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STROKE FACT SHEET D

COGNITIVE PROBLEMS FOLLOWING STROKE

Introduction

Besides the obviously visible effects of stroke, such as paralysis, weakness or loss of speech, there are often less obvious effects, and among these are what we call the cognitive problems.

Cognition is the word which covers the mental processes involved in using language, knowing, learning, understanding, perceiving, attending, remembering, awareness, judgement, attitudes and so on.

Cognitive problems arise when one or more of these processes are impaired by stroke and fail to work normally. A number of these problems are discussed and if you, as a carer, can learn to recognise them you will be more able to help the stroke person who suffers from them, and try to ensure that the right treatment is given where necessary.

Problems in Daily Living after Stroke

A person who has suffered a stroke may experience difficulties in daily living caused by any of the following:

Sensory impairment, such as partial loss of vision, or loss of sense of touch on one side of the body

Motor problems, such as paralysis or weakness

Emotional problems, such as anxiety or depression

Behaviour problems, arising from damage to the part of the brain involved in exercising self control

Cognitive problems, such as difficulty in understanding or using speech

These problems may be multiple.

Unfortunately impairments after stroke do not always occur singly. Difficulties often arise through a combination of different disabilities, or because it is easy to attribute them to a wrong cause. For example, one stroke person showed extreme fear at the prospect of walking alone or transferring from her wheelchair to somewhere else. Fear is most often thought of as an emotional disorder, but in this patient's case the emotion was a symptom of cognitive impairment that left her unable to judge depth or distance. She experienced fear because she felt that people who were in fact several feet away were going to knock her over, and when lying on a mat on the floor she thought she was about to fall a long way and hurt herself.

In contrast, a patient who was terrified of the hydrotherapy pool had always been frightened of water and never learned to swim. So her fear had nothing to do with the stroke, but was an emotional problem that had always been there and was now added to other problems which did arise from the stroke.

If you are aware that the effects of a stroke may arise from a combination of disabilities rather than single ones, you may find better ways of helping the patient to cope with them. And this will help to lessen any depression that may be caused by the sudden change from an active, independent life to one of relative inaction and dependency.

What Are The Various Cognitive Problems Following Stroke?

To a large extent, the part of the brain affected by stroke determines the nature of cognitive problems. This is because cognitive functions tend to be located mainly on one side of the brain, unlike movement functions where both the left and right sides of the brain play an equally important role. In most people the left side of the brain is more important for language, and the right side more important for spatial and perceptual skills. And because the left side of the brain controls the right side of the body and vice versa, people with right-sided paralysis often have language problems, and people with left-sided paralysis often have perceptual problems (difficulty in making sense of what they see, hear, and touch) or spatial problems (difficulty in judging depth, distance, or space). The following pages describe the disorders which can arise, and suggest ways to alleviate them.

Language Problems

As in most people the left side of the brain controls language, a stroke in this region may leave them unable to understand what others are saying, or having difficulty in using language to communicate, or even having both these problems.

Aphasia or *dysphasia* is the term used for a language disorder. There are two main types of these known as disorders of production (*expressive dysphasia*) and disorders of comprehension (*receptive dysphasia*).

In **expressive dysphasia** the stroke person has lost, or has difficulty in producing, speech. If the stroke has affected the speech mechanisms themselves (the tongue or the voice box, for example) the condition is known as *dysarthria*. If it has affected the area in the brain responsible for producing the correct sounds it is sometimes known as *Broca's aphasia*.

Another expressive disorder is caused by difficulty in choosing the correct word. This is often known as *anomia*. In fact most language impaired people have word finding problems - a common one is the use of unintended words, phrases or sounds. For example, "My little girl" for "Her little boy"; or "trubs instead of "shrubs". This condition is known as *paraphasia*.

Dysphasic patients often have difficulty with grammar or the structure of language, and may say something like "My speech no sense" instead of "My speech makes no sense". This problem is known as *agrammatism*.

Another problem, though a less common one, occurs when someone cannot repeat words or numbers although in other ways is able to understand language and communicate normally. This repetition failure is called *conduction aphasia*.

In **receptive aphasia**, when the disorder affects **understanding** rather than expression of language, it is likely that the patient has difficulty in attaching meaning to words. This condition in known as *Wernicke's aphasia*. People with this problem may speak at great length but much of what they say does not make sense. They may also have difficulty in writing correctly.

If the problem of understanding speech is due to *word deafness* (a rare condition in which speech does not sound like language at all but is just a meaningless noise) then reading and writing will not be affected and speech will be normal or nearly normal.

You may not able to remember the names of all the conditions described, but I give them to help you to see how many different forms of speech and language disorder can occur, and hope that this will give you greater understanding of your stroke person's particular difficulties.
In practice most language impaired people will have both expressive and receptive problems to some extent.

What can you do to help?
All people with speech or language problems should be seen by a speech and language therapist who will give advice and arrange treatment if necessary. But families and carers must also help. Try to talk to your stroke person as you did before the stroke. Show that you feel you are talking to an intelligent person. Speak clearly and simply, but not too loudly, and not as though you were talking to a child. Remember, too, that when stroke people cannot respond to what you say they are often still able to hear and understand you. So continue to talk to them - never give up - and of course never say anything in front of them which could hurt or worry them. If they cannot tell you their needs and wants, they may be able to write them - this should be encouraged.

Reading and Writing Problems
People who have problems in understanding or producing speech usually also have problems with reading, writing and calculating. These conditions are known as *alexia* (or *dyslexia*), *agraphia* (or *dysgraphia*) and *acalculia* (or *dyscalculia*). Sometimes people with these will be unable to read whole words but will be able to read individual letters of a word and so can understand the printed word, though, because they have to read letter-by-letter, their reading is very slow. This condition is know as *letter-by-letter reading* or *alexia without agraphia* (absence of reading without absence of writing). People with this difficulty can write reasonably well but, sadly, are unable to read what they have written.

Another kind of dyslexia occurs when people are able to read regularly spelled words such as "mint" and "beak" but not words spelled irregularly like "pint" or "steak". "Pint" will be read as if it rhymes with "mint" and "steak" with "beak". This condition is known as *surface dyslexia* (words are read according to their surface structure or read phonetically). The spelling of people with surface dyslexia is usually even more phonetic than their reading, but the following example shows that the writing is intelligible despite being incorrectly spelled: "I told my farther I whase onle werking in the stores and not doing enything dangerouse whitch carmed him down".

Other people have an inability to read nonsense words such as "wug" or "plag" or words they have never met before. They tend to read nonsense words as if they are real words ("plag" might be read as "plague"). This condition is known as *phonological dyslexia*. Writing is usually unaffected, at least for familiar words.

Another reading difficulty is called *deep dyslexia*. People with this condition find nouns much easier to read than verbs, prepositions or adjectives.

They also tend to make errors of meaning (they might read "boat" as "train" or "uncle" as "aunt"). Visual errors are also common. The word "posture", for example, might be read as "postage" and "choir" read as "chord". Deep dyslexics also show a tendency to combine errors of meaning with visual errors. One patient read "generosity" as "really old" (geriatrics) and "deny" as "jeans" (denims). The writing ability of people with this condition is similarly affected so nouns are easier to write than verbs, and errors of meaning or visual errors are common.
People with very severe language problems may be unable to read and write at all. This condition is called *alexia and agraphia*.

What Can You Do To Help?
Try to encourage the use of drawing if the stroke person can convey meaning more easily this way. It may also be helpful to encourage copying of clear print. And if the stroke person has one of the dyslexic disorders described here, try choosing words that are easier to read or write, such as nouns rather than verbs or prepositions.

Perceptual Problems
Perception is the process of making sense of what we see (visual perception), what we hear (auditory perception), or what we touch (tactile perception).

Visual perceptual problems are common after stroke in the right half of the brain (usually causing left-sided weakness or paralysis). These problems should not be confused with poor eyesight . The eyes may be unaffected but the messages relayed back to the brain are not being dealt with properly. Adequate eyesight is of course necessary for visual perceptual functioning but absence of sight does not cause a perceptual problem.

Perceptual impairment can be very disruptive. I gave an example earlier of a patient who could not perceive distance. In another case a patient, during rehabilitation after stroke, became suspicious of her occupational therapist, who she thought was tricking her in sessions involving the matching of objects. The problem was that the objects seemed to her to change or be changed when, in fact, they remained the same. The patient blamed the occupational therapist for changing the objects each time she looked away.

Here are some of the main visuo-perceptual and visuo-spatial disorders:
Visual object agnosia, or loss of ability to recognise what is seen, even though there is no difficulty in seeing or in finding the appropriate words.

Prosapagnosia, or inability to recognise familiar faces. In severe cases patients will not recognise their own face in the mirror or in a photograph. Family members can usually be recognised by their voices, their walks or other cues. This is a rare condition.

Colour agnosia, or failure to recognise colours.

Unilateral neglect, or failure to attend to one side of space or one side of the body. People with this disorder ;may bump into things on one side (usually the left), may fail to see food on the left side of a plate placed in front of them, may comb half their hair, shave or make-up one side of their face. They are likely to have a number of accidents, experience problems in manoeuvring a wheelchair, and have difficulty in getting from a wheelchair to the lavatory or other places. Unilateral neglect is seen in about 40 per cent of right hemisphere stroke patients (those with left-sided weakness).

When the stroke affects the left side of the brain (causing a right-sided weakness) unilateral neglect may occur but is usually not so severe and clears up more quickly.

Difficulty in understanding what is seen, when it is looked at from an unusual or unexpected angle. One stroke person saw a black cardigan on a bed and thought it was a cat.

Difficulty in judging depth, distance or space. For example, stroke people may believe that the car they are sitting in is about to be crashed into by an oncoming car which is, in fact, safely on the opposite side of the road.

Constructional and dressing apraxia. This refers to problems in constructing things like jigsaw puzzles or model kits, and to difficulties in dressing, such as a tendency to put on clothes the wrong way round or in the wrong order. These problems may easily be missed or misunderstood by carers, and may be put down to a need for new spectacles or even stupidity, when in fact they are caused by perceptual impairments.

What can you do to help?
Occupational therapists can often help with these perceptual and constructional problems, and a GP or consultant can usually refer patients to them. In the home it is important to ensure that lighting is adequate, and objects used in daily living, such as clothes or cutlery, should be laid out in an orderly way as they are harder to identify when they are jumbled together. Colour can sometimes be used to make objects easier to identify. Knives, forks, and spoons, for instance, can be selected more quickly if their handles are in different colours. It is a good idea, too, to allow extra time for the stroke person to do tasks involving vision.

Memory Problems
Memory is the ability to take in, store, and retrieve information. Problems with memory occur frequently after stroke. Usually, verbal memory is more impaired after a left hemisphere stroke and so there will be greater difficulty in remembering such things as names, stories and other language related information. Visual memory is usually more impaired after a right hemisphere stroke and there will be greater problems in remembering faces, shapes, routes and other non-language material.

Any stroke, however, may result in a generally poorer memory which will lead to forgetting to do tasks such as taking tablets, watering plants or making telephone calls.

Although it is common to talk of memory as though it were one thing or one skill - something either *good* or *bad* - there are in fact a number of memory systems working together. After a stroke or any kind of brain injury, accident, or infection, it is usual to find immediate memory is relatively spared so that the affected person is able to repeat a new name or telephone number that has just been given, but if required to remember it after a delay or distraction, problems may occur.

If memory is severely affected while all other cognitive skills are intact the patient is said to have *amnesia* or the *amnesic syndrome*. It is possible to have amnesia after stroke but it is more usual to have less severe memory difficulties, together with other problems such as poor attention or poor word finding, or slow thinking. In such cases it is preferable to describe this disability as having memory impairment or memory problems rather than amnesia.

Memory impaired people have difficulty learning anything new and this is often more of a handicap than forgetting episodes from the past. It is usual to find that events that happened some years or months prior to the stroke are remembered more easily than events that happened a short time before.

What can you do to help?
One of the best ways to help people with memory problems is to teach or encourage them to use memory aids such as diaries, tape recorders and wall calendars. Because it is harder to use these if you have poor memory it may be necessary to design or modify them to suit your particular stroke person, and then to spend time teaching ways to use them. Providing an aid is not likely to be helpful unless the patient is taught how to use it.

Attention Problems
We are all constantly receiving information and signals from the environment through our five senses, but for much of the time we are unaware of them because, if we want to, we can exclude them from out attention. Attention is the ability to select those signals we want to enter our awareness and those we want to keep at bay. When driving, for example, we can usually attend to the traffic on the road and carry on a conversation with a passenger. If an unexpectedly tricky situation arises we can stop talking and concentrate on the traffic. After a stroke it may be difficult to distinguish between what requires attention and what does not. So the stroke person will be easily distracted.

Some of the other everyday problems that may result from impaired attention are irritability, poor memory, fatigue, impulsiveness, and inability to plan ahead or to do more than one thing at a time.

There are a number of ways of classifying attention disorders. One of them involves considering the following five types of attention:

Focussed attention is the ability to concentrate on important matters, such as the person who is speaking to you, or the traffic on the road. Some patients, particularly in the early days after stroke, may be able to respond only to internal messages such as pain or fear, and cannot focus on important external factors.

Sustained attention is used to keep one's awareness on the task at hand (not to switch off during a conversation or to stop attending to the traffic on the road). Many stroke patients are unable to prevent themselves from having lapses of attention.

Selective attention is the ability to exclude distracting information. For example, when listening to the radio we can, to a limited extent, exclude the noise of the traffic outside, and when we are at a party we can attend selectively to the person to whom we are talking while excluding conversations going on around us. Again, this is not always easy for stroke patients who may be unable to exclude what is unimportant.

Alternating attention is the ability to shift from one task or activity to another when it is important to do so. For example, to stop talking when driving if it is necessary to deal with a complex situation, and then return to the conversation again when the difficulty has been overcome. Some stroke patients find that once they have "got going" on a task they are unable to switch to another.

Divided attention enables us to respond simultaneously to two or more things at the same time, perhaps talking while walking, or listening to a conversation while watching television. All of us will, of course, have attention problems on some occasions. If we have a toothache or are very tired we may find our attention wandering. We can usually overcome this with an effort of will but many stroke people are unable to do this.

What can you do to help?
The best way to help people with attention problems is not to give them too much to attend to at any one time.
Instructions or requests should be clear and short. Sometimes they may find it helpful to repeat what they have been told, in their own words. Attention problems are often made worse by stress or fatigue. When this happens it is best to stop making demands on the patient's attention until a more favourable time occurs.

Other Cognitive Problems
There are many other cognitive difficulties arising because of stroke. These include impairments in problem solving abilities, reasoning and judgement - and slow thinking. Apraxia is seen in some stroke patients. I have mentioned constructional and dressing apraxia in connection with perceptual problems, but in general, apraxia is a movement disorder though not one caused by paralysis or weakness.

Instead it seems to arise from planning difficulties or an inability to put the steps together in the right order. So an apraxic person may have a full range of movements and a good grip but be unable to wave goodbye because of difficulty in organising the appropriate series of movements. This may also apply to organising the movements of the articulatory organs of speech.

Seeking Help From Experts
However much you are able to help the patient yourself, you will need expert advice and help. Stroke people with language, reading and writing difficulties will be helped most by a speech and language therapist or neuropsychologist. Memory, perceptual and attention problems are likely to be tackled by occupational therapists or neuro-psychologists. Help should be sought through the stroke person's GP. Consultants can refer patients to therapists; in some areas GP's may have direct access to therapists too.

For more information contact
Stroke SA Inc *Phone:(08) 8352 4644*
302 South Road
HILTON SA 5033 *E-mail: strokesa@chariot.net.au*