Carotid Angioplasty and Stenting

Carotid angioplasty and stenting is performed through a groin puncture. Guidewire and catheters then pass through various arteries and reach the carotid artery. A stent is deployed inside the diseased carotid artery and an angioplasty balloon is then inflated to restore the lumen of the artery. Next, the physician places a tiny metal-mesh tube called a stent in the artery to hold it open. The stent will remain inside the carotid artery after the procedure. Carotid angioplasty and stenting does not require neck incisions, making it a better option for patients considered to be at high risk for the surgical endarterectomy procedure.

Carotid Artery Disease – Surgical prevention of stroke

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What are the treatments?

Treatment of carotid artery disease cannot reverse the stroke. However, patients with severe carotid artery narrowing, especially with a history of TIA or stroke have a higher risk of recurrent stroke. Proper treatment reduces the possibility of future strokes. The treatment for carotid artery disease aims to prevent stroke by means of:

1. Control Atherosclerosis
   - Screening for risk factors, optimal treatment of the medical diseases, serum lipid lowering, smoking cessation and weight reduction.

2. Anti-platelet therapy.

Control Local Diseased Carotid Artery through Carotid Endarterectomy & Stenting

Local treatment of the diseased carotid artery is only indicated in some patients. For indicated patients, carotid endarterectomy or carotid angioplasty and stenting will prevent future stroke. In general, those patients with history of TIA or stroke and also severe narrowing of the carotid artery will have the greatest benefit from surgery or intervention.

Stroke is the third common cause of death and the leading cause of disability. With prompt detection, proper medical and surgical treatment, a significant proportion of stroke is preventable.
What is Carotid Artery Disease?

Carotid artery disease occurs when the major arteries in your neck become narrowed or blocked. These arteries, called the carotid arteries, supply your brain with blood. Atherosclerotic plaque deposited over the inner surface of the artery causes narrowing (stenosis) of the vessel. When enough plaque builds up to reduce or disturb blood flow through carotid arteries, this leads to a condition known as carotid artery disease. Carotid artery disease is a serious health problem because it can cause a stroke.

What is Transient Ischaemic Attack (TIA) and Stroke?

Transient Ischaemic Attack (TIA) – it is the blockage of the blood vessel in the brain causing lack of blood supply (ischaemia) to the brain cell for a short period of time. When this occurs, the body will try to correct it by dissolving the obstructed lesion or to dilate another vessel that supplies the same region of the brain with blood so as to prevent permanent brain cell death. If the salvage is successful, the patient will experience temporary neurological symptoms (numbness, tingling sensation or weakness of one side of the body, loss of vision in one eye, one sided facial weakness, speech difficulty etc). The symptoms are usually resolved within 24 hours.

Stroke (ischaemic) – it is the blockage of the blood vessel of the brain and cannot be corrected by the body resulting in permanent brain cell death over certain regions. The symptoms are similar to TIA but they persist beyond 24 hours. Large area stroke could be fatal or severely disabling. Disability after stroke can be improved by rehabilitation exercise as the surrounding viable brain will take over part of the work of the dead brain cells.

How to diagnose Carotid Artery Disease?

1. **Duplex Scan** - An ultrasound scan that can measure the speed of blood flow in the vessel. Duplex carotid scan is a painless, non-invasive investigation that can effectively detect carotid artery disease and assess the severity of the narrowing.

2. **Computer Tomography Angiogram, Magnetic Resonance Angiogram** - These investigations usually serve as second line investigation for planning of treatment.

3. **Carotid Angiogram** - The gold standard to diagnose carotid disease and to measure its severity. It requires puncture of the artery over the groin region and carries a 1% complication rate of causing stroke. Thus carotid angiogram is usually reserved for more complicated situations.

Who is at risk?

Individuals that are prone to atherosclerotic disease are smokers and also patients suffering from diabetes, hypertension, hyperlipidaemia, morbid obesity, coronary artery disease or peripheral artery disease.

Carotid Endarterectomy

This surgical procedure can be performed under general anaesthesia or regional nerve block. The diseased carotid artery is exposed through an incision over the neck. The artery is clamped temporarily and the diseased part is then opened. Atherosclerotic plaque together with the most inner lining of the vessel is removed and the vessel is repaired with or without an additional synthetic patch.

Carotid endarterectomy bears a small risk of stroke during and immediately after the surgery (<6% for patients with previous symptom and <3% for patients without symptom). Other risks include anaesthetic risk and risk of injury to surrounding nerves (2-5%).

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![Carotid Endarterectomy](https://via.placeholder.com/150)

**Illustration:**
- **External carotid artery** (supplies blood to face, scalp and neck)
- **Internal carotid artery** (supplies blood to brain)
- **Right common carotid artery**
- **Brain**
- **Normal blood flow**
- **Reduced blood flow**
- **Plaque narrows artery**
- **Ultrasound wand**
- **Carotid artery**

**Diagram:**
- The diseased carotid artery is exposed through an incision over the neck.
- Atherosclerotic plaque together with the most inner lining of the vessel is removed.