In particular, the separation of the anterior mitral leaflet may occur secondary to aortic valve IE whereby the infected AR jet infects the anterior mitral leaflet. On the echocardiographic examination, leaflet perforation is identified by a focal defect within the leaflet with the regurgitant jet passing through this defect (Fig. 13.12).

Leaflet perforation should be suspected when the regurgitant jet is located away from the site of leaflet coaptation. (Fig. 13.10)

TTE versus TOE
It is well recognised that the sensitivity for detecting vegetations and complications associated with IE is significantly greater via transoesophageal echocardiography (TOE) compared with TTE. This is because TOE images the heart via the oesophagus. As a result, TOE avoids interfaces such as the lungs, the chest wall and the bony structures of the rib cage and sternum; this allows superior imaging of the cardiac valves. Furthermore, due to the close relationship between the oesophagus and the heart, higher frequency transducers can be utilised which enhances spatial and temporal resolution and, therefore, allows the detection of very small lesions. In addition, the LA surface of prosthetic mitral valves, which is virtually always obscured via TTE, can be readily inspected by TOE so the detection of prosthetic mitral IE is greater. However, despite the obvious superiority of TOE over TTE, TTE is still considered the first choice imaging test in patients with suspected IE. This is because TTE is a non-invasive examination that may establish the diagnosis of IE within the need for TOE; moreover, TTE has the ability to provide additional useful information regarding ventricular function and valvular haemodynamics.

Assess Functional Abnormalities of Affected Valve(s) and Assess Secondary Consequences of Valvular Disease
As previously stated, underlying congenital or acquired valve disease is one of the precursors of endocardial damage and subsequent IE. Therefore, echocardiography also has a role in the identification of pre-existing or underlying structural heart disease. In addition, as IE can result in valvular obstruction and/or regurgitation, echocardiography has an important role in assessing the degree of obstruction and/or regurgitation and in the evaluation of the secondary consequences of these lesions. Assessment of the degree and severity of valvular obstruction and/or regurgitation as well as the evaluation of chamber dimensions, ventricular systolic function and the estimation of the pulmonary pressures are performed in the standard manner (see Chapters 7–10). In particular, evidence of acute, severe regurgitation may be apparent when there is rapid and aggressive destruction of the valve.

Identify Complications of IE
Three of the most common and severe complications of IE include: (1) heart failure, (2) perivalvular extension of the infection, and (3) embolic events. Heart failure in IE occurs due to significant valve dysfunction caused by leaflet destruction, leaflet perforation, and/or chordal rupture with flail leaflets which leads to significant valvular regurgitation. Perivalvular extension of the infection refers to the formation of abscess cavities, pseudoaneurysms and fistulas as described above. In addition, if the abscess extends into the conduction tissue located in the interventricular septum (IVS), conduction abnormalities such as first-, second-, and third-degree heart block may result.

An embolic event associated with IE is another important complication of IE. The risk of embolism is highest during the first 2 weeks of antibiotic therapy and is greatest for mitral valve IE than aortic valve IE. Several echocardiographic and clinical parameters have been associated with increased risk of embolism. Clinical parameters identifying patients at risk of embolism include: (1) infection with specific microorganisms such as Staphylococci, Streptococcus bovis, and Candida species, (2) previous embolic events, and (3) biomarker evidence. Echocardiographic parameters associated with an increased risk of embolism relate to the size, location, and mobility of the vegetation.