



Research Article

## RETROSPECTIVE ANALYSIS OF CASES OF HEMIFACIAL SPASM: A TERTIARY CARE HOSPITAL STUDY

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### ABSTRACT

**Purpose:** To study epidemiological and clinical characteristics of patients diagnosed with hemifacial spasm who reported to our oculoplasty clinic over a period of seven years and to find association of dry eye disease with these patients. **Methods:** Retrospective analysis of epidemiological and clinical characteristics of patients diagnosed with hemifacial spasm who reported to oculoplasty clinic of a tertiary eye care centre in North India between January 2011 and December 2017 was carried out. Dry eye, as well as any other local factor that can mimic hemifacial spasm, were ruled out. Systemic evaluation was done to rule out any neurological disorder. A detailed history was taken to rule out any associated psychiatric disorders as well as use of any medication which could be responsible for dystonic movements. Each patient underwent magnetic resonance imaging (MRI) of the brain for any facial nerve compression or tumor involving posterior fossa. Botulinum type A injections were given after assessing their requirements on the basis of guidelines given out by Jankovic *et al.* **Results:** 24 patients were reported to have hemifacial spasm with the mean age of 51.29 years. Dry eye disease was found in 12 (50%) patients. 13 (54.16%) patients needed Inj Botulinum and improvement in symptoms as well as in disability score was seen in all these patients. **Conclusion:** Dry eye disease should be evaluated in all cases of hemifacial spasm and should be appropriately treated along with definitive treatment of spasms with botulinum toxin A.

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### INTRODUCTION

Hemifacial spasm (HFS) is a condition characterized by progressive, involuntary and irregular, clonic or tonic movements of the muscles innervated by the VII<sup>th</sup> cranial nerve.<sup>1</sup> Hemifacial spasm is known to present in two forms: typical and atypical. The typical variant of this condition begins with clonic movements of the orbicularis oculi and then spreads to other facial muscles (corrugator, frontalis, orbicularis oris, platysma, zygomaticus).<sup>2</sup> Clonic movements then progress to sustained tonic contractions of involved musculature. On the other hand, the progression of these contractions in the reverse order is seen in the atypical form of HFS. The atypical form is known to be reported in about 2–3% of patients with hemifacial spasm.<sup>3</sup> A neurovascular compression in the root exit zone of facial nerve has been known to be the most common underlying etiology of HFS, however, certain risk factors including hypertension, atherosclerosis, various intracranial space occupying lesions

which compress the facial nerve have been identified.<sup>4</sup> Considering a high rate of under diagnosis and the absence of population based data it is difficult to predict the exact prevalence of HFS. To the best of our knowledge, there have been few studies documenting the incidence and epidemiology of hemifacial spasm and unfortunately, there is paucity of literature documenting the epidemiology and clinical presentation of this condition in the Indian population. The present retrospective study was undertaken to study the epidemiological and clinical presentation of HFS in patients presenting to a tertiary eye care Centre in North India.

### MATERIAL AND METHODS

We carried out a retrospective analysis of epidemiological and clinical characteristics of patients diagnosed with hemifacial spasm reporting to the oculoplasty clinic of a tertiary eye care centre in North India between January 2011 and December 2017. Any local factor with the potential to cause involuntary ocular spasms such as pre-existing dry eye disease, local foreign body, anterior uveitis, blepharitis etc. were ruled out by meticulous history and detailed slit lamp examination. A detailed history was taken to rule out any associated psychiatric disorders, such as stress disorder or insomnia, as

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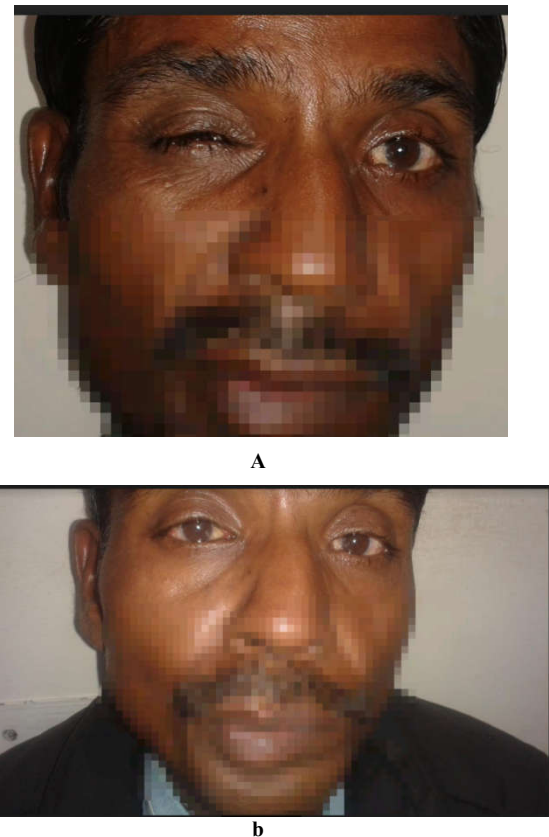
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well as the use of any medication which could be responsible for dystonic movements. To assess for the presence of dry eye, Schirmer's I, tear film break-up time (TBUT), tear meniscus height, fluorescein and rose bengal dye pattern were performed. Each patient underwent imaging in the form of magnetic resonance imaging (MRI) of the brain to rule out any facial nerve compression or tumor involving posterior fossa. Definitive treatment was given in the form of botulinum type A (BTA) injections, which were given to patients with hemifacial spasm having severity or frequency grade III and IV on the basis of guidelines given by Jankovic *et al.*<sup>7</sup> BTA injections were reconstituted with 0.9% sterile saline solution to a concentration of 2.5 IU in 0.1 ml. Muscles infiltrated with BTA, included the preseptal/ pretarsal orbicularis oculi, peribuccal muscles, and platysma. The dose was calculated according to spasm severity and location, and with reference to guidelines in the literature. Patients were reviewed at 2 weeks and further dosage administered if deemed essential. Patients were reviewed at 1 month to assess improvement in severity or frequency of symptoms based on Jankovic Rating Scale.<sup>7</sup>

**RESULTS**

The study included 24 patients with a diagnosis of hemifacial spasm.(Table 1). Out of these 24 patients 9 were males (37.5%) and 15 were females (62.5%), the female to male ratio being 1.67:1.( Figure 2). The mean age of the patients was 51.29 (±23.3) years and mean duration of symptoms before presentation was 8.9 (±6.3) months. Only 1 (4.16%) patient showed the atypical variant whereas majority, i.e.23 patients presented with the typical variant of HFS. MRI done in every patient with hemifacial spasm did not reveal any evidence of facial nerve compression or tumor involving posterior fossa in any of the patients. MRI of one patient showed age related atrophic changes and in 2 patients MRI revealed vascular compression on the trigeminal nerve.(Figure 3).12 (50%) patients were found to have associated dry eye (on the basis of self-reported symptoms and tear film tests including:

Schirmer's I, TBUT, Fluorescein staining) ipsilateral to the affected side of HFS and which were treated according to guidelines given by The Dry Eye Work Shop (DEWS), 2007.<sup>8</sup> (Figure 4). 13 (54.16%) patients required botulinum A injections. Patients were reviewed at 2 weeks and further dosage given if found appropriate. At a follow-up of 1 month, all 13 patients showed improvement in symptoms as well as in disability score which is defined as reduction in the grade of severity/ frequency of spasms.



**Fig 1** Clinical photographs of a patient with typical right-sided hemifacial spasm (a: pre-injection and; b: 2 weeks post-injection).

**Table 1** Table showing clinical profile of subjects included in the study.

S. no.	Age (years)	Sex	Mean duration of symptoms (in months)	Diagnosis	Clinical variant	Dry eye	MRI finding
1	38	F	3.5	Right sided HFS	Typical	Present	Normal study
2	44	M	7	Left sided HFS	Typical	Absent	Normal study
3	57	M	3	Left sided HFS	Atypical	Present	Normal study
4	68	F	11	Left sided HFS	Typical	Present	Normal study
5	46	M	23	Left sided HFS	Typical	Absent	Normal study
6	74	F	24	Left sided HFS	Typical	Present	Normal study
7	66	F	18	Right sided HFS	Typical	Present	Normal study
8	42	F	10	Left sided HFS	Typical	Absent	Normal study
9	27	M	6	Right sided HFS	Typical	Absent	Normal study
10	45	F	2	Right sided HFS	Typical	Absent	Normal study
11	62	F	12	Right sided HFS	Typical	Absent	Normal study
12	42	F	8	Right sided HFS	Typical	Present	Normal study
13	45	F	12	Right sided HFS	Typical	Absent	Normal study
14	48	M	4	Right sided HFS	Typical	Present	Normal study
15	33	F	11	Left sided HFS	Typical	Absent	Normal study
16	48	F	6	Right sided HFS	Typical	Absent	Normal study
17	42	M	5	Right sided HFS	Typical	Absent	Normal study
18	49	F	4	Left sided HFS	Typical	Absent	Normal study
19	45	M	2	Right sided HFS	Typical	Present	Normal study
20	69	F	6	Left sided HFS	Typical	Present	Vascular compression of trigeminal nerve
21	50	F	8	Left sided HFS	Typical	Present	Vascular compression of trigeminal nerve
22	42	M	6	Right sided HFS	Typical	Present	Normal study
23	51	F	5	Right sided HFS	Typical	Present	Normal study
24	48	M	7	Left sided HFS	Typical	Absent	Normal study

(Note: M= Male, F= Female)

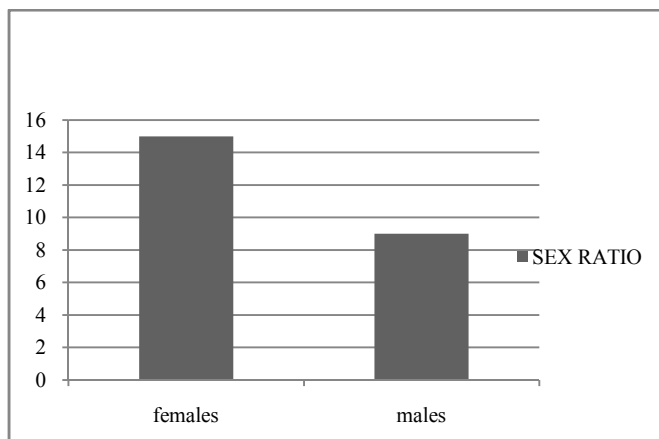


Fig 2 Bar diagram showing sex distribution of cases with hemifacial spasm

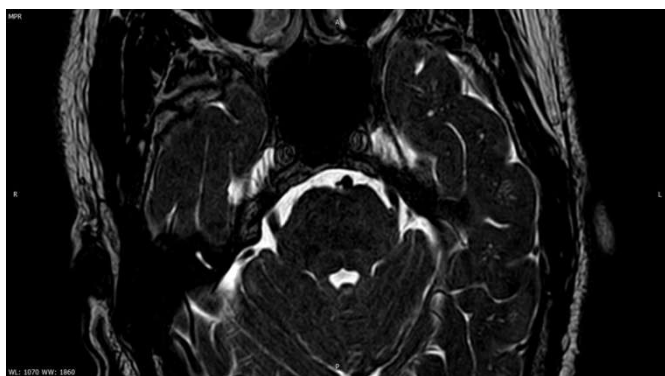


Fig 3 T2W axial MRI image shows thinned out and laterally displaced left trigeminal nerve at its root exit zone by a branch of superior cerebellar artery suggestive of neurovascular compression syndrome

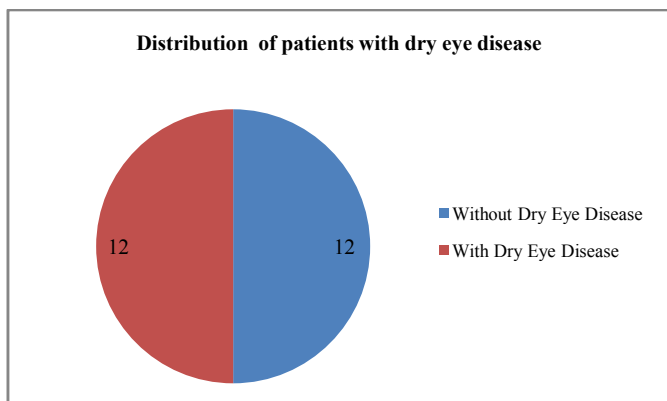


Fig 4 Pie chart showing distribution of dry eye patients associated with hemifacial spasm.

## DISCUSSION

Hemifacial spasm is characterized by an insidious onset of involuntary unilateral contractions of the muscles innervated by the ipsilateral facial nerve. It usually presents in the third to seventh decade of life, with a peak incidence in the middle age.<sup>9</sup> In our analysis also, the mean age of patients was 51.29 ( $\pm 23.3$ ) years. HFS is known to affect women more frequently than men (2:1).<sup>10</sup> In our study too, it was seen to be more common in females. The typical form of the disease characterized by initial contractions of the orbicularis oculi which progress to the corrugator, frontalis, orbicularis oris, platysma, zygomaticus was seen in 23 patients whereas the atypical variant was seen in only patient in our study. Previously studies have shown the atypical variant to have a prevalence of 2-3%.<sup>3</sup> However, since ours was not a

population-based study the prevalence cannot be commented upon.

We found that 12 patients (50%) had dry eye ipsilateral to the affected side. In a study by Raj *et al* (2017), they also reported 50% incidence of dry eye disease. When analysed separately, out of 13 patients of essential blepharospasm, 7 (53.85%) patients and out of 17 patients of hemifacial spasm, 8 (47.06%) patients had dry eye disease.<sup>11</sup> It has been reported in literature that the typical subjective discomfort symptoms of dry eye disease (including burning sensation, grittiness, or dryness of the eyes and photophobia) occur in 40–60% of patients before or at the onset of benign essential blepharospasm.<sup>12</sup> However, there is paucity of literature which shows the association of HFS with dry eye. The association of dry eye with HFS can be attributed to the abnormal tear film dynamics seen in patients of HFS. Since the periodic blinking action of the eyelids is crucial for the maintenance and renewal of the precorneal tear film, abnormality in the same as encountered in cases of HFS could account for the higher prevalence of dry eye disease in these patients.<sup>13</sup>

All cases of HFS warrant imaging to rule out facial nerve compression or tumor involving posterior fossa. The most likely etiology of hemifacial spasm is believed to be microvascular compression at the facial nerve root exit zone from the brainstem which can be picked up on MRI and MRA.<sup>14</sup> However, in our study none of the patients showed facial nerve compression, two patients however showed compression at the level of the trigeminal nerve.

Injection of botulinum neurotoxin A has been shown to result in marked improvement in symptoms of hemifacial spasm without significant adverse reactions or complications. Botulinum toxin A is one of seven neurotoxins produced by *Clostridium botulinum*. The light-chain endopeptidase component of botulinum toxin acts in the end plate of motor neurons, where it cleaves to SNAP-25, a protein involved in the fusion of acetylcholine-containing vesicles with the presynaptic membrane. When injected locally, it causes muscular paralysis by interfering with the release of acetylcholine at neuromuscular junctions.<sup>15</sup> The success rate is estimated to be approximately 95%.<sup>16,17</sup> In our study, all the 13 patients who received botox reported improvement in terms of reduced severity or frequency of episodes. In other studies, various complications reported include redness, pain, swelling, numbness, bruising, eyelid ptosis, etc.<sup>16,17</sup> However, in our case series, only one patient reported redness which lasted for a few days and resolved on its own. The above stated complications can be avoided by injecting carefully by knowing well the anatomy of the muscles.

## CONCLUSION

Despite of the fact that association of dry eyes with essential blepharospasm is well documented, presence of the same in patients with hemifacial spasm is often overlooked. In spite of this, we have reported a high incidence of dry eye disease in both of our studies. But further studies with large sample size and longer follow-ups are required to establish a definitive association of dry eye disease with hemifacial spasm. We recommend that dry eye disease should be evaluated in all cases of hemifacial spasm and should be appropriately treated along with definitive treatment of spasms with botulinum toxinA.

### Ethical Approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

### Informed Consent

Informed consent was obtained from all individual participants included in the study.

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