Survey of Paralytic Strabismus: A Regional Survay

Abdolreza Medghalchi*

Department of Ophthalmology Amiralmomenin Hospital, School of Medicine, Rasht University of Medical Sciences, Guilan, Iran

Received: 4 May 2007; Received in revised form: 9 Jul. 2007; Accepted: 4 Jan. 2008

Abstract- One of the important causes of strabismus in all ages is extraocular muscles paralysis due to 3rd, 4th and 6th cerebral nerve palsies. Exact and on-time treatment can result in improvement of deviation, amblyopia and abnormal head posture. We studied epidemiological characteristics of extraocular muscles paralysis. This retrospective study performed on 131 subjects (58% male). Records of patients with diagnosis of paralytic strabismus referred to private clinics between 1995 and 2005 were studied and their demographic data and clinical characters were extracted and evaluated. Average age of patients was 23 years old. Unilateral involvement was seen in 94% of cases. The types of paralysis were 4th nerve (70.2%), 6th nerve (17.8%), 3rd nerve (12%) and all nerves palsy (3,4 Nerves) (2.2%). The most common causes of nerve injury were congenital (62.5%), trauma (19.8%), vascular (3.8%), iatrogenic (3%), tumor and aneurysm (2.2%) and miscellaneous (9%). The most common causes in 3rd nerve palsy were trauma (40%), congenital (20%), iatrogenic (10%), aneurysm (5%), vascular (5%) and miscellaneous (10%). Pupilary involvement was seen in 55% of cases and complete form of 3th nerve in 50% of patients. The most common causes in 4th nerve palsy were congenital (81.5%), traumatic (8.5%) and miscellaneous (10%). In 6th nerve palsy, the most common causes were trauma (50%), vascular (13.6%), congenital (9%). This study indicates that the most common type of palsy is 4th, 6th and 3rd nerves and the most common causes are congenital and trauma.

Acta Medica Iranica 2009; 47(3): 221-224.

Key words: Strabismus, oculomotor Muscles, oculomotor nerve diseases

Introduction

Paralytic strabismus due to extraocular muscle palsy is a common cause of strabismus that may be due to grave central nervous system or benign self-limited disorder. Untreated paralytic strabismus could result in amblyopia, abnormal head posture and disturbance in binocular vision. Prevalence of paralytic strabismus is variable in different studies. In neurosurgery centers (1), the most common palsy is 6th nerve palsy and in ophthalmic centers (2), 4th nerve is the most common type. Rucker (1958, 1966) (3,4), Rush and Young (1981)(5) reported 6th, 3rd, and 4th nerves injury and all nerve palsies have been shown in 45%, 30%, 11% and 14% of their cases, respectively. In all studies, the most common cause of palsies are unknown (26%), trauma (20%), vascular (17%), neoplasm (14%), miscellaneous (10%) and aneurysm (7%). Khawun *et al.* (1976) showed that the most common causes of 4th nerve injury were trauma (68%), unknown (20%) (6). Harly (1980) was performed a study on 121 children under 16 years of age, and reported unknown causes in 67% of cases (7). In a Mayo clinic study, aneurysm and tumor were reported in 24% of cases (5). Reisner *et al.* showed that transient 6th nerve palsy occurred in 0.05% of cases among 6350 neonates that resolved within 6 weeks in 95% of subjects (8). In a study on 121 children, Harley *et al.* showed that 6th nerve palsy occurred in 50% of cases, which was due to trauma (34%), neoplasm (27%), unknown (15%) or inflammatory (13%) (7). Robertson et al in their study, reported trauma (20%), neoplasm (39%), unknown (9%), inflammation (17%), miscellaneous (12%) and vascular (3%) as the main causes of palsy (9). Young and Rush in their study that was done in patients with 6th nerve palsy, reported trauma (17%), neoplasm (16%), unknown (30%), vascular (18%) and miscellaneous (17%) (5). Therefore, due to variations of previous studies, we decided to evaluate the paralytic strabismus cases according their type and etiology.

Patients and Methods

This retrospective study was performed on 131 subjects. Records of patients that presented to private clinics with

***Corresponding Author:** Abdolreza Medghalchi
Department of Pediatric Ophthalmology and Strabismus, Amiralmomenin Hospital, School of Medicine, Rasht University of Medical Sciences, Guilan, Iran, Tel: +98 131 7722704, +98 131 7756898, Fax: +98 131 7756898, E-mail: rezamed1340@yahoo.com

diagnosis of paralytic strabismus between 1995 and 2005 were analyzed and demographic data and clinical characters such as type of palsy (3rd, 4th and 6th nerves), completeness, laterality, etiology of paralysis were extracted and evaluated with SPSS.12 (SPSS Inc., Chicago, IL, USA)

Results

131 patients were studies (58% male, 42% female). Average age was 23 years (0.2-70). In 96% of cases, paralysis was unilateral. The most common palsy was 4th nerve (70.24%). Other causes are depicted in figure 1. The most common cause was congenital (62.5%) (Figure 2).

3rd nerve palsy: In 50% of cases, paralysis was complete and in 55% of cases pupilary involvement was seen. The most common cause of palsy was trauma (40%) and the other causes were depicted in figure 3.

The most common muscle involvement was inferior rectus and medial rectus as shown in figure 4.

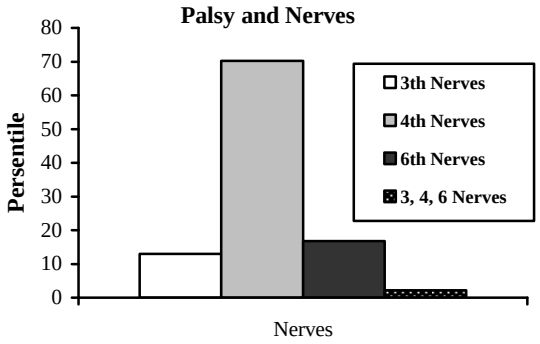

Figure 1. Distribution of 3rd, and 6th4th nerves palsy in patients

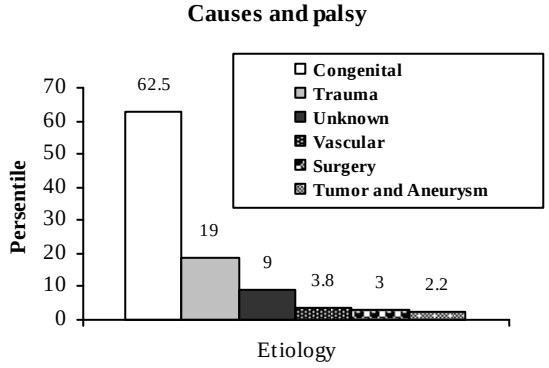

Figure 2. Distribution of causes 3rd, 4th and 6th nerves palsy

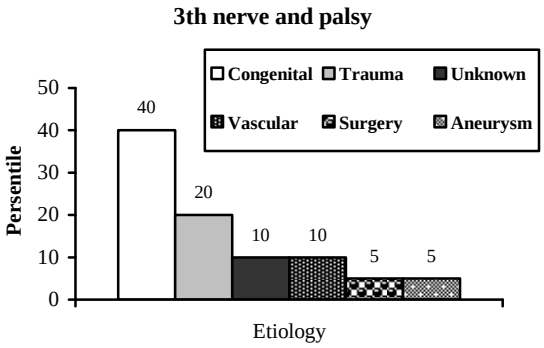

Figure 3. Distribution of causes 3rd nerves palsy

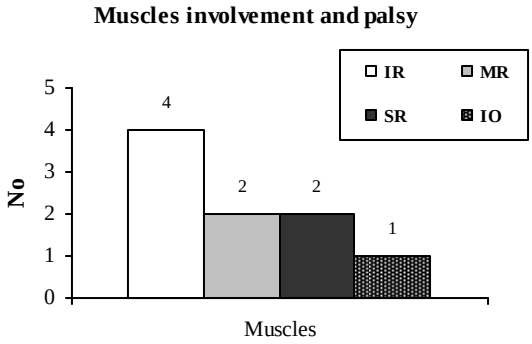

Figure 4. Distribution of Muscles involvment 3rd nerves palsy

4th nerve palsy: The most common cause was congenital (11.5%), other causes are depicted in figure 5. According to knapp classification. the classification wm introduced with knapp according the amont of hypertropin in nine cardinal position of gaze. The most common classes were III (52%), I (27%), classes data completely depicted in figure 6.

6th nerve palsy: The most common causes was trauma (50%) and other common causes were miscellaneous (27%), chronic sinusitis (22.7%) and tumor (4.5%).

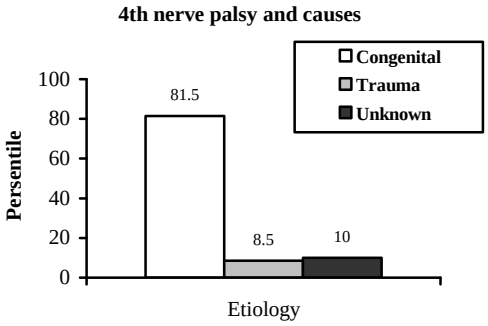

Figure 5. Distribution of causes of 4th nerves palsy

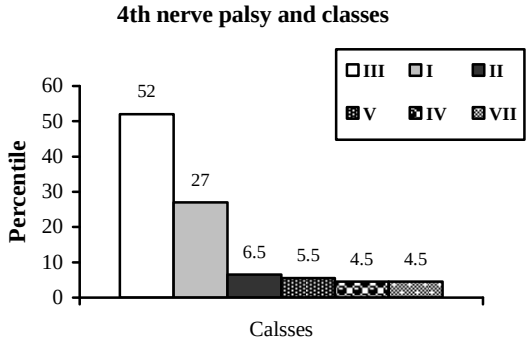

Figure 6. Distribution of the classes of 4th nerves palsy

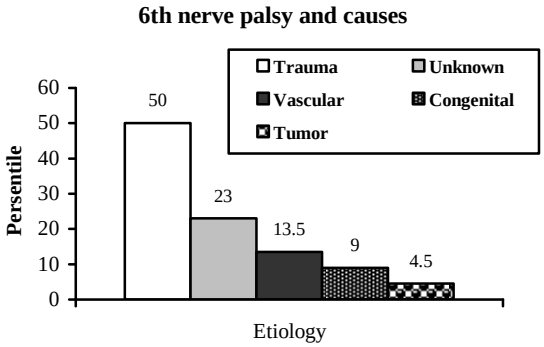

Figure 7. Distribution of causes of 6th nerves palsy

Discussion

Total cases in our study were 131 subjects that 4th nerve, 6th nerve, 3rd nerve and all nerve palsies were seen in 70.2%, 16.8%, 12.8% and 2.2% of patients, respectively.

In Von-noorden study (2004) (2), the most common palsies were 4th nerve, 6th nerve and 3rd nerve palsies, respectively. In Ruckes (1958) (3) and Rush and Yong study (1981) (5), the most common causes were 6th nerve (45%), 3rd nerve (30%), 4th nerve (11%) and all nerve palsies (14%). Our results were the same as Von-noorden (2004) (2), but different from Rush and Yong (1981) study (5). The causes of this difference may be related to reference of 3rd and 6th nerve palsies to neurologist and neurosurgeon and 4th nerve palsy to ophthalmologist.

Our study showed that the most common causes were congenital (62.5%), trauma (19.8%), vascular (3.8%), idiopathic (9%), surgical (3%) and tumor (2.2%). Bagery *et al.* (1995) in their studies reported that the most common causes were congenital (47.5%), trauma (41.5%) and acquired (11.3%) (10). In Mayo clinic study that was performed on 160 cases, the most common cause was trauma (5). Rush and Yong (1981) reported that the most common causes were unknown (26%), trauma (20%), vascular (13%), tumor (13%) and aneurysm (7%) (5). The differences between these studies may be related to variation in ages, diagnostic techniques especially imaging, and the lack of reference centers.

3rd nerve palsy

In our study the most common causes were trauma (40%), congenital (20%), surgical (10%), aneurysm (5%), vascular (5%), miscellaneous (10%). Bagery *et al.* (1995) in their study that was performed on 19 cases showed that the most common causes were trauma (57.9%), congenital (31.6%) and miscellaneous (10.5%) that was the same as our studies (10). In Maruo *et al*. (1996) study on 280 cases with 3rd nerve palsy, the most common causes were trauma (38.7%), CNS disorder (17.3%) and vascular, infection and idiopathic (44%) (11).

The difference between our study and Maruo *et al*. (1996) study may be due to variation in patients.

4th nerve palsy

In our study, the most common etiology were congenital (81.5%), trauma (8.6%). The study of Khawam and Scott (1976) (6) showed the common causes were trauma (68%) and idiopathic (20%). Von-noorden (2004) in his study on 270 cases reported congenital (39.5%), trauma (34%), idiopathic (23%) and CNS disorder (3%) as the most common etiologies (2). In his study, Forrest (12) reported trauma (34%), congenital (33%) and idiopathic (18%). Simons in his study on 123 patients reported that the most common causes were trauma (34%), congenital (33%), vascular and idiopathic (23%) (13). Bagery *et al.* (1995) in their study on 53 cases showed, congenital (65.5%), trauma (23%) and miscellaneous (11.5%) (10). Differences between these studies may be related to variation in diagnostic techniques and patients.

Based on the classification of 4th nerve palsy, the most common classes in our study were III (52%), I (27%), III (6.5%), V (5.5%), IV (4.5%) and VII (4.5%). Von noorden in his study indicated the most common classes were II (31%), I (27%), III (21%), VI (11%), V (6%), IV (3%) and VII (5%). Bagery *et al*. (1995) reported that the most common classes were III (30.8%), I (19.2%), IV (19.2%), II (7.7%) and V (3.9%). Our results were similar to Bagery *et al.* (1995) study, but were different from Von noorden study that may be related to ethical differences.

6th nerve palsy

Our study showed that the most common causes are trauma (50%), miscellaneous (22.5%), vascular (13. 5%), congenital (9%) and tumor (4.5%). Bagery *et al.* (1995) reported the most common causes were trauma (62.5%), congenital (25%) and miscellaneous (12.5%) (10). Ariochane (1995) (14) in his study that was performed on 62 cases under 7 years old, reported tumor (33%), hydrocephaly (23%), trauma (19%) as the main causes and the remainder was idiopathic. Robertson *et al*. (1970) in their study on 123 subjects under 15 years old reported that the most common causes were tumor (39%), trauma (20%), and inflammation (17%), miscellaneous (12%), idiopathic (9%) and vascular (3%) (9). Afifi in a study on 132 patients under 18 years old demonstrated trauma (28%), tumor (19%), congenital (13%), idiopathic (18%), miscellaneous (13%), infection (10%) and hydrocephaly (8%) as the main causes(15). Harley (1980) in his study on 121 children showed that the most common causes were trauma (34%), neoplasm (27%), unknown (15%), and inflammation (13%) (7). This study showed that in lower ages, tumors, and in upper ages, trauma is more common. In conclusion, in our study the most common palsies were 4th, 6th and 3rd nerves palsies. The most common causes of palsies in all patients were congenital, in 4th nerve palsy was congenital and in 3rd and 6th nerve palsies was trauma. Regarding the differences between these studies, we suggest multi central studies with more patients.

Acknowledgments

This study was supported by a small grant from guilon medical university I thanks Miss Gorbani for cooporation for preparing recerds and compuler sxerrize of amiralmomenine Hospital.

References

1. Miller NR, Newman NJ, Hoyt WF, Walsh FB, editors. Walsh and Hoyt's Clinical Neuro-ophthalmology. 5th ed. Baltimore, Md: Williams & Wilkins; 1998.
2. Von Noorden GK. Binocular vision and ocular motility: Theory and Management of Strabismus. 7th ed. St Louis: Mosby; 2004.
3. Rucker CW. Paralysis of the third, fourth and sixth cranial nerves. Am J Ophthalmol 1958; 46(6): 787-94.
4. Rucker CW. The causes of paralysis of the third, fourth and sixth cranial nerves. Am J Ophthalmol 1966; 61(5 Pt 2): 1293-8.
5. Rush JA, Younge BR. Paralysis of cranial nerves III, IV, and VI. Cause and prognosis in 1,000 cases. Arch Ophthalmol 1981; 99(1): 76-9.
6. Khawam E, Scott AB, Jampolsky A. Acquired superior oblique palsy. Diagnosis and management. Arch Ophthalmol 1967; 77(6): 761-8.
7. Harley RD. Paralytic strabismus in children. Etiologic incidence and management of the third, fourth, and sixth nerve palsies. Ophthalmology 1980; 87(1): 24-43.
8. Reisner SH, Perlman M, Ben-Tovim N, Dubrawski C. Transient lateral rectus muscle paresis in the newborn infant. J Pediatr 1971; 78(3): 461-5.
9. Robertson DM, Hines JD, Rucker CW. Acquired sixth-nerve paresis in children. Arch Ophthalmol 1970; 83(5): 574-9.
10. Bagery AB. Epidemyelogical survey of extra ocular palsy. J Bina Iranian Ophthal 1995; 5: 237-44. [Persian]
11. Maruo T, Iwashige H, Kubota N, Sakaue T, Ishida T, Honda M, et al. Results of surgery for paralytic exotropia due to oculomotor palsy. Ophthalmologica 1996; 210(3): 163-7.
12. Ellis FJ, Stein LA, Guyton DL. Masked bilateral superior oblique muscle paresis. A simple overcorrection phenomenon? Ophthalmology 1998; 105(3): 544-51.
13. Simons BD, Saunders TG, Siatkowski RM, Feuer WJ, Lavina AM, Capó H, et al. Outcome of surgical management of superior oblique palsy: a study of 123 cases. Binocul Vis Strabismus Q 1998; 13(4): 273-82.
14. Ariochane M, Repka M. Outcom of sixth nerve palsy or paresis in young children. J Pediatr Ophthalmol Strabismus 32(3): 152-6.