



Dr. Henry writes about Bulbar and spinal polio

Bulbar polio involved the brain stem where the centers for the cranial nerves are located. The cranial nerves involve smell (olfactory), vision (optic), three cranial nerves control the various muscles that control eyeball movements, the trigeminal nerve and facial nerve which innervate cheeks, tears, gums, and muscles of the face, etc, the auditory nerve which provides hearing, the glossopharyngeal nerve which controls in part swallowing, and functions in the throat, another cranial nerve which controls tongue movement and taste and one that actually sends signals to the heart, intestines, respiratory (lungs) and the accessory nerve that controls upper neck movement. Thus bulbar polio could affect any or all of these functions. Death from bulbar usually occurred from damage to the cranial nerve sending the signal to breathe to the lungs. This nerve stimulates our breathing during sleep. An iron lung, invented around 1926 could keep victims alive with negative pressure breathing. Today, ventilators mostly utilize positive pressure breathing because it is more efficient. Bulbar victims could also die from damage to the swallowing function because a victim could drown in their own secretions unless adequately suctioned or given a tracheostomy to suction secretions before the secretions entered the lungs. It was difficult to have a tracheostomy and still be able to tolerate the air tight collar of an iron lung. Death also occurred from the overwhelming invasion of the virus into other parts of the brain causing coma and death. This was found on autopsy in some deceased victims.

Spinal polio involved damage to the anterior horn cells which run up and down the spinal cord. These cells control motor function only. Sensory cells in the spinal cord were spared, thus we all feel pain and touch. Paraplegics and quadraplegics do not have motor or sensory function below the level of their injury. Spinal polio could damage the muscles of breathing in the chest wall and thus spinal polio victims could also need the assistance of a ventilator or iron lung. Many people had both, spinal and bulbar combined. Actually, many victims that had bulbar alone and had good recoveries had good muscular function because their spinal cord was not involved. With PPS, many of these people are having swallowing and central fatigue problems or problems with any functions related to the cranial nerves (double vision for example).

I hope I am explaining this adequately. Statistically, most of us had spinal polio, and most that had bulbar had it combined with spinal. But now we seem to be learning that many of us had brain involvement during the acute infection that did not do any recognizable damage then, but may be giving us problems now with the total body fatigue or central fatigue of PPS.

People who had only the GI form of polio which we had initially when we became ill (flu like) had the non-paralytic type of polio. The mystery now is whether these people may have had silent CNS involvement and are subject to PPS.

This disease, back before Salk and Sabin, and now with PPS, is amazing and fascinating to any one who studies the natural course of infectious diseases that do not always kill you quickly. Syphilis was this way

before antibiotics and Aids is similarly tragic and fascinating in its specificity for the cells of the immune system. Viruses are wonders of nature. I wished I had missed this one in 1950.

Take care all and I love this service to each other.

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Addendum

Yesterday, I posted from memory my thoughts on bulbar and spinal polio as well as spinal/bulbar polio. What is posted is generally correct. However, I got out my neurology text and will give some specifics since the readers on this list are learned folks and like accuracy.

The twelve cranial nerves and their functions are:

1.	Olfactory nerves (2) to transmit the sensation of smell to the brain.	
2.	Optic nerves (2) to transmit visual information from the eye to the brain.	
3.	Ocular moto nerver (2) supply the pupil constrictor function, eyelid function, abductor and elevator muscles of the eye.	
4.	Trochlear nerves (2) supply the superior oblique muscle of the eye, turning eye inward when the eye is adducted.	
5.	Trigeminal nerves (2) provide sensory innervation of the face, motor supply to the jaw muscles, and the sensory innervation of the cornea providing for the corneal reflex.	
6.	Abducens nerves (2) supply the lateral rectus muscle of the eye, the ability to turn the eye to the side.	
7.	Facial nerves (2) supply motor function of facial muscles (facial expression) and provides taste for anterior 2/3 of the tongue.	
8.	Acoustic nerves (2) provides two functions, one is hearing or auditory and the other is the vestibular function which transmits impulses to monitor equilibrium, orientation in space and changing position. Spinning fast may produce dizziness.	
9.	Glossopharyngeal nerves (2)	The 9,10, and 11th nerves (2) work together to provide for the muscles of swallowing, speech, and taste (for posterior 1/3 of the tongue). They also innervate the muscles of the palate and part of the tongue.
10.	Vagus nerves (2)	
11.	Accessory nerves (2)	
12.	Hypglossal nerves (2) innervate ipsilateral tongue muscles, and allow the protrusion of the tongue out of the mouth on a midline.	

Many of these nerves have branches, especially the trigeminal and vagus. The "bulb" or medulla part of the brain contains the ascending corticospinal tracts of the spinal cord, the descending sensory tracts of the spinal cord and the nuclei of the 9th thru the 12th cranial nerves. Thus, bulbar polio would most commonly affect the 9th thru 12th cranial nerve and could also affect the anterior horn cells in the spinal cord causing motor paralysis or damage to the muscles being supplied by those spinal nerves. Usually the damage was assymetrical and could even be upside down (a person left with the ability to walk, but

possibly in need of a ventilator). Thus more often bulbar polio involved problems with swallowing, breathing and speech. Add the spinal component and there would be motor paralysis, as severe as quadraplegia of motor function, not sensory.

Most people had nonparalytic polio, followed by spinal, followed by spinal-bulbar. Now I think since other areas of the brain were also involved even in spinal alone, there is some rationale as to why so many of us are now experiencing central fatigue as a symptom of PPS. So much of the central nervous system may have been involved unknown to us and our doctors at the time. The doctors, nurses, and physical therapists could only record and measure the observable losses during the time periods of the polio epidemics, not the unobservable damage. I think this explains in part at least part of the mystery of why we are experiencing such a variety of signs and symptoms with PPS. At least it makes a little bit of sense to me. I hope I communicated this in a readable manner.

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