

failure precipitated by intercurrent infection, as in the patient reported on here. Surgical treatment for the floppy mitral valve abnormalities comprises repair or replacement of the valve. In young infants either of these carries a high risk and the results are disappointing.^{3,5}

This report draws attention to the importance of careful assessment of the cardiovascular state of any child suspected of having Marfan's syndrome. This patient died after an acute illness with gross cardiac failure due to valve disease, presumably precipitated by an intercurrent respiratory infection. Early evaluation of the cardiovascular system might have resulted in earlier and possibly successful intervention.

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Bacterial tracheitis in Down's syndrome

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SUMMARY Four children with Down's syndrome and bacterial tracheitis are described. In three the infection was due to *Haemophilus influenzae*. In patients with Down's syndrome presenting with stridor tracheitis should be considered and appropriate treatment started.

Bacterial tracheitis (pseudomembranous croup) is characterised by upper airways obstruction with fever and is diagnosed by the presence on bronchoscopy of purulent tracheal secretions and a normal epiglottis. Most cases are due to *Staphylococcus aureus*, but *Haemophilus influenzae* and various streptococci have also been implicated.¹⁻⁴ Sofer *et al* reviewed 332 children with infective upper airways obstruction; 297 (89%) had croup, 28 (8%) epiglottitis, and 7 (2%) bacterial tracheitis.²

We report four children with Down's syndrome seen over three years with severe airways obstruction due to tracheitis. All were previously well and none had congenital heart disease. In three, *H. influenzae* was identified as the causative organism. Over the same period 206 children were seen with croup, and two with epiglottitis. None of them had Down's syndrome, nor was bacterial tracheitis diagnosed in any other child.

Case reports

Case 1. A 10 year old boy presented with a 24 hour history of cough, and a three hour history of increasing stridor. He was distressed, feverish, had a marked stridor, and showed signs of severe respiratory obstruction. Urgent bronchoscopy showed that the epiglottis was not enlarged and the larynx only slightly inflamed. The trachea was hyperaemic and oedematous, and copious mucopus was seen, which subsequently grew *H. influenzae*. Tracheal intubation relieved the obstruction and he breathed spontaneously. He was treated with ampicillin and flucloxacillin, tracheal aspiration, and physiotherapy. By the next day there was widespread consolidation of the lungs and enlargement of the mediastinum. His condition deteriorated and two days later ventilation was required. The antibiotics were changed to chloramphenicol and cefotaxime. With suction, tracheal lavage, and physiotherapy he gradually improved. He was extubated after seven days, and discharged well two days later.

Case 2. A 2½ year old boy was admitted with a six day history of measles. He had conjunctivitis, Koplik's spots, a morbilliform rash, cough, and mild stridor but no dyspnoea or recession. Three days after admission, over two to three hours he became

increasingly dyspnoeic with severe respiratory obstruction. Bronchoscopy showed a normal epiglottis and larynx and a narrowed oedematous upper trachea with a membrane and copious pus; *H. influenzae* was grown from the pus. He was intubated, ventilated, and given cefotaxime. The endotracheal tube became blocked repeatedly with secretions, and he developed extensive bilateral consolidation. With suction and vigorous physiotherapy he gradually improved. He was extubated seven days after admission and discharged well on the thirteenth day.

Case 3. A 5 year old girl had a cough for six weeks which did not respond to erythromycin. A chest radiograph showed collapse and consolidation of the right lower lobe. Treatment was changed to ampicillin and flucloxacillin, together with physiotherapy. Three weeks later the radiological appearances were unchanged, so she was admitted for bronchoscopy. There were thick yellow secretions in the trachea and both main bronchi. These were aspirated and generalised hyperaemia was seen, and *H. influenzae* was grown from them.

Twelve hours after bronchoscopy she developed severe stridor and rapidly worsening airways obstruction. Laryngoscopy showed oedematous cords and copious tenacious secretions in the trachea. She was intubated, given chloramphenicol, and regular tracheal toilet was carried out. For 24 hours the secretions remained thick and profuse, but lessened thereafter. She was extubated after three days and discharged after one week.

Case 4. A girl aged 17 months was admitted with a 12 hour history of cough and increasing dyspnoea. Erythromycin had already been started. She was feverish, with stridor and moderate respiratory obstruction. A chest radiograph was normal. Over two hours she deteriorated rapidly, becoming distressed and cyanosed. At bronchoscopy the epiglottis was normal, there was slight oedema of the vocal cords, and the trachea was oedematous, inflamed, and contained a lot of pus. This showed Gram positive cocci on microscopy, but was sterile on culture. She was intubated and given penicillin, flucloxacillin, and chloramphenicol. Copious secretions were aspirated from the tube. Patchy areas of consolidation were seen on subsequent x ray pictures. After nine days she was sufficiently improved for a trial of extubation. Initially she seemed satisfactory but 10 hours later had a cardiorespira-

tory arrest. She was immediately reintubated and resuscitated, but remained hypotonic and unresponsive and required assisted ventilation. Within 24 hours there was some improvement in her neurological state. She was successfully extubated three days later but remained severely handicapped with intellectual deficit and weakness of all four limbs.

Discussion

We have described four children with Down's syndrome and purulent tracheitis. In three *H. influenzae* was the causative organism. No bacteria were cultured from the fourth patient, who had received an antibiotic, but the presentation and findings were otherwise characteristic of bacterial tracheitis.

The clinical presentation was similar to that in previously reported cases;¹⁻⁴ the children had higher temperatures, worse respiratory obstruction, and were more unwell and toxic than is usual in croup. All required urgent intubation, which permitted definitive diagnosis. All produced copious secretions requiring intensive physiotherapy, suction, and lavage. One child suffered a cardiorespiratory arrest, a common complication of bacterial tracheitis.¹⁻³

Our cases show a striking association between Down's syndrome and bacterial tracheitis; one child described by Liston *et al* also had Down's syndrome.³ Interestingly, in three of our children *H. influenzae* was the causative organism; it has not been common in other series.¹⁻⁴

Bacterial tracheitis should be considered when a child with Down's syndrome presents with upper airways obstruction. Tracheitis requires urgent bronchoscopy and intubation, and patients should be cared for in a unit with adequate facilities for managing this life threatening condition.

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