

Anaesthesia for older people and people with dementia

For a long time, there have been anecdotal reports from family members that their older relative "has never been the same since the operation." Some older people do experience cognitive problems or changes in behaviour after surgery with general anaesthesia, but for the majority these will be temporary problems. This Update Sheet describes the different types of problems that may occur.

Over 50 years ago, it was suggested that 7% of older patients who underwent surgery experienced extreme "dementia", while minor changes in thinking were common. However, the evidence for this was anecdotal. More recently, research has investigated the incidence and long term outcomes of post-operative changes in thinking or cognitive function, as well as potential causes. This research has shown that cognitive problems after surgery are not dementia. Changes in thinking after surgery can present as *delirium* or as deterioration in aspects of cognitive function (compared to cognitive function before surgery) that is termed *post-operative cognitive dysfunction*.

Delirium after surgery is a transient and fluctuating disturbance of cognition that occurs mainly in the days immediately after surgery, while patients are still in hospital. Post-operative cognitive dysfunction can occur in the weeks to months after surgery and there is evidence that in rare cases it can last as long as five years.

Post-operative cognitive dysfunction (POCD)

POCD is the term used to describe a decline in cognitive performance from pre- to post-surgery. This deterioration

is evident from changes in the ability of the individual to perform brief standardised tests of cognitive function (for example, tests of memory, attention, concentration or fine movements). In general, the changes in performance that give rise to a classification of POCD are subtle, although in a small proportion of people deterioration in thinking can be more substantial. Importantly, the changes in cognitive function that occur after surgery are not large enough to satisfy clinical criteria for dementia.

POCD has rarely been documented in people under 40. While it is not unique to older patients, POCD may be more severe and longer lasting in this group. For older people, research suggests that 1 to 2 weeks after surgery, around 50% of cardiac surgery patients, around 30% of other major surgery patients and around 7% of minor surgery patients will show POCD. Patients who are older, are sicker, require more extensive surgery or have post-operative complications are more likely to have POCD at this early stage.

Three to 6 months after surgery, generally less than 10% of patients still have POCD, although up to 30% of cardiac surgery patients may still be affected. Hence there is a reduction in

the incidence of POCD across the weeks after surgery.

Between 1 and 2 years post-surgery, POCD persists in only around 1% of non-cardiac surgery patients. While another 10% of patients show some cognitive decline at this time, so do 10% of older people who did not have surgery 1 to 2 years earlier. So the cognitive decline observed in these patients is believed to be due to normal ageing changes rather than the effects of earlier surgery or anaesthesia.

In the case of cardiac surgery, some research has followed patients for 5 years and found evidence of POCD in 30 to 50% of patients at this time. However, the effects of heart disease, coronary bypass during surgery, and being 5 years older may contribute to this cognitive decline.

Taken together these studies suggest that while POCD is common in older surgical patients, for the majority of patients POCD does not occur. Furthermore, for most of those who do develop POCD, they will experience cognitive problems of varying severity that are likely to last a few weeks to a few months at the most. There is evidence that for some cardiac surgery patients, longer term cognitive problems can arise.

Delirium

Delirium is an acute and generally reversible disturbance of attention and cognition. Symptoms develop quickly and fluctuate across the day. They may include confusion, restlessness, anxiety, irritability, social withdrawal, being easily distracted and sleep disturbances. A physical cause of the delirium can usually be identified. Medications, infection and metabolic disturbance are the most common causes in older people, and delirium can also follow surgery. Several factors increase the risk of developing

delirium, including multiple medications, dehydration or malnutrition, physical or mental illness, sensory impairment, pain, increased age and pre-existing cognitive impairment or dementia.

As with POCD, post-operative delirium is reasonably common in older patients. Research shows that it affects around 10 to 15% of minor surgery patients, around 30 to 50% of major surgery patients, and up to 60% of cardiac surgery patients. However, it is also thought that post-operative delirium in older patients often goes undiagnosed. It is important that factors contributing to delirium are recognised and treated, as it is associated with longer hospital stays and delayed recovery.

Post-operative delirium is usually seen on the first or second day after surgery and symptoms are often worse at night. The majority of older patients will recover within a few days, but in a small number of patients delirium can persist for weeks or even months. Importantly, persisting delirium is not the same as dementia.

Dementia

Dementia is a chronic, progressive decline in brain function. A prominent feature is memory impairment, but dementia also involves deterioration of other cognitive, behavioural and emotional functions. It may be the result of a number of medical conditions, the most common of which is Alzheimer's disease (AD). The symptoms of dementia gradually worsen over a long time, rather than coming on suddenly after an event such as surgery.

For healthy older people, can anaesthesia cause dementia?

One of the features of AD is "plaques" (clumps of proteins) that form in the

brain. A couple of recent studies found that some anaesthetic drugs increased the rate at which plaques form in brain cells in a test tube. However, these laboratory findings may not have any bearing on what happens in a living person undergoing anaesthesia. Also, some of the inhaled anaesthetics investigated are no longer used in Australian hospitals.

These studies do not provide enough evidence to suggest that anaesthesia can cause AD or other dementias. In fact, several studies looking at risk factors for dementia have shown that previous exposure to general anaesthesia is *not* associated with an increased risk of developing dementia.

Instead, people in the very early stages of dementia, as yet undiagnosed and possibly unnoticed, may be more vulnerable to developing post-operative delirium or POCD because of the changes already going on in their brain. They may go on to be diagnosed with dementia at a later stage. It may be that in some cases the trauma of undergoing surgery can expose pre-existing cognitive deterioration, but it does not cause dementia.

For older people who experience post-operative delirium, several studies have shown that they have an increased risk of developing dementia in the following years. However, while the risk may be slightly increased, most people who experience post-operative delirium do not go on to develop dementia.

For people with dementia, can anaesthesia make it worse?

People with dementia are at increased risk of developing delirium, for any reason, not just following surgery. It must be remembered though, that delirium is not a worsening of dementia, it is a separate illness that is transient. It can be longer lasting in

people with dementia and the identification and therefore treatment of the cause can be more difficult.

While there is evidence that for some patients with dementia cognition may be impaired for weeks after surgery due to delirium or POCD, there is little evidence that they are worse off in the long term. When people with dementia are tested 1 to 2 years after having surgery, their cognitive abilities are found to be the same as others with dementia of the same age who did not have surgery. Also, while people with dementia may have an increased risk of POCD or delirium, many patients with dementia will come through their operation experiencing no additional problems at all.

Anaesthetic management is improved if the surgical team is aware that the patient has dementia, so they must be informed. An important factor in post-operative care for patients with dementia is treatment of pain. Although patients with dementia report less pain and are administered fewer painkillers, research shows that the perception and processing of pain are not diminished in people with dementia. It may be that they are less able to effectively communicate their level of pain. As pain is known to increase the risk of delirium, it is important that it is adequately treated.

What causes post-operative cognitive problems?

Many possible causes of POCD or delirium following surgery have been suggested. These include direct effects of anaesthetic drugs on brain function or chemistry, physical effects of anaesthesia leading to altered blood flow and oxygen delivery to the brain, effects from coronary bypass during cardiac surgery, genetic factors, and the stress of undergoing surgery and being hospitalised. At the moment the precise causes of POCD

and post-operative delirium are unknown, and it is likely that there are multiple causes. There is no evidence that general anaesthesia causes post-operative problems at a greater rate than other factors involved in undergoing surgery.

It is known that older people and people with dementia are more susceptible to cognitive problems following surgery. As we age, the structure and chemistry of our brain changes. These changes may mean that the older brain has less reserve to cope with the effects of anaesthesia and is more vulnerable to developing POCD. In AD and other dementias, brain changes are much greater and progress more rapidly. People with dementia therefore have even less cognitive reserve, which may make them further susceptible to POCD or delirium.

Additional factors may predispose an older person to post-operative delirium or cognitive impairment. These include alcohol or drug withdrawal, interactions between anaesthetic drugs and other drugs the patient is taking, physical illness, depression and anxiety, and increased age. It is very important that the surgeon and anaesthetist are made aware of the patient's medical history and any current medications.

Does the type of anaesthetic make a difference?

Some research has compared patients having a general anaesthetic with patients having a regional or local anaesthetic for the same operation. These studies have shown that the number of patients who develop POCD is similar for both types of anaesthetic, but that delirium may be more common after a general anaesthetic. So a general anaesthetic may increase the risk of some post-operative problems. Other studies have looked at different methods of general anaesthesia, using

inhaled versus intravenous anaesthetic drugs for example, and have shown no difference in the incidence of POCD.

What you can do to minimise POCD or delirium

Before surgery

In order to help anaesthetists choose the most appropriate way to treat an individual patient, it is vital that they have accurate and full information. For an older person or person with dementia who may not be able to communicate their medical history, a family member or carer should be involved in the pre-operative assessment. The anaesthetist should be told about any medical problems the patient has now or had in the past, how any previous anaesthetics have affected them, and all medications the patient is currently taking, including those used to treat dementia such as acetylcholinesterase inhibitors.

As far as possible, the patient should be psychologically prepared for the operation. Ask their doctor to talk to them if appropriate, and try to minimise their anxiety.

After surgery

Report any changes in behaviour, concentration, memory or other cognitive functions to medical staff so that they can determine whether any action needs to be taken. Sometimes delirium can be a sign of infection or pain and these need to be treated.

Although it can be difficult in a hospital setting, try to ensure that the environment for the patient during their recovery is as comfortable and familiar as possible. This can help reduce confusion and anxiety.

References

Abildstrom H et al (2000) Cognitive dysfunction 1-2 years after non-cardiac surgery in the elderly. ISPOCD group. International study of post-operative cognitive dysfunction. *Acta Anaesthesiologica Scandinavica*, 44:1246-1251.

Crosby G & Culley DJ (2003) Anesthesia, the aging brain, and the surgical patient. *Canadian Journal of Anesthesia*, 50:R1-R5.

Dodds C & Allison J (1998) Postoperative cognitive deficit in the elderly surgical patient. *British Journal of Anaesthesia*, 81:449-462.

Newman MF et al (2001) Longitudinal assessment of neurocognitive function after coronary-artery bypass surgery. *The New England Journal of Medicine*, 344:395-402.

Newman S et al (2007) Postoperative cognitive dysfunction after noncardiac surgery: a systematic review. *Anesthesiology*, 106:572-590.

Parikh SS & Chung F (1995) Postoperative delirium in the elderly. *Anesthesia and Analgesia*, 80:1223-1232.

Verbogh C (2004) Anaesthesia in patients with dementia. *Current Opinion in Anaesthesiology*, 17:277-283.

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This Update Sheet is provided for your information only, and does not represent an endorsement of any treatment by Alzheimer's Australia.

Further Information

A range of books, videos, Help Sheets and Update Sheets are available through Alzheimer's Australia in your State or Territory by contacting the National Dementia Helpline on 1800 100 500.

Help Sheets and Update Sheets, including any more recent information, can also be obtained on the internet at www.alzheimers.org.au