

# Chronic Stable Angina and Cardiac Rehabilitation: Improving Quality of Life

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**BERRA ET AL.: Chronic Stable Angina and Cardiac Rehabilitation: Improving Quality of Life.** Angina, the chest pain or discomfort that occurs when myocardial demand for blood and oxygen exceeds supply, is one of the most distressing symptoms of myocardial ischemia. The pathophysiology of angina is that of the underlying condition, atherothrombotic cardiovascular disease resulting in ischemia. An estimated 6.8 million Americans have angina with 400,000 new cases being diagnosed each year. The prevalence of chronic stable angina is increasing both because the population is aging and because better management of risk factors has reduced mortality from cardiovascular disease. Medical costs associated with chronic stable angina exceeds \$15 billion (US dollars) per year with indirect costs, such as loss of productivity and disability being nearly as high. As the population ages these direct medical costs will continue to increase as will the cost to society in both disability and loss of productivity. Research has shown that education accompanied by group support can improve the quality of life for persons with chronic illnesses. Persons living with chronic stable angina share many common concerns and medical limitations and have great potential to benefit from group support and education. The purpose of this paper is to discuss the pathophysiology and treatment of chronic stable angina with a focus on improving quality of life. **Get Tough on Angina (GTOA)**® is a group based education and support program designed to improve the quality of life (QOL) for persons with chronic stable angina. GTOA is ideal for use in cardiac rehabilitation settings and forms the basis of a comprehensive care program for persons with angina. (J HK Coll Cardiol 2006;14(Suppl 2):B79-B84)

Angina, chronic stable angina, patient support groups, quality of life

## 摘要

心絞痛，當心肌需求的血液和氧超過供給時發生的胸痛和不適，是心肌缺血最為痛苦的症狀之一。心絞痛的病理生理主要發生於下列情況，動脈血栓性心血管疾病導致的缺血性病變。據統計美國有六百八十萬的心絞痛患者，且每年新增的病例達四十萬。而慢性穩定性心絞痛的比例在上升，一方面是由於人口老年化，另一方面是由於對危險因素有較佳的管理，因而減少了心血管病的死亡率。慢性穩定性心絞痛相關的醫療費用每年的超過一百五十億美元，而非直接費用，如喪失勞動力和殘障，支出也接近這個數字。隨著人口的老年化，這些直接醫療費用會繼續增長，同時社會在殘障和喪失勞動力的支出也會增加。研究表示這些慢性疾病的患者通過小組支援下的陪伴教育能夠提高生活質量。患有慢性穩定性心絞痛的病人有著許多共同的感受和醫療的困惑，通過小組的支援和教育能夠獲得最大的益處。本文的目的在於探討慢性穩定性心絞痛的病理生理機制、治療和其影響。“使心絞痛病人勇敢起來”是一個旨在提高慢性穩定性心絞痛病人生活質量的教育和支援團體。它是心臟病復康治療的一種理想方式，能夠為這些患者提供綜合治療方案的基礎。

關鍵詞：心絞痛 慢性穩定性心絞痛 病人支援團體 生活質量

## Introduction

Angina, the chest pain or discomfort that occurs when myocardial demand for blood and oxygen exceeds supply, is one of the most distressing symptoms of myocardial ischemia. In patients with chronic stable

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angina, the most common manifestation of ischemic heart disease, anginal episodes are predictably triggered by physical exertion or emotional stress.<sup>1</sup> To avoid such episodes, patients often choose to limit activities, which can affect their quality of life.

An estimated 6.8 million Americans have angina with 400,000 new cases being diagnosed each year.<sup>2</sup> Angina is more prevalent among women (62% of all cases), and the highest prevalence is among African American women.<sup>2</sup> The prevalence of chronic stable angina is increasing because the population is aging and because better management of risk factors has reduced mortality from cardiovascular disease.<sup>2</sup>

The pathophysiology of angina is that of the underlying condition, atherothrombotic cardiovascular disease, resulting in ischemia. Buildup of plaque in the coronary arteries results in endothelial dysfunction and limitation of blood flow. Atherosclerotic arteries do not permit a rapid increase in flow when physical or emotional stress raises the demand for blood and oxygen. This is due in part to a reduced release of nitrous oxide secondary to damaged endothelium and to a stenotic arterial lumen.<sup>1</sup>

Medical costs associated with chronic stable angina exceeds \$15 billion (US dollars) per year with indirect costs, such as loss of productivity and disability being nearly as high. As the population ages, these direct medical costs will continue to increase the cost to the society in both disability and loss of productivity.<sup>2</sup> A recent study reported that the lifetime cost for treating chest discomfort associated with coronary artery disease (CAD) in women ranged from 750 thousand to one million dollars (US dollars).<sup>3</sup> Research has also shown that education accompanied by group support can improve the quality of life for persons with chronic illnesses. Persons living with chronic stable angina share many common concerns and limitations and have great potential to benefit from group support and education. ***Get Tough on Angina (GTOA)***<sup>®</sup> is a group based education and support program designed to improve the quality of life (QOL) for persons with chronic stable angina.<sup>4</sup>

The purpose of this paper is to discuss the pathophysiology, treatment and impact of chronic stable angina on quality of life. In addition, a patient education

and support program designed to improve quality of life will be discussed.

## Clinical Assessment

Clinical examination and medical history are critical in the evaluation of a patient with chest discomfort. Anginal characteristics (symptoms) to consider include its quality, location, and duration, as well as factors that provoke or relieve the symptoms.<sup>1</sup> In patients with chronic stable angina, the episode is brief, usually only a matter of minutes, and is generally relieved by rest and/or nitroglycerin.<sup>1</sup> Pain, discomfort, or a "squeezing" sensation in the chest is typical, but the discomfort may also radiate to the jaw, shoulder, back, or arm. Shortness of breath, nausea or unusual fatigue are also reported as symptoms of angina. "Triggers" include physical exertion, which may be as vigorous as running or as slight as carrying groceries, emotional stress, eating a large meal, and work in very hot or very cold weather. These "triggers" alone or in combination can result in the precipitation of anginal symptoms.<sup>4,5</sup>

Findings on physical examination are often normal in patients with chronic stable angina.<sup>1,5</sup> History of prior myocardial infarction, coronary artery bypass surgery, coronary artery stenting or abnormal exercise evaluation are common in persons with chronic stable angina. In addition, most patients with chronic stable angina have risk factors for coronary artery disease, such as cigarette smoking, hypertension, hyperlipidemia, and diabetes.<sup>5</sup>

Although a resting electrocardiogram (ECG) should be done in all patients, it is normal in more than half of patients with chronic stable angina.<sup>1</sup> About half of patients with angina who have a normal resting ECG will show abnormalities when an ECG is repeated during an anginal episode.<sup>1</sup> An exercise ECG has been shown to increase sensitivity in older adults (84%), because of the greater severity of coronary disease in this age group, but decrease specificity (70%).<sup>1</sup>

Stress testing with or without pharmacological imaging can help to determine the extent and severity of the ischemic burden. Pharmacologic stress imaging

is an important option for patients with physical impairments that prevent them from performing an adequate exercise ECG, such as older adults.<sup>1</sup> In addition, for women it appears that the additional use of imaging technology in identifying non-obstructive concentric atherosclerosis will help to improve the diagnosis and treatment of women with chest pain syndrome.<sup>6</sup>

Most patients do not need an echocardiogram as part of the diagnostic evaluation of angina unless valvular heart disease, such as aortic stenosis or cardiomyopathy, is suspected as a cause of the symptoms.<sup>1</sup> An echocardiogram is useful in patients with co-existing heart failure and valvular heart disease in order to evaluate the severity of valvular disease as well as to measure ejection fraction. Both of these tests help determine the need for further evaluation or therapies.

## Treatment Recommendations

Because angina is a symptom, rather than a disease, its management is directed at the causes of the underlying ischemic heart disease. In addition, symptomatic relief of the anginal symptoms is important. Treatment of the causes of the atherosclerosis remains critical. This includes lifestyle change for smoking cessation, weight control, improved nutrition and regular physical activity plus important pharmacologic therapies.

The American College of Cardiology and the American Heart Association formed a joint task force to create practice guidelines on the management of patients with chronic stable angina in 1999. An update to these guidelines was published in 2002.<sup>1</sup> These recommendations focus on the two major purposes of treatment of stable angina: to prevent myocardial infarction, death and disability (to prolong life) and to reduce the symptoms of angina and the occurrence of ischemia (to improve the quality of life).<sup>1</sup>

The ten most important aspects of management of stable angina fit a treatment mnemonic that uses the letters A through E.<sup>1</sup> The mnemonic does not reflect the order or the importance of these aspects of treatment;

it simply helps clinicians to remember the most essential elements in management of patients with chronic stable angina. Some points refer to cardiovascular risk factors, whereas other points are specific treatments for ischemic heart disease. The ten constituents of the treatment mnemonic are seen in Table 1.

## Pharmacologic Therapy

As the ABCDE mnemonic indicates, several medications are essential in the management of patients with chronic stable angina: anti-anginals, aspirin, and beta blockers.

For the immediate relief of angina, every patient should carry nitroglycerin, in sublingual or spray form. These fast-acting nitroglycerin preparations also can be taken prophylactically several minutes before exercise. Long-acting nitrate preparations also may be used prophylactically.<sup>1</sup>

In the absence of contraindications, every patient should take aspirin. A beta-blocker, which decreases myocardial oxygen demand, is the anti-ischemic drug of choice for older adults.<sup>1,2</sup> A calcium antagonist or long-acting nitrate may be combined with a beta-blocker if the initial treatment is not successful or may be used instead if beta blockers are contraindicated or not tolerated.<sup>1,7</sup> A new medical therapy, a late sodium channel blocker, became available in 2006. Ranolazine may be effective in treating anginal symptoms that are refractory to current medical and surgical therapies.<sup>8</sup>

The presence of cardiovascular risk factors in patients with coronary artery disease calls for use of additional medications that can prevent myocardial infarction and death. A lipid-lowering agent (such as an HMG-CoA reductase inhibitor [statin]) should be prescribed even if low-density lipoprotein (LDL) cholesterol is only mildly elevated. An angiotensin converting enzyme (ACE) inhibitor is recommended for

**Table 1. Guidelines for chronic stable angina<sup>1</sup>**

- Aspirin and anti-anginal therapy
- Beta blockers and blood pressure
- Cigarette smoking and cholesterol
- Diet and diabetes
- Education and exercise

patients with coronary artery disease who also have diabetes or left ventricular systolic dysfunction.<sup>1</sup>

### **Risk Factor Modification**

Several items on the ABCDE mnemonic – cigarette smoking, elevated blood pressure, cholesterol, and diabetes – are risk factors for coronary disease. Management of these risk factors, which are common in this patient population, can reduce the incidence of coronary disease events.<sup>1</sup>

For smokers, the goal should be complete cessation of tobacco use. This means not only giving up cigarettes but also avoiding second-hand smoke.<sup>1,9</sup>

Patients with hypertension and chronic stable angina are at high risk for cardiovascular events and benefit greatly from treatment of hypertension. If lifestyle modifications (diet and exercise) alone do not lower the blood pressure sufficiently, prescription of a beta blocker or calcium antagonist (but not a short-acting calcium antagonist) is recommended. The goal is to reduce blood pressure to <140/90 mm Hg, or a lower blood pressure if angina persists or if the patient also has diabetes, heart failure, or renal insufficiency.<sup>1</sup> The American Diabetes Association recommends a blood pressure of <130/85 mm Hg for persons with diabetes.<sup>10</sup>

As with the management of hypertension, treatment of hypercholesterolemia begins with dietary modification, supported by physical activity to promote weight loss. Dietary intervention and use of lipid-lowering medications benefit patients with coronary artery disease including those with chronic stable angina. The primary goal of lipid management is to reduce LDL cholesterol to <100 mg/dL (2.59 mmol). New options suggest that an even lower LDL cholesterol of <70 mg/dL (1.81 mmol) may be more effective in preventing recurrent myocardial infarction.<sup>1,11</sup>

Whether strict glycemic control in patients with diabetes reduces the risk of coronary events is uncertain.<sup>1</sup> However, it should provide benefits for minimizing microvascular complications. Therefore, management of diabetes is crucial for patients with this disease who also have chronic stable angina.

Weight reduction is important in overweight patients with chronic stable angina, because obesity increases myocardial oxygen demand.<sup>1</sup> A combination of diet and exercise support weight reduction.

Education of patients with chronic stable angina is essential in helping them to manage their condition, to prevent myocardial infarction and death and to improve quality of life. Patients need to understand their medication regimen and the importance of lifestyle modifications to reduce risk factors. The "*Get Tough on Angina*" program was developed by the Preventive Cardiovascular Nurses Association with a primary goal of fulfilling these important needs for patients and their families.<sup>5</sup>

### ***Get Tough on Angina***

Historically, the goals of anti-anginal therapies have been to lower cardiac oxygen demand and increase cardiac oxygen supply, thus alleviating the principal physiologic causes of anginal symptoms. From the late 1800's through the early 1960's, the only effective medical therapy for angina was nitrates. From the 1960's through the 1990's beta blockers and calcium channel blockers became additional effective therapies. Added to this was coronary artery bypass surgery followed by percutaneous coronary angioplasty and coronary artery stenting.<sup>4</sup> Recently, a new class of medications, late sodium channel blockers, has become available for treatment of anginal symptoms that do not respond to traditional medical and interventional therapies.<sup>8</sup>

In spite of the well established therapies, a treatment gap exists between the implementation of optimal medical and surgical therapies and quality of life for anginal patients. In a study by Spertus and colleagues, reduced quality of life, as measured by the Seattle Angina Questionnaire (SAQ) – a validated tool used to measure quality of life in persons with chronic stable angina – was observed in persons with anginal symptoms. This resulted from physical limitations, anginal instability, anginal frequency and overall quality of life.<sup>12</sup> In this study, patients had a statistically significant improvement in symptom control following institution of long-acting nitrates and reported improved QOL. Spertus found this to be true for persons with daily, weekly or monthly symptoms. It is estimated that as many as 20% of all patients have anginal symptoms despite optimal revascularization and 80% of these persons with optimal surgical interventions remain on medical therapies.<sup>12,13</sup> QOL is impacted both by functional limitations as well as emotional and social

limitations. Spertus and colleagues have also shown that scores on the SAQ correlate with mortality in that patients reporting the worst quality of life have the highest mortality.<sup>12</sup>

In 2002, "*Get Tough on Angina*" was piloted in eight programs in the United States. QOL was measured using the SAQ questionnaire and was increased significantly at the end of the 4 week program ( $P<0.01$ ). The increase in QOL was maintained at 8 weeks following the end of the program ( $P<0.07$  compared to baseline). The improvement in QOL was found even though change in angina frequency, stability, or physical limitations or interventions such as angioplasty or stenting procedures was not found (author communication).

The *Get Tough on Angina* program provides practical tools and support to help patients live the fullest life possible. Program resources also help healthcare professionals who work with and care for patients with angina. The program has four major components that are designed for patients and for healthcare providers (Table 2).

### ***Get Tough on Angina* Patient Education and Support Program**

GTOA is a 4-part interactive patient education and support program. Each session includes a number

of components to enable the patient and the healthcare provider to share information and insights about living with chronic stable angina. The sessions are designed to be interactive, to build upon information shared at the preceding session and to provide self care tools. A major goal is to improve Quality of Life for all participants. Each session shares a similar format which includes:

1. A welcome and group interaction activity;
2. Didactic education on subjects relevant to living with chronic stable angina, problem solving, stress management, and building communication skills;
3. Information about the pathophysiology and treatment of chronic stable angina, cardiovascular risk factors, and symptoms of angina;
4. Discussions regarding feelings of fear, anger, frustration and communication skills are key components. Focusing on the psychological impact of chronic illness at the first session allows a continuation of this dialogue throughout the 4 sessions;
5. Self-management is important for all persons with chronic illnesses, in particular, for those with angina. Self management in this program focuses on understanding anginal "triggers" (exercise, eating extra large meal, exposure to cold and emotional upset). In addition, understanding the role of cardiovascular risk factors and their impact on the frequency and severity of anginal symptoms

**Table 2. Components of the GTOA program**

**"Get Tough on Angina": An Educational Handbook for Patients and Families:** a comprehensive educational resource for patients that includes information on the pathophysiology, medical and lifestyle treatments, communication and stress management skills. Available in English and Spanish.

**Community Seminars about Angina:** a complete set of educational slides and materials to help healthcare professionals deliver a 60 minute seminar on chronic stable angina. This seminar is written for a public audience.

**Patient Education and Support Group:** an interactive 4-part education program designed to help improve the quality of life for persons with chronic stable angina. Healthcare professionals are encouraged to provide this program for patients in their cardiac rehabilitation programs, or in their clinical practice. This program includes a complete with a set of slides, professional scripts, homework and all necessary materials for the 4 classes.

**"Is Your Angina Managing You?" Patient Self-Assessment Tool:** a simple-to-complete card that health professionals can give to their patients in order to encourage them to share information on how angina is impacting quality of life.

*All of the Get Tough on Angina materials are available free of charge by emailing the Preventive Cardiovascular Nurses Association (info@pcna.net) or by calling 1-866-488-1212. or through the GTOA website - www.lifeheart.com. For permission to translate the materials into other languages, please contact PCNA.net.*

**Get Tough on Angina (GTOA)®**, Preventive Cardiovascular Nurses Association 2002.

(such as elevated blood pressure and smoking) are stressed;

6. Information about sexual activity and intimacy, a subject not often discussed with health care providers, begins early in the program. Sexual activity and intimacy are discussed with regard to physiological and psychological responses. A goal of the sessions is to increase awareness and generate a dialogue between the participants and their health care providers related to sexual concerns and problems;
7. Symptoms (including the recognition of individual differences) are discussed with the goal of improving participants ability to determine stability and predictability of their anginal symptoms – a key to their safety;
8. Communication skills are stressed to help patients deal with chronic and often unpredictable symptoms;
9. Pharmacological therapies are reviewed along with the mechanisms and potential side effects. Self care has been shown to be improved with greater understanding of risks and benefits of therapies;
10. Lifestyle factors, most importantly the coronary risk factors are addressed to prevent further development of atherosclerosis and to improve endothelial function;
11. Nutrition, exercise, and stress management skills are woven throughout the sessions.
12. Life Skills (brief self-administered stress management skills) are taught at the end of each session and are designed to be practiced at home.

## Conclusion

Chronic stable angina adversely affects the lives of millions of individuals with atherosclerosis. It contributes enormously to the personal, societal, and financial burdens imposed by atherosclerosis and results in decreased quality of life for those affected. Providing patients with ways to better understand their anginal symptoms and implement self care processes can be achieved through education and support. Education to improve self-efficacy and self care is an important challenge for health professionals. *Get Tough on Angina*

is an example of an education and support program designed to achieve improved Quality of Life for persons living with chronic stable angina.

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