

Case Letter

Iatrogenic Horner's syndrome: A cause for diagnostic confusion in the emergency department

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Dear editor,

Horner's syndrome (HS) results from interruption of sympathetic nervous supply to the eye and manifests clinically with partial ptosis, miosis and enophthalmos, along with anhidrosis of face on the affected side.^[1] HS is not an uncommon finding in patients visiting emergency department (ED), being reported in those with brainstem strokes, myelitis, malignancies of lung and thyroid, dissections of carotid and vertebral arteries, traumatic injury to neck and thorax and cervical or thoracic intervertebral disc herniation.^[1] Some of the iatrogenic causes of HS include cervical and upper thoracic sympathectomy, tube thoracostomy, thyroidectomy, carotid surgery/stenting and epidural anesthesia.^[1] However, percutaneous internal jugular vein (IJV) central venous catheter (CVC) placement is a rare and underappreciated cause of HS.^[2–4] Development of anisocoria in an unconscious patient, as a consequence of this iatrogenic HS, can give rise to diagnostic confusion^[3] and undue investigations.

CASE

A 37-year-old man, diagnosed with end stage chronic kidney disease and on maintenance hemodialysis (HD) for past seven months, presented to emergency department with shortness of breath and anasarca for 5 days. He was a non-smoker, did not have diabetes mellitus and was on treatment for systemic hypertension for past two years. He could not undergo HD for past seven days because of malfunctioning of radiocephalic arteriovenous fistula created in his left forearm. There were no fever, cough, expectoration and chest pain. At admission, he was

disoriented, dyspneic and had anasarca, distended jugular veins and crackles over lower lung fields. His pulse rate was 104/minute, blood pressure was 180/110 mmHg and respiratory rate was 26/minute. Laboratory evaluation revealed hemoglobin of 89 g/L, leucocyte count of $6.2 \times 10^9/L$, platelet count of $141 \times 10^9/L$, blood urea nitrogen of 92 mg/dL, serum creatinine of 12.2 mg/dL and serum sodium and potassium of 138 and 6.1 mEq/L, respectively. He subsequently had generalized tonic clonic seizures and became unconscious. Seizures were controlled with intravenous lorazepam and phenytoin. He required emergency HD for pulmonary edema, hyperkalemia and uremic encephalopathy. Right internal jugular double lumen CVC was placed in second attempt by percutaneous anterior approach, without ultrasound guidance and he underwent HD for 4 hours. Chest X-ray done showed proper positioning of the CVC, without complications.

After HD, he was noted to have developed anisocoria and he continued to remain stuporous. Anisocoria (right pupil 3 mm in size and left 6 mm) was more prominent in dark and pupillary reaction to light was preserved in both eyes. Intracranial bleed secondary to heparin use during HD and hypertension was considered. CT scan of brain was unremarkable. Subsequently, his consciousness improved and he was noted to have partial ptosis, miosis and enophthalmos (HS, Figure 1) on the right side. He did not have other focal neurological symptoms or signs suggestive of brainstem stroke. There was no headache, neck pain or swelling. Ultrasound of neck done later did not reveal neck hematoma, carotid and vertebral artery dissection. HS recovered completely over next six weeks.



Figure 1. Right sided Horner's syndrome with partial ptosis of upper eyelid, miosis (not made out clearly in the picture) and enophthalmos, following right internal jugular hemodialysis access placement.

DISCUSSION

Interruption of sympathetic nervous supply to the eye, which gives rise to HS, can be at the level of central sympathetic pathways (first order neurons) arising from hypothalamus and traversing in brainstem and cervical and thoracic spinal cord or preganglionic sympathetic fibers (second order neurons) arising from intermediolateral gray column of the cervical and thoracic spinal segments or postganglionic fibers (third order neurons) arising from superior cervical ganglion. These postganglionic sympathetic fibers traverse medial to IJV along with common and internal carotid arteries, embedded in carotid sheath.^[1] These fibers are normally less prone for injury and excessive rotation of neck during IJV CVC placement may alter the anatomical relationship between the two and predispose them to injury.^[2] Neck hematoma resulting from accidental carotid puncture during IJV CVC placement can compress and injure ansa subclavia, the part of sympathetic chain connecting middle and inferior cervical sympathetic ganglia.^[2] Hematoma can interfere with blood supply to superior cervical ganglion as well.^[2] Lack of anhidrosis on right half of face in the index case points to postganglionic HS.^[1]

Although percutaneous central venous catheterization can result in several mechanical complications, HS is a rare complication of IJV CVC placement. Risk factors for development of HS following IJV CVC placement include procedural difficulty with multiple attempts at placing CVC,^[4] placement of large bore HD CVC or Swan Ganz catheter, accidental carotid artery puncture and neck hematoma formation.^[4] Development of central vein thrombosis following CVC placement may also predispose to HS.^[5] Placement of large bore HD CVC and multiple attempts at catheterization might have resulted in HS in the index patient. Even peripherally inserted CVC^[5] and subclavian CVC placement^[6] also can be rarely complicated by development of HS. The prognosis for HS is generally favorable and spontaneous recovery expected in significant proportion,^[2,4,7] as in the index case.

Development of anisocoria from HS in the index patient, before recovery of consciousness, led to

consideration of intracranial bleed and stroke. Other clinical features of HS became evident only after he regained consciousness. Development of HS in the index patient prompted consideration of iatrogenic carotid^[8] and vertebral artery^[9] dissection during IJV CVC placement. However, subsequent work-up and rapid clinical improvement excluded these possibilities.

CONCLUSION

In conclusion, iatrogenic HS can rarely result from uncomplicated internal jugular central venous catheterization. When an unconscious patient develops anisocoria from HS, as a consequence of central line placement, diagnostic confusion may arise and undue investigations may follow. Awareness of this complication reduces diagnostic confusion and undue work-up.

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