Original Article

ABNORMALITIES OF EYELID POSITION: ANALYSIS OF CASES SEEN IN AN URBAN HOSPITAL IN NIGERIA

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ABSTRACT

Aim: To determine the types, causes and relative frequencies of abnormal tonic eyelid position in patients seen at the eye clinic of the University of Benin Teaching Hospital.

Method: A review of the case files of all new patients presenting with abnormal tonic eyelid position was done. Data on age, gender, laterality, type and aetiology of abnormal tonic eyelid position was obtained.

Result: There were 109 patients with abnormalities of tonic eyelid position. These included 51 males with a male: female ratio of 1:1.1. The age range was from 6weeks to 87years; mean age 37.6years (SD ± 23.9). There was unilateral involvement in 88 (80.7%) cases. Abnormalities of tonic eyelid position were ptosis 77 (70.6%), lagophthalmos 22 (20.2%), facial spasm 7 (6.4%) and lid retraction 3 (2.8%). The most frequent cause of ptosis was oculomotor nerve palsy while blepharospasm was the most frequent cause of facial spasm. Seventh nerve palsy was the most frequent cause of lagophthalmos while the three cases of lid retraction were seen in patients with thyroid eye disease.

Conclusion: Neurological and other debilitating illnesses were common causes of abnormal tonic eyelid position. Examination of the eyelid for tonic position should not be overlooked during ophthalmic evaluation.

Keywords: ptosis, lagophthalmos, lid retraction, facial spasm, eyelid

INTRODUCTION

The eyelids protect the eyeball from injury, maintain the tear film and prevent corneal dehydration; they assist in the control of light entering the eye and contribute to facial expression.[1] The muscles which retract (open) the upper eyelid are the levator palpebrae superioris and Muller's muscle which are supplied by the oculomotor nerve and the sympathetic system respectively.[1,2] The inferior tarsal muscle retracts the lower eyelid and is innervated by the sympathetic system while the orbicularis oculi muscle which is responsible for eyelid closure is innervated by the seventh cranial nerve.[1,2] The upper eyelid rests 1-2mm below the superior limbus (the junction between the sclera and cornea) whereas the lower eyelid rests at the inferior limbus when the eye is looking straight ahead;[2] while no part of the eyeball should be visible in complete closure of the eyelids. Abnormalities of the muscles of the eyelid or their neural supply can result in abnormal tonic eyelid positions such as ptosis, lagophthalmos, blepharospasm and eyelid retraction.[2] These anomalies may be manifestations of many neurological and other

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debilitating diseases (however, the patient may present to the ophthalmologist because of the apparent ophthalmic features). They may also be a cause of facial deformity, visual disorders, and psychosocial impact.[3–7] It is important to know the common abnormalities of tonic eyelid position in our clinical practice thereby providing data for health planning and intervention. The aim of this study is to determine the types, causes and relative frequencies of abnormal tonic eyelid position in patients seen at the eye clinic of the University of Benin Teaching Hospital.

METHODS

This is a retrospective study conducted at the Ophthalmic Outpatient Clinic of the University of Benin Teaching Hospital, Benin City, Nigeria. The hospital offers specialist eye care and other medical services to residents within Edo State and its environs. Ethical approval was obtained from the Ethics and Research Committee of the Hospital. All new patients presenting with abnormal tonic eyelid position from March 2015 to December 2019 were identified and their case notes were retrieved. All consecutive cases (children and adults) with abnormal tonic eyelid position (whether unilateral or bilateral) were included in the study. Data on age, gender, laterality, type and aetiology of abnormal tonic eyelid position was obtained. Patients who had malposition involving only the eyelid margin such as ectropion and entropion were excluded.

The abnormal tonic eyelid positions were grouped into eyelid retraction, facial spasm, lagophthalmos and ptosis. Eyelid retraction was defined as upper eyelid position at or above the limbus, or lower eyelid position below the limbus with scleral show in the primary position of gaze. Lagophthalmos referred to the inability to completely close the eyelid with exposure of part of the eyeball. Ptosis (abnormal drooping of the eyelids) was defined as a margin reflex distance 1 (distance from the corneal light reflex to the eyelid margin) of < 4.0 mm, measured with the patient looking straight ahead. For the purpose of this study, facial spasm was defined as sudden involuntary muscular contraction (spasm) of the orbicularis oculi with or without involvement of other facial muscles.

The data was analyzed with the IBM SPSS Statistics Version 21 software (Released 2012, IBM SPSS Statistics for Windows, Version 21.0; IBM Corp., Armonk, New York, USA). Descriptive analyses such as frequencies, mean and standard deviation were utilized.

RESULTS

There were 109 patients with abnormalities of tonic eyelid position. These included 51 males with a male: female ratio of 1:1.1. The age range was from 6weeks to 87years; mean age 37.6years (SD ± 23.9). Twenty-one (19.3%) of the patients were 10years and below (Figure 1). There was unilateral involvement in 88 (80.7%) and bilateral involvement in 21 (19.3%) cases. Ptosis was the most frequent abnormality in 77 (70.6%) patients (Figure 2). The most frequent cause of ptosis was oculomotor nerve palsy while blepharospasm was the most frequent cause of facial spasm. Seventh nerve palsy was the most frequent cause of lagophthalmos while the three cases of lid retraction were seen in patients with thyroid eye disease (Table 1).

Patients with facial spasm had the highest median age when compared with other types of eyelid abnormalities, but it was not statistically significant (p=0.551). (Table 2) There was also, no statistically significant difference between gender and type of abnormality (p = 0.124). On the other hand, lagophthalmos and ptosis tended to be more unilateral (p=0.008). Of the cases with facial spasm, eyelid myokymia was unilateral, while blepharospam was bilateral. Corneal pathologies such as epithelial erosions and inferior corneal opacities were seen in five patients with lagophthalmos.

DISCUSSION

This review was performed to determine the types, causes and relative frequencies of

abnormal tonic eyelid position in patients seen in our clinical practice. Ptosis was the most common abnormality accounting for two-thirds of the patients followed by lagophthalmos, facial spasm and lid retraction. Ptosis was mostly unilateral, similar to that reported in many studies.[8-14] There was a slight female preponderance and majority of the cases were acquired and not congenital. Some studies have reported a male predilection,[9-11,15] while others documented a female preponderance.[14, 16] There are various mechanisms by which ptosis can occur. It could result from innervational defects to the eyelid retractors as seen in oculomotor nerve palsy or Horner's syndrome.[17.18] It could also be from defects in levator muscle, levator aponeurosis or at the neuromuscular junction[17,18] which is the case in simple congenital ptosis, senile ptosis and myasthenia gravis respectively as seen in the current study. Mechanical weight on the eyelid such as from eyelid edema or eyelid mass or lid scarring that prevents movement of the eyelid could also cause ptosis.[17,18] Myasthenia gravis and oculomotor nerve palsy (which may be the presentation of a life threatening condition such as intracranial aneurysm) were notable causes of ptosis in the current study. Thus it is important to thoroughly evaluate a patient with ptosis. Ptosis can compromise vision when the visual axis is occluded, cause amblyopia in children and have psychosocial effects.[3,4,19]

Lagophthalmos was the second most frequent type of abnormality. It can occur in any age group as seen in this study. It was seen more in males although this was not statistically significant, and it tended to be unilateral. The most common cause of lagophthalmos in this study was seventh nerve palsy. Seventh nerve palsy is a known cause of lagophthalmos; [20-22] it causes weakness of the orbicularis oculi muscle and thus inability to completely close the eyelids.[21,22] Lagophthalmos can also occur in patients with buphthalmos from congenital glaucoma,[22] thyroid eye disease,[23,24] post ptosis repair[25] and congenital ichthyosis[22,26,27] as observed in the current study. Congenital glaucoma and thyroid eye diseases cause enlargement (buphthalmos) and forward protrusion of the eyeball respectively and prevent the upper eyelid from rolling over the eyeball.[22] The ichthyoses are a heterogeneous group of predominantly hereditary disorders in which there is abnormal scaling of the skin.[28] They may present with cicatricial lagophthalmos from restriction of eyelid movements.[27] Five patients with lagophthalmos in the current study had corneal complications such as punctate epithelial erosions and inferior corneal opacities. Corneal complications can lead to visual impairment if not treated. Thus, the cornea should be thoroughly examined to exclude these complications in patients with lagophthalmos.

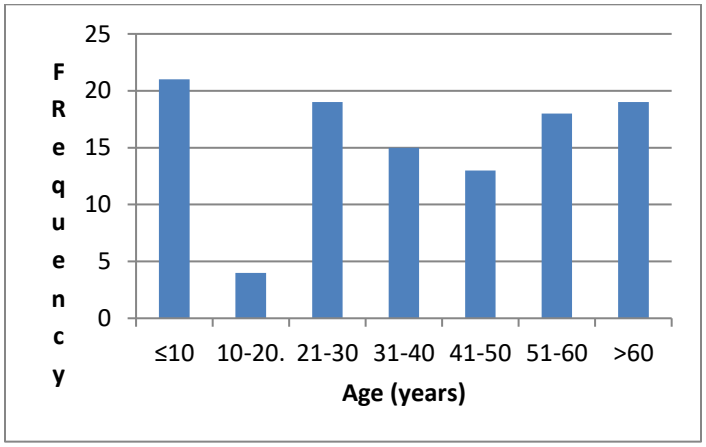

Figure 1: Age distribution of patients with abnormal tonic eyelid position

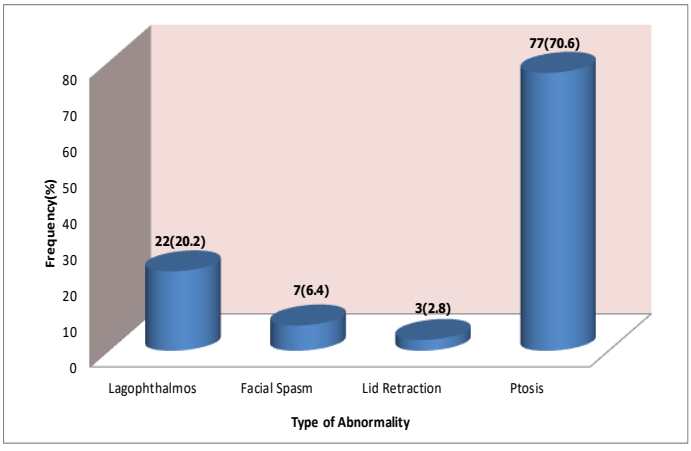

Figure 2: Types of abnormal tonic eyelid position

Table 1: Types and causes of abnormal eyelid position

Type of Abnormality	Causes	Frequency	Percent
Lagophthalmos (n=22)	Seventh nerve palsy	16	72.8
	Thyroid Eye Disease	3	13.7
	Post-ptosis repair	1	4.5
	Buphthalmos from congenital glaucoma	1	4.5
	Congenital Ichthyosis	1	4.5
Facial Spasm (n=7)	Blepharospasm	4	57.1
	Eyelid Myokymia	3	42.9
Lid Retraction (n=3)	Thyroid Eye Disease	3	100.0
Ptosis (n=77)	Intraocular Inflammation	16	20.8
	Cranial Nerve 3	19	24.6
	Congenital Ptosis	15	19.5
	Myasthenia gravis	5	6.5
	Post-intraocular surgery	5	6.5
	Allergic Conjunctivitis	3	3.9
	Levator Dehiscence	3	3.9
	Eyelid Tumour	2	2.6
	Neurofibromatosis	2	2.6
	Trauma	1	1.3
	Senile ptosis	2	2.6
	Fibrous dyspasia of the skull	1	1.3
	Frontoethmoidal Mucocoele	1	1.3
	Lymphedema (post craniotomy)	1	1.3
	Cicatrical ptosis	1	1.3

Facial spasms are sudden involuntary muscular contractions of facial muscles which result from over activity of the seventh cranial nerve. Eyelid myokymia and blepharospasm were the types of facial spasms observed in the current study. The patients were mostly females, and the spasms were unilateral in eyelid myokymia and bilateral in blepharospasm. Eyelid myokymia (also known as eyelid twitch) are involuntary, fine, unilateral fasciculations that affect the orbicularis oculi.[29] They occur generally in situations of extreme fatigue and stress.[21] They are usually benign and self-limiting,[29] but may progress to affect other facial muscles (facial myokymia) in cases with underlying brainstem disease.[30] Blepharospasm refers to involuntary bilateral closure of both eyelids caused by contraction of the orbicularis oculi.[21] It is commonly idiopathic but may sometimes be associated with ocular surface disease, lesions of the brainstem, basal ganglia (such as parkinson's disease) or drug induced tardive dyskinesia.[6,21] Other types of facial spasm, though not observed in this study include hemifacial spasms and aberrant facial nerve regeneration.[21] Hemifacial spasms, unlike blepharospasm are involuntary, unilateral spasms of the facial musculature innervated by the ipsilateral facial nerve which begin from the eyelids and then progress to involve the lower face and neck.[31] Aberrant facial nerve regeneration may follow a previous facial nerve palsy and may cause facial nerve synkinesis such

Table 2: Association between gender, age, laterality and type of eyelid abnormality

Variables	Type of Abnormality				P-value
	Lagophthalmos n=22(%)	Facial Spasm n=7(%)	Lid Retraction n=3(%)	Ptosis n=77(%)	
Gender					
Male	14(63.6)	1(14.3)	1(33.3)	35(45.5)	0.124
Female	8(36.4)	6(85.7)	2(66.7)	42(54.5)	
Age(years)					
Age range	0.1-82.0	7.0-82.0yrs	27.0-56.0	0.25-87.0	0.551
Median age	37.0	64.0	29	35	
Laterality					
Unilateral	19(86.4)	3(42.9)	1(33.3)	65(84.4)	0.008
Bilateral	3(13.6)	4(57.1)	2(66.7)	12(15.6)	

as involuntary closure of the eyelids on voluntary smiling.[21]

Eyelid retraction was seen in three patients, all of whom had thyroid eye disease (TED). TED is an autoimmune disorder characterized by swelling of various tissues within the orbit resulting in typical ocular changes such as lid retraction and proptosis.[32] Eyelid retraction is the most common clinical feature of TED, and it could be unilateral or bilateral[24] as observed in the current study. In 120 patients with TED, lid retraction was seen in 85(70.8%) of them at diagnosis and in 108 (95%) sometime in the clinical course of the disease.[24] Other ophthalmic features in TED include eyelid lag, lagophthalmos, proptosis, strabismus, and optic neuropathy.[24] Lid retraction in TED is thought to be due to overaction of Muller's muscle from increased sympathetic stimulation, contraction of the levator muscle, and adhesion between levator muscle and the lacrimal gland fascia.[33] Other causes of lid retraction include dorsal midbrain syndrome, aberrant regeneration of the third nerve, and restriction of the levator muscle from trauma, burns or surgery,[2,34] hydrocephalus[22] proptosis and buphthalmos.[34]

Abnormalities of eyelid position such as lagophthalmos, subtle lid retraction and mild ptosis (such as in Horner's syndrome) may be missed if not looked out for. Examination of tonic eyelid position should form an important part of eyelid assessment during an ophthalmic evaluation as they may be give away signs of neurological and other debilitating illnesses.

In summary, we have reported the types, causes and relative frequencies of abnormal tonic eyelid position in patients seen in our clinical practice. Ptosis was the most frequent type with third nerve palsy being the most common cause. Lagophthalmos was the next most frequent type while facial spasm and lid retraction were seen in smaller proportions of patients. Examination of the eyelid for tonic position should not be overlooked in ophthalmic examination.

References

1. Rucker JC. Normal and abnormal lid function. In: Kennard C, leigh R, ed. Handbook of Clinical Neurology: Neuro-Ophthalmology. Amsterdam: Elsevier BV; 2011:403-424.
2. Martin TJ, Yeatts RP. Abnormalities of eyelid position and function. Semin Neurol. 2000;20:31-42.
3. Federici TJ, Meyer DR, Lininger LL. Correlation of the vision-related functional impairment associated with blepharoptosis and the impact of blepharoptosis surgery. Ophthalmology.1999;106:1705-1712.

4. Bullock JD, Warwar RE, Bienenfeld DG, Marciniszyn SL, Markert RJ. Psychosocial implications of blepharoptosis and dermatochalasis. Trans Am Ophthalmol Soc. 2001;99:65-72.
5. Nellis JC, Ishii LE, Boahene KDO, Byrne PJ. Psychosocial Impact of Facial Paralysis. Curr Otorhinolaryngol Rep. 2018;6:151-160.
6. Defazio G, Hallett M, Jinnah HA, Conte A, Berardelli A. Blepharospasm 40 years later. Mov Disord. 2017;32:498-509.
7. Coulter I, Frewin S, Krassas GE, Perros P. Psychological implications of Graves' orbitopathy. Eur J Endocrinol. 2007;157:127-131.
8. Gautam P, Adhikari R, Sharma BR. Etiopathogenetic patterns of blepharoptosis in Western Nepal: an Overview. Nepal J Ophthalmol. 2016;8:36-40.
9. Berete CR, Guirou N, Kouassi LJ, Kouakou KS, Konan AJ, Kone N. Assessment and Management of 51 Cases of Acquired Ptosis in Adults at the Ophthalmology Department of the University Hospital of Treichville. (Ivory Coast). Arch Ophthalmol Optom. 2018;1:15-19.
10. Grienpentrog GJ, Diehl NN, Mohney BG. Incidence and demographics of childhood ptosis. Ophthalmology. 2011;118:1180-1183.
11. Omotoye OJ, Ajayi IA, Adeleke FO. Survey of patients with presentation of ptosis in ophthalmic-plastic subspecialty clinic. IP Int J Ocul Oncol Oculoplasty. 2017;3:308-311.
12. Agrawal G. Demography, clinical presentation and management of congenital blepharoptosis: A prospective interventional cohort study at a regional institute of ophthalmology in western India. IP Int J Ocul Oncol Oculoplasty. 2019;5:186-193.
13. Baiyeroju AM, Oluwatosin OM. Blepharoptosis in Ibadan.West Afr J Med. 2003;22:208-210.
14. Hashemi H, Khabazkhoob M, Emamian MH, Yekta A, Jafari A, Nabovati P et al. The prevalence of ptosis in an Iranian adult population. J Curr Ophthalmol. 2016;28:142-145.
15. Hashemi H, KhabazKhoob M, Yekta A, Mohammad K, Fotouhi A.The Prevalence of Eyelid Ptosis in Tehran Population: The Tehran Eye Study. Iran J Ophthalmol. 2010;22:3-6.
16. Lim MJ, Hou HJ, Singa MR, Aakalu KV, Satabutr P. Relative incidence of blepharoptosis subtypes in an oculoplastic practice at a tertiary care centre. Orbit. 2003: 32:231-234.
17. Freuh BR. The mechanistic classificat ion of ptosis. Ophthalmology. 1980;87:1019-1021.
18. Beard C. A new classification of blepharoptosis. Int Ophthalmol Clin. 1989;29:214-216.
19. Anderson RL, Baumgartner SA. Amblyopia in Ptosis. Arch Ophthalmol. 1980;98:1068-1069.
20. Osaguona VB. Facial nerve palsy: the need for an ophthalmologist. Ann Med Surg Pract. 2019; 4: 140-144.
21. Skarf B. Normal and abnormal eyelid function. In Miller NR, Newman NJ, Biousse V, Kerrison JB, ed. Walsh and Hoyt's Clinical Neuro‐Ophthalmology. 6th ed. Philadelphia USA: Lippincott Williams and Wilkins; 2005.p.1177-1229.
22. Olitsky SE, Hug D, Plummer LS, Stass-Isern M. Abnormalities of the lids: In Kliegman RM, Stanton BF, St. Geme JW, Schor NF, Behrman RE, editors. Nelson Textbook of Pediatrics. 19th ed. Philadephia USA: Elsevier Saunders; 2011. p 2163-2164.
23. Gaddipati RV, Meyer DR. Eyelid retraction, lid lag, lagophthalmos, and von Graefe's sign quantifying the eyelid features of Graves' ophthalmopathy. Ophthalmology. 2008;115:1083-1088.
24. Bartley GB, Fatourechi V, Kadrmas EF, Jacobsen SJ, Ilstrup DM, Garrity JA, et al. Clinical features of Graves' ophthalmopathy in an incidence cohort. Am J Ophthalmol. 1996;121:284-290.

25. Klapper SR, Patrinely JR. Management of cosmetic eyelid surgery complications. Semin Plast Surg. 2007;21:80-93.
26. Pinna A, Ena P, Carta F. Eye changes in a patient with lamellar ichthyosis and toe pseudoainhum. Eye. 2004;18:445-446.
27. Cruz AA, Menezes FA, Chaves R, Pinto Coelho R, Velasco EF, Kikuta H. Eyelid abnormalities in lamellar ichthyoses. Ophthalmology. 2000;107:1895-1898.
28. Singh AJ, Atkinson PL. Ocular manifestations of congenital lamellar ichthyosis. Eur J Ophthalmol. 2005;15:118-122.
29. Banik R, Miller NR. Chronic myokymia limited to the eyelid is a benign condition. J neuro-ophthalmol. 2004;24:290-292.
30. Barmettler A, Dinkin MJ, Lelli GJ. Eyelid myokymia: not always benign. Orbit. 2011; 30: 289-290.
31. Lu AY, Yeung JT, Gerrard JL, Michaelides EM, Sekula RF, Bulsara KR. Hemifacial spasm and neurovascular compression. ScientificWorldJournal. 2014;2014:349319.
32. Khurana AK. Comprehensive Ophthalmology. 4th ed. New Delhi: New Age International Ltd; 2007. pp. 390-392.
33. Maheshwari R, Weis E. Thyroid associated orbitopathy. Indian J Ophthalmol. 2012;60: 87-93.
34. Bartley GB. The Differential Diagnosis and Classification of Eyelid Retraction. Ophthalmology. 1996;1031:168-176.