser S, Kleffner I, Ritter M, Minnerup J, Dechering D, Eckardt L, Dittrich R
published in Eur J Neurol. 25 (4) 2018



Background and purpose: Detection of occult atrial fibrillation (AF) is crucial for optimal secondary prevention in stroke patients. The AF detection rate was determined by implantable cardiac monitor (ICM) and compared to the prediction rate of the probability of incident AF by software based analysis of a continuously monitored electrocardiogram at follow-up (stroke risk analysis, SRA); an optimized AF detection algorithm is proposed by combining both tools.

Methods: In a monocentric prospective study 105 out of 389 patients with cryptogenic stroke despite extensive diagnostic workup were investigated with two additional cardiac monitoring tools: (a) 20 months' monitoring by ICM and (b) SRA during hospitalization at the stroke unit.

Results: The detection rate of occult AF was 18% by ICM (n = 19) (range 6–575 days) and 62% (n = 65) had an increased risk for AF predicted by SRA. When comparing the predictive accuracy of SRA to ICM, the sensitivity was 95%, specificity 35%, positive predictive value 27% and negative predictive value 96%. In 18 patients with AF detected by ICM, SRA also showed a medium risk for AF. Only one patient with a very low risk predicted by SRA developed AF revealed by ICM after 417 days.

Conclusions: A combination of SRA and ICM is a promising strategy to detect occult AF. SRA is reliable in predicting incident AF with a high negative predictive value. Thus, SRA may serve as a cost-effective preselection tool identifying patients at risk for AF who may benefit from further cardiac monitoring by ICM.

Conclusion

- › **SRA®** is reliable in predicting atrial fibrillation with a high negative predictive value (96%)
- › **SRA®** can serve as a cost-effective triage tool to identify patients who have an increased likelihood of AF and may benefit from further long-term ECG monitoring.



Electrocardiographic RR Interval Dynamic Analysis to Identify Acute Stroke Patients at High Risk for Atrial Fibrillation Episodes During Stroke Unit Admission

Adami A, Gentile C, Hepp T, Molon G, Gigli GL, Valente M, Thijs V
published in *Translational Stroke Research* 10 (3) 2018

Abstract: Patients at short-term risk of paroxysmal atrial fibrillation (PAF) often exhibit increased RR interval variability during sinus rhythm. We studied if RR dynamic analysis, applied in the first hours after stroke unit (SU) admission, identified acute ischemic stroke patients at higher risk for subsequent PAF episodes detected within the SU hospitalization. Acute ischemic stroke patients underwent continuous cardiac monitoring (CCM) using standard bedside monitors immediately after SU admission. The CCM tracks from the first 48 h were analyzed using a telemedicine service (SRA clinic, apoplex Medical, Germany). Based on the RR dynamics, the stroke risk analysis (SRA) algorithm stratified the risk for PAF as follows: low risk for PAF, high risk for PAF, presence of manifest AF. The subsequent presence/absence of PAF during the whole SU hospitalization was ruled out using all available CCMs, standard ECGs, or 24-h Holter ECGs. Two hundred patients (40% females, mean age 71 ± 16 years) were included. According to the initial SRA analysis, 111 patients (56%) were considered as low risk for PAF, 52 (26%) as high risk while 37 patients (18%) had manifest AF. A low-risk level SRA was associated with a reduced probability for subsequent PAF detection (1/111, 0.9%, 95% CI 0–4.3%) while a high-risk level SRA predicted an increased probability (20/52, 38.5% (95% CI 25–52%). RR dynamic analysis performed in the first hours after ischemic stroke may stratify patients into categories at low or high risk for forthcoming paroxysmal AF episodes detected within the SU hospitalization.

Conclusion

- Stratification of patients with **SRA**[®] within the first 48 hours in the Stroke Unit:
 - › paroxysmal atrial fibrillation in the high-risk group: in 20 of 52 cases.
 - › paroxysmal atrial fibrillation in the low-risk group: 1 / 111 patients.

Improved Detection of Paroxysmal Atrial Fibrillation Utilizing a Software-Assisted Electrocardiogram Approach

Schaefer J R, Leussler D, Rosin L, Pittrow D, Hepp T

published in PLoS ONE 9 (2) 2014



Background and purpose: Automated complexity-based statistical stroke risk analysis (SRA) of electrocardiogram (ECG) recordings can be used to estimate the risk of paroxysmal atrial fibrillation (pAF). We investigated whether this method could improve the reliability of detection of patients at risk for pAF.

Methods: Data from 12-lead ECGs, 24-h Holter ECGs, and SRA based on separate 1-hour Holter ECG snips were collected from three groups: 70 patients with a history of pAF but who showed no AF episode in the 12-lead ECG at study entry; 19 patients with chronic AF (at study entry); and 100 young healthy individuals. AF episodes were detected by Holter ECG in 19 of the 70 non-chronic AF patients (27.1% overall, 18.6% in the first hour), and 37 of these 70 patients were classified as at risk for pAF by SRA (representing a sensitivity of 52.9% based on the first hour of analysed recording).

Results: Fifty-four of the 70 patients also showed a sinus rhythm in the first hour. SRA detected pAF risk in 23 of these 54 patients (representing a sensitivity of 42.6%). The Holter data showed at least 1 AF episode and at least 1 hour of sinus rhythm in nine of the patients with pAF. For these patients, SRA classified 77.8% as being at risk in the first hour after the end of the AF episode, and 71.4% and 42.9% as being at risk in the second and third hours, respectively. SRA detected almost all cardiologist-confirmed AF episodes that had been recorded in 1-hour ECG snips (sensitivity, 99.2%; specificity, 99.2%).

Conclusions: This outpatient study confirms previous findings that routine use of SRA could improve AF detection rates and thus may shorten the time between AF onset and initiation of prevention measures for patients at high risk for stroke.

Conclusion

- Detection rate of paroxysmal atrial fibrillation patients with manifest episodes: sensitivity >99 %, specificity >99 %

Overview of all publications

Title	Authors	Information	Journal	Year
Atrial fibrillation detection using a automated electrocardiographic monitoring in a transient ischaemic attack service	D'Anna L, Sikdar O, Lim S, Kalladka S, Banerjee S	Department of Brain Sciences, Imperial College London, London, UK Department of Stroke and Neuroscience, Charing Cross Hospital, Imperial College London NHS Healthcare Trust, London, UK	BMJ Open Quality	2022
Stroke Risk Analysis, a System With a High Detection Rate of Atrial Fibrillation in Stroke and Transient Ischemic Attack	Gomis M, Dávalos A, Purroy F, Cardona P, Rodríguez-Campello A, Martí-Fàbregas J, Pagola J, Pardo L, Muñoz-Narbona L, Benabdelhak I, Lara-Rodríguez L, Cuadrado-Godia E, Martínez-Domeño A, Juega J M, Serena J, Alvarez-Ballano J, Paipa A, Roquer J, Abilleira S, Neeter R, van de Groep A, Molina C	Hospital Germans Trias i Pujol, Hospital de Bellvitge, Hospital Sant Pau, Hospital Vall d'Hebron, Hospital Arnau i Vilanova de Lleida, Hospital del Mar, Hospital Josep Trueta de Girona, Hospital Clinic, Government of Catalonia, Stroke Programme, Evina Health Solutions	Stroke	2020
Automatic Analysis of prolonged Holter-ECG Data to identify paroxysmal Atrial Fibrillation in acute ischemic stroke patients: Ready to displace physicians?	Uphaus T, Lange B, Grond M, Jauss M, Gröschel S, Kirchof P, Rostock T, Wachter R, Gröschel K,	Department of Neurology, University Heidelberg, INF 400, 69120 Heidelberg, Germany	Eur J Neurol	2020
Automated Continuous Electrocardiogram Monitoring Accelerates the Detection of Atrial Fibrillation after Ischemic Stroke or Transient Ischemic Attack on a Hyper Acute Stroke Unit	D'Anna L, Banerjee S, Kar A, Korompaki E, Brown Z, Veltkamp R, Kirsten H	Department of Stroke and Neuroscience, Charing Cross Hospital, Imperial College London NHS Healthcare Trust, London, UK Division of Brain Science, Department of Medicine, Hammersmith Campus, Imperial College London, London, UK	J Stroke Cerebrovasc Dis.	2020
New early atrial fibrillation (AF) detection by an automated remote monitoring system on hyperacutestroke unit (HASU)	Pak D, Salman T, Metcalf AK, Hmu CA	Norfolk and Norwich University Hospital NHS Trust, Norwich, UK	Poster Session UK Stroke Forum	2018
Refinement of detecting atrial fibrillation in stroke patients Results from the TRACK AF Study	Reinke F, Bettin M, Ross LS, Kochhäuser S, Kleffner I, Ritter M, Minnerup J, Decherig D, Eckardt L, Dittrich R	Department of Cardiovascular Medicine, Division of Electrophysiology, University Hospital of Muenster, Muenster, Germany.	Eur J Neurol	2018
Electrocardiographic RR Interval Dynamic Analysis to Identify Acute Stroke Patients at High Risk for Atrial Fibrillation Episodes During Stroke Unit Admission	Adami A, Gentile C, Hepp T, Molon G, Gigli GL, Valente M, Thijs V	Stroke Center "Sacro Cuore Don Calabria" Hospital, Negrar, Italy	Transl Stroke Res	2018

Automatic detection of paroxysmal atrial fibrillation in patients with ischaemic stroke: better than routine diagnostic workup?	Uphaus T, Grings A, Gröschel S, Müller A, Weber-Krüger M, Wachter R, Gröschel K	Department of Neurology, University Medical Center of the Johannes Gutenberg University Mainz, Mainz and Department of Cardiology and Pneumology, University of Göttingen, Göttingen, Germany	Eur J Neurol	2017
Extended automatic analysis of continuous ECG monitoring (aCEM) substantially improves the identification of patients with newly diagnosed atrial fibrillation during hospitalization for acute ischemic stroke.	García-Esperón C, Zumstein D, Steiner M, Vuillomenet A, Betz T, Nedeltchev K, Kahles T	Department of Neurology & Cardiology - Cantonal Hospital Aarau, Switzerland	ESOC	2015
Improved Detection of Paroxysmal Atrial Fibrillation Utilizing a Software-Assisted Electrocardiogram Approach	Schaefer J R, Leussler D, Rosin L, Pittrow D, Hepp T,	Department of Internal Medicine, Cardiology, Philipps-University, Marburg, Germany,	PLoS One	2014
Continuous Stroke Unit Electrocardiography Monitoring Versus 24-Hour Holter Electrocardiography for Detection of Paroxysmal Atrial Fibrillation after Stroke	Rizos T, Guntner J, Jenetzky E, Marquardt L, Reichardt C, Becker R, Reinhardt R, Hepp T, Kirchhof P, Aleynichenko E, Ringleb P, Hacke W, Veltkamp R	Department of Neurology, University Heidelberg, INF 400, 69120 Heidelberg, Germany	Stroke	2012
Extended Electrocardiographic Poincare Analysis (EPA) for Better Identification of Patients with Paroxysmal Atrial Fibrillation	Duning T, Kirchhof P, Wersching H, Hepp T, Reinhardt R, Heuer H, Ringelstein E B, Knecht S	Department of Neurology, University Hospital of Muenster	J Clinic Experiment Cardiol	2011
Detection of Paroxysmal Atrial Fibrillation in Acute Stroke Patients	Rizos T, Rasch C, Jenetzky E, Hametner C, Kathoefler S, Reinhardt R, Hepp T, Hacke W, Veltkamp R.	Departments of Neurology and Cardiology, University of Heidelberg	Cerebrovascular Diseases	2010

apoplex medical
technologies

apoplex medical technologies GmbH
Zweibrücker Straße 185, 66954 Pirmasens Germany

Phone +49 6331 - 698 998 0
Fax +49 6331 - 698 998 19

www.apoplexmedical.com
info@apoplexmedical.com