What is Schwannomatosis?

Doctors working in the field of Neurofibromatosis (NF) now regard schwannomatosis as the third main type of NF. The clinical problems that can occur overlap with Neurofibromatosis type 2 (NF2). Both conditions are associated with the growth of a type of benign tumour called a schwannoma.

What distinguishes schwannomatosis from NF2 is that people with this diagnosis rarely, if ever, develop vestibular schwannomas, the hallmark tumour of NF2. Also in schwannomatosis it is very unusual to get any other tumours such as meningiomas which are quite common in NF2.

In schwannomatosis patients don’t get schwannomas in the skin itself but these develop on the nerves as they leave the spinal cord or in the major nerves supplying the arms and legs. Finally there are no eye problems associated with schwannomatosis.

How common is schwannomatosis?
There are no very accurate figures to answer this question, but schwannomatosis is much rarer than NF2.

What are Schwannomas?
Schwannomas are benign tumours of the nervous system. They originate in the nerve sheath (the cells covering and protecting the nerve). Anyone can develop a single schwannoma but if you develop multiple schwannomas then you will probably have either schwannomatosis or NF2. Examining the tumours under the microscope reveals that they are made up of multiple schwann cells. They are different to neurofibromas which have a mixture of cells in them.

How does Schwannomatosis affect people?
This depends on how many schwannomas develop and where within the nervous system they develop. When the schwannomas are located on the nerves in the arms and legs the main problem is usually pain. For some reason, the schwannomas in schwannomatosis are often associated with more pain than the schwannomas in NF2. Most nerve tumours are acutely painful when touched (described as “shooting” or “like an electric shock”) but in schwannomatosis the pain can be more severe and persistent. Fortunately there are drugs like pregabalin and gabapentin that can help with this.
If a schwannoma grows on a spinal nerve root and extends into the spinal canal, it can cause problems with weakness of an arm or leg or loss of sensation.

**How is schwannomatosis diagnosed?**

Unless a person comes from a family with definite schwannomatosis, the diagnosis is only considered after the more likely possibility of NF2 has been excluded. Patients with suspicious symptoms are usually referred to one of the specialist Neurofibromatosis Centres, or reviewed by Consultants working within a regional genetics service skilled at differentiating this diagnosis. The doctors there will undertake a series of tests to look for signs of NF2 including skin and eye checks, head and spine MRI scans and genetic testing. It may be necessary for the genetic testing to be done both on schwannomas that have been removed and blood samples before the diagnosis is clarified.

There may be a period of time when the diagnosis is unclear. For example, a patient may present initially with multiple schwannomas and complain of pain, but have no hearing problems. In time that patient may go on to develop the hallmark bilateral vestibular schwannomas that would confirm a diagnosis of NF2. This would only be apparent by serial annual MRI scans.

Making a diagnosis is made more complicated by the fact that about a third of NF2 patients with no family history are described as having “mosaic” NF2 – in other words where only a part of their body carries the NF2 gene fault. (Mosaic NF2 is described in detail in a separate fact sheet under our downloads section).

The problem for doctors is that mosaic NF2 and mosaic schwannomatosis can present in exactly the same way. On examination and on scan the schwannomas look the same - the only clinical clue is if the patient has a lot of pain...but even this is not always the case. In this situation the skill in diagnosis is particularly important and the doctor will rely on information from symptoms, physical examination, scans and tests (including mutation analysis) to come to a conclusion. This may take a frustrating length of time. In schwannomatosis about 30% of patients have a mosaic presentation with the tumours being confined to one particular area of the body, one arm or a leg only for example.

In an individual with at least 2 non-intradermal (i.e. within the layers of the skin) schwannomas, an MRI scan will be undertaken to confirm or exclude the diagnosis of NF2. If no vestibular schwannomas are present and there is no other evidence of NF2, then a diagnosis of schwannomatosis will be considered.

There is no confirmatory blood test available at present.

**Inheritance of schwannomatosis**

The majority of people with schwannomatosis are the only person in their family to be affected. There are some families with two or more affected people and here inheritance is dominant (as for NF1 and NF2) BUT the difference is that not all family members with the gene develop schwannomas.
Genes and Schwannomatosis

The genetics of schwannomatosis is much more complicated than in NF1 and NF2. So far only one gene has been identified (called SMARCB1 or INI1). Mutations have been found in this gene in between 33-66% of people from affected families cases but in only 7% of people who are the only person in the family. The SMARCB1 gene is on chromosome 22 close to the NF2 gene. Schwannomas in NF2 and schwannomatosis have different genetic changes and this is proving helpful in providing a clear diagnosis.

Management of schwannomatosis

Effective pain management and control can be a challenge in schwannomatosis. Referral to a specialist multidisciplinary pain clinic can be helpful and can offer support with medication and other techniques.

Once a tumour becomes symptomatic causing pain, surgery to remove it can bring relief. This procedure will be performed by a skilled neurosurgeon or peripheral nerve tumour specialist.

January 2013

Dr Susan Huson
Consultant Clinical Geneticist
Neurofibromatosis Centre
Genetic Medicine
St Mary's Hospital
Manchester

Rosemary Ashton
Neurofibromatosis Specialist Advisor
The Neuro Foundation

The Neuro Foundation has taken reasonable care to ensure that the information contained in its publications is accurate. The Neuro Foundation cannot accept liability for any errors or omissions or for information becoming out of date. The information given is not a substitute for getting medical advice from your own GP or health care professional.