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Post-myocardial infarction patient pathways in Portugal

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Post-myocardial infarction patient pathways in Portugal

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Gestão do doente pós enfarte agudo do miocárdio em Portugal

Abstract (Portuguese)

O enfarte agudo do miocárdio (EAM) afeta 12.000 pessoas anualmente, em Portugal [1] [2]. A nível nacional, a gestão desta doença prevê três níveis de cuidados, de acordo com a Rede de Referenciação Hospitalar de Cardiologia. Este estudo tem como objetivo caracterizar a realidade do percurso dos doentes com EAM após internamento hospitalar, nos diferentes nível de cuidados. O estudo apresenta ainda um conjunto de recomendações para a sua otimização.

Foi criado um *steering committee*, composto por especialistas em EAM, responsável pela definição da metodologia do projeto. O estudo iniciou com uma revisão da literatura para sistematizar as diretrizes nacionais e internacionais para gestão do EAM, seguida de entrevistas estruturadas aos *stakeholders* envolvidos na gestão destes doentes em sete hospitais em Portugal. Terminou com o desenvolvimento de uma reunião de consenso para analisar os resultados e desenvolver recomendações.

Relativamente à referenciação foi observada uma clara distinção entre hospitais urbanos, com uma área de referênciação relativamente pequena quando comparada com hospitais do interior, cujos doentes eram referenciados de zonas mais distantes. Do ponto de vista da partilha de informações clínicas dos doentes, apenas nos hospitais de nível 3 foi identificada uma maior interconexão e interoperabilidade de sistemas informáticos e consequente maior facilidade nos fluxos de informação. Estes hospitais tinham programas estruturados de reabilitação cardíaca que compreendiam um acompanhamento hospitalar comunitário, em linha com as recomendações da

ESC. Finalmente, em relação à frequência do acompanhamento hospitalar pós-alta e aos profissionais envolvidos, na maioria dos hospitais, foi relatada a realização duma primeira visita três meses após a alta, repetindo-se, em média, a cada seis meses durante um a dois anos.

Existe uma elevada variabilidade no suporte e nas práticas implementadas para promover a prevenção secundária do EAM nos diferentes níveis hospitalares. Há a necessidade de: otimizar o percurso do doente, garantindo o acompanhamento pela Cardiologia no hospital de referência até à referênciação para o médico de família; implementar programas de cessação tabágica; programas de nutrição; programas de psicologia e medicina física e reabilitação. A implementação de um programa de reabilitação cardíaca é fundamental para o sucesso da gestão destes doentes.

KeyWords (Portuguese)
Enfarte agudo miocárdio; reabilitação cardíaca; prevenção secundária; gestão doente; guidelines.

Abstract

Acute myocardial infarction (AMI) is a condition that affects 12 000 Portuguese individuals annually [1] [2]. In Portugal, disease management foresees three levels of services according to the Cardiology Referral Network. This study aims to characterize the path taken by AMI patients in Portugal after hospital treatment, at the different hospital levels. Subsequently, it aims to propose recommendations for improvements.

A Steering Committee, composed of cardiology experts in AMI was responsible for the project methodology. A literature review was performed to systematize national and international AMI guidelines, followed by structured interviews of stakeholders involved in the management of these patients in seven hospitals different levels in Portugal. The study ended with a consensus meeting to analyze the results and develop recommendations.

Regarding communication and liaison between hospitals in the referral network: a clear distinction was observed between hospitals in urban areas with a relatively small referral area for level 2 services versus inland hospitals, to which patients from broader areas were referred. From the point of view of communication between professionals regarding the patient's clinical information, only in level 3 hospitals in the referral network was there a greater interconnection of systems and consequent greater ease in information flows. The latter had structured cardiac rehabilitation programs, which included the integration of in-house and community facilities, in line with European Society of Cardiology recommendations. Finally, regarding the frequency of post-discharge hospital follow-up and the professionals involved, in most hospitals, follow-up was reported with the first visit at three months post-discharge, and then repeated, on average, every six months for a period between one and two years in non-atypical patients.
There is high variability in the support and practices implemented to promote secondary prevention of AMI at different hospitals levels in Portugal. There is a need to review the patient pathway considering follow-up by Cardiology in the referring hospital until discharge from the consultation to a General Practitioner; implementation of Smoking Cessation Programs; Nutrition;

Psychology and Physical Therapy, adjusted to the different hospital levels. Implementation of a cardiac rehabilitation program is key.

KeyWords
Acute myocardial infarction; Cardiac Rehabilitation; Secondary Prevention; Patient Pathway; Guidelines

Introduction - Why post-acute myocardial infarction

Acute myocardial infarction (AMI) is a condition that affects 12 000 Portuguese individuals annually , leading to high healthcare costs and disease-related indirect costs . Although primary prevention and treatment of AMI are prominent topics in Cardiology and Public Health, there is still a long road ahead in secondary prevention in AMI patients .

According to the 2017 Report of the National Program for Cerebrovascular diseases, the numbers associated with mortality from AMI have been decreasing since 2014. However, the focus on improving quality of life and reducing morbidity among AMI patients has the potential to contribute positively to the prevention of new events and simultaneously leads to gains in quality of life and indirect costs of the disease .

Commitment to secondary prevention of AMI, including regular follow-up with patient monitoring, counseling for changing lifestyles and adherence to pharmacological therapy and cardiac rehabilitation, is associated with a reduction in post-AMI mortality, in the occurrence of new episodes of infarction and hospitalization episodes and visits to the emergency service, as well as an increase in the quality of life perceived by the patient .

An example of the deficiencies in the follow-up of post-myocardial infarction patients is reflected in data from the Exercise Physiology and Cardiac Rehabilitation Study Group of the Portuguese Society of Cardiology. Values shared by this group indicate that, in Portugal, only 9.3% of patients participate in cardiac rehabilitation programs, compared with a European average of >30%, a number cited as an objective for the inclusion of patients in these programs .

The Cardiology Referral Network, recommended in a document from the Directorate-General of Health , foresees three levels of hospital capacity with cardiology services. Level 1 includes hospitals with outpatient and in-patient cardiology consultations, which should be equipped with non-invasive cardiology diagnostic techniques. Level 2 implies the existence of a permanently available hemodynamic laboratory and a cardiology intensive care ward. Level 3, corresponding to tertiary hospitals with more valences, implies the existence of the requirements of a Level 2 hospital and the existence of a cardiac surgery service. AMI patients who can be attended in less than 120 minutes after diagnosis should be referred to a Level 2 or 3 hospital.

Thus, it is clear the relevance of investigating the current situation in Portugal regarding secondary prevention of AMI in day-to-day clinical practice conditions, as well as the importance of raising

awareness among health professionals, patients, policymakers, and civil society stakeholders about the improvements that can be made in this area based on evidence and expert consensus. This study aims to characterize the reality of the path of acute myocardial infarction patients in Portugal after hospital treatment. Subsequently, it aims to compare this with the reference guidelines for secondary prevention of AMI and develop recommendations for improvements.

Methodology

A non-systematic review process was conducted to understand what is recommended for the follow-up of patients with AMI, based on national and international guidelines, including secondary prevention of AMI. The acute phase of the disease was also evaluated. The research comprised two key components: targeted research on guidelines for cardiovascular disease prevention on the websites of the European and National Cardiology Societies (ESC, SPC) and research in PubMed using search terms related to AMI.

A Steering Committee, composed of cardiology experts in AMI (Appendix 1) with recognized participation in civil society in Portugal, was responsible for the data collection methodology for following the patient's post-acute course after AMI discharge. These experts met three times, these meetings included: validation of the project methodology, the preliminary validation of the patient pathway data and specific advice on the instruments for data collection, and the final guidelines for defining the ideal patient pathway model.

To support the characterization of the national picture of patient pathway management, 12 structured interviews were performed between March and July 2022 with cardiology health professionals, including cardiologists from seven hospitals that represent levels 2 and 3 of the Cardiology Referral Network (full list included in Appendix 2), including hospitals with established cardiac rehabilitation programs. The selection of these professionals considered the geographic representation and the range of services provided by the institutions where they work. Research included hospitals at distinct levels in the referral network and health centers in their respective areas of influence. The criteria for selection were defined by the authors and considered hospitals' willingness to participate. The interviews followed a standard script (Appendix 4) which included general and specific questions on the follow-up of patients with AMI in the healthcare institution where the professional worked (hospitals or health centers, including primary healthcare units - PHCUs - and family health units - FHUs). Domains assessed included the healthcare professional's perspective on the diagnosis, referral and follow-up of these patients at a national level, communication and interconnection of systems between hospitals and primary care at referral, and on points for improvement in the care of patients with AMI in terms of infrastructure, human resources, and health awareness. An online session was scheduled per interviewee, and the questions presented in the script were performed by the interviewer. Each interview took approximately 1h. The answers were collected by the interviewer in an excel grid with the questions for analysis. The responses collected in these interviews were mapped and are presented aggregately due to non-disclosure purposes. The information collected allowed the elaboration of representative flowcharts of the pathway of patients after AMI treatment in

multiple healthcare institutions, as well as to the construction of the representation of the ideal pathway, according to the opinions of health professionals. The latter representation was then submitted for validation by the Steering Committee at its second meeting, and the comparison between this and existing recommendations issued by medical societies is presented in the Discussion section of this paper.

Results

Characterization of the response nationally

Regarding the communication and liaison between hospitals in the referral network, for referral of patients to the various levels of the network, a clear distinction was observed between urban hospitals and inland hospitals. Urban hospitals have a relatively small referral area for level 2 services (for cardiac surgery services, this area is larger, given the small number of level 3 centers) where knowledge of the network among referring hospital professionals was good and human resources were available for patient communication and transport. At inland hospitals, to which patients from larger areas were referred, there were barriers to effective patient movement. There was a reported lack of liaison between hospitals in the network, motivated in part by the lack of knowledge of the network structure itself by the professionals responsible for referral to higher level hospitals. This scenario, combined with the shortage of physicians (who are by law required to be present in-patient transport), resulted in reported delays in access to revascularization by percutaneous coronary intervention in a hemodynamic laboratory for AMI patients.

With regard to the communication of patients' clinical information between health professionals, only in level 3 hospitals in the referral network was there a greater interconnection among systems and consequent greater ease in information flows, as the same clinical information platform (SClinico) is used by cardiologists and general practitioners. At the remaining sites, the method used to refer patients to health centers was by letter written and printed by the cardiologist, containing the relevant discharge information, which should then be delivered by the patient to the physician or to the administrative services of the health center.

In the area of cardiac rehabilitation, a noticeable cleavage was perceived between level 2 hospitals in the inland and rural part of the country in contrast to hospitals in denser urban areas. The latter, predominantly level 3, generally had established and structured cardiac rehabilitation programs, which included the integration of in-house and community facilities, according to the ESC recommendations for structuring into program phases as reported by practitioners. The smaller geographical dispersion of patients followed in these hospitals also helped the pursuit of these programs, which facilitated logistics in the interaction between hospital, gym, and home. On the other hand, in the set of inland hospitals and covering a wider coverage area, a structured cardiac rehabilitation plan was not available; there was mention of pilot projects to be implemented, and occasional and ad hoc attempts to provide specialized counseling (by physiotherapists, for example) to the patient, still during hospitalization. In one of the hospitals in a lower-density urban area, the existence of a structured program with in-hospital and out-of-hospital phases was

mentioned; however, it was discontinued due to the impact of the COVID-19 pandemic and when it was operational it had experienced low adherence due to the difficulty of travel for patients to the facilities where it was conducted.

Regarding the availability of specialists from different areas complementary to Cardiology and General Practice (especially Psychologists, Nutritionists, Physical Medicine and Rehabilitation Physicians and Smoking Cessation specialists), the national panorama was more heterogeneous. Still, hospitals with highly structured cardiac rehabilitation programs infrequently offered these valences on an individualized basis. On the other hand, services traditionally provided by GPs (smoking cessation and nutritional counseling) were more often relegated to the professionals who would necessarily be in contact with the patient (cardiologists and GPs) in the center and south regions, both in-hospital and in primary health care. The availability of psychology consultations, when available, was mainly at the level of primary care centers, with differences in the location of the consultation and time slots available.

Finally, regarding the frequency of post-discharge hospital follow-up and the professionals involved, in most hospitals, a follow-up was reported with the first visit at three months post-discharge, repeating, on average, every six months for a period between one and two years in non-atypical patients. However, these values were indicated as being highly volatile. Indeed, different values were collected with different professionals in the same hospital. In all hospitals, the possibility of referral to specialized consultations was found in case of comorbidities present after discharge from the hospital consultation (mainly heart failure and cardiac devices consultation). Only one hospital reported telephone contact with the patient between hospital discharge and the first consultation, with the purpose of assessing the relevance of anticipating the consultation in less clinically stable patients. Detailed results are presented in Appendix 5, with the feedback collected from the cardiologists and GPs in the interviews performed during the study.

Patient pathway

After analysis of the interviews with health professionals and based on the research conducted, experts conceived, by consensus, an ideal model of the post-AMI patient's pathway, as presented in the flowchart in Figure 1. This pathway takes in account needs consensually stated by experts, including:

The existence of a Cardiac Rehabilitation (CR) program in all hospitals with a Cardiology department with an in-hospital (Phase 1) and an out-hospital (Phase 2) phases, including exercise risk evaluation and intervention, education program, nutrition evaluation and intervention, risk factors evaluation and management (including smoking cessation, obesity and diabetes consults), medication optimization and adherence promotion and psychology evaluation and intervention components. After Phase 2, the patients should be referred to a community CR program (Phase 3) and to a General Practitioner (GP) with a referral letter. Patients should maintain regular appointments with a cardiologist according to the clinical situation.

- Follow-up by a GP after CR (Phase 2) discharge, along with the cardiac rehabilitation program and in direct communication with the cardiologist of the cardiac rehabilitation program. This component will place emphasis on lifestyle advice and continued cardiovascular risk factor management. It also includes continuation of the CR Program in the community (Phase 3).

- Possibility of referral to dedicated consultations in Nutrition, Smoking Cessation and Psychology through the CR program (Phase 3) and through the GP.

- Possibility of referral by the GP to specialized cardiology consultations (heart failure, arrhythmology, etc.), or others (e.g. nephrology) manifesting comorbidities.

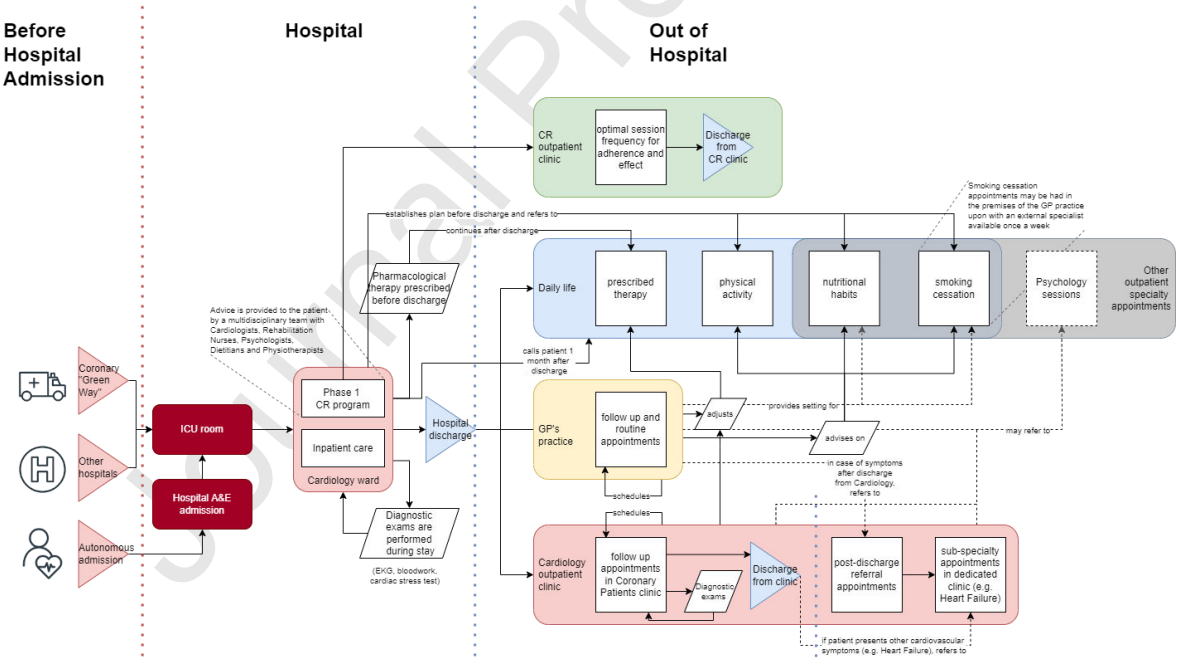

Figure 1 - Flowchart of the ideal post-AMI patient pathway

In this pathway, the patient is admitted after traveling autonomously to the emergency department (if in existence at the hospital in question), via the Coronary Fast Track, or referral from a lower-level hospital in the Cardiology Referral Network. All these ports of entry are possible and were identified in the mapping with the hospitals.

After acute treatment, mostly focused on primary angioplasty, the patient is kept for 24 to 48 hours in the coronary intensive care unit and then taken to the cardiology ward, where the patient remains for three to six days. if stable. During hospitalization, the parameters and doses of pharmacological therapy are optimized, and the necessary complementary diagnostic and therapeutic tests are ordered and analyzed.

Phase 1 of the CR program is also initiated, with intervention for the patient's education for lifestyle modification and risk factors management by the medical and nurse team. Early mobilization is promoted by physiotherapist and nurse. Intervention by specialists in Psychology, Nutrition, Smoking Cessation, and Physical Therapy, according to the patient's needs, can be done during hospitalization or early after discharge and hospitalization areas for this support must be available. An informed hospital discharge should be provided by a trained nurse or a cardiologist. The first Cardiology outpatient appointment and the onset of CR program (Phase 2) are also scheduled.

After clinical discharge from hospital, the patient's recovery can be grouped into four primary areas: Cardiac Rehabilitation Program, Cardiology Consultation, General Medicine Consultation and Everyday Life. In the period between discharge and the first visit, approximately in the first month, there should be a follow-up telephone contact by the Cardiology department where the patient was followed, to assess the patient's recovery and, if deemed necessary, change the priority of the first outpatient cardiology visit. This telephone contact should be performed by a cardiology nurse, to record outcomes of the first month of day-to-day life for the patient. This should be done independently from the CR Sessions and aims to question the patient on the actual experienced outcomes. In this call, a reminder should be given regarding the upcoming first post-discharge appointment.

In the CR program, according to national and European recommendations the patient enters Phase 2, which includes a clinical and functional evaluation for exercise capacity and possible limitations to exercise. The program includes CV risk factor management, the promotion of adherence to optimized treatment and modified lifestyle, a structured exercise program of two to three weekly sessions supervised by an exercise expert for an ideal period of three months (that can be extended to six months) and nutritional and psychological evaluation and intervention with a structured education program, identification of unstable cardiac situations and referral to exams and assistant cardiologist or hospital, as necessary. After this period, the patient is referred to a community institution, with a referral letter, where they can exercise and remain under surveillance (Phase 3). After Phase 2, decision to maintain dedicated consultations in Nutrition, Smoking Cessation and Psychology will depend on the patient´s needs and health professional advice.

The Cardiology consultation takes place three months after hospital discharge, after Phase 2 of the CR program and is maintained with the regularity considered adequate by the attending physician for a period of one to two years in asymptomatic patients. Over follow-up, therapeutic adjustment and patient education are conducted, and it must be possible to refer patients to any of the areas highlighted above (Psychology, Nutrition, Smoking Cessation, and Physical Therapy). For a

symptomatic patient, the follow-up at coronary patient consultations should be maintained. If new comorbidities are diagnosed, such as heart failure, or the need for implantation of a device (e.g., implantable cardioverter-defibrillator), the patient should be referred to a specialized consultation.

Follow-up by a GP starts when the patient goes to their usual attending physician, who has access (via computer system and/or letter) to information about the AMI event and CR program results. It is also a moment to adjust the pharmacological therapy, if necessary, and it is a vital moment for continuing patient education on lifestyles and cardiovascular risk reduction, which will be present in the patient's daily life. There should also be referrals to psychology, nutrition, smoking cessation, or other medical appointments that might be needed. Follow-up by GPs is done on an open-ended basis, and after discharge from the external cardiology consultation; GPs should be able to refer the patient back to the same or to a specialized cardiac appointment for comorbidities (e.g., heart failure) if necessary.

It is expected that the various strands of action listed above will be reflected in the patient's daily life, combining the ability to persuade the patient to adopt habits (non-smoking, healthy nutrition, increased physical activity and therapeutic adherence) and therefore reducing cardiovascular risk factors, predictors of new event, higher morbidity and higher mortality.

Discussion and Conclusion

The patient's pathway perceived through the discussion with several professionals involved in the treatment and follow-up of AMI varies substantially according to multiple factors such as the region or the level of the follow-up hospital in the Cardiology Referral Network.

The data collected allowed us to identify regional and level asymmetries in the referral network with an impact on the pathway of AMI patients. In fact, level 2 hospitals in regions with lower urban density or geographically more inland were generally reported to have a lower development of CR programs and offer other specialties and health areas, as well as greater logistical and communicational difficulty in network integration, which impacted their ability to follow up patients longer. In contrast, professional hospitals in large urban centers reported the existence of a CR program and its link to the community more frequently, as well as a more agile operation of patient referral in the network. Referral of patients to their GP, depending on the geographical distribution of the assisted population in a hospital and the consequent integration of the clinical information system of the referring hospital with that of the health centers, proved to be a preponderant factor in the way communication among professionals occurs.

Agreement among the professionals interviewed regarding the relevant elements of an adequate follow-up of post-AMI patients, reflected in the flowchart of Figure 1, suggests a relatively broad consensus on the merit of these same factors in the secondary prevention of AMI. In fact, this patient management model reflects the recommendations of the ESC, thus focusing on the geographical and supply asymmetries in Portugal. The assessment of the follow-up of these patients, through validated indicators, may help to quantify and better direct the efforts to

implement the model presented herein, bringing the Portuguese Health System closer to the health gains listed above and improving the health of AMI patients.

The differences that were highlighted in the exploration phase appear now as barriers to the full implementation of the ideal patient pathway agreed on by the specialists. On the issues of liaison and coordination between institutions, awareness raising initiatives, as well as easy access to a map of the reference institutions in the network, may complement the necessary efforts to guarantee the availability of healthcare professionals thus enabling the smooth movement of patients throughout the network. Information flow constraints, on the other hand, may be tackled through closer integration and harmonization of Electronic Health Records systems and technologies, easing the transmission of clinically relevant data among the professionals tasked with caring for each patient. Complementarily, challenges relating to shortages of staff, infrastructure or equipment require a different and more resource-constrained approach, thus prompting the need for a discussion on health financing and management of healthcare institutions. Investment in the provision of CR centers which are accessible and have enough capacity for the demand of post-AMI patients should go hand in hand with efforts to ensure the availability of dietitians, psychologists, smoking cessation specialists and further categories of healthcare professionals whose impact on the patients' outcomes has been demonstrated.

This study presents strengths and limitations due to its methodology. A non-systematic literature review was conducted meaning that there may be additional scientific papers that could have impacted the results presented, namely the ideal post-AMI patient pathway. Nonetheless the authors' research covered European and National cardiac prevention guidelines and included a comprehensive PubMed research, therefore the risk of not including relevant papers is considered low. Regarding the interviews performed, the sample of hospitals only includes seven public hospitals that covered levels 2 and 3 of the Cardiology Referral Network in Portugal. Representative from level 1 hospitals were invited to participate in the interviews but it was not possible to obtain confirmation of their involvement. Information regarding these hospitals was provided by the Steering Committee based on their expertise. Study included hospitals from different regions in Portugal (North, Center and South) which enabled us to gain a comprehensive national view. During the study we also contacted nurses from the hospitals included in the scope of the analysis, but it was not possible to gather their input. Nurses play a relevant role in the post-AMI patient pathway and their input was mitigated with the information collected in the other interviews performed. Regarding the post-AMI patient pathway, we have presented an ideal pathway based on the research we undertook. Nonetheless there is room for further development of this ideal pathway considering other scenarios that were not explored in this research. These include home-based rehabilitation for patients who are unable to attend rehabilitation clinics and the relation between the program and the return to work in the employed population.

Ethics in publishing

1. Does your research involve experimentation on animals?:
No

2. Does your study include human subjects?:
No

3. Does your study include a clinical trial?:
No

4. Are all data shown in the figures and tables also shown in the text of the Results section and discussed in the Conclusions?:
Yes

Bibliography

[1] DGS, Direção de Serviços de Informação e Análise, "Morbilidade Hospitalar - Serviço Nacional de Saúde - 2016. Portugal Continental," Direção-Geral da Saúde, Lisboa, 2017.

[2] A. Timóteo, M. Gouveia, C. Soares et all, "Indirect costs of myocardial infarction in Portugal," *Rev Port Cardiol (Engl Ed),* vol. 39, no. 5, pp. 245-251, May 2020.

[3] Direção-Geral da Saúde; Institute for Health Metrics and Evaluation, "The Nation's Health 1990–2016: An overview of the Global Burden of Disease Study 2016 Results," DGS; IHME, Seattle, WA, 2018.

[4] J. Fontes, E. Vilela, A. Durazzo et all, "Current state of cardiac rehabilitation in Portugal: Results of the 2019 national survey," *Rev Port Cardiol (Engl Ed),* vol. 40, no. 11, pp. 877-887, November 2021.

[5] H. M. Dalal, P. Doherty and R. S. Taylor, "Cardiac rehabilitation," *BMJ,* p. 351, September 2015.

[6] L. Bento, E. Vilela e L. Oliveira, "Grupo de Estudos de Fisiologia de Esforço e Reabilitação Cardíaca," 2021. [Online]. Available: https://spc.pt/portfolio-item/geferc-grupo-de-estudo-de-fisiopatologia-de-esforco-e-reabilitacao-cardiaca/. [Acedido em 14 September 2022].

[7] Programa Nacional para as Doenças Cérebro-Cardiovasculares, "Rede de Referenciação de Cardiologia," Ministério da Saúde, Lisboa, 2015.

[8] M. Piepoli, A. Hoes, S. Agewall, et all, "2016 European Guidelines on cardiovascular disease prevention in clinical practice: The Sixth Joint Task Force of the European Society of Cardiology and Other Societies on Cardiovascular Disease Prevention in Clinical Practice (constituted by representati," *European Journal of Preventive Cardiology,* vol. 23, no. 11, pp. NP1-NP96, 1 July 2016.

[9] M. Piepoli, U. Corrà, S. Adamopoulos,et all, "Secondary prevention in the clinical management of patients with cardiovascular diseases. Core components, standards and outcome measures for referral and delivery: a policy statement from the CR section of the European Association for," *Eur J Prev Cardiol,* vol. 21, no. 6, pp. 664-681, June 2014.

[10] A. Abreu, M. Mendes, H. Dores, et all, "Mandatory criteria for cardiac rehabilitation programs 2018: guidelines from the Portuguese society of cardiology," *Rev Port Cardiol,* vol. 37, no. 5, pp. 363-373, 2018.

[11] A. Abreu, I. Frederix, P. Dendale, et all, "Standardization and quality improvement of secondary prevention through cardiovascular rehabilitation programmes in Europe: The avenue towards EAPC accreditation programme," *European Journal of Preventive Cardiology,* vol. 28, no. 5, pp. 496-509, 2021.

[12] F. Visseren, F. Mach, Y. Smulders, et all, "2021 ESC Guidelines on cardiovascular disease prevention in clinical practice: Developed by the Task Force for cardiovascular disease prevention in clinical practice with representatives of the European Society of Cardiology and 12 medical societies With," *European Heart Journal,* vol. 42, no. 34, pp. 3227-3337, September 2021.

Appendix

Appendix 1 – Steering Committe Members

Name	**Position** (as of November 2023)	**Institution** (as of November 2023)
Eduardo Infante Oliveira	-Interventional Cardiologist -Head of Cardiology -President of APIC	Centro Hospitalar Lisboa Norte Hospital Lusíadas de Lisboa APIC
Filipe Macedo	-Head of Cardiology -Director of the National Program for Cerebrovascular and Cardiovascular Diseases	Centro Hospitalar Universitário São João Direção Geral de Saúde
Hélder Pereira	-Head of Cardiology	Hospital Garcia de Orta

	-President-Elect	Sociedade Portuguesa de Cardiologia
Ricardo Fontes-Carvalho	Head of Cardiology	Centro Hospitalar de Vila Nova de Gaia e Espinho

Appendix 2 – List of interviews performed

N	Specialty	Institution
1	Cardiologist	Centro Hospitalar Universitário São João
2	Cardiologist	Centro Hospitalar de Vila Nova de Gaia e Espinho
3	Cardiologist	Centro Hospitalar de Vila Nova de Gaia e Espinho
4	Cardiologist	Centro Hospitalar Tondela Viseu
5	General Practitioner	Centro Hospitalar Tondela Viseu – Reference area
6	Cardiologist	Centro Hospitalar Lisboa Ocidental
7	Cardiologist	Centro Hospitalar Lisboa Ocidental
8	General Practitioner	Centro Hospitalar Lisboa Ocidental – Reference area
9	Cardiologist	Centro Hospitalar Lisboa Norte
10	Cardiologist	Hospital Garcia de Orta
11	Cardiologist	Centro Hospitalar do Algarve
12	General Practitioner	Centro Hospitalar do Algarve – Reference area

Appendix 3 – Project timeline

Post-MI Pathway

Guide for interviews
Cardiologists and General Practitioners

[translated version from the original – applied in Portuguese]

Interview guide

Introduction

Good morning / Good afternoon, my name is _____, I work at IQVIA in Portugal, a company that develops consulting studies / services in the health sector.

We are currently carrying out a study in the area of secondary prevention of myocardial infarction, the objectives of which include understanding how these patients are managed; their journey through the healthcare system after the acute phase; what treatments and tests are available for their management; what are the clinical guidelines for their treatment and finally; what are the main needs that are still unsatisfied and what initiatives may be developed in the future.

The information provided will be treated confidentially and analysed aggregately with the information collected in other interviews.

According to the code of conduct that regulates our activity, we guarantee that any information you provide will be completely confidential and treated in the strictest confidence. Your answers will not be associated with you and will always be treated in a consolidated manner together with those of other respondents.

We would like to point out that, in accordance with the current regulatory framework, we will be obliged to report any occurrences of adverse events and/or safety situations relating to pharmacological treatments (namely: misuse; abuse; exposure during pregnancy/breastfeeding; lack of effectiveness; occupational exposure; *off-label* ; overdose; unexpected beneficial effects; suspected transmission of an infectious agent; medication error), related to products from the pharmaceutical company we represent, of which we may be aware during this interview.

This interview will last approximately **45 minutes**.

Thank you in advance for your collaboration.

A. Knowledge of the professional and their reality

To deepen the epidemiological knowledge of the disease and quantify the number of patients you usually come into contact with, we would like to ask you some questions. Please consider your personal experience to answer the following questions.

1. Does the hospital/hospital center where you work manage Acute Myocardial Infarction (AMI) patients?
   1.1. What types of interventions and responses are available for these patients?

2. Considering your last 12 months of clinical practice in the period before the COVID-19 pandemic:
   2.1. Approximately, how many new patients were diagnosed with AMI and admitted to the hospital/hospital center where you work?
   2.2. Approximately, how many of these patients were followed only in the hospital/hospital center where you work?

3. Approximately how many AMI patients do you follow during a year?
   3.1. Do you consider that they are representative of the population of patients suffering from AMIs in the area of influence of the hospital/hospital center in which you work?
   3.2. Do you consider that these could have had different follow-up if they were in the area of influence of another hospital at the same level in the referral network?
      3.2.1. If yes, why?

[only applicable to General Practitioners]:

1. In the primary care unit where you work, do you care for patients who have had an Acute Myocardial Infarction (AMI)?
   1.1. What type of follow-up is available for these patients?

2. Approximately how many AMI patients do you follow during a year?
   2.1. Do you consider that they are representative of the AMI population in the area of influence of the primary care unit in which you work?
   2.2. Do you consider that they could have had different follow-up if they were in the influence area of another primary care unit?
      2.2.1. If yes, why?

3. In the last two years, how do you assess the impact of the COVID-19 pandemic on the monitoring we just talked about?

B. Introduction patient journey

[applicable to Cardiologists]

In this chapter, we would like to generally understand the patient's entire journey after the acute treatment period and encompass all potential aspects of follow-up.

1. What steps does an AMI patient treated at your hospital/hospital center go through in the post-acute period? *(ask to develop everything you remember)*

2. What characterizes good follow-up of AMI patients?
   2.1. Do you consider that AMI patients in your hospital/hospital center have access to this type of follow-up?

3. What are the *outcomes* to expect and value in an AMI patient one month after hospital discharge? And after 6 months? And after a year?

4. What indicators reflect good follow-up of an AMI patient? Which can be used to evaluate a hospital/hospital center/local health unit?

5. Over the last two years, how do you assess the impact of the COVID-19 pandemic on the journey we just talked about?

C. Details of the patient's journey

In this chapter, we will attempt to explore the patient's journey after the acute phase in a more systematic way, helped by literature review and international clinical guidelines.

a. Cardiologists from level 1 hospitals

1. How does an AMI patient get to the hospital/hospital center where they work? In the acute period? In post-acute follow-up?
   1.1. Which AMI patients in the acute period are referred to a higher-level hospital in the referral network? Which hospitals can they be referred to?
   1.2. How is this flow processed and what criteria are there? Who makes the decision to refer to another hospital?

2. When does an AMI patient in the post-acute period return to the hospital/hospital center where they work? *(after acute intervention, after discharge, after a certain time)*

3. How many Cardiology appointments are carried out after the AMI patient's acute period? What are the appointments discharge criteria?
- **3.1.** Are consultations carried out in other specialties (Nutrition, Rehab, Psychology), or multidisciplinary medical appointments?
  - **3.1.1.** If so, in what proportion of AMI patients?
- **3.2.** What exams/procedures are ordered for an AMI patient in the post-acute period? *(ask ECG, echocardiogram, physical stress tests)*
- **3.3.** What analytical parameters are relevant in AMI patients? *(ask lipid profile, blood glucose, triglycerides)*

4. Are AMI patients referred to a cardiac rehabilitation program?
- **4.1.** If so, what does this program consist of? What is its average duration? How often does the patient come into contact with program sessions? What specialties and what types of professionals are involved? In which facilities does this program take place? How are patients transported?
- **4.2.** If so, does this referral happen and is scheduled before hospital discharge?

5. What medication is routinely prescribed to all AMI patients?
- **5.1.** What dosage or therapeutic class adjustments are common? How often is medication reviewed and adjusted? Who is responsible for this adjustment?
- **5.2.** How is the interaction with the patient's usual medication managed before the AMI?
- **5.3.** What steps are taken to ensure patient adherence to therapy?

6. How is an AMI patient referred for follow-up in Primary Health Care? In what calendar does this referral take place?
- **6.1.** Is this referral accompanied or dependent on the evaluation of other specialties?

b. Cardiologists from level 2 and 3 hospitals

1. In the hospital/hospital center where you work, what is the distribution of AMI patients arriving:
- **1.1.** By referral from another hospital, following the *Via Verde Coronária*?
- **1.2.** Directly to your hospital/hospital center?

2. How many Cardiology consultations are carried out after the AMI patient's acute period? What are the consultation discharge criteria?

- **2.1.** Consultations of other specialties are carried out *(Nutrition, Physical and Rehabilitation Medicine, Psychology)*, or multidisciplinary appointments?
  - **2.1.1.** If so, in what proportion of AMI patients?
- **2.2.** What exams are ordered for an AMI patient in the post-acute period? *(ask ECG, echocardiogram, physical stress tests if not mentioned)*
- **2.3.** What analytical parameters are relevant in AMI patients? *(ask lipid profile, blood glucose, triglycerides)*

3. Are AMI patients referred to a cardiac rehabilitation program?
- **3.1.** If so, what does this program consist of? Where does the program take place? How are patients transported? What is its average duration? What specialties and what types of professionals are involved?
- **3.2.** If so, does this referral happen and is scheduled before hospital discharge?
- **3.3.** What steps are taken to ensure patient adherence to therapy?

4. What medication is routinely prescribed to all AMI patients?
- **4.1.** What dosage or therapeutic class adjustments are common? How often is medication reviewed and adjusted? Who is responsible for this adjustment?
- **4.2.** How is the interaction with the patient's usual medication managed before the AMI?
- **4.3.** What steps are taken to ensure patient adherence to therapy?

5. Is referral made to other hospitals in the referral network?
- **5.1.** If so, what factors determine this referencing? *(Geographical, demographic, severity of the episode, etc.)*
- **5.2.** What proportion of AMI patients are referred to lower-level hospitals?

6. How is an AMI patient referred for follow-up in Primary Health Care? In what calendar does this referral take place?
- **6.1.** Is this referral accompanied or dependent on the evaluation of other specialties?

c. General Practitioners

1. How are AMI patients referred to Primary Health Care?

2. Do you have Nutrition, Psychology or Physiotherapy consultations available in your unit?

3. Is the unit you work in integrated into the cardiac rehabilitation programs prescribed to AMI patients after the acute period?

4. What factors are taken into account when prescribing medication with cardiovascular implications to an AMI patient?
- **4.1.** How frequent is it to adjust the medication prescribed in a hospital environment, in the acute period or in follow-up consultations, by cardiologists?
- **4.2.** How often is this medication incompatible with the usual medication the patient was taking before the AMI episode?

5. In what situations is an AMI patient being followed up in Primary Health Care referred again for Cardiology consultation?

D. Knowledge and reflection of the guidelines

In this chapter, we will try to understand the relevance given to international recommendations and standards and their impact on real practice.

1. The recommendations and *guidelines* about monitoring AMI patients that you know, which ones are you most familiar with?
- **1.1.** With the exception of DGS standards and the hospital/hospital center where you work, which do you consider to be the most appropriate to the local reality you come into contact with?
- **1.2.** Does your hospital/hospital center have recommendations or *guidelines* adapted to the context of the area of influence, for monitoring AMI patients?
  - **1.2.1.** If so, in your opinion, do they make sense and are they adapted to your needs?
  - **1.2.2.** If so, is it theoretically possible to try to implement what is recommended in them?
  - **1.2.3.** If not, recommendations/ *guidelines* from another entity?
    - **1.2.3.1.** If so, in your opinion, are these appropriate to the local reality?
    - **1.2.3.2.** If so, is it theoretically possible to try to implement what is recommended in them?

2. The reality of clinical practice reflects the recommendations or *guidelines* mentioned above?
- **2.1.** If there is no reflection of the recommendations or *guidelines* In your clinical practice, what impediments do you identify for this to happen?

3. Regarding the *guidelines* or recommendations that have guided clinical practice in the hospital/hospital center where you work have evolved and been adapted over time?
- **3.1.** If so, have recommendations been adopted or adapted and *guidelines* from the same entity *(e.g. ESC, NICE, AHA)*?

E. Present and future needs

In this chapter, we aim to systematize the current needs that are not met, either in terms of recommendations or in terms of means and human resources allocated to AMI patients.

1. What do you consider to be the present limitations of recommendations/ *guidelines* existing in terms of monitoring AMI patients?

- **1.1.** Do you consider that there is sufficient awareness among health professionals regarding these needs?

1.2. Which entities can meet the needs identified in terms of recommendations/ *guidelines*?

2. What limitations in terms of infrastructure and human resources do you identify when following up AMI patients?

3. What do you consider to be the present limitations of health literacy in AMI patients?
3.1. How do you think these limitations can be overcome? Which entities and areas of the society should be involved in this process?
3.2. What do you understand to be the role of clinical recommendations in improving patients' health literacy?

4. What do you consider to be the most relevant challenge for the treatment and secondary prevention of Acute Myocardial Infarction in Portugal today?

Appendix 5 – Interview debrief

Appendix 5

Cardiologists' responses

Question	Cardiologists' answers
Knowledge of the professional and their reality	
Does the hospital/hospital center where you work treat Acute Myocardial Infarction (AMI) patients?	Yes
What types of interventions and responses are available for these patients?	In level 1 hospitals there's medical therapy and echocardiogram available; In level 2 hospitals there's also a hemodynamic room (reperfusion for primary angioplasty), MRI, ICU and ward hospitalization; Finally, in level 3 hospitals they also have cardiac surgery laboratory, ICU and cardiac rehabilitation program.
Approximately, how many new patients were diagnosed with AMI and admitted to the hospital/hospital center where you work?	Between 400-500 patients, ~40% with ST-elevation and ~50% from the hospital's referral area.
Approximately, how many of these patients were followed only in the hospital/hospital center where you work?	50-90%
Approximately how many AMI patients do you follow during a year?	It depends if the physician does consultation or not, but for the ones who do, answered that it could be around 100-300 per year.
Do you consider that they are representative of the population of patients suffering from AMIs in the area of influence of the hospital/hospital center in which you work?	Physicians in urban areas consider their population is representative and physicians in the interior consider they are not (older population, at higher risk, and with more severe coronary disease)
Do you consider that they could have had different follow-up if they were in the area of influence of another hospital at the same level in the referral network?	Physicians in level 2 and 3 hospitals consider patients are followed in accordance with international recommendations, but physicians in level 1 hospitals report large regional differences, for example in the interior of the country, especially due to transport times until primary angioplasty that can worsen the patient's outcomes.
Introduction patient journey	
What steps does an AMI patient treated at your hospital/hospital center undergo in the post-acute period? (ask to develop everything you remember)	Hemodynamic room, 24-48 hours in the Coronary Unit and then Cardiology hospitalization for 2-4 days, sometimes with intervention on other vessels. They do clinical analyzes and ECG. In some hospitals there is a team of Psychologist, Dietitian, etc. who provide advice and teach the patient about controlling risk factors, constituting a phase 1 rehabilitation program. Then they can be referred to a phase 2 program. In other hospitals patients receive a more informal education on heart attacks, with videos and explanations of the disease. Some undergo rehabilitation with rehabilitation nurses, but it is nothing structured. After that, they are discharged, with a prescription for 6 months of medication so that there is no shortage before your next appointment. Patients with any case of compromise are seen earlier at the coronary consultation, in addition to referral for GPs.
Do you consider that AMI patients in your hospital/hospital center have access to this type of follow-up?	Yes, although only 10% have access to a phase 2 rehabilitation program.
What are the outcomes to expect and value in an AMI patient one month after hospital discharge? And after 6 months? And after a year?	1 month later most are able to resume work (if it's not comprised of extensive physical activity or stressful functions).
What indicators reflect good follow-up of an AMI patient? Which ones can be used to evaluate a hospital/hospital center/local health unit?	Mortality, reinfarction, HF (or assessment of cardiac function and residual ischemia), therapeutic offer and control of risk factors (more than adherence to therapy), percentages of patients complying with the indicators present in the recommendations, patients who stop smoking after being referred for a smoking cessation consultation (only those contemplating cessation are referred), therapeutic prescription and compliance, lipid profile, left ventricular function, good exercise tolerance, compliance with lifestyle advice , prescription of standard medication in AMIs, offer of referral to control risk factors (smoking cessation, cardiac rehabilitation), offer of nutritional counseling.
In the last two years, how do you assess the impact of the COVID-19 pandemic on the path we just talked about?	Most physicians report very little impact and say patient numbers haven't changed much, although some physicians report cardiac rehabilitation has lost capacity.
Detail of the patient's journey	

In the hospital/hospital center where you work, what is the distribution of AMI patients arriving: By referral from another hospital, following the 'Via Verde Coronária'? Directly to your hospital/hospital center?	25%-35% Via Verde, 30% from other centers, 35-45% directly to the emergency room.
How many Cardiology consultations are carried out after the AMI patient's acute period? What are the consultation discharge criteria?	12-18 months without symptoms usually lead to discharge from the Coronary consultation, if symptoms are not IC. Patients go the cardiologist every 3 to 6 months.
Are consultations carried out in other specialties (Nutrition, Physical and Rehabilitation Medicine, Psychology), or multidisciplinary consultations?	In hospitals with a Rehabilitation program there are Psychologist, Nutritionist, Rehabilitation Nurse, Physiotherapist, Psychiatrists and also Smoking Cessation consultations.
What MCDTs are ordered for an AMI patient in the post-acute period? (ask ECG, echocardiogram, exercise tests if not mentioned)	Analysis, ECG, chest X-ray, coronary angiography, echocardiogram on admission, Holter monitoring, exercise testing, stress tests, MRI, perfusion studies.
What analytical parameters are relevant in AMI patients? (ask lipid profile, blood glucose, triglycerides)	Blood count, Ionogram, blood glucose, creatinine, BUN, HbA1c if diabetic, liver panel, lipid profile, urine type 2, NT-pro-BNP.
Are AMI patients referred to a cardiac rehabilitation program?	Most of the patients in the hospital area are referenced if the hospital has cardiac rehabilitation.
If yes, what does this program consist of? Where does the program take place? How are patients transported? What is its average duration? What specialties and types of professionals are involved?	Phase 1 happens during hospitalization, as detailed before in the patient journey. Phase 2 exists after discharge, with coordination by a Cardiologist, and patients going to the gym 3x a week, 1 hour per session, for 6 weeks-2 months. There are CR programs in conjunction with Physiotherapy and all of this can be adapted to the patient's life.
If yes, does this referral happen and is scheduled before hospital discharge?	All patients who are indicated are referred to a cardiac rehabilitation program after phase 1, no specific criteria is applied.
What steps are taken to ensure patient adherence to therapy?	Few, adhesion of around 60%.
What medication is routinely prescribed to all AMI patients?	Dual antiaggregation, statin, beta-blocker and antihypertensive.
What dosage or therapeutic class adjustments are common? How often is medication reviewed and adjusted? Who is responsible for this adjustment?	Tension profile and adverse reactions are usually the factors to consider and there are very frequent changes to the dosage to guarantee targets are met.
How is the interaction with the patient's usual medication managed before the AMI?	During hospitalization, the usual medication is always checked and adjusted to the patient's needs.
What steps are taken to ensure patient adherence to therapy?	The patient is motivated to comply with the medication, adherence to therapy is not a problem if the patient has the right follow-up.
Is there referral to lower-level hospitals in the referral network?	Most of the times no, there's low capacity installed in institutions close to the patient.
If yes, what factors determine this referencing? (Geographical, demographic, severity of the episode, etc.)	Mostly geographic, for all patients who are not from the hospital's referral area, immediately after the intervention and if there is local capacity.
What proportion of AMI patients are referred to lower-level hospitals?	Residual
How is an AMI patient referred for follow-up in Primary Health Care? In what calendar does this referral take place?	Discharge letter that the patient must take to the GP and information in S-Clinic.
Is this referral accompanied or dependent on the evaluation of other specialties?	No, it's automatic.
Knowledge and reflection of the guidelines	
Of the recommendations and guidelines on monitoring AMI patients that you know, which ones are you most familiar with?	ESC
Does your hospital/hospital center have its own recommendations or guidelines, adapted to the context of the area of influence, for monitoring AMI patients?	Some physicians report they have, but it is usually integrated with the ESC guidelines.
If so, in your opinion, do they make sense and are they adapted to your needs?	Yes
If so, in your opinion, are these appropriate to the local reality?	Yes
If so, is it theoretically possible to try to implement what is recommended in them?	Yes
Does the reality of clinical practice reflect the recommendations or guidelines mentioned above?	Yes
Present and future needs	
What do you consider to be the limitations of existing recommendations/guidelines in terms of monitoring AMI patients?	Physicians don't see many limitations
What limitations in terms of infrastructure and human resources do you identify when following up AMI patients?	Geographic dispersion of patients compromises participation in phase 2 of the rehabilitation programs; There can be a lack of personnel for the program (cardiologists, nurses, etc.); Lack of cardiologists to ensure ideal regularity of consultations in the first year (every 3 months); Lack of capacity in hospitals to carry out all the specific exams needed, which causes long waiting lists for relatively simple exams; There is also a lack of cardiopneumology technicians; Being able to do an ECG in the ambulance

	and go directly to the Hemodynamics laboratory; Ventricular assist devices (intraventricular and intraaortic balloons) are lacking despite tenuous evidence of its importance; More inpatient space and infirmary beds; Investment in telemedicine as a support; Extended rehabilitation gym time for hospitals who offer this solution.
What do you consider to be the present health literacy limitations in AMI patients?	Although literacy is low in the country, it is not an extremely limiting factor. There are paradoxical situations in which differentiated patients end up coming into contact with myths (statins, for example) that make it difficult to adhere to therapy. Additionally, because the treatment is so effective, there's a lack of awareness for the warning signs of having a heart attack. However, the main obstacle to a good treatment is economic.
How do you think these limitations can be overcomed? Which entities and areas of society should be involved in this process?	Awareness campaigns about the need to act quickly when symptoms begin. Early identification of stroke and AMI being part of health education at school, etc.
What do you consider to be the most relevant challenge for the treatment and secondary prevention of Acute Myocardial Infarction in Portugal today?	Cardiac rehabilitation, Portugal is still well below the European average for referrals for CR.

GPs' responses

Question	General Practitioner's answers
Knowledge of the professional and their reality	
In the primary care unit where you work, do you care for patients who have had an Acute Myocardial Infarction (AMI)?	Yes, after being discharged.
What type of follow-up is available for these patients?	Mainly monitoring, control of risk factors and optimization of therapy.
Approximately how many AMI patients do you follow during a year?	Between 10-25 per year
Do you consider that they are representative of the population of patients suffering from AMIs in the area of influence of the primary care unit in which you work?	Yes, it is a population similar to what can be found in the rest of the country.
Do you consider that they could have had different follow-up if they were in the catchment area of another primary care unit?	Follow-up in GPs varies greatly depending on whether or not you have a family doctor, a difference in access to consultation, but it is in line with the rest of the country, with good conditions in the centers where physicians worked.
If yes, why?	Greater availability of FPs, allowing more frequent and personalized monitoring of users who are not assigned a family doctor.
Detail of the patient's journey	
How are AMI patients referred to Primary Health Care?	Referral by the hospital doctor (Cardiologist) with two letters: one for the patient and one for GP; when there are no family doctors, it is the doctor providing the consultation at UCSP/USF who receives and records this letter. Post-MI patients do not have any priority for having a family doctor if they do not have one yet.
There are Nutrition, Psychology or Physiotherapy consultations available in your unit?	They have Physiotherapy and Psychology, but referral is not common. There are also smoking cessation consultations available, and nutrition is sometimes available, if not, GPs try to give their support in this area.
Is the unit you work in integrated into the cardiac rehabilitation programs prescribed to AMI patients after the acute period?	There is no specific rehabilitation at the primary care level, although GPs know this follow-up is available in some of the hospitals.
What factors are taken into account when prescribing medication with cardiovascular implications to patients with AMI?	Be careful with anti-inflammatory drugs due to renal function and increased CV risk; Ensure that the patient complies with antiaggregants/coagulants; Adjustment and elimination of duplication of medication prescribed at discharge.
How frequent is it to adjust the medication prescribed in a hospital environment, in the acute period or in follow-up consultations, by cardiologists?	Initially, the adjustment is done by the Cardiologist, due to the spacing between GP consultations. Most of adjustments are small and during the acute period. Sometimes there is duplication between hospital prescriptions and the patient's previous usual medication, and there is a need to eliminate duplicates. It happens with different brands of the same active ingredient, which patients perceive as two different drugs.
How often is this medication incompatible with the usual medication the patient was taking before the AMI episode?	Little incompatibility, only duplication sometimes.
In what situations is an AMI patient who is being followed in Primary Health Care referred again for Cardiology consultation?	After an average of 1 year, the patient is discharged from the Cardiology consultation and remains in GPs. Depending on the risk factors, and apart from emergency episodes, the referral back to Cardiology is done in the same way as for other patients (GPs normally have the phone numbers of the Cardiologists) in case of reappearance of symptoms, which happens in ~50% of cases after 2 years. In acute cases of reinfarction, the way back to the hospital will happen with the emergency route.
Knowledge and reflection of the guidelines	
Of the recommendations and guidelines on monitoring AMI patients that you know, which ones are you most familiar with?	ESC

Does your hospital/hospital center have its own recommendations or guidelines, adapted to the context of the area of influence, for monitoring AMI patients?	No
If so, in your opinion, do they make sense and are they adapted to your needs?	They are adapted to reality.
If so, in your opinion, are these appropriate to the local reality?	They are quite complete and comprehensive, reflecting clinical realities.
If so, is it theoretically possible to try to implement what is recommended in them?	Yes
Does the reality of clinical practice reflect the recommendations or guidelines mentioned above?	Yes
Present and future needs	
What do you consider to be the limitations of existing recommendations/guidelines in terms of monitoring AMI patients?	There are no major limitations, regular follow-up and clear guidelines
What limitations in terms of infrastructure and human resources do you identify when following up AMI patients?	More GPs and nurses at primary care level, to achieve the necessary regularity of consultations, which was worsened by the pandemic. Lack of nutritionists is crucial; a lot of money would be saved on medication for preventable changes.
What do you consider to be the present health literacy limitations in AMI patients?	Very variable with the type of patient, closely related to education. It is the GP's task to try to explain the advantage of controlling risk factors. Time for this is limited as with everything, but it generally serves the purpose. Patients are poorly aware of the prevention (primary, primary and secondary) of the disease although they understand their situation and are aware of what they could do to prevent adverse outcomes, but they do not show much desire to change.
How do you think these limitations can be overcome? Which entities and areas of society should be involved in this process?	From a young age, there is a lack of awareness for the prevention of relevant risk factors for AMI and other diseases.