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Research Correspondence

Effect of the COVID-19 pandemic on cardiac electrophysiological ablation procedures in Greece – Data from the Hellenic Society of Cardiology Ablation Registry

Throughout 2020 the coronavirus disease-19 (COVID-19) pandemic swept over the entire world causing literally millions of deaths and imposing an unprecedented burden on health systems. In these challenging times, clinical Cardiology surfed the wave of the pandemic, dealing with cardiovascular complications of COVID-19 and catering for patient needs alongside the Internists, Respiratory, Emergency Room and Intensive Care specialists. However, elective interventional procedures in Greece almost came to a halt on several occasions during this period, for several reasons, ranging from patient unwillingness to visit hospitals to administrative restrictions on elective admissions to make room for COVID-19 cases, similarly to what happened in institutions all around the world[1]. In this short communication, we present data from the Hellenic Cardiology Society Ablation Registry.

1. Methods

The Hellenic Cardiology Society Ablation Registry was founded in 2008 and collects input from more than 25 cardiac Electrophysiology Laboratories in Greece, both in private and public sector institutions[2], showing a steady rise in annual procedure caseloads since then[3]. We compared the number of ablation procedures between the years 2019 and 2020, considering that Greece – like most European countries – was not affected by COVID-19 up until late January 2020. Cases were separated in atrial fibrillation ablation (pulmonary vein isolation), ablation of supraventricular tachycardias (SVT) (mainly including atrioventricular nodal re-entry tachycardias, accessory-pathway-mediated tachycardias and atrial flutter) and ventricular tachycardia (VT) ablation. The counts of cases across the different subcategories of ablation procedures were handled as continuous variables and compared using non-parametric tests as appropriate (Mann-Whitney and Wilcoxon Signed Ranks test).

2. Results

Overall, 3182 ablation cases were entered in the registry database in 2019 as compared to 2759 in 2020, i.e. 423 fewer cases corresponding to a mean decrease of 13.3%. Pulmonary vein isolation and concomitant atrial fibrillation ablation procedures were reduced by 13.8% (from 1287 on 2019 to 1110 in 2020), and similar reductions were seen in SVT ablation (1398 in 2019 versus 1212 in 2020, corresponding to a decline of 13.3%). VT ablation interventions were reported to be 311 in 2019 and 271 in 2020 (−12.1%).

The data, further stratified according to the kind of procedure, separately for the public and private sector, are summarized in Fig. 1. Reductions across all categories were statistically significant ($p = 0.028$ in the paired comparison). The overall reduction in the public sector amounted to 16.2%, as compared to 9.3% in the private sector ($p = 0.050$ for the difference in the magnitude of relative reduction).

3. Discussion

The present survey from the Hellenic Cardiology Society Ablation Registry indicates a moderate reduction in workload during the initial period of the COVID-19 pandemic, which included time intervals of stringent lockdown measures. Reductions were larger in the public sector, which can be explained by the fact that public sector hospitals received most of the pandemic-related burden and were, thus, more prone to postpone or defer non-urgent procedures. This is also reflected by the difference in the magnitude of decrease between public and private institutions, which was largest for SVT ablation (−17.6% versus −6.5%, respectively), probably explained by the fact that SVTs are generally characterized by a benign course and SVT ablation is not commonly considered to be of urgency. The reductions observed in the present survey are not far from reports from other European countries, such as the one coming from the German-wide Helios hospital network, where a 10% decline in catheter ablations was observed[4]. Of note, these reductions were accompanied by reports of a decline in the diagnosis of new cases of arrhythmias, including atrial fibrillation[5], which should be mainly attributed to under-diagnosis. The latter may have led to under-treatment, which is suggested by about 40% higher risk of ischemic cerebrovascular events and/or death during the lock-down[5]. This phenomenon was also observed in other common cardiovascular causes of hospitalization, including acute coronary syndromes[6], suggesting healthcare services utilization avoidance along, perhaps, with truly decreased incidence, of unclear etiology.

The reduction in laboratory volumes is of interest not only from the point of view of health services offered to the public, but also for the impact it could have on training of young electrophysiologists. In a survey from Yale university[7], it was found that the COVID-19 pandemic resulted in a decrease in procedural volume for cardiac electrophysiology trainees, but the majority of fellows and program

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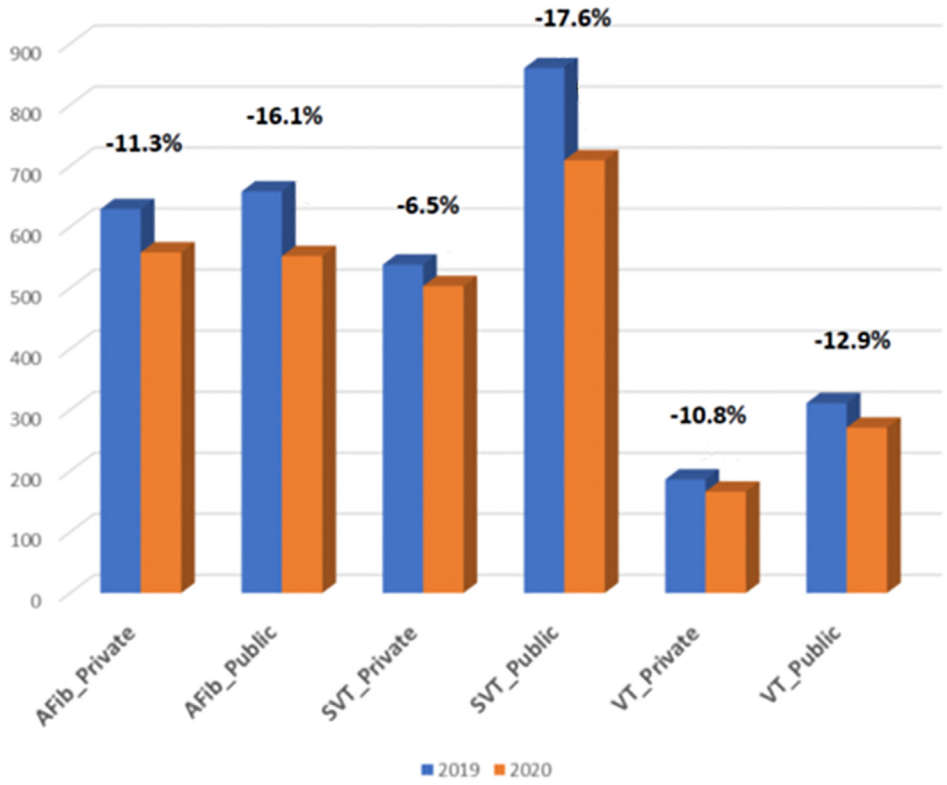

Figure 1. Caseloads of ablation procedures in private and public sector institutions in 2019 ("pre-COVID-19") and 2020 ("COVID-19"), as reported in the Hellenic Society of Cardiology Ablation Registry.

directors did not anticipate major barriers to timely graduation. It is the authors' opinion that the same can be deduced for Greece, considering that the magnitude of reduction in ablation caseloads during the peak of the pandemic and the foreseeable return to normality suggest that, unless an unexpected turn of events leads to a dramatic deterioration of the pandemic, training in cardiac electrophysiology will not be significantly affected. In any case, this adversity should guide our efforts to innovate our approach to medical learning, by employing new technologies, virtual teaching tools, meetings and rounds, as well as paying attention to somewhat neglected facets of medical education, namely the emotional well-being of trainees[8,9]. The latter is of particular importance considering that in the time of a pandemic additional stress and frustration weigh their load on the already work-laden and often stressed-out trainees[10].

There are certain limitations to this analysis. Most are inherent in the concept of a registry and are related to the accuracy of the input, the willingness of the participating centers to record their cases, the homogeneity of record keeping and interpretation of entries etc. In addition, there may be limitations pertaining to the specific period of time, the most important one probably being the possibility that operators and other personnel could be more likely to be unwilling to enter data in the registry during the pandemic for logistic and psychological reasons. We believe, however, that this was not an important factor, considering that active centers remained active in the registry, without any significant decline in the number of contributing centers.

Overall, it is of note that these numbers can be read from two different perspectives, the proverbial half-full or half-empty dichotomy. It is true that they show a significant reduction in ablation caseload, which comes after a steadily increasing 10-year trend. On the other hand, they also demonstrate an impressive resilience of the subspecialty of cardiac electrophysiology, which in the face of unprecedented adversity retained about 90% of case volumes. This also signifies that the demand for ablation services remained high in this context, denoting a high level of real clinical necessity. In other words, ablation of cardiac arrhythmias is not "cosmetic medicine"[11] and, thus, cannot be sidetracked even by major public health crises, like the one we continue to experience.

References

1. Czeisler MÉ, Marynak K, Clarke KE, et al. Delay or avoidance of medical care because of COVID-19-related concerns - United States, June 2020. *MMWR Morb Mortal Wkly Rep*. 2020;69:1250–1257.
2. Vassilikos VP, Efremidis M, Mantziari L, et al. Radiofrequency ablation procedures in Greece: initial experience and results from the national registry 2008-2010. *Hellenic J Cardiol*. 2012;53(2):108–117.
3. Vassilikos 1 VP, Billis A, Efremidis M, et al. Trends in ablation procedures in Greece over the 2008-2018 period: results from the Hellenic Cardiology Society Ablation Registry. *Hellenic J Cardiol*. 2021;62(1):48–54.
4. König S, Ueberham L, Pellissier V, et al. Hospitalization deficit of in- and outpatient cases with cardiovascular diseases and utilization of cardiological interventions during the COVID-19 pandemic: insights from the German-wide helios hospital network. *Clin Cardiol*. 2021;44(3):392–400.
5. Holt A, Gislason GH, Schou M, et al. New-onset atrial fibrillation: incidence, characteristics, and related events following a national COVID-19 lockdown of 5.6 million people. *Eur Heart J*. 2020;41(32):3072–3079.
6. Papafaklis MI, Katsouras CS, Tsigkas G, et al. "Missing" acute coronary syndrome hospitalizations during the COVID-19 era in Greece: medical care avoidance combined with a true reduction in incidence? *Clin Cardiol*. 2020;43(10):1142–1149.
7. Singla VK, Jain S, Ganeshan R, et al. The impact of the COVID-19 pandemic on cardiac electrophysiology training: a survey study. *J Cardiovasc Electrophysiol*. 2021;32(1):9–15.
8. Kotta PA, Corso B, Brailovsky Y, et al. The impact of 2020 and the future of cardiology training: How do we innovate? *J Am Coll Cardiol Case Rep*. 2021;3(4):697–700.
9. Kuehn BM. COVID-19 leads to major changes for cardiologists in training. *Circulation*. 2020;142(2):175–177.

10. Kadavath S, Hawwas D, Strobel A, et al. How the COVID-19 pandemic has affected cardiology fellow training. *Am J Cardiol*. 2021;151:114–117D.
11. Vrachatis D, Deftereos S, Giannopoulos G. The role of cardiology specialties in times of crisis. *Eur Heart J*. 2020;41(31):2935–2936.

Vassilios P. Vassilikos[†], Georgios Giannopoulos[*], Nikolaos Fragakis[†]
Third Department of Cardiology, Hippokration General Hospital, Aristotle University of Thessaloniki, Thessaloniki, Greece

Antonis Billis[†]
Lab of Medical Physics, Aristotle University of Thessaloniki, Thessaloniki, Greece

Michalis Efremidis, Konstantinos Letsas, Themistoklis Maounis, Anna Kostopoulou
Onassis Cardiothoracic Center, Department of Electrophysiology and Pacing, Athens, Greece

Georgios Andrikopoulos, Sokratis Pastromas
Henri Dunant Hospital, Athens, Greece

Apostolos Katsivas
Department of Cardiology, Red Cross Hospital, Athens, Greece

Charalambos Kossyvakis
Geniko Kratiko Hospital, Athens, Greece

Eleftherios Kallergis, Emmanouel Kanoupakis
Department of Cardiology, University Hospital of Heraklion, University of Crete, Heraklion, Greece

Panagiotis Ioannidis
Department of Electrophysiology, Athens Bioclinic, Athens, Greece

Stelios Tzeis, Dimosthenis Avramidis, Ioannis Papagiannis
Mitera Childrens' Hospital, Athens, Greece

Spyridon Deftereos, Eftychia Symeonidou
Second Department of Cardiology, Attikon University Hospital, National and Kapodistrian University of Athens, Athens, Greece

Dimitrios Tsiachris
Iatriko Athinon Hospital, Athens, Greece

George Theodorakis, Ioannis Rassias
Metropolitan General, Athens, Greece

Dimitrios Lysitsas, Eleni Chatzinikolaou, Nikolaos Mezilis
St Luke's Hospital, Thessaloniki, Greece

Stylianos Paraskevaidis
First Department of Cardiology, AHEPA University Hospital, Aristotle University of Thessaloniki, Thessaloniki, Greece

Spyros Kourouklis, Theodoros Apostolopoulos, Dimosthenis Katritsis
Hygeia Hospital, Athens, Greece

Sophia Chatzidou
Alexandra University Hospital, National and Kapodistrian University of Athens, Athens, Greece

Lilian Mantziari
Interbalkan Medical Center, Thessaloniki, Greece

Georgios Leventopoulos, Ioannis Chiladakis
Department of Cardiology, Rio University Hospital, University of Patras, Patras, Greece

George Kourgiannidis
251 General Airforce Hospital, Athens, Greece

George Stavropoulos
Second Department of Cardiology, Hippokration General Hospital, Aristotle University of Thessaloniki, Thessaloniki, Greece

Sotirios Xydonas
Evangelismos General Hospital, Athens, Greece

Charilaos Ginos
401 General Military Hospital, Athens, Greece

Athanasios Kotsakis
Nikea General Hospital, Piraeus, Greece

Giannis Baltogiannis
Department of Cardiology, University Hospital of Ioannina, University of Ioannina, Ioannina, Greece

Antonis S. Manolis, Skevos Sideris[†], Konstantinos Gatzoulis[†]
First Department of Cardiology, Hippokration University Hospital, National and Kapodistrian University of Athens, Athens, Greece

[*] Corresponding author. 3rd Department of Cardiology, Aristotle University of Thessaloniki, Thessaloniki, Greece.
E-mail addresses: ggiann@auth.gr, georgios.giannopolous@yale.edu (G. Giannopoulos).

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[†] For the Hellenic Working Group on Pacing and Electrophysiology, Hellenic Society of Cardiology