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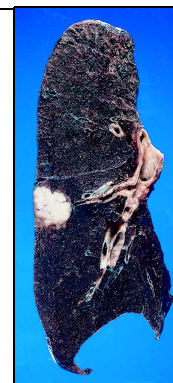
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Respiratory medicine and thoracic surgery



NEW ADVANCES HAVE REINFORCED our understanding of respiratory disease as a complex interaction between environment, genetic predisposition and host responses.¹ We describe recent advances in diseases that are a major cause of morbidity and mortality.

Prevention. Smoking cessation, pollution control, vaccination, medical review and education represent important advances in respiratory disease prevention. Effective interventions for nicotine addiction include replacement therapy (eg, transdermal patches, nasal spray, gum) and antidepressants (bupropion, nortriptyline).² Both are efficacious when used correctly, but more so in conjunction with behavioural modification.^{2,3}

Epidemiological studies have identified the importance of reducing exposure to occupational dusts and chemicals, air pollution and passive smoking.^{1,2} Reduction of pollution has required public policy, altered workplace practices and individual protective strategies.

The characterisation of the genetic basis of disorders such as cystic fibrosis (CF) and α_1 -antitrypsin deficiency has made a major impact on their prevention by identifying at-risk individuals.^{1,2}

The emergence of multidrug-resistant strains of *Streptococcus pneumoniae* has led to the development of a 23-valent pneumococcal vaccine, effective in preventing pneumococcal bacteraemia and pneumonia in high-risk patients.⁴ Influenza vaccination appears to reduce serious illness and death in chronic obstructive pulmonary disease (COPD).²

Diagnosis. Innovative technologies have enabled the rapid diagnosis of many respiratory disorders.¹ Computed tomography (thin-section and spiral) is used to diagnose lung cancer, pulmonary embolus and to assess emphysema.¹ The detection of bacterial DNA in clinical samples by polymerase chain reaction (PCR) permits rapid identification of the infection. PCR is also being used to monitor viral load (eg, cytomegalovirus) in immunosuppressed individuals. Invasive surgical techniques include video-assisted thoracoscopy, a procedure with low morbidity, high diagnostic accuracy and short post-operative recovery time.¹

Interventions. Treatment of asthma in high risk patients should be aligned to the degree of airway inflammation.⁴ Inhaled anti-inflammatory drugs are effective maintenance treatment, reducing symptoms and improving quality of life.^{3,4} Adding a long-acting β_2 -agonist to inhaled corticosteroids is as effective as increasing the dose of inhaled steroids.⁴ Combined therapy may have a significant disease-modifying effect on inflammation and remodelling. Leukotriene modulators may be useful for patients when inhaled corticosteroids fail to control asthma.⁴

Treatment of COPD is still controversial. No current therapy modifies the long-term decline in FEV₁.² Bronchodilators control symptoms,² and combining a long-acting β_2 -agonist and an anticholinergic drug or theophylline may produce additional benefits in lung function.^{2,4} Oxygen therapy and multidisciplinary rehabilitation programs improve survival, symptoms and quality of life.² Surgical treatments include lung volume reduction surgery (LVRS) for regional emphysema,

and bullectomy for giant bullous emphysema. Randomised controlled trials are being conducted to compare LVRS with optimal medical therapy,² but patients at high risk of death after LVRS have recently been identified.

No successful medical therapy has been found to treat interstitial lung disease. However, one study reported significant improvement after 12 months of treatment with interferon- γ_{1b} and corticosteroids compared with corticosteroids alone.³

Treatments such as laser methods, endobronchial radiation and airway stents offer palliation for terminal lung cancer.¹

The recognition in recent years that mild to moderate obstructive sleep apnoea is a major risk factor in cardiovascular morbidity and mortality represents a major advance.

Although *S. pneumoniae* is the most common pathogen in cases of community acquired pneumonia, other pathogens, such as *Legionella* species, *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Mycoplasma pneumoniae*, are also implicated.³ Early therapy with penicillin or third-generation cephalosporin with a macrolide is important.³

Meta-analysis shows that neuraminidase inhibitors are effective in preventing influenza A and B and in shortening the duration of illness.⁵

The recognition that hyaline membrane disease of the newborn is caused by a surfactant deficiency and subsequent intra-tracheal administration of surfactant has been estimated to save 2000 neonates per year in the United States.¹

Advances in surgical technique and perioperative management have led to improved survival for patients undergoing lung transplantation. In carefully selected patients with advanced lung disease (eg, COPD, CF, ILD or bronchiectasis), lung transplantation has also been reported to improve quality of life and functional capacity.^{1,2}

Ventilatory support includes both non-invasive negative-pressure or positive-pressure ventilation and invasive mechanical ventilation.⁴ Advances in ventilation have reduced mortality from respiratory failure resulting from acute respiratory distress syndrome, congestive heart failure, asthma and COPD with acute carbon dioxide retention.¹

Conclusion. Increasing understanding of the mechanisms of respiratory disease, particularly at the cellular and molecular level, will enable improved diagnosis and treatment. Prevention remains a key strategy.

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