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Obstetric Brachial Plexus Palsy – A Retrospective Data Analysis

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Abstract

Background: Obstetric brachial plexus palsy is the condition seen during birth due to any injury to the nerves. There are mainly 3 type's brachial plexus injuries (BPI), namely Erb's palsy, Klumpke's palsy and total plexus palsy. The injury can cause paralysis of upper limb and may lead to deformity. Thus this study aimed at analyzing the prevalence and influences of few physical factors noticed during the clinical practice.

Method: Retrospective data of 28 children with obstetric brachial plexus injury (OBPI) was subjected to statistical analysis. The collected data included age, gender, weight, side of affection, type of delivery and the instrumentation used.

Result: Statistical analysis of the data showed that there was more affection in boys than girls. The frequency of non instrument assisted deliveries was higher in the sample included. There was only one child born through LSCS. Right sided brachial palsy was more in frequency as compared to left sided and bilateral plexus injury. Erb's palsy was most commonly reported than Klumpke's palsy and total plexus palsy. The mean weight of boys was relatively higher than the girls.

Conclusion: The study concluded that gender and birth weight of the new born along with mode of delivery and instrument assisted deliveries influenced the occurrence of OBPI.

Keywords: *Obstetric brachial plexus injury; Birth weight; Vaginal delivery; Erb's palsy*

Introduction

Obstetric brachial plexus palsy (OBPP) is "a flaccid paresis of an arm at birth, with the passive range of motion greater than the active." Erb-Duchenne palsy which resolves within a year is the most commonly occurring injury affecting the C_5-C_6 nerve roots. Klumpke's palsy is the next most commonly occurring affecting the C_8-T_1 nerve roots.[1] Erb's palsy produces a classic "waiters tip" with the forearm being adducted, internally rotated, and the elbow being extended. Total brachial palsy is characterized by complete arm paralysis, decreased sensation, and a pale extremity. Obstetric brachial plexus injury occurs more frequently in males.[2] The incidence of brachial plexus injuries has been shown to vary from 1 to 5 in 1000 deliveries, and this incidence is dependent on the level of healthcare. In Sweden the incidence of brachial plexus palsy as a birth injury is 1.3 in 1000 deliveries, in England it is less than 1 in 1000 deliveries, and in developing countries it is 5 in 1000 deliveries.[3]

Methodology

Ethical permission for the study was obtained from the institutional ethical committee. Consent for publishing the data without revelation of the subjects identity was obtained from the parents of the children who met the inclusion and exclusion criteria. Files of 39 children with upper extremity paresis were identified as being treated for rehabilitation from 2012 to 2019. 11 children were found to have paresis due to nerve injury following post-traumatic reasons such as supra-condylar fractures, road traffic accidents or chemical neuritis etc. The study thus included the data of only 28 children diagnosed with obstetric brachial plexus palsy.

Data like age, gender, type of delivery, birth weight and instrumentation for child birth were collected from the files. The data collected was subjected to analysis.

Inclusion criteria: Data of children, both girls and boys, from 2 days to 6 yrs of age who were born between 37 – 41 weeks of gestation and diagnosed with brachial plexus palsy at birth were included in the study.

Exclusion criteria: Data of children having monoplegia due to causes other than obstetric brachial plexus injury where excluded.

Result

Data of 28 cases with brachial plexus palsy were assessed. The participants included 6 (21.42%) girls and 22 (78.57%) boys with the mean age of 11 months and 5.5 months respectively. The z-score for population proportion showed the proportion of boys being significantly higher than girls with a z-value of -4.2762 and p-value of <0.00001. The birth weight of all the children ranged from 2400 - 5800 gms with a mean weight of 3485.8 gms (±1049.531) The mean birth weight of girls and boys were 3183.3 gms (±799) and 3568.4 gms (±1133) respectively. Out of 28 children 3 children were found to be low birth weight. Highest prevalence of 28.6% children were found to be in the range of 2500 gms - 3000 gms followed by 25% in the range of 3500 - 4000 gms. Children in range of 3000 - 3500 gms and 4000 - 4500 gms were found to be 10.7% each.14% of the children weighed greater than 4500 gms.

The number of children with left sided, right sided and bilateral brachial plexus injury were 11 (39.28%), 16 (57.14%) and 1 (3.5%) respectively. Prevalence of right sided brachial plexus palsy was significantly higher as compared to the others.

One child out of 28 children was delivered by LSCS, which shows that vaginal deliveries are in significant numbers in case of children with brachial plexus injury.

A comparison of instruments used at the time of delivery showed that 11 out of 28 deliveries used vacuum or forceps at the time of delivery (8 vacuum and 3 forceps assisted). Our results showed a significantly higher proportion of non instrument assisted deliveries with a value of z-value of -1.6036 and p-value of 0.1096.

The prevalence of Erb's palsy was the highest at 93% followed by total plexus injury at 7%. No cases of Klumpke's palsy were found in the collected data.

Discussion

The results showed that boys were more likely to be affected than girls. This result is supported by previous articles dated a couple of decades ago4 till the most recent ones[2].The mean weight of the boys was found to be approximately 380 gms greater than that of the girls. This result is consistent with studies which report that average mean birth weight of the male infants is generally higher than the average mean birth weight of female neonates.[2] Our result showed that the highest prevalence of children OBPI were in the range of normal average birth weight for Indian children according to a study.[5] Children weighing above 3000 gms were twice those in the normal weight range. When compared amongst the normal weight and above normal weight this number was significant.

The right sided brachial plexus injury was more prevalent than the left sided and bilateral brachial plexus injury as suggested in the results, however no studies reporting a prevalence of affected sides in BPI were found during the search for review of literature.

The study showed that majority of children who suffered with BPI were delivered through vaginal delivery. This result is supported by a study which reports that vaginal deliveries were 5 times more frequent in cases with plexus injury.6 Approximately 40% of the children were delivered with instrument assistance (forceps or vacuum). This result is consistent with the study which reports that 41% of children with OBPI had an instrument - assisted delivery (forceps, vacuum or both).7 Erbs palsy was the most prevalent type of OBPI in the population studied. No cases of Klumpke's palsy were identified. This result is consistent with the report that the upper brachial plexus is most commonly affected and isolated injury to the lower plexus is rare. 8

Conclusion

We would like to conclude that child's birth weight, gender, type of delivery and instrument assistance for delivery play an important role in the occurrence of OBPI. However these results may be difficult to generalize as the sample size included in this study was small and various other factors like maternal history, etc. were not included. Future studies including all the various foetal,

maternal and obstetric risk factors in our population with the larger sample size may be more appropriate.

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