

anaerobic, capnophilic, and Gram-negative. *C. canimorsus* is a normal resident of the canine mouth. Their growth in blood culture is slow but they may be isolated by Gram staining of a buffy coat preparation. The correct diagnosis of infection with this organism in case 1 was possible when the microbiologist was alerted. Usually, infection is associated with asplenism,² hairy cell leukaemia,³ liver cirrhosis,⁴ and other immune suppressive states. This organism, designated a Dysgonic Fermenter 2 (DF2) by the US Centers of Disease Control, has caused fulminant bacillaemia and sepsis in some asplenic patients.^{5,6} Cutaneous infection causing eschar formation and gangrene associated with DF2 septicaemia has also been reported.^{5,7} Infection by this microbe in healthy subjects is occasionally encountered.⁸ The child in this report had no known risk factors.

Pasteurella multocida is a small non-motile, Gram-negative, bipolar coccobacillus which often inhabits the oropharynx of cats, dogs and

some birds as a commensal. Infection by the organism has been identified in cases of Ludwig's angina, epiglottitis, and tonsillitis following animal bites. Fulminant infection caused septicaemia and peritonitis in a cirrhotic cock trainer,⁹ and empyema in another patient.¹⁰ These organisms have occasionally been isolated from throats of healthy humans with frequent exposure to animals. Invasive pasteurellosis may cause meningitis, pneumonia, and otitis media, due to the spread of organisms from pre-existing colonies in the upper respiratory tract. In the present report, case 2 was effectively treated with cefotaxime, although a cheaper drug like penicillin could have controlled the infection but for his sensitivity. In animal bite wounds initial therapy with penicillin is preferable unless contraindicated, as it can control infection with several microbes including *Pasteurella* and *Capnocytophaga* species.

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Death due to air embolism during sexual intercourse in the puerperium

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Summary

We describe the cases of two young women who died due to air embolism during sexual intercourse early in the puerperium.

Keywords: air embolism; sexual intercourse; puerperium

The review of maternal deaths covering the period 1967-1993 includes over 20 million pregnancies; 18 deaths were due to air embolism.¹ We describe two such cases occurring within a 2-year period in a West Yorkshire town with approximately 2400 deliveries a year at the local hospital.

Case 1

A 22-year-old woman was engaged in sexual intercourse with her husband in a rear entry (knee-chest) position 8 days following the

spontaneous vaginal delivery of their third child, when she collapsed suddenly and died, passing blood per vagina. Autopsy showed features of air embolism. Air bubbles were present in major vessels of organs inspected *in situ*, including cerebral and coronary arteries. Frothy blood was detected between the trabeculae in the wall of the right ventricle. The endometrial cavity contained blood clot and fresh haemorrhage, and histological examination of the placental bed showed few thrombosed blood vessels. Most vessels in the placental bed myometrium contained fresh blood and some showed organising luminal thrombus. Post-mortem blood showed an amphetamine concentration of 175 ng/ml.

Case 2

A 29-year-old woman died suddenly during sexual intercourse with her husband in the

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missionary position 5 days following the spontaneous vaginal delivery of their fourth child. Autopsy confirmed death due to air embolism. Bubbles were identified in major vessels, and air was released from the right atrium on opening it under water. The lower uterine cavity contained blood clot, and histology of the placental bed showed organising thrombus with blood in most vessels. No vessels with thrombotic luminal occlusion were identified.

Discussion

Maternal deaths due to air embolism reported to the Department of Health enquiry¹ were associated with abortion in seven cases and with labour in five. One death followed drainage of a lower segment Caesarean wound abscess. In three cases embolism occurred during sexual intercourse at 19 and 31 weeks gestation and in the early puerperium. One death followed oral sex during foreplay.

Death during sexual intercourse is fortunately uncommon, most cases being attributable to arrhythmias complicating ischaemic heart disease and heightened sympathetic stimulation of the myocardium in middle-aged men.² Maternal deaths due to air embolism during pregnancy or labour have been described following sexual intercourse, induced abortion,³ oral sex, manual extraction of the placenta, version and forceps delivery.⁴ During the puerperium, air embolism is associated particularly with sexual activities in the knee-chest position.⁴ This position elevates the uterus above the level of the right atrium to create a pressure gradient which may draw air into patent veins, while intercourse forces air under pressure into the uterine cavity.

Uterine spiral arteries during early pregnancy are converted by invading trophoblast into distended uteroplacental arteries.⁵ The sequence of events by which these arteries

thrombose and the endometrium regenerates following parturition is not clearly defined, but involution of the placental site is normally complete within about 3 weeks. Delay in the physiological obliteration of the large vessels underlying the placental site is not uncommon, however, typically presenting as haemorrhage in the first few weeks of the puerperium.

In the two cases presented here, thrombotic occlusion of the placental bed vasculature was not complete. The patency of these dilated vessels and the pumping action of intercourse forcing air into the uterine cavity would predispose to massive air embolism. Circulating amphetamine in the first case, in addition to prolonging sexual activity, may have acted as an additional factor in encouraging air embolism via involuting placental bed vessels by its action on heart rate, blood pressure, and uterine muscle tone.^{6,7}

Non-fatal air embolism during Caesarean section may be more common than appreciated. Precordial Doppler studies detected venous air embolism in 52% of Caesarean sections in one study,⁸ a finding which has subsequently been confirmed.^{9,10} Predisposing factors at operation include the gradient created between the position of the right side of the heart and the uterine incision in the Trendelenburg position, and exteriorising the uterus during lower segment repair.^{11,12}

Cases of fatal air embolism in the puerperium are rare. Most couples restart intercourse 5 or 6 weeks after delivery,¹³ and mothers frequently seek advice about resumption of sexual activity.¹⁴ There are moves to give more general guidelines about resuming intercourse than to persist in setting a postpartum sexual abstinence period of 6 weeks.¹⁵ However, we feel it would be wise to warn mothers, without causing undue alarm, that intercourse could be dangerous in the early days of the puerperium.

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