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Rhino-cerebral Mucormycosis Presenting with Multiple Cranial Nerve Palsy and Cerebral Infarcts in a Patient with Uncontrolled Diabetes Mellitus

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Abstract

Multiple cranial nerve palsy is a syndrome resulting from damage to 2 or more cranial nerves, usually caused by granulomatous inflammation or an infectious process in the superior orbital fissure or lateral wall of cavernous sinus, or retrosphenoid space with involvement of cranial nerves 2, 3, 4, 5, or 6 in combination. Mucormycosis is a potentially lethal opportunistic fungal infection occurring in immunocompromised person.

We depict a patient with uncontrolled diabetes mellitus complicated by opportunistic fungal infection in the nose, palate and paranasal sinus progressively invading the cranial nerves 2,3,4,5 - sensory (oph and max), 6 and also the 7 ipsilaterally.

The patient also had multiple embolic infarcts of brain with involvement of intracranial ICA territory.

Mucormycosis is a serious opportunistic fungal sepsis of the soft tissue around face and mouth, including nose and paranasal sinus in immunocompromised person progressing rapidly to involve multiple cranial nerves and the cerebral vasculature.

Risk factors associated with such infection are uncontrolled diabetes mellitus, hyperlipidemia and atherosclerosis.

Early suspicion and diagnosis is mandatory to treat this dreadful infection and patient survival.

Keywords: Mucorales; Fungal sepsis; Cranial neuropathy; Embolic infarcts; Diabetes mellitus.

Introduction:

Multiple cranial nerve palsy is a syndrome resulting from damage to 2 or more cranial nerves, usually caused by granulomatous inflammation or an infectious process in the superior orbital fissure or lateral wall of cavernous sinus, or retrosphenoid space with involvement of cranial nerves II, III, IV, V or VI in combination. Mucormycosis is a potentially lethal opportunistic fungal infection occurring in immunocompromised persons. Mucormycosis is caused by fungi of the order mucorales, class Zygomycetes. These fungal infections are not common and most frequently occur in people with another form of debilitating illness including poorly controlled diabetes, decreased immune function due to any cause, and burns or severe skin

or mucosal wounds. Treatments for mucormycosis need to be fast and aggressive. The need for speed is because by the time even the presumptive diagnosis is made, often the patient has suffered significant tissue damage that cannot be reversed.

We depict a patient with uncontrolled diabetes mellitus complicated by opportunistic fungal infection in the nose, palate and paranasal sinus progressively invading the cranial nerves 1, II, III, IV, V, VI and also the VII. She was diagnosed mucormycosis by tissue biopsy and was treated with liposomal Amphotericin B and surgical debridement and concomitant insulin therapy to control her diabetes and antibiotic therapy for cavernous sinus infection.

Presentation of the case:

A 35 year old obese woman admitted to this hospital with sudden onset visual loss in her left eye with ptosis, dysarthria and facial asymmetry.

One week before admission, she developed fever and diarrhea, was admitted in a local nursing home and treated with IV fluids & antibiotics and intravenous fluids.

Three days after coming home, she developed fever & weakness in her right upper limb and with slurring of speech and left sided facial weakness. On the day of admission, she developed sudden loss of vision in her left eye and was admitted in our hospital. She also had left hemicranial headache, with inability to move her left eye. She didn't have any trauma, loss of consciousness, or convulsion.

She was a known diabetic on irregular medication & also took OCP regularly. There was no history of hypertension or any chronic infection.

On Examination, she was conscious, oriented with normal vitals. She looked anxious, higher mental function normal. Speech was dysarthric with normal fluency, comprehension and repetition.

Cranial Nerves:

Olfactory: anosmia in left nose.

Optic: Only perception of light in left eye & normal visual acuity & colour vision in right eye.

III, IV, VI Nerve: Left pupil dilated, not reacting to light, left ptosis, left extra-ocular movements absent.

V Nerve:

Motor: jaw movement & chewing was normal, without any deviation.

Sensory loss along left maxillary division.

VII: angle of mouth deviated towards right, unable to blow with left cheek. There was absence of wrinkles in left forehead.

Her palatal movements were normal bilaterally with painful swallowing. There were sores in her mouth, gum and nose.

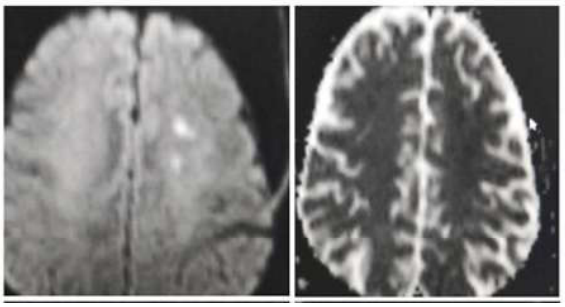
Motor system : Power in right upper & lower limbs - 4/5 and right sided pronator drift was present. Power in left upper & lower limbs was also reduced with hyporeflexia in both lower limbs. Plantar response was extensor (right).

Kernig's, Brudzinsky sign negative. Remainder of the neurological and other system examination including sensory and cerebellar system was within normal limit.

Provisionally diagnosed with stroke and sepsis, she was treated conservatively with antibiotics, antiplatelets, statin and physiotherapy.

Fig. 1: Images showing absence of all extra-ocular movements in left eye with facial deviation to rightand absence of wrinkles in left forehead due to left 3rd, 4th, 6th and 7th nerve palsies.

Investigations: blood leukocytosis with raised CRP, ESR, hyperglycemia (FBS -180mg/dl; PPBS-350mg/dl, hyperlipidemia, and MRI (Fig. 2)



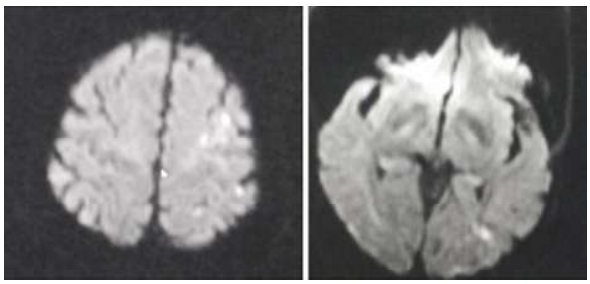


Fig. 2: Diffusion restricted lesions (embolic infarcts) in frontal, parietal and temporal lobes with corresponding ADC mapping

revealed acute infarcts in left parietal, temporal & frontal region with diffusion restricted lesions; There was absent flow void in left intracavernous internal carotid artery. MRAngio

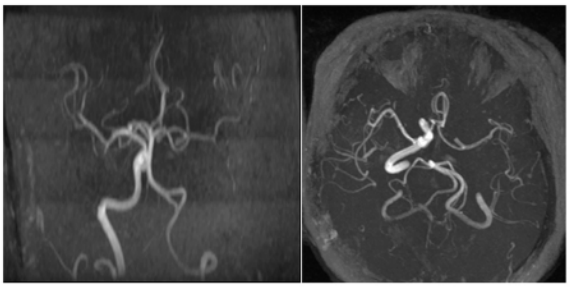


Fig. 3: MR Angiogram revealed no signal in left ICA and non visualisation of M1 part of left MCA; M2 & M3 segment of left MCA and left ACA appears unremarkable possibly through ACOM collaterals

showed non-visualization of left ICA & middle cerebral artery (MCA). Echocardiogram was normal.

Clopidogrel was added. But her neurological condition didn't improve; the patient complained of increasing pain within oral cavity. On next examination of oral cavity, one penetrating ulcer with fungating mass was noted

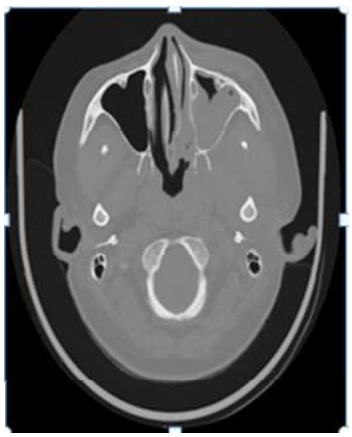


Fig. 4A: CT PNS-showing nodular thickening of mucous membranes of left nasal cavity, left ethmoidal, sphenoidal & maxillary sinus with gross dilatation and sclerosis of wall.

which perforated the hard palate; scrapping from ulcer base obtained for microbiological culture/ biopsy; CT PNS & NCV of all four limbs were done. NCV revealed bifacial axonal neuropathy (left worse than right) with mild distal axonal polyneuropathy. RNST did not show decrementing response and excluded Myasthenia gravis.

Clinically, a diagnosis of rhinocerebral Mucormycosis with multiple cranial nerve palsy with multiple embolic infarcts with ipsilateral ICA occlusion was made and patient was administered Liposomal Amphotericin B with monitoring of renal function. Anticoagulant LMWH was added and antibiotics upgraded to Meropenem and Piperacillin-tazobactum. CT PNS (Fig. 4 A & B)

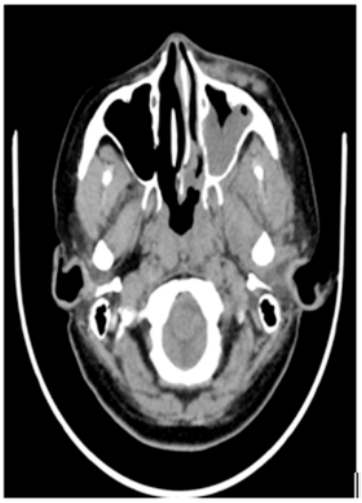


Fig. 4B: CT PNS-showing nodular thickening of mucous membra -nes of left nasal cavity, left ethmoidal, sphenoidal & maxillary sinus with gross dilatation and sclerosis of wall

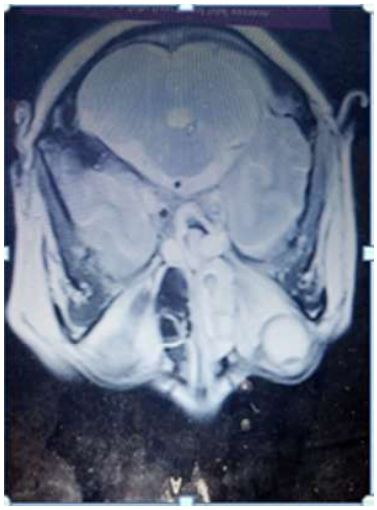


Fig. 4C: MRI brain showing absence of flow void in left ICA and mucosal thickening in left nose and paranasal sinus.

showed mucosal thickening of left sphenoidal, ethmoidal & maxillary sinus, dilatation & sclerosis of wall without destruction. Microscopy and tissue biopsy of oro nasal scrapings

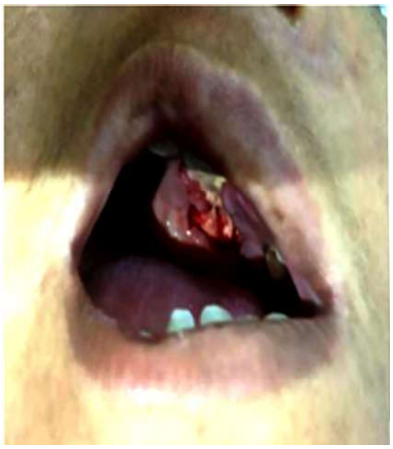


Fig. 4D: Fungating ulcer eroding hard palate.

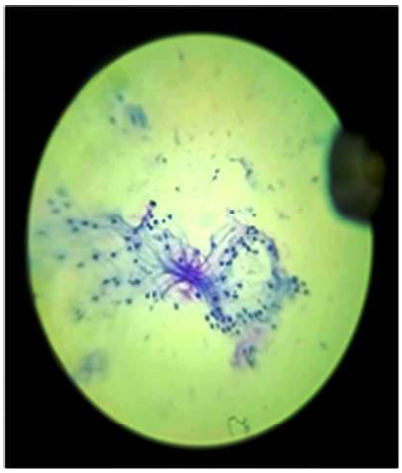


Fig. 4E: Microscopy & biopsy from nasal tissue through eroded hard palate revealing PAS+ fungal structure having broad non septate hyphae & irregular branching s/o mucormycosis.

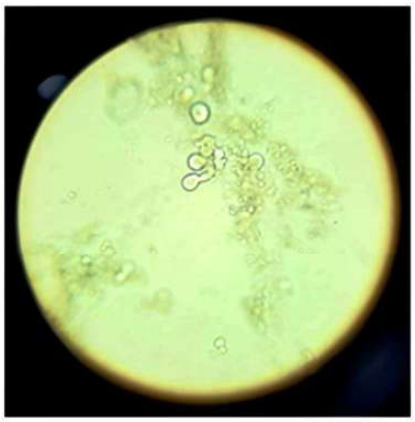


Fig. 4F: Microscopy & biopsy from nasal tissue through eroded hard palate revealing PAS+ fungal structure having broad non septate hyphae & irregular branching s/o mucormycosis.

showed hyphae with branching. DSA revealed complete occlusion of left internal carotid artery, no flow in M1 segment of left middle cerebral artery with good collaterals from right ICA .

After initial period of treatment with liposomal Amphotericin B, the patient was clinically better and there was no further deterioration of neurodeficit. Her left eye movement and vision did not improve. Biopsy report from palatal scrape confirmed diagnosis of Mucormycosis. Add on therapy with intravenous immunoglobulin (IVIG) 25 gms daily for 3 days was also administered for her polycranial neuritis with distal symmetric polyneuropathy and bifacial axonopathy.

Further, as the patient got symptomatically better, in consultation with the neurologist and the ENT surgeon, the case was referred to maxilla facial surgeon for surgical debridement.

Nerve : Site	L1 mS	L2 mS	A p-p mVpp	Dist mm	CV M/S
Rt Oculi Orbicularis	3.50	5.25	0.1	–	–
Rt NASALIS	3.62	7.00	0.1	–	–
Rt ORBICULARI ORIS	3.12	4.00	0.1	–	–
Lt Oculi Orbicularis	1.25	1.25	–	–	–
Lt NASALIS	1.25	1.25	–	–	–
Lt ORBICULARI ORIS	1.25	1.25	–	–	–

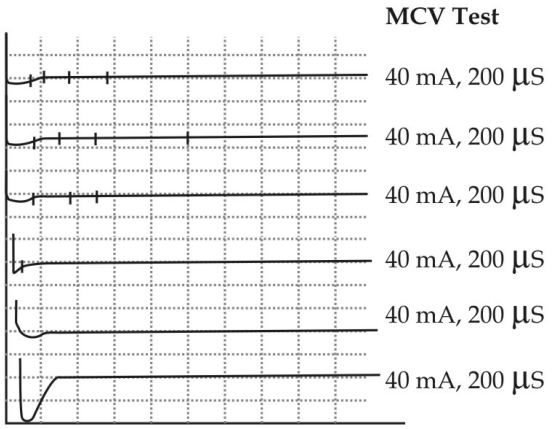


Fig. 5a: NCV study of facial nerves and upper limbs revealed bifacial axonlal neuropathy.

Ref By: GM-UNIT-1 Set2 mcv Tech:

Nerve : Site	L1 mS	L2 mS	A p-p mVpp	Dist mm	CV M/S
Rt Median Wrist	3.87	5.50	3.3	0	
Rt Median Eibow	7.25	9.00	2.6	230	68.2
Rt Uinar Wrist	2.25	3.87	5.3	0	
Rt Uinar Eibow	5.75	9.00	5.1	220	62.8
Lt Median Wrist	3.50	6.00	2.7	0	
Lt Median Eibow	7.12	9.87	2.5	230	63.5
Lt Uinar Wrist	2.62	5.75	4.9	0	
Lt Uinar Eibow	6.00	9.00	4.5	220	65.2

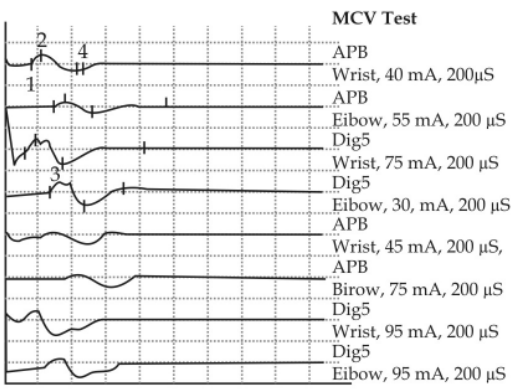


Fig. 5b: Distal symmetric motor axonal neuropathy of upper limbs.

Discussion:

This patient was an obese uncontrolled diabetic presenting with left hemicranial headache and sudden visual loss, and ptosis of left eye and absent extraocular movement and pupillary dilatation, with infraorbital sensory loss consistent with polycranial neuropathy involving II, III, IV, V2 & VI.[1]

This was preceded by acute gastroenteritis and sepsis for which she was treated elsewhere. She also had ipsilateral infranuclear facial nerve palsy, which was axonal neuropathy.[2,3] The corrosive lesions in her palate, mouth, nose and paranasal sinus was proven to be Mucormycosis on tissue biopsy.The fungus eventually invaded the left internal carotid artery causing embolic infarcts in 3 different lobes of the cerebrum.[3] Alternatively, the infarcts might have been the result of artery to artery embolic stroke arising from the atherothrombotic ICA, the risk factor being uncontrolled diabetes mellitus, obesity, hyperlipidemia and OCP.

She was treated conservatively with IVIG followed by Liposomal Amphotericin B.[4]

As her condition improved, she was eventually referred to ENT and Orodental surgeons for surgical debridement.

Conclusion:

Mucormycosis is aserious opportunistic fungal sepsis of the soft tissue around face and mouth, including nose and paranasal sinus in immunocompromised person progressing rapidly to involve multiple cranial nerves and the cerebral vasculature.

Risk factors of such infection are uncontrolled diabetes mellitus, hyperlipidemia and atherosclerosis. Early suspicion and diagnosis is mandatory to treat this dreadful infection and patient survival.

References:

1. Petrikkos G, Skiada A, Lortholary O, Roilides E, Walsh TJ, Kontoyiannis DP. Epidemiology and clinical manifestations of mucormycosisexternal icon. Clin Infect Dis. 2012 Feb;54 Suppl 1:S23-34.
2. Koc Z, Koc F, Yerdelen D, Ozdogu H. Rhino-orbital-cerebral mucormycosis with different cerebral involvements: Infarct, hemorrhage, and ophthalmoplegia. Int J Neurosci. 2007;117:1677–90.
3. Shekar V, Sikander J, Rangdhol V, and Naidu M Facial nerve paralysis: A case report of rare complication in uncontrolled diabetic patient with mucormycosis. Nat Sci Biol Med. 2015 Jan-Jun; 6(1): 226228.
4. Kauffman CA. Zygomycosis: reemergence of an old pathogen, Clin. Infect. Dis, 2004, vol.39 588-90
5. Lewis RE, Kontoyiannis DP. Epidemiology and treatment of mucormycosis. Future Microbiol. 2013 Sep;8(9):1163-75