The First Year of Life

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CONVULSIONS IN THE NEWBORN

Although the involuntary movements of a convulsion are usually generalised, they may affect only one limb, the face, or tongue. The distinctive feature is repetitive jerky movements, which may be accompanied by loss of consciousness, apnoea, or rigidity. Often the convulsion has stopped by the time the baby is seen by a doctor. A brisk Moro reflex or jerky normal movements in a baby may be misinterpreted as a convulsion by an inexperienced observer. If the convulsion is not seen apnoea or cyanosis may indicate that it has occurred, and if there is any doubt it is safer to investigate the baby on the assumption that there has been a convulsion.

Management

If the baby is not already in hospital he should be admitted. After hypoglycaemia has been excluded by a Dextrostix test an anticonvulsant should be given while waiting for the results of other investigations. The order of carrying out the various procedures is important. Hypoglycaemia and hypocalcaemia should each be sought for and excluded in that order before the next test. Hypoglycaemia is the more dangerous condition.

If the plasma glucose and calcium concentrations are normal a paediatrician should decide whether a lumbar puncture is indicated.

Immediate management

The infant is placed on his side and the airway cleared by suction of the pharynx under direct vision. The baby should be nursed in an incubator to improve observation. Oxygen is given in high concentration with a funnel or head-box until convulsions cease.

Hypoglycaemia

A specimen of blood should be taken from a heel prick immediately for a Dextrostix test. If the value is less than 1.4 mmol/l (25 mg/100 ml) hypoglycaemia may be present. A further blood sample should be taken and part of it used to repeat the Dextrostix test and the remainder taken into a fluoride tube for the laboratory to check the blood glucose concentration. If the second Dextrostix value is low, 2-4 ml of 20% glucose solution per kg body weight should immediately be given intravenously slowly by a scalp or limb vein. A continuous intravenous infusion of 10% glucose solution is then set up.

Hypoglycaemia accompanied by fits is treated with intravenous glucose and when the fits have ceased continuous intragastric milk should be given.

The amount of intravenous glucose should be reduced gradually over at least 24 hours, during which three-hourly Dextrostix tests are carried out, supplemented by regular laboratory blood glucose measurements. If an intravenous infusion of glucose is stopped suddenly by accident severe reactive hypoglycaemia may follow and cause severe convulsions.

In contrast asymptomatic hypoglycaemia has a good prognosis. Intragastric milk should be given by continuous infusion but the milk should be increased by 25% to raise the blood glucose concentration. Oral or intravenous glucose should be prescribed only on the advice of a senior member of the unit.

Hypocalcaemia

If the Dextrostix test result is normal blood should be taken for emergency plasma calcium estimation. If convulsions are still occurring or recur after hypoglycaemia has been excluded by the Dextrostix test, intramuscular paraldehyde should be given while the results of detailed tests are awaited. If the plasma calcium concentration is lower than 1.8 mmol/l (7 mg/100 ml) treatment depends on whether the convulsions are still occurring or recurring. If the convulsions have stopped 1-2 ml of 10% calcium gluconate is added to each feed, which should be either human or low solute milk. The calcium gluconate should be added to the feed and not given directly to the infant. The total dose of calcium gluconate in 24 hours should not exceed 12 ml of the 10% solution.

If the convulsions continue and the plasma calcium concentration is low 10% calcium gluconate should be diluted to 2.5% with 5% glucose solution in a syringe and given slowly intravenously into a scalp or limb vein until the convulsions cease or until a maximum of 4 ml/kg body weight of the 2.5% diluted solution has been given. The heart rate is monitored with a cardiac monitor or stethoscope during the procedure and the injection stopped if bradycardia occurs. Calcium gluconate should be added to the feeds until the plasma calcium concentration rises to normal. Calcium gluconate must never be given intramuscularly or allowed to escape out of a vein as severe tissue necrosis may occur.

Hypomagnesaemia

In some units there is a high incidence of fits associated with low plasma magnesium concentrations. If there are recurrent fits or the plasma calcium concentration does not rise despite supplementary calcium gluconate the plasma magnesium concentration should be estimated. If this is less than 0.6 mmol/l (1.5 mg/100 ml) intramuscular magnesium sulphate is given. The dose is 0.2 ml/kg of a 10% solution given intramuscularly every six hours; if the value is normal no further treatment is needed. The plasma estimation must be repeated after two days. The main toxic effect is hypotonia, which can be reversed by intravenous calcium gluconate if the features are severe.

Prognosis

Hypoglycaemia and hypocalcaemia may be found together, especially in infants of diabetic mothers, but hypoglycaemia is the more dangerous. Symptomatic hypoglycaemia may be followed by mental impairment but symptomatic hypocalcaemia or hypomagnesaemia has an excellent prognosis although enamel hypoplasia, which predisposes to dental caries, is a late complication of hypocalcaemia. Intravenous glucose is not hazardous but intravenous calcium salts may lead to cardiac arrest.

Cerebral lesions

If the convulsions are not controlled by a single dose of paraldehyde and calcium and magnesium concentrations are normal advice should be sought about the special investigations available for cerebral haemorrhage or rare causes of convulsions, including organic acidaemia and pyridoxine deficiency.

Features suggestive of a cerebral lesion are lethargy, raised tension of the anterior fontanelle, and hypotonia. Meningitis may be present with no specific symptoms or signs.

If the final diagnosis is cerebral birth trauma phenytoin or phenobarbitone should be given for about 48 hours. Diazepam is an effective anticonvulsant but an intravenous dose lasts only about 15 minutes, and depression of the respiratory centre may easily occur if the drug is given too quickly or in an excessively high dose.

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Taking blood

Capillary blood taken from infants aged up to 2 years can be used for a variety of tests. The commonest is the Guthrie test, but capillary blood may also be used for Dextrostix testing, haemoglobin estimations, and most biochemical tests.

The best site for taking capillary blood from an infant aged under 6 months is the heel. In older infants the thumb is a better site. The heel must be warm. If it is cold the infant's foot should be dipped into hand-hot water (40°C) for five minutes and dried thoroughly. The examiner then holds the infant's foot by encircling the ball of the heel with his thumb and forefinger. The site selected for the heel prick must be on the side of the heel; if the ball or back of the heel is used a painful ulcer may form.

The site is wiped with isopropyl alcohol and allowed to dry. A disposable lancet is inserted into the heel about 2 mm and then withdrawn. As the examiner withdraws the lancet he should cut very slightly sideways. The initial drop of blood should be wiped away with a dry cotton swab and succeeding drops allowed to drip into the container, on to the Guthrie test card, or on to the end of a Dextrostix. To milk blood into the heel the examiner should squeeze and release his fingers around the infant's calf and keep the heel below the rest of the leg. Up to 2 ml of blood can be obtained. When the required volume has been obtained the heel is wiped and the wound pressed with a clean cotton wool ball. A small plaster should then be applied.