morbidity and mortality following thoracotomy.

The study by Morice and colleagues\(^9\) helps delineate the role of exercise testing in the preoperative assessment of potential thoracotomy candidates. These investigators found that approximately 10 percent of patients with technically resectable lesions failed to qualify for resection on the basis of the results of routine tests, including split function lung scanning. Yet 13 of 34 (38 percent) individuals with poor pulmonary function exercise to a \(\text{VO}_2\text{max}\) greater than 15 ml/kg/min; the eight patients who accepted thoracotomy all survived, and only two experienced postoperative complications.

It is not clear why exercise capacity as reflected by the \(\text{VO}_2\text{max}\) should predict postoperative complications, such as pneumonia and atelectasis. The \(\text{VO}_2\text{max}\) is a measure of physical fitness. Thoracotomy is a physiologic stress, and it may be that when additional stresses develop in the postoperative period, only the fit survive. Irrespective of the reason for its ability to predict postoperative morbidity and mortality, \(\text{VO}_2\text{max}\) appears to be a useful prognosticator in assessing patients for thoracotomy. Patients with a \(\text{VO}_2\text{max}\) exceeding 20 ml/kg/min have low morbidity following thoracotomy, whereas those with a \(\text{VO}_2\text{max}\) less than 10 ml/kg/min have an unacceptably high risk, with an 80 percent complication rate and mortality exceeding 30 percent.\(^{9,10,15,17}\) Patients with a \(\text{VO}_2\text{max}\) of 15 to 20 ml/kg/min appear to be at moderate risk and those with a \(\text{VO}_2\text{max}\) of 10 to 15 ml/kg/min appear to be at high risk, with complications rates of 25 percent and 32 percent, respectively.

Exercise testing has become a valuable adjunct in evaluating selected patients for thoracotomy. Patients older than 60 years and those with cardiac disease are particularly prone to develop postoperative complications.\(^{19,20}\) Exercise testing identifies the high-risk patient so that close monitoring in an intensive care setting can be provided during the immediate postoperative period. Individuals with poor pulmonary function who fail routine testing become operative candidates if their exercise performance is adequate. The latter criterion offers the possibility of curative therapy to some who otherwise might be treated in a palliative manner.

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REFERENCES


**Endocarditis Due to Beta-Hemolytic Streptococci**

Alpha-hemolytic (viridans) streptococci, *Streptococcus bovis*, and enterococci are common causes of...
Infective endocarditis, while beta-hemolytic streptococci are not. However, over the years endocarditis due to beta-hemolytic streptococci has been recognized. With the use of Lancefield serogrouping according to cell wall antigens, beta-hemolytic streptococci may be identified as group A, B, C, or G. Group D streptococci may be alpha-hemolytic, beta-hemolytic, or non-hemolytic. Most microbiology laboratories are now routinely serogrouping beta-hemolytic streptococci isolated from blood cultures. Consequently, septicemia and endocarditis due to Group A, B, C, and G streptococci are being reported.¹

There is only one species of group A streptococci, *Streptococcus pyogenes*, which is known to be a major cause of pharyngitis, cellulitis, and pyoderma, although it is capable of causing other infections, including septicemia with shock. Endocarditis caused by group A streptococci is rather uncommon.² There have been only 36 published cases of endocarditis due to group A streptococci with clinical details, including 22 cases in intravenous drug abusers (IVDAs). The disease was acute and often involved a normal heart valve. The mortality was 21 percent, but only 9 percent in the IVDAs.³ Among the beta-hemolytic streptococci, it is the most common cause of endocarditis in IVDAs.

Group B streptococcus (†Streptococcus agalactiae†) is best known for causing neonatal septicemia and meningitis, although it can cause serious illnesses in adults, including septicemia and endocarditis.⁴ Among the beta-hemolytic streptococci, it is the most commonly reported cause of endocarditis. Since 1962, there have been 100 reported cases of group B streptococcal endocarditis, including eight cases in IVDAs, with an overall mortality of 41 percent and a mortality in IVDAs of 25 percent. Group B streptococci cause acute endocarditis and are capable of causing right-sided endocarditis in individuals who are not IVDAs.⁵ Many patients have underlying diseases, such as diabetes mellitus, malignancy, and alcoholism. Large arterial emboli are common.⁶

There are at least three species of group C streptococci: *Streptococcus equi*, *Streptococcus equisimilis*, and *Streptococcus zooepidemicus*. These are pathogens in horses and other animals, but septicemia, meningitis, endocarditis, and other infections in humans have been reported.⁷ There have been 18 well-described cases of group C streptococcal endocarditis, including one case in an IVDA; the mortality was high (41 percent [single IVDA survived]).

Group G streptococci include the large-colony types and the “minute”-colony types, such as *Streptococcus anginosus*, which is closely related to the group F streptococci. Group G streptococci have been reported to cause serious infections, including arthritis, osteomyelitis, septicemia, and endocarditis.¹¹ Group G streptococci also cause acute endocarditis. Diabetes mellitus, alcoholism, and malignancy are important underlying conditions. There have been 72 well-described cases of group G streptococcal endocarditis, including 20 in IVDAs. The overall mortality was 35 percent; that in IVDAs, 15 percent.

In summary, group A, B, C, and G beta-hemolytic streptococci may cause acute endocarditis. Group A, B, C, and G streptococci are all susceptible to penicillin; group A streptococci are the most susceptible. Treatment of endocarditis due to these organisms is high-dose penicillin with an option of adding gentamicin for synergism. Endocarditis caused by group B streptococci is the most common type, and endocarditis caused by group A streptococci is associated with the lowest mortality. Early valve replacement may be indicated in endocarditis caused by group B, C, and G streptococci.

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