

insertion is straightforward and minimally invasive,<sup>8</sup> and the stent can be left in place long term without swallowing, voice, or coughing problems.

Our patient had a major and sustained improvement of his lung function with disappearance of his airways obstruction. We believe that restoration of airflow was the major factor in this clinical improvement. He still has copious purulent secretions colonised by *Pseudomonas* due to bilateral bronchiectasis, but eliminates secretions easily and infection is no longer a problem.

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## Commentary: yet more to see down the bronchial tree?

Martin R Hetzel

These three case reports illustrate the range of rare conditions that may be encountered from time to time at diagnostic bronchoscopy. Many may at least superficially resemble bronchial carcinomas, but lead to surprises when full laboratory results become available from bronchoscopic biopsy samples. The case described by Collard *et al* illustrates the usefulness of direct inspection at bronchoscopic examination in evaluating the dynamics of the airway wall.

In the case of pulmonary actinomycosis described by Hsieh *et al* bronchoscopic examination gave the diagnosis by demonstrating a cavitating lesion which could be entered with the bronchoscope and provided positive microbiology samples. Interestingly, however, the authors were cautious in making a diagnosis of actinomycosis alone and were concerned at the possibility of a fungal infection – presumably because of the radiographic characteristics of the meniscus sign and the previous diagnosis of old tuberculosis.

Pulmonary actinomycosis is very rare and many cases are only diagnosed retrospectively from resected specimens (sadly the author's personal experience!) unless stronger clues such as sinus formation onto the chest wall with characteristic sulphur granules are present. The most common misdiagnosis is of bronchial carcinoma and, while some patients may not suffer too much if a resected "cancer" turns out to be actinomycosis, it is of course a tragedy if this rare but treatable disease is completely missed. Confusion with tuberculosis is a further problem, both from the radiological appearance and because *Actinomyces israelii* can stain acid fast. Moreover, some reports have described

cases of colonisation of tuberculous cavities. Actinomycosis is more common in the lower lobes but upper lobe lesions occur and are then more likely to mimic tuberculosis. In the case described here one presumes that the initial diagnosis of tuberculosis was erroneous. It is interesting to note that rifampicin has been tried in the treatment of actinomycosis<sup>1</sup> so, if this drug was included in the three-drug regimen used, it might have held the disease under partial control during the previous period of empirical treatment for tuberculosis.

This patient was susceptible to pulmonary actinomycosis from two risk factors – namely, dental sepsis and diabetes. Because of the anaerobic conditions required for actinomycosis to flourish, response to penicillin and other appropriate antibiotics tends to be slow. Surgery alone is unlikely to cure, although surgical drainage is usually recommended where there is abscess formation. Some cases are cured by antibiotic treatment alone. In this case the authors imply that they elected for immediate surgery because of a tentative diagnosis of fungal infection although, somewhat paradoxically, they actually had proof of actinomycosis from their bronchoscopic samples. One might speculate on the possibility of curing this patient with prolonged antibiotic therapy and postural drainage. However, because of the possibility of a chronic infection in a diabetic subject, sacrificing some viable lung at lobectomy was probably still the best management option.

As reported by Farrell *et al*, primary malignant melanoma of the bronchus is very rare and many previous case reports have not fully

excluded the possibility of a primary site elsewhere. A review by Herbert<sup>2</sup> of 18 previously published papers, for example, found only two cases to be proven with a further eight considered near proven; thus at most only 50% of these cases were likely to have been primary tumours. The diagnosis is most unlikely to be suspected at the time of bronchoscopy unless the clue of pigmentation is present. Amelanotic melanoma in the bronchus is likely to be misinterpreted as anaplastic carcinoma. The authors gave a valuable review of criteria from which the diagnosis of a primary tumour can eventually be made with some confidence.

The very small numbers of convincing case reports make it difficult to judge the prognosis for primary malignant melanoma of the bronchus. It would appear logical to attempt surgical resection when practicable. This particular patient appears to have done well, which would be surprising if there was enlargement of the hilar lymph nodes. Unfortunately the authors have not stated clearly whether these nodes were examined for involvement by melanoma or whether they reflect infection in the distally collapsed lower lobe. Why primary malignant melanoma occurs in the bronchial tree remains a puzzle on which little can be added to the discussion in this case report.

The case report described by Collard *et al* demonstrates the value of direct inspection in assessing tracheomalacia in the spontaneously breathing patient. These authors showed impressive improvements in the flow-volume loop and arterial blood gas measurements after stent insertion. It is not quite clear, however, why this patient continued to have obstructive sleep apnoea in spite of his dramatically improved spirometric parameters. Presumably he had some additional pathology in the upper airway above the stent.

A considerable number of stents have been developed in recent years because they all have disadvantages.<sup>3</sup> The expanding wire types (for example, Gianturco stents) are popular, particularly with physicians in the UK because they can be inserted with the fiberoptic bronchoscope under local anaesthesia, although radiographic screening is also required. They avoid interfering with the mucociliary escalator but will become embedded in the airway

mucosa and cannot subsequently be removed. This is not often a problem in palliation of advanced cancers but raises considerable anxieties for their use in patients with non-malignant diseases in whom a longer survival is anticipated, as in the case of tracheomalacia. Silicone stents, amongst which the Dumon type has probably been most widely used, have the advantage of easy removal but need studs on their outer walls or flanges on their ends to prevent migration. The Dumon variety requires an expensive purpose-built rigid bronchoscopic system for insertion. Some thoracic surgeons prefer to use tailor made stents cut from silicone tubing inserted over bougies through the rigid bronchoscope. All these types require considerable skill with the rigid bronchoscope to insert them. Moreover, long lengths of airway cannot be stented without compromising the mucociliary escalator, necessitating the Montgomery T tube type of stent with a tracheostomy side arm for insertion of a suction catheter by the patient.

The stent described and developed by Collard *et al* attempted to overcome this problem by mimicking the natural trachea with a posterior collapsible wall so that an effective cough can be preserved. This device does, however, require a purpose built forceps device to place the stent. Stent insertion has to be done blind since no bronchoscope can be used. The stent, with its two bronchial limbs closed by the forceps jaws, is pushed through the larynx into the trachea and then opened when judged to be in position. How long patients can be maintained with this new type of stent remains to be seen.

We still need to develop stents that can be inserted under direct vision, do not migrate, can be easily removed, and do not compromise the mucociliary escalator. Unfortunately, manufacturers tend to be more interested in developing vascular stents where there is a much larger market to reward development costs.

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