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Short reports

Life threatening haemoptysis controlled by laser photocoagulation

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We have recently described the use of the neodymium yttrium aluminium garnet laser in palliative treatment of carcinoma of the bronchus.[1] We now report a case of acute massive haemoptysis controlled by emergency laser photocoagulation as a primary treatment.

Case report

A 70 year old man presented in October 1982 with a six week history of left shoulder pain and exertional dyspnoea, with one episode of coughing up blood streaked sputum. He had smoked 15 cigarettes a day until 1980. Examination revealed a firm, mobile nodule below the left eye but no lymphadenopathy or hepatomegaly. Histological examination of the resected facial nodule showed the appearances of a mucin secreting adenocarcinoma and the chest radiograph showed an ill defined opacity above the right hilum, which was considered to be the primary tumour.

His symptoms were insufficient to merit radiotherapy and he was given no specific treatment. He began to have further blood streaking of the sputum and in early December he was readmitted to hospital after coughing up about two cupfuls of frank blood containing clots. The chest radiograph showed enlargement of the shadow above the right hilum and in addition there were multiple discrete nodular opacities throughout the lung fields. While in the ward he expectorated an estimated 200 ml of fresh blood and emergency fibreoptic bronchoscopy was performed. During this procedure a further 900 ml of fresh blood were aspirated and he became shocked, with a pulse rate of 130 beats/min and a blood pressure of 100/60 mm Hg. An intravenous line was inserted and blood was taken for grouping and cross matching. A large clot was found in the orifice of the right main bronchus at the carina, and when this had been removed a nodular haemorrhagic tumour was seen to be partially occluding the bronchus. Topical adrenaline was applied but haemostasis was only partial and transient and brisk bleeding soon developed again. A flexible glass fibre was passed through the biopsy channel of the bronchoscope and a laser beam was transmitted along it and on to the tumour. The system used was a neodymium yttrium aluminium garnet laser (Barr and Stroud Fiberlase 100). A total of 1398 J was applied to the tumour and this achieved photocoagulation of its surface with complete haemostasis. The patient's haemodynamic condition reverted to normal without the use of blood transfusion.

The bleeding had been sufficient to cause a fall in his haemoglobin concentration from 13·1 to 10·0 g/dl. There were no further haemoptyses but partial collapse of the right lung occurred soon after the photocoagulation. Fibreoptic bronchoscopy was repeated two days later and showed narrowing of the right main bronchus by extrinsic compression, while the lumen was partially obstructed by exudate and coagulum from the burnt tumour. This was removed and the residual intraluminal portion of the tumour was treated with laser photoresection (a further 4367 J). There was no evidence of further bleeding. Subsequently the patient's general condition deteriorated, although breathlessness was minimal and chest pain absent. He died eight days after admission, having had no haemoptysis since his first laser treatment. Necropsy showed widespread pulmonary, hepatic and adrenal metastases, while the right main bronchus was partially obstructed by endobronchial tumour combined with extrinsic compression by malignant subcarinal and paratracheal lymph nodes.

Discussion

The use of life saving techniques in patients dying from metastatic malignant disease is not usually appropriate. Torrential haemoptysis, however, is a violent and frightening event and its control by a non-toxic and well tolerated procedure is worthwhile. Although as it turned out our patient's life was prolonged for only a short time, there was no further haemoptysis and death was peaceful and dignified. Death from massive haemoptysis may occur in patients with localised disease and a better prognosis. In these patients laser photocoagulation may preserve life for long enough to allow other forms of treatment to be used.

Massive haemoptysis may be rapidly fatal and requires urgent measures to prevent aspiration of blood and hypovolaemic shock. Maintenance of adequate airway patency is essential and requires efficient suction, preferably through a rigid or fibreoptic bronchoscope. Subsequent measures for controlling the bleeding include bronchial artery embolisation, rigid bronchoscopy with cold

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saline or adrenaline lavage, and emergency thoracotomy. These techniques, however, take time to organise and may entail administering a difficult general anaesthetic. Endoscopic laser photocoagulation for bleeding peptic ulcers has become available recently[2] and has been shown to reduce mortality in a controlled trial.[3] Recent reports have described the experience of three centres using bronchoscopic lasers to treat tracheobronchial lesions.[1 4 5]

In almost all cases the patients treated have had symptoms of breathlessness due to partial or complete occlusion of a major airway, usually by tumour. The series reported by Hetzel *et al*[1] also included six patients with recurrent haemoptysis, three of whom improved after treatment. This is the first report of the successful use of bronchoscopic laser photocoagulation to control massive life threatening haemoptysis.

References

[1] Hetzel MR, Millard FJC, Ayesh R, *et al.* Laser treatment for carcinoma of the bronchus. *Br Med J* 1983;**286**:12–6.

[2] Laurence BH, Vallon AG, Cotton PB, *et al.* Endoscopic laser photocoagulation for bleeding peptic ulcers. *Lancet* 1980;i:124–5.

[3] Swain CP, Bown SG, Storey DW, Kirkham JS, Northfield TC, Salmon PR. Controlled trial of argon laser photocoagulation in bleeding peptic ulcers. *Lancet* 1981;ii:1313–6.

[4] Dumon JF, Reboud E, Garbe L, Aucomte F, Meric B. Treatment of tracheobronchial lesions by laser photoresection. *Chest* 1982;**81**:278–84.

[5] Toty L, Personne C, Colchen A, Vourc'h G. Bronchoscopic management of tracheal lesions using the neodymium yttrium aluminium garnet laser. *Thorax* 1981;**36**:175–8.