



Early Hospital Discharge following Primary Percutaneous Coronary Intervention (PCI)

A delivery guide based on work from Barts Heart Centre, London

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Executive Summary

Heart attack centres use percutaneous coronary intervention (PCI) to open blocked coronary arteries in patients with ST segment elevation myocardial infarction (STEMI). When compared to thrombolysis, this is found to significantly enhance patient clinical outcomes, with a lower incidence of recurrent ischaemia, and shorten hospital stays.

The [2021 GIRFT National Cardiology Report](#) highlighted PCI should be performed at heart attack centres that are specifically recognised and provide a 24/7/365 service.

Current guidelines recommend early discharge within 48-72 hours in selected low risk patients alongside early rehabilitation and adequate follow up¹. For STEMI patients who are at low risk for early Major Adverse Cardiovascular Events (MACE), the Barts Heart Centre, part of Barts Health NHS Trust, introduced an Early Hospital Discharge (EHD) programme in 2020. Patient follow-up at pre-determined intervals is facilitated utilising a virtual platform.

Due to the COVID-19 pandemic's pressures and the necessity to prevent patient exposure to the virus through extended hospital stays, the EHD pathway was implemented.

A prospective study of patients who had primary PCI at Barts Heart Center was used to evaluate the practicability and safety of the EHD pathway. The results show that low risk patients who have successfully undergone primary PCI and on the EHD pathway can be safely discharged and given a virtual follow-up by a multidisciplinary team.

Who should read this guide?

This guide is intended to be useful to clinicians, organisations, and systems that want to optimise early discharge following primary PCI, improve patient satisfaction, and service effectiveness.

Purpose of this guide

This guide describes the Barts Heart Centre's EHD pathway following PCI. It provides important information for centres looking to replicate this process, such as patient eligibility requirements, patient pathway, and key learning.

¹ [ESC Guidelines on Acute Myocardial Infarction in patients presenting with ST-segment elevation \(Management of\)](#) (escardio.org)

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Introduction

Acute Myocardial Infarction (AMI), including ST segment Elevation Myocardial Infarction (STEMI) is one of the major causes of mortality in developed countries².

Immediate coronary angiography in conjunction with primary Percutaneous Coronary Intervention (PCI), a non-surgical method for treating obstructive coronary artery disease, is recommended for patients with STEMI. PCI can significantly lower severe adverse cardiac events.

The Barts Heart Centre, a high-volume heart attack centre (HAC) in London that provides care to ten district general hospitals, has optimised patient discharge, and adopted efficient virtual secondary prevention following PCI. The HAC has improved patient outcomes and increased healthcare efficiency by implementing a standardised Early Hospital Discharge (EHD) pathway which aims to accurately and efficiently identify low risk AMI patients who can be safely discharged between 24 and 48 hours after successful primary PCI.

Key elements that contribute to successful optimisation of patient discharge following PCI include:

- Use of a pre-admission clinic for careful patient selection and assessment.
- Effective interdisciplinary team composed of advanced clinical practitioners, nurses, pharmacists, managers, and administrators, as well as medical representatives.
- Standardised patient pathway covering patient selection through to virtual follow-up.
- Development of supporting procedural documents on how to support and care for patients in the pre-operative and post-operative phases of the pathway.

This guide details the steps taken by the Barts Heart Centre team to optimise early discharge for patients after PCI through the implementation of a pathway that integrates recommendations from the 2021 GIRFT National Cardiology Report, pertinent national guidance, and novel practice.

² Mortality from ischaemic heart disease by country, region, and age: Statistics from World Health Organisation and United Nations <https://doi.org/10.1016/j.ijcard.2012.10.046>

Challenges

Studies have shown that severe adverse cardiac events are uncommon after 24 hours following STEMI, hence uncomplicated post-infarct patients who have received primary PCI with good results should be mobilised and discharged early.

Current guidelines recommend early discharge at 48-72 hours. Due to strained hospital resources and the COVID-19 pandemic's effects, the early hospital discharge pathway complemented by a structured multidisciplinary follow up was implemented.

Barts Heart Centre is one of the providers of primary PCI for London's 6.1 million people. Therefore, it was essential to implement an evidence-based pathway that promoted efficient patient flow, safe early discharge, and timely post-discharge follow-up without compromising clinical outcomes and patient satisfaction.

The challenges noted by Barts Heart Centre include:

- 50% of patients who spent three to five days in the coronary care unit after a STEMI were low risk with >40% left ventricular ejection fraction with no bystander disease and haemodynamically stable.
- Extended waiting periods and variable, non-protocolled cardiology follow-up following discharge.
- High follow-up DNA rate (31%).
- 1 in 5 patients had no follow-up.
- Only 16% of patients were receiving appropriate medical therapy at the end of 12 weeks due to pressure on primary care to review patients after myocardial infarction and up-titrate medication.

Approach

The following sections describe the patient eligibility criteria, pre-discharge administrative tasks, and the virtual follow-up process.

Patient selection

Appropriate patient selection based on an individual's cardiac risk, comorbidities, functional state, and social support is essential for a successful early hospital discharge. Patient admission time and clinical course also determines if a patient's discharge occurs at 24 hours or after 36 hours.

The primary PCI operator identifies suitable patients who could be discharged at 24 to 48 hours after their procedure. Below are patient eligibility criteria for EHD based on Barts Heart Centre's existing 48 to 72 hour discharge policy and [recommendations](#) for early hospital discharge from the European Society of Cardiology.

- LVEF >40% (LVgram or TTE)
- Successful primary PCI (TIMI III flow)
- Absence of disease requiring inpatient revascularization (CABG or PCI)
- No recurrence of ischaemic symptoms
- Absence of heart failure (Killip 1)
- No significant arrhythmias (VT, VF NSVT)
- No haemodynamic instability (no inotropes or mechanical support)
- No significant co-morbidity
- Mobility, with suitable social circumstances for discharge.

Pre-discharge

The following actions are performed post-operatively before discharging patients.

- Patient is onboarded to a virtual platform to facilitate the collection of clinical information and monitoring of patient recovery and symptoms post-discharge.
- Patient is provided with medication advice.
- Patient is given a blood pressure monitoring machine (if they do not have one) and are taught how to use it.
- Patient is given post-acute myocardial infarction information papers, and a clinician is available to answer any queries.
- Advanced clinical practitioners (ACP) in cardiology are informed when a patient is discharged to ensure prompt follow-up.

Follow-up

The ability to detect symptomatic recurrences or late complications in patients is made possible by timely follow-up of patients after an acute myocardial infarction.

A coordinated multidisciplinary follow-up program was put in place by the Barts Heart Centre to facilitate timely outpatient reviews that included symptom evaluation, physical examination, medication, and cardiovascular risk management.

The virtual platform technology enables clinicians and patients to have virtual appointments using a computer or mobile phone. This application allows the patient to upload clinical information (such as heart rate, blood pressure, blood glucose, weight, and temperature) for monitoring by the multidisciplinary team, 2-way messaging and video consultations.

ACP and pharmacy-led virtual follow-up visits take place at pre-determined times (48 hours, 1, 4, 8, 12 weeks, and 12 months) after discharge.

Primary care is informed of the results at each stage of the follow-up to minimise the need for GP follow-up.

An illustration of the pathway and prompts can be found [here](#).

Achievements and Results

The EHD approach has provided various advantages for Barts Heart Centre. Performance has been sustained since implementation and the pathway is live at other UK centres including Glenfield Hospital, Lancashire Heart Centre, and Basildon Cardiothoracic Centre.

The results below are from a cohort of 600 low risk patients placed on the EHD pathway between March 2020 and June 2021:

High Patient Satisfaction

- 85% reported being satisfied or very satisfied on the EHD pathway vs 73% on the standard pathway.
- 75% reported saving money and 62.5% saved time off work due to the virtual nature of the follow up pathway.

Length of Stay

- Median stay of 24.6 hours (ranging from 17 to 40 hours) with 48% of patients discharged within 24 hours, 76% within 30 hours, and 100% within 40 hours.

Medication up-titration

- Moderate to high patient adherence achieved in 80% of cases due to the standardised multidisciplinary follow-up process using the Morisky Medication Adherence Scale.

Improved efficiency

- Lower DNA rate of 9% compared to 31% previously.
- Timely follow-up with 100% of patients seen within 2 weeks compared to more than 8 weeks previously.
- 70% reduction in appointment duration. A drop from 20 minutes to 6 minutes.

Savings

- Bed day and cost savings due to shorter hospital stay.

Patient Experience

Service evaluation considers patient feedback on their experience on the Early Hospital Discharge pathway. Some examples are shown below verbatim:

“Wonderful place. My dad was treated @BartsHospital earlier this year after a heart attack, was home in under 24 hours and was full of praise for the treatment he received.”

“Having my follow up care by remote monitoring enabled me to recover in a more relaxed environment, takes away the stress of travelling. More importantly it educated me on the purpose and benefits of monitoring my own blood pressure, weight, diet, it necessitated me to understand my medication.”

“I think my care was excellent. Although remote, it nevertheless ensured that I received appropriate follow-up that included a second angiogram and two further stents. Everyone involved in my care should be proud of themselves.”

Key Learning

Early discharge success, comprehensive outpatient evaluations, and low adverse rates depend on appropriate patient selection and a strong multidisciplinary virtual protocolised follow-up program.

The use of remote consultation enables the prevention of lost and delayed follow-up, and the reduction of patient travel and associated costs.

The EHD cohort had a lower cumulative probability of Major Adverse Cardiac Events (MACE) compared to patients who were discharged from the standard group.

Further Resources

Recommended document	Author	Overview
2021 GIRFT National Cardiology Report	GIRFT	The cardiology report presents a detailed review of the ways in which services are delivered and who is delivering them. It makes 25 recommendations aimed at closing gaps in provision, improving clinical pathways and improving access to imaging and workforce.
GIRFT Academy Resources	GIRFT	Best practice resources, pathways and clinical guidance can be sourced via the Academy resources.
Acute Coronary Syndrome Pathway	GIRFT	Best practice pathway endorsed by the British Cardiovascular Society.
Early Hospital Discharge Following PCI for Patients With STEMI	BHC	A study to assess the safety and feasibility of a novel early hospital discharge pathway for low-risk STEMI patients.
National award for scheme sending heart attack patients home sooner Our news - Barts Health NHS Trust	BHC	Barts Heart Centre wins the National Health Service Journal award for implementing the EHD pathway.
Ortus-iHealth Virtual Clinic Pathway	BHC	A video describing how the virtual pathway functions.

Acknowledgements

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About GIRFT and the GIRFT Academy

Getting It Right First Time (GIRFT) is an NHS programme designed to improve the quality of care within the NHS by reducing unwarranted variation. By tackling variation in the way services are delivered across the NHS, and by sharing best practice between trusts, GIRFT identifies changes that will help improve care and patient outcomes, as well as delivering efficiencies such as the reduction of unnecessary procedures and cost savings.

The GIRFT Academy has been established to provide easily accessible materials to support best practice delivery across specialties and adoption of innovations in care.

Importantly, GIRFT Academy is led by frontline clinicians who are expert in the areas they are working on. This means advice is developed by teams with a deep understanding of their discipline, generated by the management of services on a daily basis.

The GIRFT programme is one element of the government's response to the recommendations of Lord Carter's report on operational productivity and performance in NHS acute trusts in England, published in 2016. The Carter Report highlighted the GIRFT programme within its theme on quality and efficiency, outlining the orthopaedic GIRFT pilots which identified the scale of benefit to tackling unwarranted variation.

For more information on the GIRFT programme, visit our website at:

www.gettingitrightfirsttime.co.uk

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