An initial *M pneumoniae* complement-fixing antibody titre was 1/1028; two weeks later the titre was again 1/1028, indicating a recent infection.

Comment

Four types of CNS disorder have been described in association with *M pneumoniae* infections²—meningoencephalitis, psychosis, meningitis, and radiculopathy. Antecedent or concurrent pulmonary disease is common but not uniformly present.² The nature of the neurological lesion is not clear but direct invasion of the CNS is unlikely. A neurotoxin has been suggested but has never been isolated from cases in man.³ The diagnosis is suspected by the detection of cold haemagglutinins⁴ (discovered in the present case owing to an abnormal MCV) and is confirmed by measuring either serial complement-fixing or growth-inhibiting antibody titres. A definite diagnosis is important because, although antimicrobial treatment is ineffective,⁵ the prognosis for a full recovery is generally good.

I thank Dr Maurice Gross for permission to report this case, and Professor H P Lambert for helpful advice.

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³ Thomas, L, Davidson, M, and McCluskey, R T, *Journal of Experimental Medicine*, 1966, **123**, 897.

⁴ Sköldenberg, B, *British Medical Journal*, 1965, **1**, 100.

⁵ Taylor, M J, *et al*, *Journal of the American Medical Association*, 1967, **199**, 813.

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Pregnancy and lactation after pituitary surgery

We report the clinical and biochemical features of a patient with a prolactin-secreting pituitary adenoma who conceived after trans-sphenoidal surgery and who lactated in the puerperium despite unusually low postpartum serum prolactin concentrations.

Case report

A 34-year-old woman presented to the endocrine clinic in November 1973 with a six-month history of amenorrhoea (after 10 years' oligomenorrhoea) and a five-year history of gradually increasing body hair. She was a thin

woman (54.8 kg) with normal secondary sexual development and mild hirsutism of the face, trunk, and limbs. The results of investigations at this time included normal basal gonadotrophin concentrations, thyroxine, testosterone, and 24-hour urine oxogenic steroids and oxosteroids. The skull x-ray film was reported as normal. She was given two courses of clomiphene citrate but failed to ovulate. At routine follow-up in August 1974, a serum prolactin concentration measured for the first time was found to be very high, at 350 µg/l (normal <15 µg/l VLS-1). Again, the concentrations of gonadotrophins, both basal and LH-RH-stimulated concentrations, were within the normal range. Tomography of the pituitary fossa showed an asymmetrical enlargement consistent with the presence of a prolactin-secreting pituitary tumour. A lumbar air encephalogram (AEG) showed no evidence of suprasellar extension of the tumour.

In July 1975 a transsphenoidal adenectomy was performed (Mr R A Williams). Postoperatively her prolactin level was 11.4 µg/l; gonadotrophin, TSH, and ACTH secretion were normal. Ovulatory menstruation resumed within a month of surgery, her last menstrual period was on 15 October 1975, and pregnancy was confirmed in December 1975. She had an uncomplicated pregnancy and delivered a normal child on 28 July. Postnatally her breasts became engorged and she was able to breast feed normally until six weeks postpartum, when she elected to change to bottle feeding. Prolactin concentrations throughout the pregnancy remained at about 15 µg/l and did not change significantly in the puerperium (see figure). Despite adequate lactation there was no rise in prolactin in response to suckling at one week postnatally. There was a small increase in prolactin after TRH (see figure).

Discussion

The association of hyperprolactinaemia and amenorrhoea, irrespective of the presence of galactorrhoea, is now well established, and this patient shows many of the typical features of this syndrome.¹ In this case the finding of a very high prolactin concentration was associated with the presence of radiological changes of a pituitary tumour. Treatment of the patient with a radiologically apparent prolactinoma who wishes to become pregnant is controversial¹ but at this centre transsphenoidal surgery is the treatment of choice when the AEG indicates that there is minimal or no suprasellar extension.² After removal of the adenoma her serum prolactin concentration fell to within the normal range; there was no evidence of hypopituitarism; and ovulatory menstruation resumed without further treatment within a month of surgery. This illustrates that the reproductive disorder of hyperprolactinaemic amenorrhoea is readily repaired by effective reduction of prolactin, whether by medical or surgical means.²

In the normal woman prolactin concentrations rise steadily during pregnancy, to reach levels of about 100 µg/l in the third trimester, and remain high in the week after delivery. Thereafter, basal levels may return to normal, but, for two to three months suckling produces a steep rise in prolactin concentrations.³ In our patient prolactin concentrations remained relatively low, and unchanged, during pregnancy and the puerperium and suckling at one week postpartum failed to produce a rise of prolactin. Nevertheless, this patient was able to lactate adequately. Lactation may occur without a rise in prolactin concentrations, as is the case of some patients who have galactorrhoea,^{1,4} and in normal women studied late in the puerperium.³ The reason for this is not yet entirely clear, though recently it has been postulated that prolactin can induce and maintain its own receptor population in mammary tissue.⁵ Hence the concentration of 15 µg/l in this patient was possibly sufficient to maintain an adequate number of prolactin receptors in the breast, and thereby sustain lactation.

The reagents for the prolactin assay were generously supplied by the National Pituitary Agency of the United States of America.

¹ *New England Journal of Medicine*, 1976, **295**, 954.

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Serial serum prolactin concentrations during pregnancy and the puerperium.