

The role of apraclonidine in Horner's syndrome – A case report

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SUMMARY

Introduction Horner's syndrome is an interruption of the sympathetic nervous system at any point along its course between the hypothalamus and the orbit. Horner's syndrome is classically presented as an ipsilateral miosis, subtle ptosis, and facial anhidrosis. Pharmacologic testing is very useful in the diagnosis of Horner's syndrome as it could help to localize the lesioned neuron in the sympathetic pathway, suggesting an etiology.

Case Outline We present a case report of a 41-year-old woman who reported right eyelid drooping immediately after operation of sympathetic chain schwannoma. We performed apraclonidine test for the diagnosis of Horner's syndrome, which produced mydriasis on the affected eye, while there was no significant change of the normal eye. Based on the clinical presentation of anisocoria and one-sided ptosis, and previous medical history of surgical removal of the mediastinal tumor, the patient was diagnosed with a right-sided, partial Horner's syndrome.

Conclusion Timely recognition, exact localization of the lesioned neuron, and referral for urgent imaging studies are important for ophthalmologists in order to prevent and treat life-threatening conditions. Besides its diagnostic value in Horner's syndrome, topical apraclonidine could correct ptosis for the sake of esthetics or when ptosis reduces the superior visual field.

Keywords: Horner's syndrome; apraclonidine test; sympathetic chain schwannoma

INTRODUCTION

Horner's syndrome (HS), also known as oculosympathetic palsy, was first described by Johann Friedrich Horner, as an interruption of the sympathetic nervous system at any point along its course between the hypothalamus and the orbit [1, 2]. The interruption of the sympathetic fibers could be central (between the hypothalamus and the fibers' exit from the spinal cord) or peripheral (in the cervical sympathetic chain, at the superior cervical ganglion, or along the carotid artery) [3]. HS is classically presented as an ipsilateral miosis, subtle ptosis, and facial anhidrosis [4]. Pharmacologic testing is very useful in the diagnosis of HS as the pupillary response to different pharmacological agents could help localize the lesioned neuron in the sympathetic pathway and identify the level of involvement (i.e. preganglionic or postganglionic), suggesting an etiology [1]. Localizing the lesion is very important because preganglionic lesions are associated with a higher incidence of malignancy and need rapid investigations. Pharmacological tests traditionally consist of cocaine testing with hydroxyamphetamine localization, but recently apraclonidine testing has become a pertinent alternative [1]. Appropriate evaluation of HS and timely determination of its etiology may allow for a potentially life-saving intervention [5].

We had the opportunity to observe a patient who developed HS as a consequence of medi-

astinal tumor. Clinical, imaging, and pharmacologic studies are presented.

CASE REPORT

We present a case report of a 41-year-old woman who reported right eyelid drooping immediately after operation of sympathetic chain schwannoma two years earlier. She was diagnosed with a mediastinal tumor by routine chest radiography. A mass was found in the right side of the superior mediastinum. Magnetic resonance imaging revealed a homogenous mass in the same location at the level from Th1 to Th3, which was suspected to be neurogenic. Surgical resection of the tumor was performed and the tumor was completely removed. The histopathological examination showed schwannoma characteristics. Immediately after the surgical intervention, the patient developed ptosis and miosis on the right side. No recurrence of the tumor was observed in two years after operation. Her ptosis and miosis remain until present day.

She was referred to the University Eye Clinic, Clinical Center of Serbia, in Belgrade, because of the drop of the eyelid on the right eye, and different size in pupils. She had been aware of her ptosis for the previous two years, but she hadn't sought ophthalmological assistance. On admission, her visual acuity was 20/20 on both eyes. Her extraocular motilities

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Figure 1. The photograph shows the patient with longstanding right-side Horner's syndrome; right ptosis and miosis.

was normal, with no signs of restriction or double vision or pain. Confrontational visual fields were normal except in her right eye, with defect in the upper half of the visual field. When her right upper eyelid was lifted, visual field was full-to-finger-count. Slit lamp examination of the anterior segment and intraocular pressure testing gave results within normal limits. Her pupils in the light measured 3 mm in the right eye, and 4 mm in the left eye. In the dark, the anisocoria increased with the pupils measuring 3 mm and 6 mm, respectively. There were no signs of the afferent pupillary defect, and both pupils reacted to light well. Also, her accommodative pupillary responses were normal. Ophthalmic examination showed ptosis of the upper lid on the right eye. Interpalpebral fissure widths were measured at 8 mm in the right eye, and 11 mm in the left, which confirm the right eye lid ptosis (Figure 1). As she was hysterectomized, no signs of ipsilateral anhidrosis were found, nor reported by the patient. She also denied a history of dry eyes. The patient's fundus examination provided normal findings. Subsequently we performed the apraclonidine test for the diagnosis of HS. We instilled one drop of 1% apraclonidine into each eye. After 20 minutes, instillation of apraclonidine into the affected eye produced mydriasis (Figure 2), while there was no significant change of the normal eye. Based on the clinical presentation of anisocoria and one-sided ptosis, and previous medical history of surgical removal of the mediastinal tumor, the patient was diagnosed with a right-sided, partial HS. As our patient was not keen to undergo the lid surgery for ptosis, we suggested the use of apraclonidine for ptosis relief. We monitor this patient on a four-month basis as long as no new symptoms and signs occur.

DISCUSSION

A thorough cognition of the sympathetic nervous system is critical in detecting the underlying pathology of HS. The oculosympathetic pathway has a long and tortuous route from the hypothalamus prior to innervation of the ocular structures [4]. Preganglionic lesions affect the neurons that travel from the brainstem to the spine, and from the spine to the superior cervical ganglion, while the postganglionic lesions affect the fibers from the superior cervical ganglion [6]. Preganglionic HS indicates a serious underlying



Figure 2. The same patient following the instillation of 0.5% drop of apraclonidine in each eye – note the reversal of anisocoria and complete resolution of ptosis

pathology and is associated with high incidence of malignancy. Postganglionic HS has primarily benign causes, such as vascular headache [7], while painful HS suggest the possibility of internal carotid artery dissection [4].

In the past, pharmacologic diagnosis of HS with the topical use of 5% or 10% cocaine and hydroxyamphetamine solution has been the gold standard [8]. However, cocaine has several drawbacks. It is a controlled substance that must be prepared by individual pharmacies for local use and has become difficult to obtain for a wide range of practitioners [6]. Higher concentrations of cocaine solutions (i.e. 10%) could compromise the corneal epithelium [1]. An innovative pharmacologic alternative has recently been suggested [4]. Apraclonidine drops (approved for glaucoma; off-label application for HS) are now replacing cocaine in diagnosing HS, as topical apraclonidine is readily available and widely used [9, 6].

Patients with HS develop denervation hypersensitivity of α_1 receptors on the iris dilator muscle. Instillation of one drop of either 0.5% or 1% apraclonidine in each eye result in mydriasis of the affected pupil, often dramatically [9]. This response was seen in eyes with preganglionic or postganglionic lesions. On the other hand, in the normally innervated eyes, apraclonidine produces little or no pupil dilation. Also, reversal of ptosis is reported in some patients after 0.5–1% apraclonidine installation [5, 6].

Garibaldi et al. [10] demonstrated the effect of apraclonidine on anisocoria and ptosis in HS by installing one drop of 0.5% apraclonidine in both eyes of three patients who presented with acute HS. Apraclonidine results in a slight mydriasis of the affected side and no change of the unaffected side (a reversal of the anisocoria), and in some patients a mild upper lid retraction. Morales et al. [6] also found the apraclonidine to be a safe and readily available alternative to cocaine for the diagnosis of HS.

In our case, in-office pharmacologic testing helped us to ascertain the diagnosis of HS based upon the patient's history of surgical intervention and presenting signs. HS is a frequent complication of the surgical resection of schwannoma that originates from the cervical sympathetic chain. This complication should probably be discussed with patients during the perioperative counseling [11].

The preferred surgical intervention for patients with ptosis from HS is either a mullerectomy or an external levator aponeurotic advancement [12]. For the patients

who are not keen to go through the lid surgery, 0.5% apraclonidine drops could induce pharmacologic reversal of HS-related ptosis, as it was suggested by several authors [10, 13]. In most patients with HS (87%), apraclonidine caused significant lid elevation. Yet, this effect was not specific to HS, because near one half of normal, control eyes had the same effect. The lid elevation effect can be useful in long-term symptomatic relief of patients with HS, affected by their ptosis [14].

In most cases, patients with HS tolerate well the associated mild ptosis. They also have no visual disturbance. Timely recognition, exact localization of the lesioned neuron, and referral for urgent imaging studies are important for ophthalmologists in order to prevent and treat life-threatening conditions. Persistent ptosis could be repaired by lid surgery or by topical apraclonidine. Besides its diagnostic value in HS, topical apraclonidine could correct ptosis for the sake of esthetics or when ptosis reduces the superior visual field.

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Улога апраклонидина код Хорнеровог синдрома – приказ болесника

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Увод Хорнеров синдром је прекид симпатичког нервног система на било ком делу свог тока од хипоталамуса до орбите. Хорнеров синдром се типично приказује као ипсилатерална миоза, умерена птоза и анхидроза. Фармаколошко тестирање је веома значајно у постављању дијагнозе Хорнеровог синдрома јер утврђивање локализације оштећења на симпатичком путу може да сугерише на етиологију.

Приказ болесника Приказујемо случај 41-годишње жене која наводи пад горњег капка на десном оку убрзо након операције шванома симпатичког ланца. Извели смо апраклонидински тест, који је довео до мидријазе на захваћеном оку, док на нормалном оку није било одговора. Према клиничкој презентацији анизокорије и једностране птозе,

увидом у претходну медицинску документацију хирушког уклањања медијастиналног тумора, постављена је дијагноза десностраног Хорнеровог синдрома.

Закључак Благовремено препознавање, тачна локализација оштећеног неурона и хитно упућивање на снимања су кључне за офталмологе у циљу превенције и лечења по живот опасних стања. Локални апраклонидин, поред дијагностичког значаја код Хорнеровог синдрома, може да коригује птозу било због естетских разлога, било због смањења горњег видног поља.

Кључне речи: Хорнеров синдром; апраклонидински тест; шваном симпатичког ланца

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