

RIGHT ARM WEAKNESS AND APHASIA (Slide CC14-7)

CASE 4: Answers and Clinical Course

Answers:

1. **Global aphasia** - i.e. inability to both understand and produce meaningful speech. This deficit suggests damage to both receptive and motor speech areas which in most individuals corresponds to Broca's area and Wernicke's area in the left cerebral hemisphere.

Left gaze preference - This could be due to a lesion of the right abducens nucleus or right paramedian pontine reticular formation or of the left frontal eye fields. In addition, a left parietal lesion can in some cases cause right sided neglect, though hemineglect is more often seen with right parietal lesions.

Right facial droop sparing upper face - The facial nucleus receives bilateral corticobulbar fibers for the upper face. Therefore, an upper motor neuron lesion in the face area of the left motor cortex, or in the descending axons of the corona radiata, internal capsule, cerebral peduncles or pons will produce a right facial droop with sparing of the upper face.

Right arm plegia; Right leg weakness - These findings could be produced by lesions anywhere along the motor pathway including the left motor cortex, internal capsule, cerebral peduncle, pyramidal tract, right lateral corticospinal tract, anterior horn cells, peripheral nerve or muscles.

No response to pain in Right hand - Again, this could be due to a lesion anywhere in the pain sensation pathway for the hand including the peripheral nerves, dorsal horn cells, anterior commissure of the spinal cord, anterolateral pathway in the spinal cord, medulla, pons, or midbrain, VPL nucleus of the thalamus, or the left primary sensory cortex.

2. The combination of global aphasia, left gaze preference, and long tract signs affecting the right half of the body are virtually diagnostic of a large lesion of the left lateral cerebral convexity. The sudden onset suggests a CVA, and indeed, a CVA involving the entire left MCA territory would encompass Broca's, Wernicke's and other speech areas, the left frontal eye fields, and the primary sensory and motor cortices for the right face and arm. The lenticulostriate and other deep branches supplying the internal capsule and corona radiata could be involved as well, producing the partial right leg weakness. An additional finding that is often seen in large MCA infarcts but was not described in our patient is a contralateral visual field cut due to involvement of the optic radiations as they pass deep to the temporal and parietal lobes. Upper motor neuron signs often take several days or weeks to develop following an acute injury (such as a CVA) and initially, reflexes and tone may be diminished to normal (as in our patient) or increased.

Clinical course and CT scans:

The patient was admitted for presumed massive left MCA infarct. A CT scan obtained within a few hours after the event (see slide, left image) showed no focal abnormalities. This is not surprising, since it can take up to 24 to 48 hours for the macroscopic pathologic changes such as brain edema, necrosis and secondary hemorrhage to be visible on head CT following an acute CVA. Occasionally, changes can be seen as early as six hours after the event. In a follow-up head CT about twenty hours later (middle slide) some hypodensity can be appreciated in the left perisylvian cortex consistent with CVA of the left MCA. Two days following admission, the patient became increasingly lethargic and her respirations became very shallow necessitating urgent intubation. A repeat head CT (right slide) shows infarction in the entire left MCA territory, with mass effect due to edema causing left to right midline shift. In more caudal images

(not shown) mild left uncal herniation and obliteration of the basal cisterns could be seen suggesting transtentorial herniation with compression of the brainstem. The patient was treated with measures to decrease intracranial pressure and survived to be extubated five days later. Two months later, she remained globally aphasic, with right hemiplegia and was transferred to a long-term rehabilitation facility.