THE OCCURRENCE OF PASTEURIELLA SEPTICA
(syn. MULTOCIDA) IN BRONCHIECTASIS

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There are a number of British reports of the
isolation of Past. septica from wounds (Allott,
Cruckshank, Cyrilas-Williams, Glass, Meyer,
Straker, and Tee, 1944; Cooper and Moore,
1945; Brunson and Mallett, 1953) and from
other situations in the human body, such as the
appendix (Ludlam, 1944) and joint spaces (Pizey,
1953), but with the exception of the case of
sinusitis reported by Bartley and Hunter (1947)
the occurrence of this organism in the respiratory
tract has not previously been described in this
country.

In the following case Past. septica was repeatedly
isolated from the sputum of a patient with bronchi-
ectasis over a period of several months.

Case Report
C. B., a watchmaker, aged 29, had a history of re-
current attacks of bronchitis and asthma since the
age of 10 years. These did not cause him much
incapacity until 1950, when he was admitted to hos-
pital with a severe attack of bronchitis; since then
he has been cyanosed and has had a decreased exercise
tolerance. In February, 1953, he was admitted to
the Brook Hospital, London, with purulent bronchitis
and finger clubbing, and was suspected of having
incipient cor pulmonale. His sputum was examined
bacteriologically on March 9, a mixed bacterial flora
with no predominant organism being found. He
was discharged from this hospital much improved after
six weeks' treatment.

In July, 1953, his condition deteriorated and he
was admitted to King's College Hospital dysnpeic
and persistently cyanosed at rest. He was producing
a considerable quantity of purulent sputum. A report
at this time stated that bronchograms of the right
side showed slight dilatation of the upper lobe
branches with mild fusiform bronchiectasis, and
diminution in volume of the middle lobe with slight
dilatation of the dorsal mid-basic and cardiac branches
of the lower lobe. On the left side fusiform dilatation
of a moderate degree affecting the lingular, middle,
and posterior basic segments of the lower lobe was
seen. The results of physical examination, of electro-
cardiograms, and of cardiac catheterization were com-
patible with a diagnosis of right heart cardiac hyper-
trophy due to pulmonary hypertension.

Cultures of his sputum on July 3 and July 10 pro-
duced a heavy growth of Past. septica.

A course of aureomycin (2 g. daily for six days)
was given, at the end of which Past. septica was no
longer recovered from the sputum, which yielded a
heavy growth of Proteus vulgaris; with breathing
exercises and postural drainage the patient's condition
further improved, and he was discharged on July 22
after three weeks in hospital.

Sputum obtained one month after discharge grew
only Proteus vulgaris, but Past. septica was isolated on
October 10 from a specimen which yielded a pre-
dominant growth of Proteus vulgaris. Sputum exam-
ined on November 9 yielded a predominant growth of
Past. septica; Proteus vulgaris was not isolated.

Though at this time the patient's general condition had
deteriorated considerably, there was no reason to be-
lieve this was attributable to infection with Past.
septica.

As it is suggested that animals are the source
of infection with this organism in man, it should be
recorded that, since disposing of his dog in 1949, the
patient had had no close contact with animals.

Bacteriology

In smears from the initial aerobic culture the
pasteurella was seen as a small Gram-negative cocco-
bacillus measuring approximately 1.5 μ × 0.5 μ. Bipolar
staining was not observed. In cultures on
5% horse-blood agar plates capsules were readily
demonstrated. There was no observed motility either
at 37°C. or at 22°C.

Cultural Characteristics.—On horse blood agar after
18 hours' aerobic incubation at 37°C. there was a
profuse growth of round, grey, convex, translucent
shiny colonies, 1-2 mm. in diameter. There was no
haemolysis.

Growth in nutrient broth produced a uniform turbi-
dity and a slight powdery deposit after 18 hours. A
gelatin stab showed a filiform growth but no lique-
faction after a week. There was no growth on Mac-
Conkey's agar after a week.
Biochemical Reactions.—Acid, but no gas, was produced in glucose, sucrose, mannitol, galactose, sorbitol, and xylose, and weakly in maltose. There was no fermentation in adonitol, arabinose, dulcitol, glyceral, glycerogen, inositol, inulin, lactose, raffinose, rhamnose, or trehalose.

The other biochemical tests were as follows:

- Litmus milk: no change.
- Methylene blue reduction: positive.
- Methyl red: negative.
- Voges Proskauer: negative.
- H₂S production: negative.

Pathogenicity Tests.—A guinea-pig inoculated intraperitoneally with 0.5 ml. of an 18-hour broth culture of the organism died within 18 hours. One pair of albino mice received 0.2 ml. of the undiluted culture intraperitoneally, and another pair 0.2 ml. of a 1 in 100 dilution. After 18 hours, one of the first pairs of mice was dead and the other moribund; of the second pair, one mouse was moribund and the other obviously sick.

At necropsy, large numbers of short Gram-negative rods showing bipolar staining were seen in smears of the spleen and heart blood of all five animals.

Serology

This strain was not agglutinated by any of three “O” sera (D/5107/51, D/3607/51, D/4307/51) with one of which the majority of animal Pasteurellae are agglutinated (Smith, 1953).

A slide agglutination test with the patient’s own serum and organism was weakly positive, but tube tests conducted at 37°C for somatic antigens and 4°C for capsular antigens showed no agglutination above a titre of 1 in 10.

Sensitivity to Antibiotics

Using a plate technique with a filter paper strip, the organism was found to be sensitive to penicillin, streptomycin, chloramphenicol, aureomycin, and terramycin.

Discussion

Although not reported in this country before 1944, human infection by Past. septica is by no means uncommon. The majority of recorded cases have been reviewed by Lévy-Bruhl (1938), Regamey (1939), and Schipper (1947), and fall into two main categories: sepsis following trauma and infections of the respiratory tract. There are a few cases falling into neither class, in which the organism has been recovered from the gastrointestinal tract, from the meninges, from the pericardial sac, and from infected joints. There is almost invariably a history of direct animal contact in cases of wound infection, the majority of which follow the bites of cats or dogs, and, very occasionally, those of other animals, e.g., rabbit and panther.

In the more deep-seated infections, on the other hand, evidence of animal contact is generally lacking; for example, it was present in only one of 13 cases reviewed by Schipper. Regarding respiratory tract infection, our knowledge as to direct or indirect animal contact is very limited, since we have no information on this point from the largest group of these cases. These were reported by Needham, in a personal communication to Bezjak and Mimica (1952), who states only that he isolated Past. septica from 28 patients “nearly all of whom were suffering from bronchiectasis.”

Too much stress, we feel, need not be given to a history of animal contact in chronic cases, because of the well-known ubiquity of Past. septica in diseased and healthy animals, such as cats (Schenk, 1938), dogs (Smith, 1953), and rats (Schipper, 1947); thus it would appear that few people are able to avoid contact with the organism on some occasion. There is evidence (Smith, 1953) that most Pasteurellae isolated from human infection following bites can be recognized serologically as belonging to the types commonly found in the animals concerned, but in at least two cases of human infection without history of animal contact, e.g., our case and one of pericardial infection (Harries, 1954), the strain differed serologically from the usual domestic animal types, a finding which suggests that the source of infection in these cases was different. On the other hand, some modification may have occurred in the strains during residence in the human body.

While there is no doubt as to the pathogenicity of Past. septica in the case of traumatic infections of the soft tissues, which often involve also the underlying bone, and the occasional infections of serous surfaces or the meninges, the assessment of the role of this organism when found by chance in the sputum is much more difficult. In the present case, Past. septica was found in the sputum on four occasions over a period of several months, most often as the predominant organism; it was thus obviously no chance contaminant of the respiratory tract but an integral part of the bronchial flora. Like the majority of the cases described by Needham (1948) and those of Mulder (1938) and Bezjak and Mimica, this finding was associated with bronchiectasis.

Since it is proverbially difficult to assess the role of any given organism in bronchiectasis, it is impossible to determine the part played by Past. septica in the pathology of these cases; it
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may well be no more than the colonization of an already damaged bronchial tree.

There is little doubt, as Needham suggests, that Past. septica is more common in the respiratory tract than is generally supposed, and his isolation of this organism from 11 cases in the Mayo clinic during 1947 bears out this contention. This may partly be due to the fact that the cultural characteristics of Past. septica are such that it may easily be overlooked, especially if it is not grown initially in pure culture. Brunsdon and Mallett have suggested that the organism would be isolated more often from wounds of animal origin if routine cultures were taken in casualty departments, and confirmation of this point has been provided by the isolation of Past. septica from two wounds of this nature swabbed as part of a survey of staphylococcal finger infections which was undertaken at this hospital from August to November, 1953.

Summary

A case of bronchiectasis is described in which Past. septica was isolated from the sputum on several occasions over a period of four months. The source of infection in this and other cases mentioned in the literature and the possible relationship of the organism to the disease is discussed.

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REFERENCES

Smith, J. E. (1953). Personal communication.
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