# SHORT COMMUNICATION

# Heart failure management in Polish medical centers during the coronavirus disease 2019 pandemic: results of a survey

Małgorzata Lelonek<sup>1</sup>, Marcin Książczyk<sup>1</sup>, Agnieszka Pawlak<sup>2,3</sup>, Mariusz Gąsior<sup>4</sup>, Piotr Rozentryt<sup>5,6</sup>, Jadwiga Nessler<sup>7</sup>

- 4 3rd Department of Cardiology, Medical University of Silesia, Silesian Center for Heart Diseases, Zabrze, Poland
- 5 Department of Toxicology and Health Protection, Faculty of Health Sciences in Bytom, Medical University of Silesia in Katowice, Katowice, Poland
- 6 3rd Department of Cardiology, Faculty of Medical Sciences in Zabrze, Medical University of Silesia, Silesian Centre for Heart Diseases, Zabrze, Poland
- 7 Department of Coronary Disease and Heart Failure, Institute of Cardiology, Jagiellonian University Medical College, Kraków, Poland

Introduction On March 11, 2020, the World Health Organization declared the outbreak of coronavirus disease 2019 (COVID-19) to be a pandemic.1 Since March 4, 2020, 36155 Polish patients were infected by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).<sup>2</sup> The risk of SARS-CoV-2 transmission may be higher in patients with heart failure (HF) and also increased due to comorbidities and advanced age.<sup>3</sup> In the current European Society of Cardiology Guidance for the diagnosis and management of cardiovascular disease during the COVID-19 pandemic, it is recommended to refrain from hospital visits and to use guideline-directed medical therapy and telemedicine, whenever possible, to follow up stable patients with HF.3 During the COVID-19 pandemic, Jiménez-Blanco Bravo et al<sup>4</sup> showed a 56.5% reduction in the number of emergency room visits and a 46.9% reduction in hospital admissions of patients with HF in Spain. Similarly, Bromage et al<sup>5</sup> confirmed fewer HF patient admissions to cardiology units in 2020 compared with 2019 in the United Kingdom (23% vs 37%, respectively), and the patients admitted during the COVID-19 pandemic presented with a higher New York Heart Association (NYHA) class and severe peripheral edema.

This study aimed to obtain data on the care of patients with HF in Polish medical centers during the COVID-19 pandemic.

**Methods** We developed a survey and sent it by email in June 2020 to most Polish medical centers that provide HF treatment. Thirty-six questionnaires were completed. Medical centers differed regarding the referral level—academic or nonacademic (provincial, district, or regional). The survey was anonymous, voluntary, conducted electronically, and regarded the first 3 months of the pandemic. It included 26 singleor multiple-choice questions. Only a single respondent or a person authorized by them was allowed to fill in the questionnaire in each center. Additional bioethics committee approval was not required.

**Statistical analysis** The obtained data were subjected to statistical analysis. Categorical variables were presented as percentages. Statistical significance for individual study groups was not evaluated.

**Results and discussion** Selected results of the survey are presented in TABLE 1. The questionnaire was completed by 18 academic and 18 nonacademic centers, including 5 outpatient clinics and 5 private healthcare centers. In 89% of the centers, a cardiology outpatient clinic was available on site. According to the reported data, the number of hospitalizations due to HF in academic, provincial, or district centers was lower during the pandemic than earlier, while in regional centers somewhat similar to that noted before the pandemic. The centers widely offered teleconsultations (83%); in-person visits, if necessary, were scarce (5.5%), regardless of

Correspondence to: Marcin Książczyk, MD,

Department of Noninvasive Cardiology, Medical University of Lodz, ul. Żeromskiego 113, 90-549 Łódź, Poland, phone: +48 42 639 35 71, email: marcin\_ksiazczyk@interia.pl Received: July 17, 2020. Revision accepted: August 16, 2020. Published online: August 25, 2020. Kardiol Pol. 2020; 78 (10): 1035-1038 doi:10.33963/KP.15584 Copyright by the Author(s), 2020

Department of Noninvasive Cardiology, Medical University of Lodz, Łódź, Poland

<sup>2</sup> Department of Invasive Cardiology, Centre of Postgraduate Medical Education, Central Clinical Hospital of the Ministry of the Interior and Administration, Warsaw, Poland

<sup>3</sup> Department of Applied Physiology, Mossakowski Medical Research Center, Polish Academy of Sciences, Warsaw, Poland

 TABLE 1
 Selected healthcare components in 36 Polish medical centers during the coronavirus disease 2019 outbreak according to the referral level, based on a survey (continued on the next page)

Center characteristicInInpatient clinic1511Outpatient clinic32Private healthcare center-3Private healthcare center-3Unit profile-3Cardiology1810Internal medicine-3Primary healthcare center-3Primary healthcare center-3Primary healthcare center-3Primary healthcare center-3Polients diagnoed with acute HF per week before the pandemic, n-5So the top pandemic on-5-Primary beatfore the pandemic, nNo such hospitalizations due to acute HF during the pandemic, nNo such hospitalizations21Pring persotted during the pandemic, nNo such hospitalizations21Pring persotted during the pandemic, nNo such hospitalizations29Pring persotted during the pandemic, n11ARB99ARB99<		Academic centers (n = 18)	Nonacademic centers (n = 18)
Inspatient clinic1511Ortgatient clinic22Private center23Unity profile101Cardiology180Internal medicine-3Primary healthcare-3Primary healthcare-3Batterist diagnosed with acute H per week before the pandemic, not-4S-1075-Soltable case with acute H Garving the pandemic, notKamaya Schore the pandemic09-Ross Charle case with acute H Garving the pandemic, notKamaya Schore the pandemic09-No schore the pandemic69-Ross Charle case with schore the pandemicRoss Charle case with schore the pandemic10Ross Charle case with schore the pandemic6Ross Charle case with schore the pandemic7-	Center characteristic		
Outpatient clinic32Private healthore center-5Unit profile-3Cardiology103Primary healthcare-5Patient clinic diagnosed with acute HF per week before the pandemic. n-3Patient clinic diagnosed with acute HF per week before the pandemic. n-3S-1024-S-10799S-10799Ostpatizations due to acute HF during the pandemic, nKansy as before the pandemic69-Nosuch hospitalizations21-Rest shab before the pandemic90-Nosuch hospitalizations21-Rest shab before the pandemic90-Nosuch hospitalizations99-Rest shab before the pandemic1615-Rest shab before the pandemic1616-Rest shab before the pandemic22-Rest shab before the pandemic1616-Rest shab before the pandemic1616- <td></td> <td>15</td> <td>11</td>		15	11
Private healthare center-SCardiolog180Lanterpolife-3Internal medicine-SPrimary healthare-SPatients diagnosed with acute HF per week before the pandemic, n-S>1024SS-1029SO-599SDestationt diagnosed with acute HF during the pandemic, nSSS-10109SLess than before the pandemic109No such borpitelizations109No such borpitelizations109ARRA99SARRA101010ARRA101010ARRA101010ARRA101010Loop duretic161310Indexing Cale161310Indexing Cale101010Indexing Cale101010 <tr< td=""><td></td><td>3</td><td>2</td></tr<>		3	2
Cardiology180Internal medicine-3Primary healthcare-5Patients diagnosed with acute HF per week before the pandemic, m4S-10760-5090Hospitalizations due to acute HF during the pandemic, m5Kernary as before the pandemic, m109Hospitalizations due to acute HF during the pandemic, m109No such hospitalizations109No such hospitalizations1010No such hospitalizations1010No such hospitalizations1010No such hospitalizations1010No such hospitalizations1010ARRA1010ARRA1010ARRA1010ARRA1010Iopiduretic1010Loopiduretic1010Loopiduretic1010Loopiduretic1010Soluto hospitalization203Nording20310Soluto hospitalization203Soluto hospitalization203Soluto hospitalization203Soluto hospitalization33Soluto hospitalization33Soluto hospitalization33Soluto hospitalization33Soluto hospitalization33Soluto hospitalization33Soluto hospitaliza		-	5
Cardiology180Internal medicine-3Primary healthcare-5Patients diagnosed with acute HF per week before the pandemic, m4S-10760-5090Hospitalizations due to acute HF during the pandemic, m5Kernary as before the pandemic, m109Hospitalizations due to acute HF during the pandemic, m109No such hospitalizations109No such hospitalizations1010No such hospitalizations1010No such hospitalizations1010No such hospitalizations1010No such hospitalizations1010ARRA1010ARRA1010ARRA1010ARRA1010Iopiduretic1010Loopiduretic1010Loopiduretic1010Loopiduretic1010Soluto hospitalization203Nording20310Soluto hospitalization203Soluto hospitalization203Soluto hospitalization203Soluto hospitalization33Soluto hospitalization33Soluto hospitalization33Soluto hospitalization33Soluto hospitalization33Soluto hospitalization33Soluto hospitaliza	Unit profile		
Internal medicine-3Primary healthcare-5Patients diagnosed with acute HF per week before the pandemic, n24>10295>100900-5000Hospitalizations due to acute HF during the pandemic, n88Nasuny ab efore the pandemic680Dursp prescripted during the pandemic, n1090No such hospitalizations000Dursp prescripted during the consultations (e-prescriptions)900ARR9900ARR161000ApBiocher16000Log during tiere consultations (e-prescriptions)10100ARR99000ApBiocher1616161616Log during tiere consultations (e-prescriptions)101010Log during tiere consultations (e-prescriptions)101010 <td></td> <td>18</td> <td>10</td>		18	10
Patients diagnosed with acute HF per week before the pandemic, n>10245-10750-599Hospitalizations due to acute HF during the pandemic, n88Less than before the pandemic68Less shan before the pandemic09No such hospitalizations21Drugs prescribed during teleconsultations (e-prescriptions)15ARE99ARNI1615ARB1010Loop duretic1618Loop duretic1618Loop duretic110Loop duretic110Loop duretic115-10245-10115-1026No new drug swere administered, %1121078Patients in whom the treatment was modified, %1121013615-102615-103615-103615-101615-103615-101515-101515-101515-101515-101515-101515-101515-101515-10		-	3
>10245-10750-599Hospitalizations due to actt HF during the pandemic, n88Less than before the pandemic109No such hospitalizations21Drugs prescribed during teleconsultations (e-prescriptions)11ARB999ARNI16151Logo diurcitic16151Logo diurcitic16181Logo diurcitic10121Logo diurcitic1222Pattons met drugs were administered, %23Sill1211Sill1233Sill1233Sill1233Sill1311Sill1233Sill1333Sill1333Sill1333Sill1333Sill1333Sill1333Sill1333Sill1333Sill1333Sill1333Sill1333Sill1333Sill1333Sill1333Sill1433Sill1533 <td>Primary healthcare</td> <td>-</td> <td>5</td>	Primary healthcare	-	5
5-10790-599Hospitalizations due to acute HF during the pandemic, m8As many as before the pandemic109Less than before the pandemic109No such hospitalizations21Drugs prescribed during teleconsultations (e-prescriptions)5ARE99ARNI43ARPA101Dup diuretic1615MRA1110Loop diuretic1618Updata24Digoin23S-1011S-1023S-1036S-1055S-1055S-1055S-1055S-1055S-1055S-1055 <t< td=""><td>Patients diagnosed with acute HF per week before the pandemic, n</td><td></td><td></td></t<>	Patients diagnosed with acute HF per week before the pandemic, n		
0-599Hospitalizations due to acute HF during the pandemic, n68Less than before the pandemic109No such hospitalizations21Drugs prescribed during teleconsultations (e-prescriptions)115ARB999ARNI1101β-Blocker161516MRA111010Loop diuretic161810Loop diuretic161810John new drugs were administered, %2410Staff Constructions2310Staff Constructions111010Loop diuretic11101010Loop diuretic242410 <t< td=""><td>&gt;10</td><td>2</td><td>4</td></t<>	>10	2	4
Hospitalizations due to acute HF during the pandemic, n68As many as before the pandemic09Less than before the pandemic109No such hospitalizations21Drugs prescribed during teleconsultations (e-prescriptions)115ARB999ARNI439PeBocker1615MRA1110Loop diuretic1618Dubardine24Digoxin-2Patients in whom new drugs were administered. %3>10115-1023<5	5–10	7	5
As many as before the pandemic68Less than before the pandemic109No such hospitalizations21Drugs prescribed during teleconsultations (e-prescriptions)115ARB999ARN 1631ABB151516ARD 2161516Loop diuretic161810Loop diuretic161810Loop diuretic2420Patients in whorn new drugs were administered, %11>10111S-10233S-10111S-10233S-101033S-10233S-10233S-10363Networting Atom743S-10363S-10363S-10363S-10363Networting Atom743S-10363S-10363S-10363S-10351S-10351S-10351S-10351S-10351S-10355 <trr>S-1055&lt;</trr>	0–5	9	9
Less than before the pandemic109No such hospitalizations21Drugs prescribed during teleconsultations (e-prescriptions)15ARE1815ARB99ARNI43p.Blocker1615MRA1110Loop diuretic1618Iyobradine24Digxin-2Patients in whom new drugs were administered, %11S-1023S-1023No new drug administration73S-1036No new drug durinistration74S-1036S-1036S-1036S-1036S-1036S-1036S-1036S-1056S-1056S-1056S-1015S-1056S-1056S-1056S-1056S-1056S-1056S-1056S-1056S-1056S-1056S-1056S-1056S-1056S-1056S-1056S-105 <td>Hospitalizations due to acute HF during the pandemic, n</td> <td></td> <td></td>	Hospitalizations due to acute HF during the pandemic, n		
No such hospitalizations21Drugs prescribed during teleconsultations (e-prescriptions)15ARE99ARNI43ARNI1615MRA1010Loop duretic1618Iopaduretic24Digxin-2Patents in whom new drugs were administered, %11S-1023S-1023S-1023S-1023S-1023S-1036S-1036S-1036S-1036S-1036S-1036S-1036S-1036S-1056S-10 <t< td=""><td>As many as before the pandemic</td><td>6</td><td>8</td></t<>	As many as before the pandemic	6	8
Drugs prescribed during teleconsultations (e-prescriptions)ACEI1815ARB99ARNI43β-Blocker1615MRA1010Loop diuretic1618Ivabradine24Digoxin-2Patients in whom new drugs were administered, %11>10115-1023<5	Less than before the pandemic	10	9
AEI1815ARB99ARNI43β-Blocker1615MRA1010Loop diuretic168Ivabradine24Digoxin-2Patents in whom new drugs were administered, %11>1013S-1023No new drug administration78S-1036No new drug administration74S-1036S-1036S-1036S-1036S-1036S-1036S-1036S-1036S-1036S-1036S-1056S-1056S-1056S-1056S-1056S-1055S-1055S-1055S-1055S-1055S-1055S-1055S-1055S-1055S-1055S-1055S-1055S-1055S-1055S-1055S-1055S-1055 <td>No such hospitalizations</td> <td>2</td> <td>1</td>	No such hospitalizations	2	1
ARB99ARNI43AP.Blocker1615MRA1110Loop diuretic1618Ivabradine24Digoxin22Patients in whom new drugs were administered, %11>10115-1023S86No new drug administration78Patients in whom the treatment was modified, %11>103615-10361S961S961S161S151S151S151ID1551ID1551ID1151Alation1031Suppended1151	Drugs prescribed during teleconsultations (e-prescriptions)		
ARNI43β-Blocker1615MRA1110Loop diuretic1618Ivabradine24Digoxin-2Patients in whom new drugs were administered, %11>10115-1023<5	ACEI	18	15
β-Blocker1615MRA1110Loop diuretic1618Ivabradine24Digoxin-2Patients in whom new drugs were administered, %11>10115-1023<5	ARB	9	9
MRA1110Loop diuretic1618Ivabradine24Digoxin-2Patients in whom new drugs were administered, %11>10115-1023<5	ARNI	4	3
Loop diuretic1618Ivabradine24Digoxin-2Patients in whom new drugs were administered, %11>101115-10236 S f and administration786No new drug administration786Patients in whom the treatment was modified, %551>105855S f and administration-36S f and administration3S f and administration3S f and administration3S f and administration3<	β-Blocker	16	15
Ivabradine24Digoxin-2Patients in whom new drugs were administered, %-1>10115-1023<5	MRA	11	10
Digoxin-2Patients in whom new drugs were administered, %11>10115-1023<5	Loop diuretic	16	18
Patients in whom new drugs were administered, %>101>1015-1023<5	Ivabradine	2	4
>10115-1023<5	Digoxin	-	2
5-1023<5	Patients in whom new drugs were administered, %		
<586No new drug administration78Patients in whom the treatment was modified, %74>10745-1036<5	>10	1	1
No new drug administration78Patients in whom the treatment was modified, %>10745-1036<5	5-10	2	3
Patients in whom the treatment was modified, %>10745-1036<5	<5	8	6
>10745-1036<5	No new drug administration	7	8
5-1036<5	Patients in whom the treatment was modified, %		
<585No treatment modification-3Electrotherapy proceduresICD155CRT115Ablation103Suspended12	>10	7	4
No treatment modification-3Electrotherapy procedures155ICD115CRT103Ablation102	5–10	3	6
Electrotherapy proceduresICD155CRT115Ablation103Suspended12	<5	8	5
ICD       15       5         CRT       11       5         Ablation       10       3         Suspended       1       2	No treatment modification	-	3
CRT       11       5         Ablation       10       3         Suspended       1       2	Electrotherapy procedures		
Ablation         10         3           Suspended         1         2	ICD	15	5
Suspended 1 2	CRT	11	5
	Ablation	10	3
Not applicable (noninvasive center) 2 11	Suspended	1	2
	Not applicable (noninvasive center)	2	11

TABLE 1 Selected healthcare components in 36 Polish medical centers during the coronavirus disease 2019 outbreak according to the referral level, based on a survey (continued from the previous page)

	Academic centers (n = 18)	Nonacademic centers (n = 18)
Remote CIED monitoring		
Yes	9	4
No	9	14
Interventional cardiac procedures (ICA, PCI)		
Performed like before the pandemic	6	5
Occasional	10	-
Suspended	-	1
Not applicable (noninvasive center)	2	12

Abbreviations: ACEI, angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker; ARNI, angiotensin receptor neprilysin inhibitor; CIED, cardiac implantable electronic device; CRT, cardiac resynchronization therapy; ICA, invasive coronary angiography; ICD, implantable cardioverter-defibrillator; MRA, mineralocorticoid receptor antagonist; NOAC, non–vitamin K oral anticoagulant; PCI, percutaneous coronary intervention; VKA, vitamin K antagonist

the center referral level. These 2 forms of visits were not available in 11% of the centers.

Additional diagnostic procedures such as echocardiography, 24-hour electrocardiogram monitoring, cardiac magnetic resonance, or cardiac computed tomography angiography were used in 72% of the centers, but mainly in non-new patients with chronic HF. In general, invasive procedures were performed less frequently than before the pandemic.

A teleconsultation for new patients with HF as the only form of medical visit was provided in 33% of the centers. Before teleconsultations were implemented, up to 5% of the HF population was hospitalized due to HF decompensation in the pandemic period. Although, at the time of the use of teleconsultations, in 64% of the centers, patients required referral to a hospital due to HF exacerbation.

In 92% of the centers, e-prescriptions were issued. The most commonly prescribed drugs were: loop diuretics (torasemide, furosemide), angiotensin-converting enzyme inhibitors, and  $\beta$ -blockers, whereas the least popular prescribed drugs included: angiotensin receptor neprilysin inhibitors, ivabradine, and digoxin (TABLE 1). Peripheral edema was the most critical symptom for the modification of diuretic treatment. Of note, both angiotensin receptor neprilysin inhibitors and ivabradine were administered only in the cardiology units of regional or academic centers, and digoxin was administered both in the cardiology units and primary healthcare clinics of district centers. In 42% of the centers, patients' therapy was not modified.

Switching from vitamin K antagonists to nonvitamin K oral anticoagulants was unexpectedly rare (10/36) and more common in provincial (2/3) and district (4/7) rather than in academic or regional centers (4/26). The low switching rate might result from contraindications to such therapy modification (eg, mechanical valve prosthesis), as well as from a limited access to laboratories and data on serum creatinine levels and international normalized ratio before switching from vitamin K antagonists to non–vitamin K oral anticoagulants.

Surprisingly, the question less frequently asked to assess the patient's clinical status concerned their body weight (25/36), while questions regarding the NYHA status, edema of lower extremities, or blood pressure and heart rate were more frequent (32/36, 34/36, and 33/36, respectively).

Finally, patient education regarding HF management was provided in 69% of the centers and conducted by physicians (92%) or nurses (8%, only in academic centers). Educators relied on their knowledge (100%), and additional tools, such as web pages or mobile phone applications, were rarely used (32%). Among the surveyed centers, 86% expressed concern about the negative impact of the pandemic on the HF population, while 61% indicated that teleconsultations would partially replace in-person visits after the pandemic.

**Limitations** Our study had some limitations. First, it included a relatively small number of centers nationwide. Next, it was focused on general trends in HF management in certain centers, and not on patient-centered care. The study also regarded only the first 3 months of the pandemic and did not determine the long-term impact of the pandemic on HF prognosis. Also, the survey did not cover all issues related to the care of HF patients (eg, exercise, rehabilitation). Admittedly, it might be much more broadly elaborated in an original research article.

**Conclusions** The epidemiological situation seems to be unpredictable, and the pandemic appears to be long-lasting. Teleconsultations,

mobile phone applications, and self-monitoring play a key role during the COVID-19 outbreak.<sup>6</sup> The presented results of the HF survey carried out in Polish centers are similar to those obtained in other European countries. Following the national lockdown and social distancing restrictions, a lower access to healthcare and highly specialized procedures in patients with HF and a decrease in the number of hospitalizations due to acute HF might have an impact on HF prognosis. Similarly, Legutko et al<sup>7</sup> reported a decline in the number of coronary angiography and percutaneous coronary intervention procedures in Polish patients with myocardial infarction during the COVID-19 pandemic.<sup>7</sup> It might lead to a rapid increase in the HF burden in Poland.

## **ARTICLE INFORMATION**

ACKNOWLEDGMENTS The authors would like to thank all medical centers that took part in the survey.

#### **CONFLICT OF INTEREST** None declared.

**OPEN ACCESS** This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License (CC BY-NC-ND 4.0), allowing third parties to download articles and share them with others, provided the original work is properly cited, not changed in any way, distributed under the same license, and used for non-commercial purposes only. For commercial use, please contact the journal office at kardiologiapolska@ptkardio.pl.

HOW TO CITE Lelonek M, Książczyk M, Pawlak A, et al. Heart failure management in Polish medical centers during the coronavirus disease 2019 pandemic: results of a survey. Kardiol Pol. 2020; 78: 1035-1038. doi:10.33963/KP.15584

### REFERENCES

1 World Health Organization Director-General's opening remarks at the media briefing on COVID-19 – 11 March 2020. World Health Organization website. https:// www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19--11-march-2020. Accessed July 6, 2020.

2 Map of coronavirus infections (SARS-CoV-2). Polish Ministry of Health website. https://www.gov.pl/web/koronawirus/wykaz-zarazen-koronawirusem-sarscov-2. Accessed July 6, 2020.

3 ESC guidance for the diagnosis and management of CV disease during the COVID-19 pandemic. European Society of Cardiology website. https://www. escardio.org/Education/COVID-19-and-Cardiology/ESC-COVID-19-Guidance. Accessed July 6, 2020.

4 Jiménez-Blanco Bravo M, Cordero Pereda D, Sánchez Vega D, et al. Heart failure in the time of COVID-19. Cardiology. 2020; 145: 481-484.

5 Bromage DI, Cannatà A, Rind IA, et al. The impact of COVID-19 on heart failure hospitalization and management: report from a Heart Failure Unit in London during the peak of the pandemic. Eur J Heart Fail. 2020; 22: 978-984.

6 Kałużna-Oleksy M, Gackowski A, Jankowska EA, et al. The patient with heart failure in the face of the coronavirus disease 2019 pandemic: an expert opinion of the Heart Failure Working Group of the Polish Cardiac Society. Kardiol Pol. 2020; 78: 618-631.

7 Legutko J, Niewiara Ł, Bartuś S, et al. Decline in the number of coronary angiography and percutaneous coronary intervention procedures in patients with acute myocardial infarction in Poland during the coronavirus disease 2019 pandemic. Kardiol Pol. 2020; 78: 574-576.