myocarditis

**Aetiology**
- Coxsackie virus B (an enterovirus) is the most common cause of viral myocarditis
- HIV is generally associated with another infection rather than being causative itself
- Rheumatic fever is an important post-infectious cause
- Systemic diseases such as SLE, polymyositis, scleroderma & sarcoidosis can be complicated by myocarditis
- Infiltrative cardiomyopathies such as haemochromatosis or amyloidosis may have myocarditis as a feature

**Clinical presentation**
- most often presentation is with chest pain, fatigue, dyspnoea & palpitations
- rarely patients present with a fulminant course with severe acute heart failure, pulmonary oedema & cardiogenic shock
- blood tests may reveal leukocytosis, eosinophilia & an elevated ESR; cardiac biomarkers may be elevated & rheumatological serological markers and HIV testing should be undertaken
- ECG shows sinus tachycardia and nonspecific ST elevation & T wave changes most often
- there may be arrhythmias or conduction block
- myocardial biopsy is the most definitive diagnostic technique with histopathological diagnosis made on the basis of the Dallas criteria
- biopsy should be strongly considered when results will affect management

**Investigations**
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**Clinical course**
- patients with heart failure & myocarditis can recover normal LV function; however, a number progress to chronic cardiomyopathy
- paradoxically, patients will fulminant myocarditis have the best long-term prognosis with >90% 1 year and 10 year survival rates

**Therapy**
- heart failure therapies:
  - inotropes and vasopressors may be required
  - mechanical ventricular assist devices & IABP should be considered for the potential of spontaneous resolution & good outcome
  - cardiac transplant is the final option for treating critically ill patients with myocarditis; however, it should only be used as a last resort
- immunosuppressive therapies:
  - clinical trials do not support the routine use of immunosuppressive in patients with lymphocytic myocarditis; however, this treatment should be considered in patients who continue to deteriorate despite routine care & IABP should be considered for the potential of spontaneous resolution & good outcome
  - cardiac transplant is the final option for treating critically ill patients with myocarditis; however, it should only be used as a last resort
  - immunosuppressive therapy should be used in patients with myocarditis associated with rheumatological diseases

**Table 1. Causes of Myocarditis**

<table>
<thead>
<tr>
<th>Immune</th>
<th>Inflammatory</th>
<th>Toxic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rheumatic</td>
<td>Cardiac</td>
<td>Drugs</td>
</tr>
<tr>
<td>Systemic</td>
<td>Autoimmune</td>
<td>Antihypertensives, calcium channel blockers, diuretics, angiotensin converting enzyme inhibitors, nonsteroidal anti-inflammatory drugs</td>
</tr>
<tr>
<td>Vascular</td>
<td>Viral</td>
<td>Alcohol, heavy metals, physical agents, electric shock, hyperthermia, radiation</td>
</tr>
<tr>
<td>Allergic</td>
<td>Bacterial</td>
<td>Endotoxin, sepsis, postoperative, endomyocardial, postoperative</td>
</tr>
<tr>
<td>Hypersensitivity</td>
<td>Fungal</td>
<td>Endomyocardial, postoperative, endomyocardial, postoperative</td>
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<tr>
<td>Autoimmune</td>
<td>Parasitic</td>
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<td>Metabolic</td>
<td>Immune-mediated</td>
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<tr>
<td>Neoplastic</td>
<td>Immune-mediated</td>
<td>Endomyocardial, postoperative, endomyocardial, postoperative</td>
</tr>
<tr>
<td>Other</td>
<td>Immune-mediated</td>
<td>Endomyocardial, postoperative, endomyocardial, postoperative</td>
</tr>
</tbody>
</table>

*The most common causes are shown in boldface type. Data are from Liu et al. [2](#) and others.*