tion, would facilitate the swallowing of air into the stomach. This may have been further exacerbated by the use of both a tight-fitting oxygen mask in the ambulance and a nebuliser on arrival at hospital.

- ¹ Watts HD. Lesions brought on by vomiting: the effect of hiatus hernia on the site of injury. *Gastroenterology* 1976;**71**:683-8.
- ² Darke SG, Bloomfield E. Case of complete gastric rupture complicating resuscitation. *Br Med J* 1975;iii:414-5.
- ³ Solowiejczyk M, Koren E, Wapnick S, Mandelbaum J. Rupture of the stomach following mouth-to-mouth respiration. *Postgrad Med J* 1974;**50**:769-72.
- ⁴ Fenton ESN. A danger of nasal catheter used as a means of oxygenation postoperatively. *Br J Anaesth* 1956;**28**:220-1.
- ⁵ Olsen VB, Foley TJ. The air-sucker's gastric rupture syndrome. *Am J Surg* 1961;**102**:602-6.

(Accepted 28 May 1982)

Royal Infirmary, Edinburgh EH3 9YW

MARGARET M MCQUEEN, FRCSed, surgical registrar (now at Princess Margaret Rose Orthopaedic Hospital, Edinburgh)
JOHN M GOLLOCK, FRCSed, senior surgical registrar

Respiratory Unit, Northern General Hospital, Edinburgh EH5 2DQ

RONALD J FERGUSSON, MRCP, registrar

Accidental administration of ergometrine to newborn infant

We describe a neonate who was accidentally given an adult dose of ergometrine after birth. The infant soon became ill with respiratory failure, convulsions, acute renal failure, and temporary lactose intolerance.

Case report

A baby born normally at full term weighing 2670 g and with good Apgar scores was accidentally given 0.5 mg ergometrine by intramuscular injection immediately after birth instead of vitamin K. One hour later she had a cyanotic episode, from which she recovered quickly. By the age of 2 hours she needed 40% inspired oxygen to maintain a transcutaneous partial pressure of oxygen of 6.7 kPa (45.53 mm Hg). Her oxygen requirement increased gradually, and by the age of 16 hours she needed inspired oxygen of 70%. Progressive respiratory failure was treated with continuous positive airway pressure and subsequently with intermittent positive-pressure ventilation.

Brief apnoeic attacks at 2 hours were followed by generalised convulsions that persisted until 48 hours and were treated with paraldehyde, phenobarbitone, and diazepam.

Only 7 ml of urine had been voided by 36 hours. When she was 10 hours old serum electrolyte concentrations were normal. At 36 hours potassium concentration was greater than 8 mmol/l (mEq), urea concentration was 8.5 mmol/l (51 mg/100 ml), and serum creatinine concentration was 317 mmol/l (3.6 mg/100 ml). At this stage she was transferred to the Birmingham Children's Hospital. Peritoneal dialysis was started at the age of 47 hours and continued until the age of 65 hours, by which time she was passing small amounts of bloodstained urine spontaneously. She was weaned off the ventilator by the 5th day.

At the age of 5 days breast-feeding was started but she developed watery diarrhoea with sugar-containing stools. She was therefore fed Pregestimil. At the age of 6 weeks she was reintroduced to an artificial feed based on cows' milk and tolerated this.

An electroencephalogram on day 3 showed "abnormal brain function," but subsequent electroencephalograms on days 8 and 24 were normal.

Subsequent follow-up to 1 year showed a developmentally normal infant.

Comment

Three cases of accidental administration of Syntometrine (oxytocin plus ergometrine) have been described.¹⁻³ In all three 1 ml Syntometrine containing five units oxytocin and 0.5 mg ergometrine maleate was given accidentally. The three infants had similar symptoms with respiratory problems and convulsions to those described here, but our infant is the only one reported who was given ergometrine alone and differed from the three others by also developing acute renal failure.

Ergometrine is widely used to reduce the incidence and extent of postpartum haemorrhage. It causes smooth-muscle spasm of various organs. Respiratory problems are due to pulmonary vasoconstriction and depression of the respiratory centre. Convulsions are probably due to depression of inhibitory influences from the reticular system and to a decrease in cerebral blood flow. Acute renal failure and transient lactose intolerance probably result from ischaemia of the kidneys and small intestine.

There is no antidote to ergometrine, and the treatment of acute ergometrine poisoning is supportive. Babies should receive intensive care: they are likely to need ventilatory support, and there may be a case for using a pulmonary vasodilator—for example, tolazoline—or a directly acting general vasodilator like sodium nitroprusside. Urinary output and serum electrolyte and creatinine concentrations should be monitored, and dialysis may be needed if acute renal failure occurs.

The toxic effects of ergometrine appear to be temporary and reversible, and in the reported cases, where supportive treatment was successful, the children appear to have recovered completely.

We thank Dr J Insley for allowing us to report this case, and Mrs H Forrester for typing the manuscript.

- ¹ Kenna AP. Accidental administration of syntometrine to a newborn infant. *Br J Obstet Gynaecol* 1972;**79**:764-6.
- ² Whitfield MF, Salfeld SAW. Accidental administration of syntometrine in adult dosage to the newborn. *Arch Dis Child* 1980;**55**:68-72.
- ³ Brereton-Stiles GC, Winship WS, Goodwin NM, Roos RF. Accidental administration of syntometrine to a neonate. *S Afr Med J* 1972;**46**:2052.

(Accepted 26 May 1982)

Bromsgrove General Hospital, Bromsgrove, Worcestershire

S K PANDEY, MRCP, DCH, registrar in paediatrics
C I HAINES, MRCP, DCH, consultant paediatrician

Lupus-like syndrome induced by methyldopa

Methyldopa has been shown to be clearly associated with the development of antinuclear antibodies. Few cases of isolated lupus erythematosus cell phenomena induced by methyldopa have been reported, and none of the patients showed clinical features of systemic lupus. We report on a patient who developed a lupus-like syndrome while taking methyldopa.

Case report

A 48-year-old woman was admitted with a history of malaise, generalised weakness, arthralgia, morning stiffness, and Raynaud's phenomenon of 12 months' duration. She had been taking methyldopa 250 mg three times daily for two years for arterial hypertension. On admission blood pressure was 180/100 mm Hg. Further physical examination showed no abnormalities. No rash or signs of joint inflammation were observed. Fundoscopy, electrocardiography and a chest x-ray film were normal.

Blood glucose, plasma creatinine and urate, and electrolyte concentrations were normal, as were results of liver function tests and protein electrophoresis. Erythrocyte sedimentation rate was 24 mm in the first hour. Haemoglobin concentration was 11.4 g/dl. Red-cell morphology, platelet count, and white cell count were normal. Microscopy of the urinary deposit yielded normal results. There was no glucosuria or proteinuria. Isotopic study of separate renal function and intravenous pyelography with rapid-sequence films were normal.

A direct Coombs' test and a test for lupus erythematosus cells gave positive results. Rheumatoid factor was absent. Antinuclear and antithyroid microsome antibodies (the latter with a titre of 1/6400) were present. Anti-smooth muscle, anti-parietal cell, antimitochondrial, and antithyroglobulin antibodies were absent. Anti-double-stranded DNA was absent but anti-single-stranded DNA present. Cold agglutinins and cryoglobulins were absent. Complement was normal. IgA and IgG concentrations were within normal limits, but the IgM concentration was raised at 367 mg/100 ml (normal 50-150).

Methyldopa was stopped and within two weeks the Raynaud's phenomenon, arthralgia, and other symptoms had disappeared completely. Three months later a Coombs' test was negative and titres of antinuclear and antithyroid microsome antibodies had declined. A test for lupus erythematosus cells, however, was still positive. Erythrocyte sedimentation rate was 17 mm in the first hour. Blood pressure was controlled with atenolol 100 mg a day.

Comment

In the present case the evolution of the clinical findings clearly indicated a relation of this lupus-like syndrome to administration of methylodopa. Methylodopa induces a positive Coombs' test in about 20% of patients. Furthermore, a clear association exists between methylodopa and the development of antinuclear antibodies.¹⁻³ Only a few cases of lupus erythematosus cells being induced by methylodopa, however, have been reported. Sherman *et al* in 1967⁴ were the first to report positive results to tests for lupus erythematosus cells in two elderly patients with methylodopa-induced haemolytic anaemia in whom a Coombs' test was positive. In 1968 Harth reported on another patient in whom a Coombs' test was positive who had lupus erythematosus cells but no symptoms suggestive of systemic lupus erythematosus. Three patients have been reported in whom lupus erythematosus cells were found in association with methylodopa-induced hepatic necrosis. One of them also had transient arthritis.⁵ Chan in 1977 reported on a patient with methylodopa-induced fever associated with the development of antinuclear antibodies, lupus erythematosus cells, and ocular disturbance. Antithyroid antibodies have been sought in several cases but have not been found.^{1,4}

To our knowledge the association of Raynaud's phenomenon with arthralgia and lupus erythematosus cells induced by methylodopa has not been reported. Thus in addition to the rare appearance of lupus erythematosus cells the development of a lupus-like syndrome during administration of methylodopa must be added to the list of possible side effects of the drug.

- ¹ Breckenridge A, Dollery CT, Worledge SM, Holborow EJ, Johnson GD. Positive direct Coombs' tests and antinuclear factor in patients treated with methylodopa. *Lancet* 1967;ii:1265-8.
- ² Perry HM, Chaplin H, Carmody S, Haynes C, Frei C. Immunologic findings in patients receiving methylodopa: a prospective study. *J Lab Clin Med* 1971;78:905-17.
- ³ Wilson, JD, Bullock JY, Sutherland DC, Main C, O'Brien K. Antinuclear antibodies in patients receiving non-practolol beta-blockers. *Br Med J* 1978;ii:14-6.
- ⁴ Sherman JD, Love DE, Harrington JF. Anaemia, positive lupus and rheumatoid factors with methylodopa. *Arch Intern Med* 1967;120:321-6.
- ⁵ Eliastam M, Holmes AW. Hepatitis, arthritis and lupus cell phenomena caused by methylodopa. *Am J Dig Dis* 1971;16:1014-8.

(Accepted 2 June 1982)

Department of Internal Medicine, Academisch Ziekenhuis VUB, University of Brussels, Belgium

A DUPONT, MD, assistant
R SIX, MD, professor

Benoxaprofen and papillary necrosis

The cause of renal papillary necrosis remains controversial. Clinical evidence suggests that phenacetin usually taken with aspirin is almost always responsible, but in animal studies nearly all analgesic drugs have been implicated to some degree. We report on a patient who developed papillary necrosis during treatment with the non-steroidal anti-inflammatory agent benoxaprofen.

Case report

A 53-year-old man was referred with an eight-month history of rheumatoid arthritis. His renal function was normal, with urea concentration 4.1 mmol/l (24.6 mg/100 ml) and creatinine concentration 75 µmol/l (848 µg/100 ml). Indomethacin was given initially but changed after a few months to flurbiprofen for better control of symptoms. He took no other analgesics. One year later he developed acute pancreatitis, which settled after 13 days. Renal function was normal during admission, with maximum urea concentration 6.5 mmol/l (39 mg/100 ml) and creatinine concentration 75 µmol/l (848 µg/100 ml). He took no drugs for the next four months but then, because of worsening symptoms, benoxaprofen 600 mg daily was given for 10 weeks. He then presented with a two-week history of haematuria and dysuria associated with a 'flu-like illness and a one-week history of epigastric pain and vomiting.

On examination he was feverish, jaundiced, dehydrated, confused, and oliguric. Investigations showed urea concentration 57 mmol/l (342 µg/100 ml), creatinine concentration 960 µmol/l (10.9 mg/100 ml), alkaline phosphatase

activity 514 U/l, aspartate transaminase activity 68 U/l, alanine transaminase activity 70 U/l, bilirubin concentration 149 µmol/l (8.7 mg/100 ml), and amylase activity 198 U/l. Haemoglobin concentration was 9.9 g/dl and white cell count $11.7 \times 10^9/l$. The initial diagnosis was acute renal failure secondary to septicaemia related to urinary or biliary tract infection. He required haemodialysis and received gentamicin and metronidazole. Urine cultures grew *Escherichia coli*, and intravenous pyelography showed normal-sized, poorly functioning kidneys. The jaundice cleared after a week but his oliguria persisted.

A month later retrograde pyelography showed a normal right kidney but the left ureter could not be catheterised. Renal biopsy showed 17 normal glomeruli with florid interstitial nephritis, interstitial oedema, and mononuclear cell infiltrate. One interlobular artery was seen showing pronounced crescentic subintimal thickening. As prednisolone did not improve his renal function regular dialysis was begun. Two months later he collapsed and died during dialysis. Necropsy showed a fresh papillary muscle infarct. The kidney showed extensive in-situ papillary necrosis with virtually all papillae necrotic and partially sloughed (figure). A walled off perforation of the sigmoid colon was found, which in retrospect may have been responsible for his septicaemia.

Extensive in-situ papillary necrosis.

Comment

Our patient had taken modest amounts of indomethacin and flurbiprofen before taking about 45 g benoxaprofen. We consider benoxaprofen to be the most likely cause of the papillary necrosis since there was no history of consumption of any other analgesic despite repeated questioning, and the finding that all papillae were at the same stage of necrosis suggested a recent insult.

The Committee on Safety of Medicines has received one other notification of papillary necrosis associated with benoxaprofen (personal communication), and we have found three documented cases of papillary necrosis associated with other non-steroidal anti-inflammatory drugs—namely, phenylbutazone,¹ fenoprofen,² and fenoprofen with aspirin.³ In our patient we suspect that administration of benoxaprofen led to interstitial nephritis with subsequent development of papillary necrosis. While there is no reason to suggest that benoxaprofen is particularly nephrotoxic, clearly phenacetin is not the only drug that can cause papillary necrosis. Awareness of this effect of non-steroidal anti-inflammatory drugs should lead to tests of renal function and urine analysis for blood and protein being done more often; in this way the incidence of interstitial nephritis and papillary necrosis could be more accurately defined.

- ¹ Wiseman EH, Reinert H. Anti-inflammatory drugs and renal papillary necrosis. *Agents Actions* 1975;5:322-5.
- ² Husserl FE, Lange RK, Kantrow CM. Renal papillary necrosis and pyelonephritis accompanying fenoprofen therapy. *JAMA* 1979;242:1896-8.
- ³ Huskisson EC, Wojtulewski JA, Berry H, *et al*. Treatment of rheumatoid arthritis with fenoprofen: comparison with aspirin. *Br Med J* 1974;ii:176-80.

(Accepted 2 June 1982)

Renal Unit, Royal Infirmary, Glasgow G4 0SF

L ERWIN, MB, MRCP, registrar
J M BOULTON JONES, MB, MRCP, consultant physician