SHORT REPORTS

Pneumococcal cross infection in hospital

The mortality associated with pneumococcal infection has been reduced with chemotherapy and modern supportive care, though pneumococcal bacteraemia in elderly patients still carries a poor prognosis. The ready availability of penicillin and other antibiotics that are effective against pneumococci may have distracted attention from cross infection among patients.

Case reports

Four women admitted to the same postnatal ward after delivery were infected with the same serotype of *Streptococcus pneumoniae*. The first woman to be infected was feverish when first seen, complaining of shortness of breath and generalised muscular pain. Cultures of blood taken on admission showed *S pneumoniae* capsular type 9. She received parenteral ampicillin within 48 hours after admission.

Two days after the first patient was delivered a second patient, who had previously been well, developed a temperature of 39 C and signs of lobar pneumonia. *S pneumoniae* capsular type 9 was grown from her sputum. Two days later two more patients who had both undergone caesarean section one day before and were being nursed in adjacent rooms on the same ward, developed similar signs. Results of microscopic examination of sputum in both were consistent with pneumococcal infection, but culture of sputum yielded negative results as parenteral ampicillin had been started before the sputum was obtained. Countercurrent immunoelectrophoresis on sputum showed the presence of type 9 pneumococcal antigen in both cases. The table shows the results of laboratory investigations in all four patients.

Results of laboratory investigations

Case No	Sputum		Blood culture
	Culture	Antigen titre	
1	No pathogens isolated	Not done	*S pneumoniae* type 9
2	*S pneumoniae* type 9	Positive; 1/100 *S pneumoniae* type 9	Negative
3	No pathogens isolated*	Positive; neat *S pneumoniae* type 9	Negative
4	No pathogens isolated*	Positive; 1/1000 *S pneumoniae* type 9	Negative

*Antibiotics administered before specimen collected.

Three patients (cases 2, 3, and 4) were probably infected by the strain of *S pneumoniae* introduced by the first patient. The last two patients to be infected were nursed in single side rooms, and no further cases were detected.

Comment

The occurrence of localised epidemics of pneumococcal disease was recognised as long ago as 1903 when Sinigar described a probable outbreak among the patients and staff of an asylum; bacteriological studies were limited to microscopic examination of sputum.[1] When capsular serotyping became available epidemiological investigation became more accurate. Schroder and Cooper described an outbreak in a children's home in 1930 in which patients in whom pneumococcal infection was clinically diagnosed were isolated.[2] The finding of markers of drug resistance prompted investigations of the spread of *S pneumoniae*, and outbreaks in hospitals of infection with strains resistant to penicillin have been noted.[3] There have been very few recent reports of cross infection, although one described transmission of infection between mother and son.[4]

Acquisition and carriage of a particular type of pneumococcus do not invariably result in overt disease. Other patients may possibly have been colonised by pneumococci during our outbreak without developing overt clinical infection. This variable and relatively low incidence of cross infection has led to varying attitudes to the need to isolate patients with pneumococcal disease. A recent edition of a standard American textbook said, "Ideally, every patient with pneumococcal pneumonia should be isolated. Although isolation rules are often disregarded because of the relatively low cross infection rates, in crowded hospital wards containing persons with congestive heart failure and other debilitating diseases, it is advisable whenever possible to place patients with pneumococcal pneumonia in separate rooms."[5]

Our experience in this outbreak shows that the possibility of cross infection must always be considered in severe cases of pneumococcal infection. If evidence of cross infection is found active steps to control it must be taken promptly. The availability of effective antimicrobial treatment has perhaps eclipsed a lesson learnt in an earlier era of medical treatment.

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4 Fenton PA, Spencer RE, Sarill JS, Grerer S. Pneumococcal bacteraemia in mother and son. *Br Med J* 1983;**287**:529-30.
5 Davis BD, Dulbecco R, Eisen HN, Ginsberg HS, Wood WB. Streptococci. *Microbiology*. 2nd ed. New York: Harper and Row, 1973:705.

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Acquired arteriovenous communication: complication of cannulation of internal jugular vein

Percutaneous cannulation of major veins is undertaken increasingly for perioperative management and long term intravenous access. In surgical patients the internal jugular vein is usually selected; its cannulation was originally described by English *et al* as being safer than that of the femoral, subclavian, or antecubital veins.[1] The method entails entering the vein either high in the neck by penetrating the sternomastoid or just above the clavicle, where the vein lies between the sternal and clavicular heads of this muscle. The latter route is now favoured in adults and was used in the two patients described here.

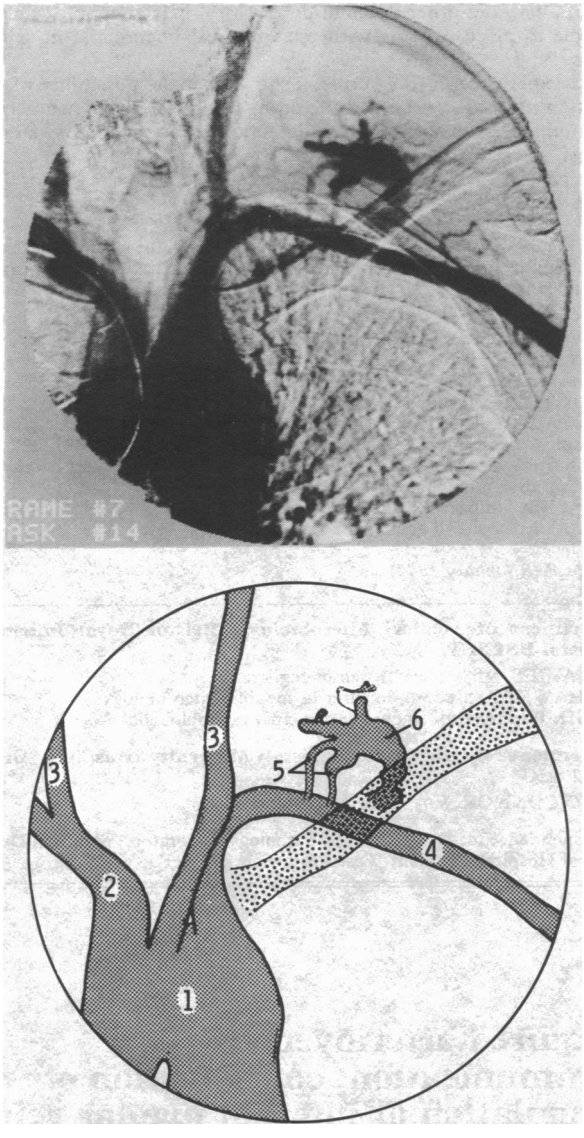
Case reports

Case 1—A man of 56 underwent cannulation of the left internal jugular vein without evident problems before elective surgery to replace the aortic valve, and the cannula was withdrawn after 48 hours. Four and a half years later an uncomfortable pulsatile swelling (3 cm in diameter) was present in the left supraclavicular fossa. Digital subtraction angiography with ascending aortic contrast injection (figure) showed a communication between two small derivatives of either the thyrocervical or costocervical branches of the left subclavian artery (both branches are derived from the first part of the subclavian artery on the left) and a dilated venous channel draining towards the subclavian vein.

Case 2—A man of 47 required cannulation of the right internal jugular vein during emergency replacement of the aortic valve because of fulminating bacterial endocarditis. The cannula was introduced without undue difficulty and remained in situ for four days. On the seventh day a continuous murmur

was heard below the right clavicle. Angiography showed a direct communication between right subclavian artery and vein.

Both patients have been reviewed regularly, but have not needed corrective surgery.



Digital subtraction angiogram showing left supraclavicular arteriovenous communication in case 1. 1 Aortic arch; 2 brachiocephalic artery; 3 common carotid arteries; 4 left subclavian artery; 5 arterial feeding vessels to arteriovenous communication; 6 dilated venous channel draining towards left subclavian vein.

Comment

In describing 500 cannulations of the internal jugular vein using their innovative technique, English *et al* recorded as complications one pneumothorax and three haematomas formed by entering an artery.[1] Other rare early complications of this or of closely related methods have subsequently been encountered, chiefly in small infants. These include pleural damage with pneumothorax, direct tracheal injury,[2] infection, venous thrombosis, embolism, arterial laceration, trauma of the thoracic duct on the left side, injury to the brachial or cervical plexus, and Horner's syndrome. Late complications include cardiac tamponade and hydropneumothorax.[3]

Inadvertent entry into an artery occurred in three out of 316 cannulations of the internal jugular vein reported by Rao *et al*[4] as well as in three of the original 500 cases described by English *et al*.[1] Formation of an arteriovenous communication is well recognised after penetrating injury and is perhaps not unexpected after percutaneous insertion of a cannula. The two cases described here represent one centre's cumulative experience of cannulation procedures in more than 1000 cases over five years. Both patients had aortic valve lesions, and unfolding of the aortic arch and major arteries, which is often seen in disease of the aortic valve, may have been implicated.

Arteriovenous communication may present as an early or late complication of apparently uneventful cannulation of the internal jugular vein, any latency probably being governed by the size of the artery concerned. Digital subtraction angiography is ideally suited to clarifying the anatomy of small vascular lesions of this kind. Because the use of percutaneous vein cannulation is increasing, surgeons and physicians should be aware of potential complications such as arteriovenous communication.

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Pneumomediastinum during sexual intercourse

Spontaneous pneumomediastinum is a relatively benign condition, although its presentation may be associated with severe dyspnoea and chest pain. We describe a case in which only a detailed history explained an otherwise potentially alarming radiological feature.

Case history

A 21 year old male university student presented to the casualty department with acute dyspnoea, sharp retrosternal chest pain, and discomfort in the throat. Inquiry elicited that he had been having sexual intercourse with a male partner when he became gradually breathless. This persisted and worsened before his admission. He had been a practising homosexual for three years and his present activity was no different from that of previous occasions. He had recently had a cold but was otherwise well and there was no past medical history of note. He was not asthmatic, although he did suffer from hay fever for which he had recently taken chlorpheniramine on an irregular basis.

On examination he was acutely dyspnoeic but within minutes this settled spontaneously. There was no wheeze or crepitus on chest auscultation. The electrocardiogram was normal but chest radiography showed a large pneumomediastinum. He was kept under observation and within 24 hours his dyspnoea and chest pain had settled, as had the discomfort in his throat. Further examination showed pronounced subcutaneous emphysema of the neck and retrosternal crepitus on auscultation. Routine blood investigations were unhelpful; he had a mild lymphocytosis, a haemoglobin concentration of 15·6 g/dl, white cell count of $7{\cdot}3 \times 10^9$/l (lymphocytes 49%), sedimentation rate of 7 mm in the first hour, and negative Monospot and viral serological test results.

His condition settled rapidly over the next 48 hours and the subcutaneous emphysema and crepitus disappeared, as did the chest *x* ray abnormalities.

Comment

Air within the mediastinum may appear spontaneously or as a result of perforation or surgical intervention to the trachea, bronchus, or oesophagus. It may spread from fascial planes of the neck or pharynx and has been associated with crush injuries and other forms of trauma to the chest.[1] It may also occur secondary to severe asthma, coughing and the Valsalva manoeuvre,[2 3] and rapid ascent from scuba diving.

Our patient presented with an acute spontaneous pneumomediastinum, probably as a consequence of a prolonged Valsalva manoeuvre.