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Obstetric Brachial Paralysis

VA NOTTIDGE*

Summary

Nottidge VA. Obstetric Brachial Paralysis. *Nigerian Journal of Paediatrics* **1985; 12:75.** Forty-eight children with obstetric brachial plexus injuries were seen in the paediatric neurology clinic of the University College Hospital, Ibadan, over a 3-year period; this was 2.3% of clinic referrals for the period. There was no difference in sex incidence or the side affected. Asphyxia at birth, occurred in 12.5%, while 39.6% were described as being big at birth. Isolated Erb-Duchenne palsy occurred in 85.4%; 6 patients had injury affecting the entire plexus and sensory loss occurred in 37.5%. Only 26% of 42 treated patients had good recovery. This low rate of recovery was due to inadequate facilities for physical, social and psychologic rehabilitation. It is concluded that environmental factors are important in the causation of this disease in Nigeria.

Introduction

ACCORDING to Morrison,[1] Duchenne first described four cases of subacromial subluxation in 1861 and also described obstetric brachial paralysis in 1872 before Erb pioneered the use of faradic stimulation in the evaluation of upper brachial injuries in 1874. Later, Klumpke[2] reported her observations of brachial palsy, drawing attention to lesions due to injury of the lower roots and the consequent pupillary abnormalities associated with sympathetic involvement. More recently, Adler and Patterson[3] have reported significant deformities in their study of 88 patients with obstetric brachial palsy, who were followed up into adult life. The Nigerian child with brachial plexus injury has, hitherto, received scant attention. This communication therefore, reports a 3-year study of this paralysis at the University College Hospital (UCH), Ibadan.

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Patients and Methods

All the patients were referred to the paediatric neurology clinic, UCH, Ibadan, between April 1980 and March 1983. Patients with brachial palsy due to non-obstetric causes were excluded. The study was essentially clinical since facilities for electromyography (EMG) and sensory nerve conduction were not available. The diagnosis was based, in each case, on the following clinical criteria except where otherwise indicated:

A *Upper Brachial (Erb-Duchenne) Palsy*

(*i*) Absent Moro reflex in early infancy, but with no limitation of passive movement and no tenderness.

(*ii*) When the patient was in the sitting or standing position, the arm hung limply

to the side and was internally rotated or there was a tight adduction with internal rotation at the shoulder.

(*iii*) Extension and pronation of the elbow.

(*iv*) Flexion of fingers with thumb adduction resulting in the characteristic "waiter's tip" posture.

(*v*) Absent deep tendon reflexes in the biceps, triceps and brachioradialis.

(*vi*) Normal roentgenograms of the affected limb.

B *Lower Brachial (Klumpke's) Paralysis*

(*i*) Ability to flex the elbow.

(*ii*) Wrist extension.

(*iii*) Hyper-extension at the metacarpo—phalangeal joints.

(*iv*) In chronic cases, claw hands which were atrophic and were often dry.

C *Whole Plexus (Erb-Duchenne-Klumpke) Palsy*

A combination of the above criteria with an extended elbow.

Sensory loss at initial evaluation was accepted only if confirmed at re-evaluation two weeks later. Also, anaesthesia over C_7 was accepted if there was no sensory loss over both C_6 and C_8.

Treatment was by physical therapy consisting initially of passive exercises till recovery of muscle tone was observed, after which graded, active exercises were introduced. Electrotherapy by galvanic stimulation was started early, to prevent fibrosis of denervated muscle. Night splints were used but long-term protective splinting was avoided because of the unacceptably high incidence of contractures resulting from it.

Recovery was graded as follows:

(*a*) *Good*, if there was no significant dysfunction or deformity.

(*b*) *Satisfactory*, if the patient could get the hand to the mouth without abduction and flexion of the shoulder and forward flexion of the head and neck. In effect, this occurred if shoulder abduction was less than 90° and external rotation was reduced by more than 20° and

(*c*) *Poor*, if there was inability to get the hand to the mouth. This was often associated with delay in bone growth of the affected arm.

Results

There were 48 patients (24 males and 24 females) with obstetric brachial palsy seen over the 3-year study period, out of a total clinic referral of 2053. The incidence of this palsy was therefore, 2.3% of the total clinic referrals.

All the children were singletons. Twenty-three of them (47.9%) were delivered in government, mission or University hospitals while 19 (39.6%) were delivered in private maternity clinics. Only 6 patients (12.5%) were delivered by traditional birth attendants.

Table I shows the age at first presentation. The majority (89.6%) presented before 3 months of age, but 5 children (10.4%) presented late, at 6–46 months of age.

Maternal parity and delivery

Maternal parity is shown in Table II. It will be observed that only 5 of the mothers were primigravidae.

TABLE I

Age at presentation of 48 Children with Obstetric Brachial Paralysis

Age	*No of Patients*	*% of Total*
0–4wks	22	45.8
5 wks–3 months	21	43.8
> 3 months	5	10.4
Total	48	100.0

TABLE II

Parity of the Mothers of 48 Children with Obstetric Brachial Paralysis

Previous Deliveries	*No of mothers*	*% of Total*
0*	5	10.4
1	5	10.4
2	5	10.4
3	22	45.8
4	5	10.4
5	3	6.3
9	3	6.3
Total	48	100.0

* Primigravida

Information on the mode of delivery was available for 45 patients, since 3 mothers claimed that they could not remember the mode of delivery. Forty–two (93.3%) of these 45 patients were vertex presentation while two were breech and the remaining one was a transverse lie. Eleven children were products of spontaneous unassisted vertex deliveries. Assistance in 34 cases comprised instrumentation in six (5 forceps and one vacuum extraction), emergency Caesarean section for arm prolapse in one, breech delivery in two, manual assistance for shoulder arrest in 4 and unspecified manual assistance in 12. Nine were described as having been "pulled out". One of these was delivered at a private maternity clinic after prolonged labour culminating in a perineal tear. She sustained Erb-Duchenne-Klumpke paralysis. This patient had an elder sib who had Erb-Duchenne palsy following delivery at the same clinic. Six children (12.5%) were reported to have been asphyxiated at birth and 19 (39.6%) were described as big babies.

Injuries sustained

Paralysis involved the left arm in 25 and the right in 22, while one patient had bilateral upper brachial paralysis associated with breech delivery. Forty–one (85.4%) of the patients had Erb-Duchenne palsy while one had Klumpke's paralysis and the other 6 (12.5%) had injury affecting the entire plexus (C_5—T_1), which resulted in flail anaesthetic arms, with associated Horner's syndrome in one. Four of these six children were delivered in private maternity clinics, while the other 2 were delivered in government hospitals. Sensory loss (Table III) occurred in 18 patients (37.5%); the greatest vulnerability was at C_5.

TABLE III

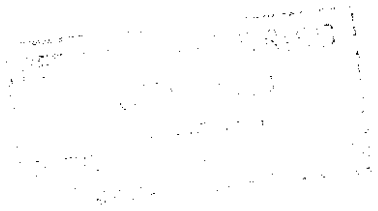
Spinal Roots involved in Sensory Loss among 18 Children with Obstetric Brachial Palsy*

Spinal Root	*No of Patients*	*% of Total*
C 5	11	61.1
C 6	8	44.4
C 7	5	27.8
C 8	5	27.8
T 1	—	—

*More than one root was involved in many patients.

Response to treatment

After the initial evaluation, 42 children returned for treatment and follow-up for periods ranging from one month to three years, the remaining 6 having defaulted after the first attendance; these consisted of one neonate, 3 of those who presented between 5 weeks and 3 months and 2 late attenders. Recovery achieved is shown in Tables IV and V. Twelve of the 18 children with sensory loss recovered sensation in



three to six months, the other six being those children who had Erb-Duchenne-Klumpke paralysis.

TABLE IV

Response to Treatment related to Age at Presentation in 42 children with Obstetric Brachial Paralysis

Age at Presentation	*Grade of Recovery*			*Total*
	Good	*Satisfactory*	*Poor*	
0-4 weeks	7	5	9	21
5 wks-3 months	4	4	10	18
> 3 months	–	–	3	3
Total	11	9	22	42

Discussion

Obstetric brachial palsy is principally a clinical diagnosis, but investigative procedures like EMG and sensory nerve conduction,[4] as well as axon reflex test,[4 5] are useful in assessing prognosis. They help to differentiate between pre- and post-ganglionic lesions, the former having a worse prognosis. Electromyography, performed about one month after injury, when Wallerian degeneration should have been completed, can also be used to determine motor activity, or early recovery that is too subtle to be detected by clinical examination. These tests could not be undertaken in this study due to lack of facilities. Myelography was not used because of uncertainty about its specificity in this injury.[6-8] A two-week precautionary delay for re-examination was imposed in this study because of the difficulties of sensory testing in

TABLE V

Recovery Status in 42 Children in relation to Age at Presentation and Duration of Treatment

Recovery Status	*Age at Presentation*									*Total*
	0–4 wks			5 wks–3 mon			> 3 mon			
	Duration of treatment (mon)			*Duration of treatment (mon)*			*Duration of Treatment (mon)*			
	<3	3–6	>6	<3	3–6	>6	<3	3–6	>6	
Good	–	–	7	–	–	4	–	–	–	11 (26.2)*
Satisfactory	1	4	–	–	4	–	–	–	–	9 (21.4)
Poor	5	2	2	1	8	1	3	–	–	22 (52.4)
Total	6	6	9	1	12	5	3	–	–	42

*Figures in parentheses represent percentages of total treated

young children. The delay was justified because previous experience by the author and others[9] had shown that recovery of sensation usually occurs late.

Contrary to previous experience, paralysis affected the left arm slightly more often than the right in the present study. Eng,[9] in a study of 25 children, found a 2:1 preponderance on the right. This finding was explained by the more common occurrence of left occipito-anterior presentation, which leaves the right shoulder impinged against the pubic arch for a prolonged period. In our hospital, left occipito-anterior presentation occurs in about 80% of confinements (Adelusi, personal communication); the finding of a slight left preponderance in this study is therefore, unexplained.

The high frequency of Erb-Duchenne palsy compared with Klumpke's paralysis observed in this series, and the relative infrequency of sensory loss, have previously been reported [9 10] and explained.[4 6 11] It is important to note that sensory rootlets are much more resistant to injury because of their structure. Only one child had Horner's syndrome which is a known association in injuries affecting the lower plexus.[12] However, no patient had phrenic nerve paralysis in this study, even though it sometimes occurs when there is proximal extension of the injury to involve C_4.[13 14]

The differential diagnosis of obstetric brachial paralysis includes subluxation of the shoulder, fractures of the clavicle or humerus, syphilitic epiphysitis at the shoulder, pseudo-paralysis of scurvy and temporary loss of use of an arm in a child who has recently been lifted by the arm.[1] Early osteomyelitis of the humerus is also important since it can cause a true brachial neuropathy, probably due to impaired blood flow in the vasa nervorum.[15] Injury to the proximal humeral epiphysis may sometimes mimic obstetric brachial palsy although it presents as restriction of both active and passive movements.[3]

Even though the majority of patients in the present study started treatment within 3 months of injury, only 31.3% attended for more than 6 months and this included all the eleven children who had good recovery. The poor recovery of sensation in those children with Erb-Duchenne-Klumpke paralysis was probably because of the severity of the injury. This study supports a previous finding that prolonged supervision improves the prognosis,[3] contrary to the alternative view that most of the recovery occurs early.[1] The results were adversely influenced by inadequate facilities for physical, social and psychological rehabilitation of both patient and family.

The poor results indicate a need for preventive measures and therefore justify consideration of aetiology, since this is necessary for meaningful prevention. Morrison[1] found cyanosis due to birth asphyxia in 50% of his patients. He speculated that this could be important as the associated hypotonia would facilitate a wide separation between the head and shoulder during delivery thus causing brachial plexus injury. Only 12.5% of our patients were known to be asphyxiated at birth. This suggests that hypotonia due to asphyxia was probably not an important aetiological factor in the majority of these patients. Furthermore, whereas 46% of the mothers in Morrison's study[1] were primigravidae, only 10% of our mothers were in this category. Thus, the injury in our patients was unlikely to have been due to maternal inexperience. Indeed, 68.8% of our mothers were in their fourth pregnancy or after. No satisfactory explanation could be found for the peculiar susceptibility in the fourth pregnancy.

Poor supervision during confinement is an important cause of delivery mishaps, especially delivery of big babies and it appears to be a depressingly common problem of developing countries. In the only instance where brachial paralysis occurred in a sibship in this study, the 2 children were delivered in the same clinic. Furthermore, the majority of mothers in Nigeria

still do not have the benefit of skilled care during pregnancy or at confinement. In rural areas, most of them depend on traditional birth attendants whose competence is not vetted. Comprehensive rehabilitation services are expensive investments and so are likely to remain unattainable in most developing countries for a long time. Therefore, the provision of safe maternity services coupled with greater effectiveness in health education, are the most efficient means of lowering the incidence of this paralysis and the potentially severe deformities[3] resulting from it.

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