Dementia detection research a personal mission for PhD student

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Helen Beaumont

A University of Manchester PhD student has used MR scans in a new way to detect the devastating form of dementia that affected her late husband, raising the possibility of earlier diagnosis.

Helen Beaumont's husband, Clive was diagnosed with Frontotemporal dementia (FTD) aged 45 and died six years later in 1999. Motivated by her loss, Helen set up a charity called Young Dementia UK, wrote a book which has made the NHS recommended reading list for dementia and enrolled at The University of Manchester to carry out her PhD.

Her research has focussed on using MR scans to look for signs of FTD and her findings have shown that it is possible to detect it by examining

the amount and location of fluid in the brain.

She said: "Diagnosing FTD is currently a process of elimination. The symptoms such as personality changes or difficulties in performing tasks at work can be attributed to a number of physical and mental conditions, so doctors run tests to rule each of these out.

"What I wanted to do is use MR scans to detect differences in the brains of people with FTD, so that diagnosis is speedier and patients and their families can be helped sooner."

Helen scanned 17 people with FTD and 18 who were tested to ensure they didn't have dementia. She reconfigured the MR scanner to take images of the movement of blood and fluid around the brain – known as perfusion and diffusion.

People's brains vary in the way they look, and so it is difficult to do any sort of comparisons using just the raw images from the MR scan. As a result, Helen had to normalise the images – a process of distorting them until they are all the same shape.

Frontotemporal dementia affects the frontal and temporal lobes of the brain. If the image is thought of as a map, normalising the image makes the same point in every brain have the same coordinates. Once she had done this, Helen could do statistical tests to see if there were differences in the images between the patients and the controls.

When the 35 images were normalised and analysed, it was the fluid which stood out among the FTD group.

Helen, who lives in Manchester, said: "It may be that, as brain cells die because of the disease process, the spaces left fill up with cerebrospinal fluid (CSF). As CSF has a huge signal compared with normal brain

tissue, this would explain why these regions show up so much more clearly in the scans."

The current results are for patients with clear signs of FTD, but Helen is now looking for funding so that she can test her technique on potential early sufferers.

She said: "There were signs that there was something wrong with Clive at an early stage, but it took four years to achieve a diagnosis. When people's personality changes, the first person they are often referred to is a psychiatrist and even once you look for physical reasons, the symptoms can also be due to a brain tumour or thyroid deficiency.

"If we can establish benchmarks which show that FTD is killing brain cells, then the uncertainty and wasted time for patients and their families will be much reduced."

Provided by University of Manchester