WHAT DOES A NEUROLOGIST DO

A neurologist is a doctor who assesses people with neurological symptoms and conditions, diagnoses them and offers treatment. These neurological conditions are many and varied and can affect different areas of the system. In particular the first thing a neurologist does is where is the lesion. In other words where is the problem and is it in the -

nervous system.

- brain or brainstem
- spinal cord
- nerve root
- plexus (where the nerve roots coalesce together)
- peripheral nerve going down the legs and arms
- nerve muscle junction
- muscle.

So that is the whole system and anywhere in that pathway patients can have problems that give them neurological systems and sometimes significant diseases.

The second thing a neurologist does is figure out **what is the problem**. The problem in neurology is that we have more diagnoses compared to all other aspects of medicine and these vary from

- inherited disorders
- infectious disorders
- nutritional disorders such as vitamin deficiency
- endocrine disorders
- degenerative disorders such as Alzheimer's disease or Parkinson's disease haematological or allergic disorders such as autoimmune disorders
- paraneoplastic disorders which is a distal effect of underlining cancer
- trauma, head trauma or spinal injury can cause difficulty
- iatrogenic or medication-induced so patients are on polypharmacy nowadays and some of those can have significant side-effects causing difficulties
- psychiatric disorders
- metabolic disorders

So when a person or patient goes to see a neurologist he/she tries to figure out "where is the lesion" and "what is the lesion". The story and history is about 70-80% of the work, so the neurologist will spend a longtime teasing out the story

- what the problem is
- what is the family history
- what is the past medical history
- what medications you are on

What other problems might be present such as

- cigarette smoking
- alcohol ingestion or drug ingestion
- other problems with the other organs in the body such as the bones and joints; the eyes; the hearing; the heart and lungs; the GI tract; the urinary tract; the sexual function and indeed personality, sleep and mood, etc.

Following a detailed history the neurologist is likely to have a fair idea "where the problem is". For example some patients may have an upper motor neuron problem, a condition affecting brain, brainstem or spinal cord giving stiffness or increased tone in the legs/arms, either spasticity or rigidity depending on which pathway is affected. There may be weakness and depending on where the lesion is either down one side of the body (e.g. such as a stroke) or perhaps both legs if it is spinal cord.

The examination compliments the history and as outlined above the neurologist often assesses the patients cognition and mood. There may be a cognitive assessment or the eye movements if there is a problem with movement of eyes indicating a brainstem problem

- is sensation and movement of the face normal?
- is the hearing normal?
- is the speech and swallow normal?
- is neck movement normal?

Following these assessments the neurologist often will look at

- arms and legs to ensure that the tone in the arms and legs is normal and not stiff
- is power normal distally in the arms and legs and proximally?
- is coordination and fine dexterity of the hands and legs normal?
- is there a problem with clumsiness or slowness of movement?
- is sensation normal in arms and legs including light touch, pinprick and pain, temperature, vibration using a tuning fork and what is called proprioception is where the joint is in space which is a critical sensation for normal balance function?

Following that the neurologist will assess the reflexes (ankles, knees, biceps, triceps and forearms) as brisk reflexes can occur with an upper motor neuron lesion affecting the spinal cord, brainstem or brain or absent reflexes are present. Is there is a low motor neuron such as an neuropathy associated with diabetes or vitamin B12 deficiency. When combining the history and examination well over 90% of the time the neurologist has figured out where in the system is the problem lies and has a good idea about what the problem may be.

The investigations therefore are to confirm the same. For example a brain imaging study such as CT brain scan or MRI brain scan can be very helpful if there is a concern that someone may have had a stroke or multiple sclerosis affecting the brain, brainstem or spinal cord. A lumbar puncture looking at the cerebrospinal fluid that

bathes the spinal cord and brain is very helpful if someone has an inflammatory condition like multiple sclerosis - inflammatory protein can spill into the fluid from the spinal cord and brain. Various blood investigations are done to look for vitamin deficiency, and/or infections or major organ problems that can affect the nervous system.

In summary using a detailed history, detailed neurological examination complimented by investigations. The neurologist usually figures where and what the problem is in the nervous axis and hopefully will instigate treatments that are of benefit to the patient. For example, in multiple sclerosis, immunomodulatory therapies can be of benefit to decrease the risk of further relapses. In Parkinson's disease often medication to replace the dopamine deficiency in the brain will improve movement control, speed of movement and balance for the patient. In stroke blood thinning agents or clot busting agents can be used in the acute setting to try and stop any permanent damage to brain tissue. Increasingly neurologists have more and more new therapies for conditions such as multiple sclerosis, migraine or stroke and hence the early diagnosis of neurological disease is key to be able to improve patient's quality of life and hopefully decrease mortality.