

Blood coagulation results available immediately after death showed pronounced disseminated intravascular coagulation, with fibrin degradation products of 320 g/l, plasma fibrinogen concentration of 1.1 g/l, and platelet count $11 \times 10^9/l$. No organisms were grown from blood or urine on routine culture.

At necropsy there was acute non-specific reactive hepatitis with a considerable increase in neutrophils and large, rather bizarre mononuclear cells. These non-specific changes suggested an overwhelming infection. There was no evidence of amniotic embolism or acute pyelonephritis.

Investigations and results

Sera were taken from the first patient on days 3, 10, and 31. The farm flock was also sampled in June 1981, about three months after lambing; sera were examined from four non-aborted healthy ewes and four sheep vaccinated against enzootic abortion six weeks before lambing (both groups delivering healthy lambs) and five aborted ewes. All sera were tested by complement-fixation tests using *C psittaci* antigen (supplied by the Division of Microbiological Reagents, Central Public Health Laboratory, Colindale). The anti-complementary activity of the sheep sera was overcome by inactivating them at 60°C; none of them reacted with normal yolk sac antigen after this treatment. All sera were tested at the Public Health Laboratory, Bristol by indirect immunofluorescence using whole inclusions of the strain of *C psittaci* that causes enzootic abortion as antigen. Q fever antibodies were not found in any of the sera. The table confirms infection in both the first patient and her farm flock.

Results of tests for antibodies to *C psittaci*. Results expressed as reciprocal of titres

	Complement fixation	Immunofluorescence
Case 1:		
Day 3	10	< 8
Day 10	20	< 8
Day 31	160	128
Aborted sheep:		
A	80	512
B	20	1024
C	10	128
D	160	256
E	20	512
Normal sheep:		
F	10	128
G	10	< 8
H	20	16
I	20	< 16
Vaccinated sheep:		
J	160	> 1024
K	40	1024
L	20	1024
M	40	> 512

Discussion

Schachter *et al*³ subdivided chlamydial infections of man into two groups according to their mode of transmission. Direct person-to-person contact is the route of infection in trachoma, inclusion conjunctivitis, genitourinary tract infection, and lymphogranuloma venereum. In the second group, the zoonoses, man is an accidental host usually acquiring the infection from birds, producing a pneumonic illness. Chlamydiae from domestic and wild animals, however, may also produce signs of severe systemic upset⁴ or simply subclinical infection; several serological surveys of people in contact with chlamydia-infected animals suggest that these animals may be the source of human infection.⁵

Chlamydiae have been recorded from human spontaneous abortion tissue⁶ and one such strain resulted in placentitis and abortion after infection of cattle with this isolate.⁷

Studies in Russia suggest *Chlamydia* is responsible for an appreciable number of spontaneous abortions and perinatal and infant deaths as well as chronic gynaecological disease.⁸

Both our patients were farmers' wives in late pregnancy who helped their husbands with lambing in flocks that had active infection at the time of their illnesses. The first patient showed a diagnostic rising titre of antibody by both complement-fixation and immunofluorescence tests. The high concentrations of

antibody by immunofluorescence in the sera from sheep that had aborted were consistent with psittacosis. These results strongly suggest that the first patient was infected with this organism, with which she had been in close contact. Though laboratory tests for chlamydia were not carried out on the second patient the infection in the sheep and the similarity of symptoms to those of the first patient suggest that she too may have been infected with the causal agent of enzootic abortion in ewes.

Disseminated intravascular coagulation in psittacosis has been reported in non-pregnant persons⁹⁻¹¹; the origin of the infection in these cases was avian. We report the first association between disseminated intravascular coagulation and *C psittaci* infection in pregnancy.

The strains of *Chlamydiae* that cause enzootic abortion in ewes can establish placental and fetal infection in animals after chlamydiaemia, with a predilection for the hilar region of the placenta.¹ The first patient made no real clinical improvement despite erythromycin treatment until she was delivered. The same predilection for placental tissue may exist in humans infected with the causal agent of enzootic abortion in ewes and unless this focus of infection is removed clinical recovery may be delayed, with the risk of a stillborn fetus. If infection with the strain of *C psittaci* that causes enzootic abortion in ewes is suspected in late pregnancy, early delivery may be the correct management, and the placenta should be examined for the organism in such cases.

The clinical picture and epidemiology in the second case makes it likely that chlamydiae were responsible for her illness and subsequent death. With hindsight, had this diagnosis been considered initially, delivery soon after admission might have saved both mother and infant.

We thank Dr C R Tribe, regional assessor to the *Report on Confidential Enquiries into Maternal Deaths in England and Wales*, for his histopathological report, and Miss Catherine Jennings for typing the manuscript.

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(Accepted 24 February 1982)

Correction

One year's treatment with propranolol after myocardial infarction: preliminary report of Norwegian multicentre trial

The legends to figures 2 and 3 in this article (16 January, p 155) have been criticised as confusing. They should have read: FIG 2—Survival curve for sudden cardiac death (intention to treat); FIG 3—Survival curve for total death (intention to treat).