Miliary tuberculosis (MTB) occurs due to unchecked lympho-haematogenous dissemination of Mycobacterium tuberculosis. MTB is seen in 1-3 per cent of all tuberculosis cases and mortality is very high in untreated cases which may go up to 100 per cent. Mortality rate can be reduced by early and appropriate treatment. Most cases of MTB occur in high prevalence areas after primary infection while it occurs mostly in elderly people in low prevalence areas due to re-activation of the disease. It has been noticed recently that there is an increase in the incidence of MTB because of the emergence of HIV infection and the increasing use of immunosuppressive drugs. The presenting symptoms of MTB are usually non-specific: fever, anorexia, sweats and loss of weight. Bacteriological diagnosis is possible by sputum, gastric aspirate, urine and bronchoalveolar lavage (BAL) cultures. Transbronchial biopsy may aid in histopathological diagnosis. Molecular methods such as polymerase chain reaction have also been advocated in the diagnosis of miliary tuberculosis. Acute MTB may be associated with meningitis and enlargement of liver, spleen or lymph nodes. Chest radiographs show uniform lesions of the size 1-2 mm throughout all regions of the lung. Acute disease may be fulminant which may lead to acute respiratory distress syndrome, septic shock and multi organ failure. The chronic ‘cryptic’ MTB is normally seen in elderly subjects and chest radiographs in such cases are without typical radiographic shadowing.

MTB is an interstitial lung disease (ILD) having clinical, radiological and physiological similarities with other ILDs. Pulmonary function abnormalities in ILDs are typical, but not specific. The progress of ILDs can be assessed by resting pulmonary function and cardiopulmonary exercise studies. Vital capacity and diffusing capacity for carbon monoxide (DL\textsubscript{CO}) are useful parameters to monitor the response of ILD patients to therapy. As a result of the similarity of MTB with other ILDs, it poses diagnostic and therapeutic challenges to physicians. It has to be emphasised that an early and definite diagnosis of miliary tuberculosis is of paramount importance as it is a treatable condition whereas most other ILDs do not have a specific treatment. High resolution computed tomography (HRCT) is nowadays considered the best imaging tool for diffuse lung diseases and it has been found to be useful to detect and assess interstitial lung diseases and to predict the response to treatment. In this issue Pipavath and colleagues describe the HRCT findings and correlation of these findings with pulmonary function and gas exchange parameters in miliary tuberculosis. In addition to the demonstration of miliary nodularity in HRCT, this study has demonstrated other radiological features (consolidation, ground glass and focal cystic abnormalities) which cannot be seen in chest radiographs. Another important HRCT finding from this study is the demonstration of emphysematous changes following treatment. They have also demonstrated that HRCT findings correlate with restrictive physiology and impaired gas exchange as in other interstitial lung diseases. The main limitations of this study were insufficient sample size and lack of follow up data after completion of treatment. It has been noticed that MTB is associated with lymphocytic alveolitis and a higher total cell count in BAL fluid was associated with a high CT score. Persistence of lymphocytic alveolitis and pulmonary function changes has also been reported in miliary tuberculosis despite treatment. Cardiopulmonary exercise studies in MTB have demonstrated that these patients, though clinically normal following treatment, have residual cardiopulmonary limitations.

As one third of the world’s population is currently infected with M. tuberculosis, the control or elimination
of tuberculosis globally is a formidable task, even if all patients are treated successfully with currently available anti-TB drugs. Dormant bacilli persisting in such ‘cured’ patients and in latent tuberculosis infections are potential sources of active disease, as we do not have drugs that act on dormant bacilli. This is further complicated by the increasing prevalence of HIV/AIDS globally and the wide use of immunosuppressive agents especially for certain immunological disorders and after organ transplantations. In addition to these challenges, healing in tuberculosis following ‘successful’ treatment results in fibrosis which leads to anatomical and physiological alterations of the organs involved. Obstructive, restrictive and mixed patterns of ventilatory defects have been found to occur in patients treated for pulmonary tuberculosis. Pulmonary arterial hypertension due to airway obstruction is an important sequel of treated cases of pulmonary tuberculosis. Pulmonary arterial defects have been found to occur in patients treated for tuberculosis with chemotherapeutic regimes aids in a mycobacteriological cure and will not prevent the development of sequelae in many patients. Many such patients after completion of their prescribed chemotherapy and declared as “cured” continue to visit health care facilities to get relief of their symptoms. The morbidity and mortality associated with such sequelae are enormous in these patients and the quality of life is greatly reduced. This has a great economic impact on individuals and family and these aspects have not received much attention from physicians and research workers.

The persistence of physiological, radiological and immunological defects in MTB despite treatment and the observation of sequelae in treated cases of pulmonary tuberculosis patients point to the fact that these patients have not regained optimal health despite achieving a microbiological cure. In a 10 yr follow up study, it has been observed that corticosteroids when added to anti-tuberculosis chemotherapy in patients with tuberculous pericardial effusion has reduced the adverse reactions and the risk of death provided there are no contraindications to the use of steroids. The role of steroids along with anti-tuberculosis drugs in the treatment of MTB to prevent the radiological and physiological abnormalities has not been properly studied in a controlled clinical trial. The exact immunopathogenesis of pulmonary fibrosis is not adequately understood and drugs are not currently available to reverse the fibrotic lesions. It is also not understood why some patients develop extensive sequelae after anti-tuberculosis treatment whereas others do not. Is it due to genetic differences in the strains of M. tuberculosis or differences in the genetic make of the individuals? We do not have a scientifically valid explanation at present. Research, therefore, should be directed to unravel the mystery of immunopathogenesis of fibrosis and to develop drugs that can prevent the occurrence of fibrosis and reverse fibrosis once it has developed. There are promising results from basic science research that stem cell therapy in the lung may help with lung regeneration and repair.

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