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COURSE OF VALVE DEFECTS OF RHEUMATIC ETIOLOGY IN PATIENTS WITH CORONARY HEART DISEASE

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Abstract: This article examines the clinical course and interaction between rheumatic valvular heart disease and coronary heart disease (CHD). The coexistence of these two conditions presents unique diagnostic and therapeutic challenges, as rheumatic valve lesions may exacerbate myocardial ischemia, and CHD may complicate the hemodynamic burden of valve dysfunction. The study highlights pathophysiological mechanisms, clinical manifestations, and management strategies, emphasizing the need for individualized care in patients presenting with both conditions. Modern diagnostic tools and surgical interventions have improved outcomes, yet prognosis largely depends on timely recognition and comprehensive treatment approaches.

Keywords: Rheumatic heart disease, coronary artery disease, valvular defects, ischemic heart disease, mitral stenosis, aortic insufficiency, comorbidity, cardiac surgery

Introduction

Rheumatic heart disease (RHD) and coronary heart disease (CHD) are two of the most prevalent cardiovascular pathologies globally, yet their co-occurrence in the same patient poses a multifaceted clinical problem. While RHD primarily affects young adults and is the sequela of acute rheumatic fever, CHD is most commonly observed in older individuals due to atherosclerosis. However, with increasing life expectancy and improved survival from initial cardiac events, more patients are being diagnosed with both conditions simultaneously.

Rheumatic valve defects, particularly mitral stenosis and aortic regurgitation, can significantly alter left ventricular function and intracardiac pressures. In patients with CHD, these alterations may worsen myocardial perfusion and provoke anginal symptoms even in the absence of critical coronary stenoses. Conversely, ischemia and ventricular dysfunction from CHD may unmask or aggravate valvular insufficiency. Understanding the interplay between these pathologies is critical for accurate diagnosis and optimal management.

Pathophysiology and hemodynamic interaction

Rheumatic valve disease typically results from post-inflammatory fibrosis and calcification of cardiac valves, most frequently the mitral valve. The narrowing or incompetence of valves leads to abnormal pressure gradients, volume overload, and progressive remodeling of cardiac chambers. When superimposed on coronary disease, these changes can precipitate heart failure symptoms even at rest or with minimal exertion.

For example, mitral stenosis limits diastolic filling, leading to decreased cardiac output. In the setting of CHD, this reduced perfusion can further compromise coronary flow, especially during tachycardia or atrial fibrillation, which are common in RHD. Aortic regurgitation causes left ventricular volume overload, which, if accompanied by ischemia, can rapidly decompensate into left-sided heart failure.

Clinical presentation

Patients with concurrent RHD and CHD often present with overlapping symptoms: exertional dyspnea, chest pain, palpitations, and fatigue. However, the clinical picture may be

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misleading. Anginal chest pain may be due to reduced coronary reserve from valvular abnormalities rather than obstructive coronary disease alone. Likewise, symptoms traditionally attributed to CHD may in fact stem from progressive valvular deterioration.

Electrocardiography may reveal left atrial enlargement or left ventricular hypertrophy in valvular disease, while ischemic changes may signal active coronary involvement. Echocardiography remains central to assessing valve structure and function, while coronary angiography is essential before any surgical intervention.

Diagnosis and risk stratification

Modern imaging techniques such as transesophageal echocardiography, cardiac MRI, and CT coronary angiography enable detailed evaluation of both valvular and coronary anatomy. Risk stratification involves not only estimating surgical risk but also evaluating myocardial viability, presence of arrhythmias, and degree of functional impairment.

In patients undergoing valve surgery, it is essential to assess coronary arteries preoperatively, as silent CHD may worsen postoperative outcomes. Combined valve replacement and coronary artery bypass grafting (CABG) are often required, especially in elderly patients or those with multivessel disease.

Management strategies

Management of patients with dual pathology is highly individualized and depends on the dominant clinical picture. Medical treatment includes optimization of heart failure therapy, rate or rhythm control in atrial fibrillation, and use of antiplatelet agents and statins in patients with ischemia.

Surgical intervention, including valve repair or replacement with or without CABG, remains the mainstay for patients with significant symptomatic valvular disease and coexisting CHD. Percutaneous interventions such as balloon valvuloplasty or transcatheter aortic valve replacement (TAVR) may be considered in selected high-risk patients.

Long-term follow-up is crucial to monitor prosthetic valve function, progression of coronary disease, and control of risk factors such as hypertension, diabetes, and dyslipidemia.

Pathophysiology and hemodynamic interactions

Rheumatic heart disease (RHD) arises from autoimmune reactions following untreated or inadequately treated group A streptococcal pharyngitis. These immune responses primarily target the cardiac valves, leading to progressive fibrosis, leaflet thickening, commissural fusion, and eventually valvular stenosis or regurgitation. The mitral valve is most commonly affected, followed by the aortic valve. In the context of coronary heart disease (CHD), the hemodynamic burden imposed by valvular abnormalities can significantly worsen myocardial ischemia and contribute to rapid decompensation.

When a patient has both CHD and RHD, a "vicious cycle" often forms: impaired valve function causes volume or pressure overload in the heart chambers, which increases myocardial oxygen demand. If coronary perfusion is already compromised due to atherosclerotic lesions, this added stress can trigger angina, arrhythmias, or even myocardial infarction. For example, in a patient with mitral stenosis, elevated left atrial pressures may lead to pulmonary hypertension and right heart failure, while reduced preload impairs cardiac output, aggravating ischemia in coronary-prone territories.

Types of valve lesions and their impact in CHD

- **Mitral stenosis (MS):** Commonly caused by RHD, MS restricts blood flow from the left atrium to the left ventricle, reducing preload and thereby limiting cardiac output. In CHD patients, this exacerbates exercise intolerance and ischemia. Moreover, the

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stagnant blood flow in the left atrium increases the risk of thrombus formation, especially in patients with atrial fibrillation.

- **Aortic regurgitation (AR):** This lesion causes volume overload of the left ventricle, increasing wall stress and oxygen demand. In patients with compromised coronary arteries, the ventricle struggles to adapt, leading to early heart failure symptoms. Diastolic pressure drops due to regurgitation may further impair coronary perfusion, as coronary arteries fill during diastole.
- **Mixed lesions:** Many rheumatic patients present with combinations such as mitral stenosis and regurgitation, or both mitral and aortic valve involvement. These complex lesions further complicate the clinical picture in CHD, requiring a nuanced therapeutic approach.

Clinical manifestations and diagnostic challenges

Symptoms often overlap between the two diseases and may mask each other. For example, shortness of breath and fatigue may result from left-sided heart failure due to CHD, or from pulmonary congestion caused by mitral stenosis. Anginal pain might be a true ischemic event, or secondary to increased left ventricular wall stress in the presence of aortic insufficiency.

A detailed clinical assessment, including auscultation, may reveal murmurs suggesting valve pathology; however, physical signs are not always reliable. Many elderly patients with CHD have calcified valves, and distinguishing degenerative changes from rheumatic pathology can be difficult without imaging.

- **Echocardiography** (especially transesophageal) remains the gold standard for evaluating valve morphology and function.
- **Cardiac catheterization and coronary angiography** are crucial before planning surgery, especially for patients above 40 or with angina symptoms.
- **Stress testing, CT angiography**, and **MRI** help in assessing myocardial viability and coronary perfusion, particularly when noninvasive functional data is needed.

Surgical Considerations and Interventional Approaches

Surgical intervention in patients with both CHD and rheumatic valve disease must be individualized. The decision to perform valve surgery alone, coronary artery bypass grafting (CABG), or a combined procedure depends on the severity of each condition and the patient's functional status.

- ✓ **Combined Valve Surgery + CABG** is recommended for patients with significant valve lesions and angiographically confirmed multi-vessel or left main disease.
- ✓ **Valve Replacement or Repair** may be performed with minimally invasive techniques, especially in younger rheumatic patients with isolated valve disease but incidental coronary stenosis.
- ✓ **Percutaneous interventions** like **balloon mitral valvotomy** are often used for isolated mitral stenosis with favorable valve anatomy, even in the presence of mild CHD.
- ✓ For high-risk surgical candidates, Transcatheter Aortic Valve Replacement (TAVR) has shown promising results and is increasingly used in elderly patients with comorbidities.

Postoperative outcomes depend heavily on the completeness of revascularization, the preservation of ventricular function, and rhythm control (especially if atrial fibrillation is present). Long-term anticoagulation is often needed in valve replacement patients, which must be carefully managed to avoid ischemic or hemorrhagic complications, especially when concomitant CHD warrants antiplatelet therapy.

Prognostic implications and long-term management

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The prognosis of patients with both RHD and CHD is generally worse than those with either condition alone. Key predictors of poor outcome include:

- ✓ Reduced ejection fraction
- ✓ Severe pulmonary hypertension
- ✓ Left main or triple-vessel coronary disease
- ✓ Persistent atrial fibrillation
- ✓ Delayed surgical intervention

Conclusion

The coexistence of rheumatic valve disease and coronary heart disease requires a multidisciplinary approach that considers the hemodynamic and clinical interactions between the two conditions. Early recognition and timely intervention are key to improving prognosis. Advances in diagnostic imaging, surgical techniques, and postoperative care have significantly enhanced outcomes, yet the complexity of these cases demands tailored treatment plans based on individual risk profiles and disease burden.

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