Comment

In a study of 100 children and young adults with acute appendicitis this is the only occasion on which we found *C jejuni* in the appendix. The other enteropathogenic organisms found were *Salmonella* spp (one case) and *Yersinia enterocolitica* (three cases). Thus appendicitis must be included with other types of localised complications in enteritis due to campylobacter, such as pancreatitis and cholecystitis.

¹ Communicable Disease Surveillance Centre. Campylobacter infections, 1977-80. *Br Med J* 1981;282:1484.

² Butzler JP, Skirrow MB. Campylobacter enteritis. *Clin Gastroenterol* 1979;8:737-65.

³ Bradshaw MJ, Brown R, Swallow JH, Rycroft JA. Campylobacter enteritis in Chelmsford. *Postgrad Med J* 1980;56:80-4.

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Leiomyoma of the oesophagus: follow-up of 14 years before operation

We describe a case of leiomyoma of the oesophagus in which the patient refused operation at the time of initial diagnosis, therefore enabling the condition to be observed for an unusually long time. New techniques of investigation became available during this period. Computed tomography may contribute to the exact preoperative evaluation of the tumour.

Case report

In 1966 a 19-year-old man was found to have an abnormality on a routine chest x-ray film, the upper right mediastinum being widened. Radiography of the oesophagus followed by endoscopy (with a rigid endoscope) suggested a diagnosis of leiomyoma. Typical features seen at endoscopy were sharply defined radiological defects and a bulging mass with intact mucosa. Operation was refused.

In 1973 the patient was referred with minor chest pain and pain between the shoulders. There was no obvious relation to meals. Radiographs of the chest and oesophagus were practically unchanged. He again refused an operation. The findings seemed to support the initial diagnosis.

In 1980 he presented with additional complaints. He experienced dysphagia, mainly with solid food, and occasionally had regurgitations. There was no loss of weight. On chest radiography the widening of the

mediastinum seemed slightly increased, but this was of doubtful importance. The same applied to changes on the x-ray film of the oesophagus. Endoscopy (with a flexible endoscope) again showed an intact mucosa. No biopsy specimen was taken. Computed tomography of the mediastinum (figure) showed a mass with an attenuation coefficient (Hounsfield number¹) compatible with muscle tissue. Its length was estimated at 11 cm, its maximum width 4 cm. Proximally it was located to the right of the oesophageal lumen, more distally it gradually moved to the left.

The patient agreed to an operation and right-sided thoracotomy was performed. After longitudinal incision of the oesophageal muscle the tumour was removed by enucleation. The mucosa was left intact. The specimen had a curved shape and a smooth lobulated surface. Its maximum measurements were 9×8×5 cm, weight 130 g. The consistency was solid, and histology confirmed the diagnosis of leiomyoma. The post-operative period was uneventful.

Comment

Clinical leiomyoma of the oesophagus is relatively rare. Seremetis *et al*² analysed 838 published cases. Postmortem studies have shown an incidence varying from one in 250 to one in 20 000 in different series. Scrupulous investigation seems to explain this difference: with histological investigation of the whole oesophagus an incidence of tumours of 5.1% could be found.³

The natural history is intriguing: our patient lived at least 14 years with an impressive tumour, which hardly changed in size. Nevertheless, he gradually developed the typical symptoms. This might be explained by changes in the consistency of the tumour and present an argument for operation, rather than fear of malignant change, which has not been clearly documented.²

Leiomyoma may be diagnosed with reasonable certainty by conventional radiography and endoscopy; if the mucosa is normal biopsy is not advisable as it causes complications at operation. Computed tomography, however, has some advantages: it can confirm the type of tissue (with certain limitations⁴) by determining the attenuation coefficient; and shows the relation to the aorta, avoiding aortography, as is suggested in certain cases.² Its role is important in establishing the accurate size and spread of the tumour. The decision whether the tumour can be enucleated or whether partial resection will be necessary may then be taken with more certainty.

¹ Hounsfield GN. Computerised transverse axial scanning (tomography): part I. Description of system. *Br J Radiology* 1973;46:1016-21.

² Seremetis MG, Lyons WS, de Guzman VC, Peabody JW Jr. Leiomyomata of the esophagus: an analysis of 838 cases. *Cancer* 1976;38:2166-77.

³ Postlethwait RW, Musser AW, Durham NC. Changes in the esophagus in 1000 autopsy specimens. *J Thorac Cardiovasc Surg* 1974;68:953-6.

⁴ Heitzman E. Computed tomography of the thorax: current perspectives. *Am J Radiology* 1981;136:3-12.

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Successful treatment of invasive pulmonary aspergillosis complicating influenza A

Invasive pulmonary aspergillosis complicating influenza has been fatal in all four cases reported to date.¹⁻³ We report on a patient successfully treated with amphotericin B and flucytosine, followed by econazole when renal function deteriorated.

Case report

A previously healthy 69-year-old housewife presented with encephalitis and hypoxic respiratory failure nine days after the onset of influenza. She was cyanosed and confused with a tachycardia of 130 beats/min and bilateral coarse crackles at her lung bases. She had increased muscular tone, neck stiffness, and depressed reflexes. Chest radiography showed extensive bilateral patchy shadows in mid and lower zones. Haemoglobin concentration was 12 g/dl and white cell count $8.3 \times 10^9/l$ with 16% lymphocytes. T cells, measured three weeks later, were depressed to $0.61 \times 10^9/l$ but recovered to

Computed tomogram of area below bifurcation of trachea: the oesophagus (filled with air) is displaced to the right and the main bronchi pushed ventrally by the tumour.

1.31×10^9 /l after she was discharged. Results of liver function tests and lumbar puncture were normal. The titre of influenza A antibody was 256.

During the first week she remained febrile and semi-conscious. She was treated with oxygen, parenteral nutrition, physiotherapy, and tracheal aspiration of tenacious green sputum. Erythromycin was stopped after 72 hours, when antibodies to *Legionella* were shown to be absent. Five days after admission invasive pulmonary aspergillosis was diagnosed on the basis of persistent fever, diffuse radiographic changes, and densely branched septate hyphae in the tracheal aspirate, from which numerous colonies of *Aspergillus fumigatus* (sensitive to flucytosine and amphotericin) were cultured. Precipitins to *A. fumigatus* were absent on gel diffusion.

Amphotericin B (initially 15 mg daily but increasing over four days to 60 mg daily) and flucytosine (2.5 g four times daily) were given intravenously. After a week the flucytosine was given by nasogastric tube. There was a striking clinical improvement (figure): her temperature fell, the tracheal aspirate became mucoid, the colony count decreased, and hyphal fragments became smaller and less abundant. A recurrence of fever and green sputum owing to infection with *Staphylococcus aureus* responded to flucloxacillin. Blood urea concentration rose to 18.6 mmol/l (112 mg/100 ml), however, necessitating withdrawal of amphotericin after 460 mg had been given. Four days later flucytosine was stopped. Meanwhile, fever had recurred and the sputum had again become green and contained abundant large viable fragments of *A. fumigatus*, so econazole 200 mg thrice daily intravenously was started. Thereafter the temperature dropped and the sputum, although still containing hyphae, became sterile. The profusion and apparent viability of hyphae in sputum were assessed daily as a guide to treatment. Subsequently the sputum smears were arranged in random order and assessed on two occasions on an arbitrary 10-point scale, with five as a maximum each for profusion and fragment size. These readings are recorded in the figure as sputum score.

Clinical course of disease, showing temperature, drug regimen, sputum hyphae score (measured on two occasions (see text)), and sputum *A. fumigatus* colony count.

Econazole was stopped after 18 days, when she had been afebrile and free of sputum for a week. Renal function had returned to normal. The chest film was finally clear nine weeks after admission. Neurological recovery, apart from some amnesia, was complete within two months.

Comment

While invasive pulmonary aspergillosis usually occurs in immunosuppressed hosts, it has occasionally been described after influenza,¹⁻³ which may, as in our patient, depress T lymphocytes. In all such published reports the disease has proved fatal; nevertheless, our patient shows that it may respond to treatment if diagnosed promptly. The key to such diagnosis lies in the demonstration of characteristic densely branching hyphae in sputum, tracheal aspirate, or a lung biopsy specimen in a patient with signs of systemic infection and diffuse pulmonary infiltrates. Culture will produce typical colonies of *Aspergillus*, though serum precipitins are usually absent.

In the treatment of aspergillosis amphotericin is the drug of choice either alone or in combination with flucytosine when the isolate is sensitive. Emergence of resistance to flucytosine is prevented by adding amphotericin,⁴ whose dose, and hence toxicity, may be reduced. Econazole has been used successfully in the treatment of aspergillosis,⁵ and our results suggest that it merits further evaluation.

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Administration of potassium by subcutaneous infusion in elderly patients

Fluid administration by the subcutaneous route or hypodermoclysis was once a common procedure; the development of the intravenous drip infusion, however, led to its virtual abandonment. Recently, hypodermoclysis has been shown to be an excellent method for giving fluid supplements to elderly patients where their need is not urgent and has few side effects when modern equipment is used.^{1 2 3}

Although the possibility of giving potassium by hypodermoclysis has been reported,^{4 5} we could not find a detailed description of the technique or of its practical applications. We describe our experience of giving potassium by the subcutaneous route.

Patients, methods, and results

Isotonic solutions of glucose or of saline were made up containing potassium chloride in amounts of up to 34 mmol/l. To each 500-ml pack, 750 IU of hyaluronidase were added. The injection sites, on the anterolateral aspect of the middle third of each thigh, were cleansed with alcohol and povidone-iodine. Two standard intravenous infusion sets were used with No 20 needles. The needles were inserted deep into the subcutaneous tissues in the direction of the patient's head. The rate of infusion was adjusted so that the patient received 1 litre in three to four hours.

A total of 350 infusions were given to 67 patients (average age 82) with no side effects whatsoever. In those few cases where the patient complained of discomfort, relief was obtained by slowing the drip rate. The main indication for giving potassium was mild deficiency (with serum concentrations of 3.0 to 3.5 mmol(mEq)/l) or conditions liable to cause hypokalemia such as gastrointestinal disturbances or difficulty in ingesting food. The serum potassium concentration was monitored during and after the infusion and never rose by more than 1.0 mmol/l. Patients with severe electrolyte imbalance were given intravenous infusions.

Most infusions (30) were given over two months to an 84-year-old woman who had undergone surgery for a fractured neck of the femur and had Parkinsonism and dysphagia; she received 18 mmol potassium a day. The largest amount of potassium in an infusion was given to a hemiplegic patient whose serum potassium concentration fell to 3.2 mmol/l because of vomiting; he received 60 mmol of potassium in 2 litres of glucose and saline solutions every day for a week, the potassium concentration returning to normal within three days.

Comment

The serious side effects of intravenous infusions, such as thrombophlebitis, systemic infection, and embolism, are not seen in hypodermoclysis.² Moreover, hypodermoclysis has further advantages in the elderly: not only does it obviate the pain and distress caused by searching for fragile and elusive veins but, since the infusion is over in a few hours, the patient is not immobilised for long periods as so often happens when the intravenous route is used.

We found hypodermoclysis to be a safe and acceptable method for