

Education of Physicians and Implementation of a Formal Referral System Can Improve Cardiac Rehabilitation Referral and Participation Rates after Percutaneous Coronary Intervention



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Background

Cardiac rehabilitation (CR) is an effective preventive measure that remains underutilised in the United States. The study aimed to determine the CR referral rate (RR) after percutaneous coronary intervention (PCI) at an academic tertiary care centre, identify barriers to referral, and evaluate awareness of CR benefits and indications (CRBI) among cardiologists. Subsequently, it aimed to evaluate if an intervention consisting of physicians' education about CRBI and implementation of a formal CR referral system could improve RR and consequently participation rate (PR).

Methods

Data were retrospectively collected for all consecutive patients who underwent PCI over 12 months. Referral rate was determined and variables were compared for differences between referred and non-referred patients. A questionnaire was distributed among the physicians in the Division of Cardiology to assess awareness of CRBI and referral practice patterns.

After implementation of the intervention, data were collected retrospectively for consecutive patients who underwent PCI in the following six months. Referral rate and changes in PRs were determined.

Results

Prior to the intervention, RR was 17.6%. Different barriers were identified, but the questionnaire revealed lack of physicians' awareness of CRBI and inconsistent referral patterns. After the intervention, RR increased to 88.96% (Odds Ratio 37.73, 95% CI 21.34-66.70, $p < 0.0001$) and PR increased by 32.8% to reach 26%. Personal endorsement of CRBI by cardiologists known to patients increased CR program graduation rate by 35%.

Abbreviations: CABG, Coronary artery bypass graft; CR, Cardiac rehabilitation; DM, Diabetes mellitus; GRMC, Georgia Regents Medical Center; MI, Myocardial infarction; PCI, Percutaneous coronary intervention

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Conclusions

Cardiologists' awareness of CRBI increases CR RR and their personal endorsement improves PR and compliance. Education of providers and implementation of a formal referral system can improve RR and PR.

Keywords

Cardiac rehabilitation • Prevention • Percutaneous coronary intervention • Education • Referral.

Introduction

Major advancements have been made in the treatment of coronary artery disease, especially restoring coronary perfusion and minimising myocardial damage by performing percutaneous coronary intervention (PCI). In 2009, approximately 600,000 patients underwent PCI [1]. Nonetheless, morbidity and mortality rates of MI remain high [1]. Utilisation of measures that promote recovery and prevent recurrence of adverse cardiac events remains essential.

Cardiac rehabilitation (CR) is an effective preventive measure that improves the functional status in patients with a variety of cardiovascular conditions and reduces mortality in these patients by 25% [2–5]. Several national guidelines have recommend CR as a Class I indication for the management of patients after PCI [6]. The American Association of Cardiovascular and Pulmonary Rehabilitation and the American College of Cardiology Foundation/American Heart Association performance measures on CR state that all hospitalised patients with a qualifying cardiovascular diagnosis – including acute myocardial infarction (MI), PCI, coronary artery bypass graft (CABG) surgery, chronic stable angina, cardiac transplantation, or heart valve surgery – should be referred to outpatient CR prior to hospital discharge [7]. In 2006, the Centers for the Medicare and Medicaid Services included PCI among other conditions as a covered indication for CR [8]. For the large patient population that undergoes PCI, CR has been shown to improve endothelial function [9], decrease mortality by 40% [10], decrease future cardiac events by 60% [11], and decrease hospital readmission rate by 20%–60% [10,11]. It has also been noted that the lack of progression of functional capacity in a CR program following PCI can be a predictor of re-stenosis [12].

Although CR is generally cost-effective and can substantially reduce the burden of cardiovascular disease on the healthcare system [13,14], it continues to be underutilised in the United States. A recent study of 72,817 patients eligible for CR from 156 different hospitals across the United States reported an overall CR referral rate of only 56%. Referral rates were 53% for patients with acute MI, 58% for patients after PCI, and 74% for patients after CABG surgery [15]. These rates are lower than those of the other quality-of-care performance measures reported in different cardiovascular conditions [1]. Many reports from multiple single centres in the United States have shown variable referral rates that range from 8% to 40% [16–22]. Furthermore, participation rates among eligible patients are <30% [21–27].

In order for patients to participate and benefit from CR, they need to be referred first. Therefore, the first step to improve utilisation of this important preventive measure

is to correct suboptimal CR referral practice patterns. Because CR referral rates vary substantially among different medical centers across the United States, it is necessary for each centre to assess its own referral rate, identify barriers that may be unique to its own system and practice, and implement an intervention to improve performance. Different studies have identified several barriers to CR referral, such as older age, female gender, race, lack of insurance, longer travelling distance to the CR centre, and having multiple comorbidities (e.g., hypertension, DM, heart failure) [15,16,28,29]. Many of these barriers cannot be modified and an attempt to identify and overcome reversible ones should be sought. Lack of awareness of CR benefits and indications among healthcare providers has been reported to be a barrier to referral as well [15,30,31]. Poor coordination between providers or lack of a formal CR referral system may also contribute to poor performance [30]. Therefore, overcoming such reversible barriers may contribute to improvement in CR utilisation.

Objectives

The main objective was to improve the local CR referral rate. The primary hypothesis was that an intervention consisting of education of healthcare providers and implementation of a formal referral system could result in improvement of CR referral rate. A secondary hypothesis was that improvement in referral rate could contribute to improvement in CR participation rate because the service became more promoted and offered to a larger number of patients.

This process included the following steps:

- 1) Examination of the CR referral rate among patients undergoing PCI at Georgia Regents Medical Center (GRMC), an academic tertiary care centre, in Augusta, Georgia.
- 2) Evaluation of the CR referral patterns and awareness of CR benefits and indications among the cardiologists in the Division of Cardiology at GRMC.
- 3) Implementation of an intervention that consisted of education of cardiologists and initiation of a formal CR referral system.
- 4) Subsequently, re-examination of the CR referral rate to evaluate for changes after implementation of the intervention.
- 5) Evaluation of impact of the intervention on the CR participation rate among patients referred to the local CR centre in Augusta, Georgia.

Methods

The study was approved by the Institutional Review Board. All consecutive patients who underwent PCI from

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