Monoparesis

Complication of constant positive airways pressure

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Turner, T., Evans, J., and Brown, J. K. (1975). *Archives of Disease in Childhood*, 50, 128. **Monoparesis: complication of constant positive airways pressure.** Erb's palsy has been observed in 2 infants who had been treated with constant positive airways pressure for idiopathic respiratory distress syndrome. Both infants made complete neurological recovery from what was thought to be an acquired injury from the neck seal.

Since Gregory, *et al.*, (1971) described the use of constant airways pressure (CPAP) in the management of the idiopathic respiratory distress syndrome (RDS) many centres have used modifications of his technique. In the course of developing this method of intensive neonatal care in our unit we have used CPAP with considerable success both with and without an indwelling endotracheal tube. While we have observed no major complications with the former method, we have now observed on two occasions the development of an acute but transient monoparesis of the Erb's variety during and after the use of a head box supplied by Vickers Medical Limited. Using the neck seal in the fashion described by the manufacturers, with CPAP pressures not exceeding 10 cm H₂O, 2 infants who appeared to be progressing satisfactorily developed Erb's palsies.

Case reports

Case 1. A male infant, birthweight 2440 g, delivered at 37 weeks' gestation by caesarean section for pre-eclampsia, developed RDS within 2 hours of birth. Despite high inspired oxygen concentrations in a simple head box he continued to deteriorate both clinically and biochemically. At 24 hours of life CPAP in a Vickers head box was started at 10 cm H₂O pressure with rapid improvement in the infant's condition. After 84 hours in CPAP this was discontinued. Despite recommended nursing care of the neck area (Gregory, 1973), considerable excoriation was noted in the posterior region at the site of the neck seal. On the 7th day of life the infant was noted for the first time to

have developed a flaccid, right upper limb, lower motor neurone palsy with associated oedema in the right posterior triangle of the neck. This was thought to be the result of local pressure from the CPAP neck seal. Dexamethasone was given intramuscularly in a dose of 2 mg immediately and 1 mg 6-hourly for 72 hours with improvement in the local oedema but none in the monoparesis. The monoparesis was initially dense, affecting both the shoulder girdle muscles and the muscles supplied by C5, 6, 7 (Fig.). Deltoid and biceps were totally paralysed, M.R.C. muscle power grade 0 (Medical Research Council, 1943). Rhomboids and trapezius were also very weak so that the shoulder girdle could be moved up and down over the chest wall. Electromyography showed complete electrical silence in supraspinatus, rhomboids, biceps, and deltoid on the right. There was an incomplete interference pattern in the right triceps and extensor digitorum muscles. Long finger flexor muscles were normal. There was no evidence of fibrillation. With passive movement physiotherapy there was a slow improvement, and follow-up electromyography 26 days later showed marked improvement in the right deltoid with an incomplete interference pattern and normal motor units with no fibrillation or evidence of denervation. There was a similar improvement in other muscle groups tested. At 6-month follow-up examination there was no evidence of any residual paresis.

Case 2. A male infant, birthweight 2830 g, born at 36 weeks' gestation by spontaneous vertex delivery, developed classical RDS within 2 hours of birth. Despite high oxygen concentrations in a simple head box, the clinical and biochemical status of the infant deteriorated and he was transferred to our care at 30 hours. He was treated initially with CPAP through an endotracheal tube but his condition deteriorated and he

(a)

(b)

FIG.—(a) Case 1. Marked excoriation and ulceration of posterior cervical region after 84 hours in CPAP with headbox. (b) Typical Erb's palsy of right upper limb appearing 6 days after first application of neck seal.

required ventilation by intermittent positive pressure ventilation at 56 hours of life for 24 hours. At 80 hours he was changed to CPAP maintained at 8 cm H₂O pressure in a head box. This was continued for 47 hours when it was noted that he had developed a left upper limb lower motor neurone paresis. He was rapidly weaned from CPAP and on examination of the neck no obvious abnormalities were observed. On neurological examination there was evidence of weakness in the shoulder girdle muscle group and the classical signs of an Erb's palsy affecting C5, 6, 7. Electromyography showed normal motor units and interference pattern in supraspinatus and extensor digitorum. The deltoid had normal motor units with incomplete interference pattern but no insertional activity, spontaneous activity at rest, or fibrillation. Biceps was more severely affected with scanty motor units and fibrillation on insertion and with marked fibrillation at rest in one area of muscle sampled. After passive physiotherapy there was a rapid clinical improvement and at 14 days

the electromyogram showed return to normal activity in all muscle groups, biceps showing a near complete interference pattern with normal motor units and no fibrillation in the areas of muscle sampled.

Discussion

Erb's palsy is a fairly common complication of traumatic delivery in mature infants delivered by breech extraction or with shoulder dystocia but is less frequently seen in the preterm infant (*British Medical Journal*, 1972; Eng, 1971). It is commonly diagnosed within 24 hours of birth and is usually transient with an excellent prognosis. The development of Erb's palsy in the situation described has not to our knowledge been described previously. We believe that it is the result of root ischaemia due to pressure from the neck seal. Neither infant had a Horner's syndrome and both were otherwise neurologically intact. The first infant showed a complete conduction block and then recovery with no evidence of denervation or loss of continuity of axons. Though the second infant showed patchy fibrillation in biceps suggesting denervation, this appeared 5 days after first application of the neck seal. Intensive observation and several examinations before application of CPAP showed no abnormality of the limb and there is nothing to support birth trauma rather than the neck seal as a cause. A further interesting observation in support of an ischaemic hypothesis is the occasional cyanosis or oedema of one upper limb seen after application of the neck seal suggesting subclavian compression.

We postulate that ischaemia to the plexus is at root level since the nerve to rhomboids is affected, yet the sympathetic rami to the eyelid are spared.

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